Tantalum Surface Mount Capacitors – Standard Tantalum

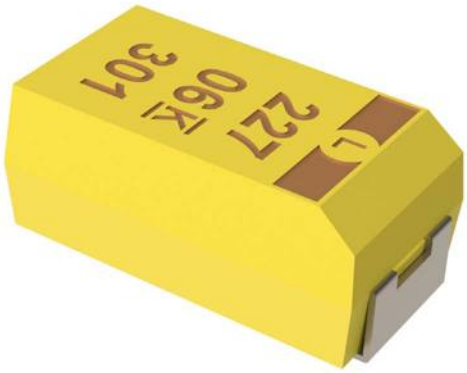
T489 Low DC Leakage MnO_2

Overview

The KEMET T489 provides DC leakage current that is 25% lower than the commercial T491. The T489 also offers improved reliability, low ESR options, and meets or exceeds the requirements of EIA standard 535BAAC. The T489 is classified as moisture sensitivity level (MSL) 1 under J STD 020: unlimited floor life time at ≤ 30°C/85% RH. The T489 standard terminations are available in 100% matte tin and provide excellent wetting characteristics and compatibility with today's surface mount solder systems. Tin/lead (Sn/Pb) terminations are available upon request for any part number. Gold-plated terminations are also available for use with conductive epoxy attachment processes. Standard packaging of these devices is Tape & Reel in accordance with EIA 481. This system provides perfect compatibility with all tape-fed placement units.

Benefits

- DC Leakage at 0.0075 CV
- Improved reliability: 0.50%/1,000 hours, 85°C, rated voltage
- Low ESR options available
- Meets or exceeds EIA standard 535BAAC
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Laser-marked case



Applications

Typical applications include decoupling and filtering, in many high-end applications.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder or gold-plated.

- Halogen-free
- Epoxy compliant with UL94 V–0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	489	B	156	M	016	A	T	E800
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	ESR
T = Tantalum	Low DC Leakage Series	A B C D X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte tin (Sn)-plated H = Standard solder coated (SnPb 5% Pb minimum) G = Gold-plated	E = ESR last three digits specify ESR in mOhms (800 = 800 mOhms)

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.10 – 470 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (±10%), M Tolerance (±20%)
Rated Voltage Range	6.3 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification
ESR (100 kHz)	Refer to Part Number Electrical Specification
Leakage Current	≤ 0.0075 CV (µA) at rated voltage after 5 minutes
Reliability	0.50%/1,000 hours at 85°C, V_R with 0.1 Ω series resistance

Qualification

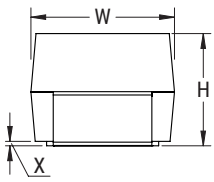
Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55C° to 125° C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak. MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

**IL = Initial limit*

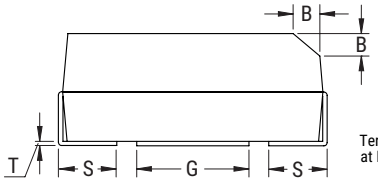
Dimensions – Millimeters (Inches)

Metric will govern

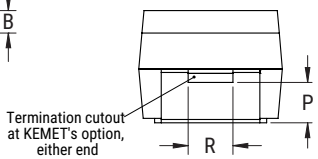
CATHODE (-) END VIEW



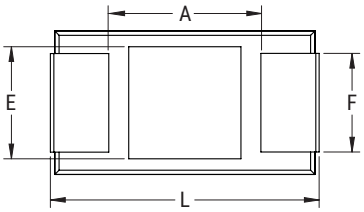
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component												
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S ±0.3 ±(0.012)	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216–18	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	1.2 (0.047)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9±0.2 (0.075±0.008)	2.2 (0.087)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.1 (0.122)	2.8 (0.110)	2.4 (0.094)
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)

Notes: (Ref) – Dimensions provided for reference only.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C
6.3	10	B/3528-21	T489B106(1)006A(2)	0.5	6.0	3000	E3K0			168	N/A	125
6.3	15	A/3216-18	T489A156(1)006A(2)	0.7	6.0	2030	E2K0	1500	E1K5	192	224	125
6.3	22	C/6032-28	T489C226(1)006A(2)	1.0	6.0	2000	E2K0			235	N/A	125
6.3	47	B/3528-21	T489B476(1)006A(2)	2.2	6.0	1620	E1K6	500	E500	229	412	125
6.3	150	B/3528-21	T489B157(1)006A(2)	7.1	15.0	3000	E3K0			168	N/A	125
6.3	100	C/6032-28	T489C107(1)006A(2)	4.7	6.0	440	E440			500	N/A	125
6.3	150	C/6032-28	T489C157(1)006A(2)	7.1	8.0	500	E500	300	E300	469	606	125
6.3	100	D/7343-31	T489D107(1)006A(2)	4.7	8.0	800	E800			433	N/A	125
6.3	150	D/7343-31	T489D157(1)006A(2)	7.1	6.0	400	E400	150	E150	612	1000	125
6.3	220	D/7343-31	T489D227(1)006A(2)	10.4	8.0	360	E360	150	E150	645	1000	125
6.3	470	X/7343-43	T489X477(1)006A(2)	22.2	8.0	250	E250	200	E200	812	908	125
6.3	680	X/7343-43	T489X687(1)006A(2)	32.1	15.0	600	E600			524	N/A	125
10	2.2	A/3216-18	T489A225(1)010A(2)	0.5	6.0	7000	E7K0			104	N/A	125
10	4.7	A/3216-18	T489A475(1)010A(2)	0.5	6.0	2900	E2K9			161	N/A	125
10	6.8	A/3216-18	T489A685(1)010A(2)	0.5	6.0	2650	E2K6			168	N/A	125
10	6.8	B/3528-21	T489B685(1)010A(2)	0.5	6.0	3000	E3K0			168	N/A	125
10	10	A/3216-18	T489A106(1)010A(2)	0.8	6.0	2200	E2K2	1800	E1K8	185	204	125
10	15	B/3528-21	T489B156(1)010A(2)	1.1	6.0	2030	E2K0			205	N/A	125
10	15	C/6032-28	T489C156(1)010A(2)	1.1	6.0	2000	E2K0			235	N/A	125
10	22	B/3528-21	T489B226(1)010A(2)	1.7	6.0	1880	E1K8	700	E700	213	348	125
10	33	B/3528-21	T489B336(1)010A(2)	2.5	6.0	1000	E1K0	650	E650	292	362	125
10	33	C/6032-28	T489C336(1)010A(2)	2.5	6.0	590	E590			432	N/A	125
10	33	D/7343-31	T489D336(1)010A(2)	2.5	6.0	1100	E1K1			369	N/A	125
10	47	C/6032-28	T489C476(1)010A(2)	3.5	6.0	540	E540			451	N/A	125
10	47	D/7343-31	T489D476(1)010A(2)	3.5	6.0	400	E400			612	N/A	125
10	68	C/6032-28	T489C686(1)010A(2)	5.1	6.0	490	E490			474	N/A	125
10	100	C/6032-28	T489C107(1)010A(2)	7.5	8.0	500	E500			469	N/A	125
10	100	D/7343-31	T489D107(1)010A(2)	7.5	6.0	440	E440	150	E150	584	1000	125
10	150	D/7343-31	T489D157(1)010A(2)	11.3	8.0	400	E400	150	E150	612	1000	125
10	220	D/7343-31	T489D227(1)010A(2)	16.5	8.0	500	E500			548	N/A	125
10	330	X/7343-43	T489X337(1)010A(2)	24.8	8.0	300	E300	100	E100	742	1285	125
16	1	A/3216-18	T489A105(1)016A(2)	0.5	6.0	10000	E10K			87	N/A	125
16	2.2	A/3216-18	T489A225(1)016A(2)	0.5	6.0	4550	E4K5	3500	E3K5	128	146	125
16	3.3	B/3528-21	T489B335(1)016A(2)	0.5	6.0	4500	E4K5			137	N/A	125
16	4.7	B/3528-21	T489B475(1)016A(2)	0.6	6.0	3160	E3K1			164	N/A	125
16	6.8	B/3528-21	T489B685(1)016A(2)	0.8	6.0	2650	E2K6			179	N/A	125
16	6.8	C/6032-28	T489C685(1)016A(2)	0.8	6.0	2500	E2K5			210	N/A	125
16	10	B/3528-21	T489B106(1)016A(2)	1.2	6.0	2200	E2K2			197	N/A	125
16	10	C/6032-28	T489C106(1)016A(2)	1.2	6.0	2000	E2K0			235	N/A	125
16	15	B/3528-21	T489B156(1)016A(2)	1.8	6.0	2030	E2K0	800	E800	205	326	125
16	22	B/3528-21	T489B226(1)016A(2)	2.6	6.0	1100	E1K1	600	E600	278	376	125
16	22	C/6032-28	T489C226(1)016A(2)	2.6	6.0	700	E700	350	E350	396	561	125
16	22	D/7343-31	T489D226(1)016A(2)	2.6	6.0	1100	E1K1			369	N/A	125
16	33	C/6032-28	T489C336(1)016A(2)	4.0	6.0	590	E590			432	N/A	125
16	47	C/6032-28	T489C476(1)016A(2)	5.6	6.0	540	E540	350	E350	451	561	125
16	47	D/7343-31	T489D476(1)016A(2)	5.6	6.0	540	E540	200	E200	527	866	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C
16	68	D/7343-31	T489D686(1)016A(2)	8.2	6.0	490	E490	150	E150	553	1000	125
16	100	C/6032-28	T489C107(1)016A(2)	12.0	10.0	1000	E1K0			332	N/A	125
16	100	D/7343-31	T489D107(1)016A(2)	12.0	6.0	440	E440	150	E150	584	1000	125
16	150	D/7343-31	T489D157(1)016A(2)	18.0	12.0	700	E700			463	N/A	125
20	1	A/3216-18	T489A105(1)020A(2)	0.5	4.0	6630	E6K6			106	N/A	125
20	1.5	A/3216-18	T489A155(1)020A(2)	0.5	6.0	5460	E5K4			117	N/A	125
20	2.2	A/3216-18	T489A225(1)020A(2)	0.5	6.0	4550	E4K5			128	N/A	125
20	3.3	A/3216-18	T489A335(1)020A(2)	0.5	6.0	3740	E3K7	3500	E3K5	142	146	125
20	3.3	B/3528-21	T489B335(1)020A(2)	0.5	6.0	3740	E3K7			151	N/A	125
20	4.7	B/3528-21	T489B475(1)020A(2)	0.7	6.0	3160	E3K1			164	N/A	125
20	6.8	B/3528-21	T489B685(1)020A(2)	1.0	6.0	2650	E2K6			179	N/A	125
20	6.8	C/6032-28	T489C685(1)020A(2)	1.0	6.0	2000	E2K0			235	N/A	125
20	10	B/3528-21	T489B106(1)020A(2)	1.5	6.0	2200	E2K2	1000	E1K0	197	292	125
20	10	C/6032-28	T489C106(1)020A(2)	1.5	6.0	800	E800	500	E500	371	469	125
20	15	C/6032-28	T489C156(1)020A(2)	2.3	6.0	720	E720	400	E400	391	524	125
20	15	D/7343-31	T489D156(1)020A(2)	2.3	6.0	1100	E1K1			369	N/A	125
20	22	D/7343-31	T489D226(1)020A(2)	3.3	6.0	650	E650	300	E300	481	707	125
20	33	C/6032-28	T489C336(1)020A(2)	5.0	6.0	590	E590	300	E300	432	606	125
20	33	D/7343-31	T489D336(1)020A(2)	5.0	6.0	590	E590	250	E250	504	775	125
20	47	D/7343-31	T489D476(1)020A(2)	7.1	6.0	540	E540	200	E200	527	866	125
20	68	C/6032-28	T489C686(1)020A(2)	10.2	8.0	500	E500			469	N/A	125
20	68	D/7343-31	T489D686(1)020A(2)	10.2	6.0	490	E490	200	E200	553	866	125
20	100	X/7343-43	T489X107(1)020A(2)	15.0	6.0	300	E300	150	E150	742	1049	125
25	0.47	A/3216-18	T489A474(1)025A(2)	0.5	4.0	9530	E9K5	7000	E7K0	89	104	125
25	0.68	A/3216-18	T489A684(1)025A(2)	0.5	4.0	7980	E7K9			97	N/A	125
25	1	A/3216-18	T489A105(1)025A(2)	0.5	4.0	6630	E6K6			106	N/A	125
25	2.2	B/3528-21	T489B225(1)025A(2)	0.5	6.0	4550	E4K5			137	N/A	125
25	3.3	B/3528-21	T489B335(1)025A(2)	0.6	6.0	3740	E3K7	2000	E2K0	151	206	125
25	4.7	B/3528-21	T489B475(1)025A(2)	0.9	6.0	3160	E3K1	1000	E1K0	164	292	125
25	6.8	B/3528-21	T489B685(1)025A(2)	1.3	6.0	1500	E1K5	1000	E1K0	238	292	125
25	6.8	C/6032-28	T489C685(1)025A(2)	1.3	6.0	1070	E1K0	600	E600	321	428	125
25	10	C/6032-28	T489C106(1)025A(2)	1.9	6.0	800	E800	600	E600	371	428	125
25	10	D/7343-31	T489D106(1)025A(2)	1.9	6.0	1200	E1K2			354	N/A	125
25	15	C/6032-28	T489C156(1)025A(2)	2.8	6.0	720	E720			391	N/A	125
25	15	D/7343-31	T489D156(1)025A(2)	2.8	6.0	720	E720	300	E300	456	707	125
25	22	D/7343-31	T489D226(1)025A(2)	4.1	6.0	650	E650	300	E300	481	707	125
25	33	D/7343-31	T489D336(1)025A(2)	6.2	6.0	590	E590	400	E400	504	612	125
25	47	D/7343-31	T489D476(1)025A(2)	8.8	6.0	540	E540	250	E250	527	775	125
35	0.1	A/3216-18	T489A104(1)035A(2)	0.5	4.0	20000	E20K			61	N/A	125
35	0.22	A/3216-18	T489A224(1)035A(2)	0.5	4.0	13710	E13K			74	N/A	125
35	0.33	A/3216-18	T489A334(1)035A(2)	0.5	4.0	11280	E11K			82	N/A	125
35	1	A/3216-18	T489A105(1)035A(2)	0.5	4.0	6630	E6K6	3000	E3K0	106	158	125
35	1	B/3528-21	T489B105(1)035A(2)	0.5	4.0	3400	E3K4	2000	E2K0	158	206	125
35	1.5	B/3528-21	T489B155(1)035A(2)	0.5	6.0	5460	E5K4	2500	E2K5	125	184	125
35	2.2	B/3528-21	T489B225(1)035A(2)	0.6	6.0	4550	E4K5	2000	E2K0	137	206	125
35	3.3	B/3528-21	T489B335(1)035A(2)	0.9	6.0	3740	E3K7			151	N/A	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

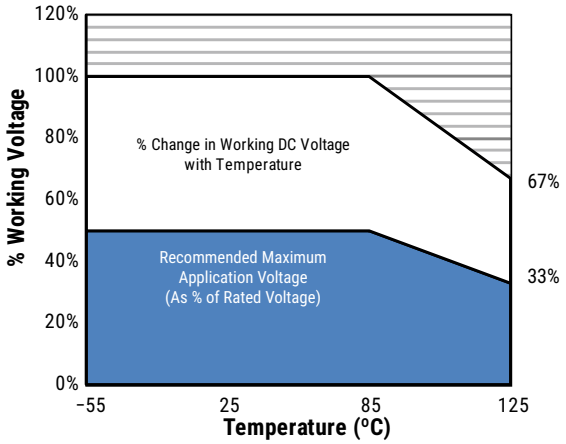
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C
35	3.3	C/6032-28	T489C335(1)035A(2)	0.9	6.0	1840	E1K8	800	E800	245	371	125
35	4.7	C/6032-28	T489C475(1)035A(2)	1.2	6.0	1410	E1K4	600	E600	279	428	125
35	4.7	D/7343-31	T489D475(1)035A(2)	1.2	6.0	1500	E1K5			316	N/A	125
35	6.8	C/6032-28	T489C685(1)035A(2)	1.8	6.0	1070	E1K0	600	E600	321	428	125
35	6.8	D/7343-31	T489D685(1)035A(2)	1.8	6.0	1300	E1K3			340	N/A	125
35	10	C/6032-28	T489C106(1)035A(2)	2.6	6.0	800	E800	600	E600	371	428	125
35	10	D/7343-31	T489D106(1)035A(2)	2.6	6.0	800	E800	400	E400	433	612	125
35	15	D/7343-31	T489D156(1)035A(2)	3.9	6.0	720	E720	350	E350	456	655	125
35	22	D/7343-31	T489D226(1)035A(2)	5.8	6.0	650	E650	300	E300	481	707	125
50	0.22	A/3216-18	T489A224(1)050A(2)	0.5	4.0	7500	E7K5	7000	E7K0	100	104	125
50	0.33	A/3216-18	T489A334(1)050A(2)	0.5	4.0	7000	E7K0			104	N/A	125
50	0.68	B/3528-21	T489B684(1)050A(2)	0.5	4.0	4000	E4K0	2000	E2K0	146	206	125
50	1	C/6032-28	T489C105(1)050A(2)	0.5	4.0	3000	E3K0			191	N/A	125
50	1.5	C/6032-28	T489C155(1)050A(2)	0.6	6.0	2500	E2K5	1500	E1K5	210	271	125
50	2.2	C/6032-28	T489C225(1)050A(2)	0.8	6.0	1700	E1K7	1000	E1K0	321	332	125
50	2.2	D/7343-31	T489D225(1)050A(2)	0.8	4.5	2000	E2K0	1200	E1K2	274	354	125
50	3.3	D/7343-31	T489D335(1)050A(2)	1.2	4.5	1100	E1K1	800	E800	369	433	125
50	4.7	D/7343-31	T489D475(1)050A(2)	1.8	4.5	900	E900	600	E600	408	500	125
50	6.8	D/7343-31	T489D685(1)050A(2)	2.6	4.5	700	E700			463	N/A	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mΩ at +25°C 100 kHz Maximum	E-Spec Code	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	67% of V_R
Recommended maximum application voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

KEMET Series and Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C with +20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
Pmax = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

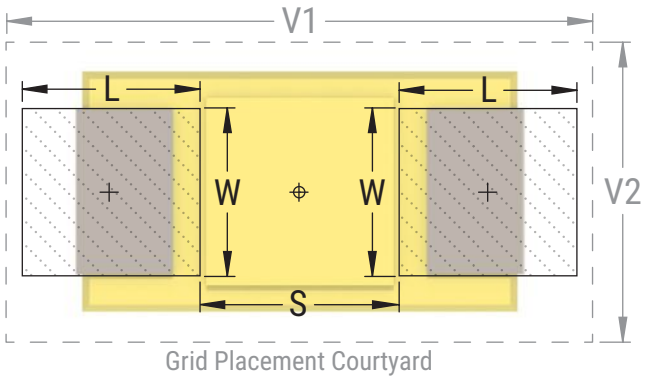
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

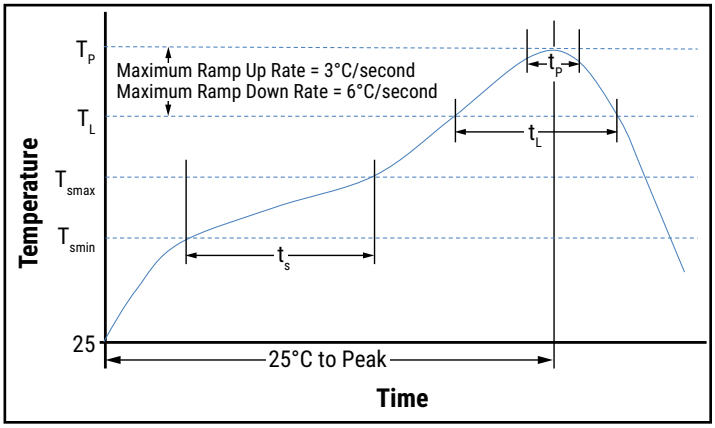
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

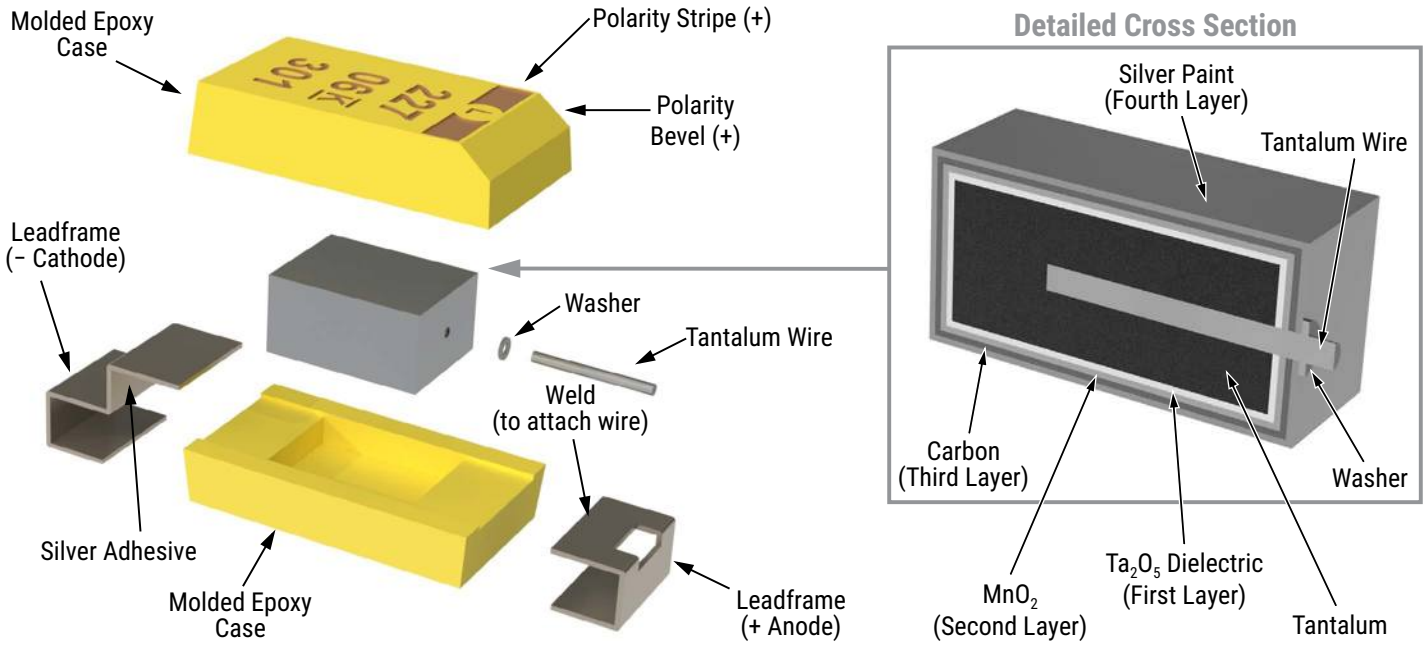
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



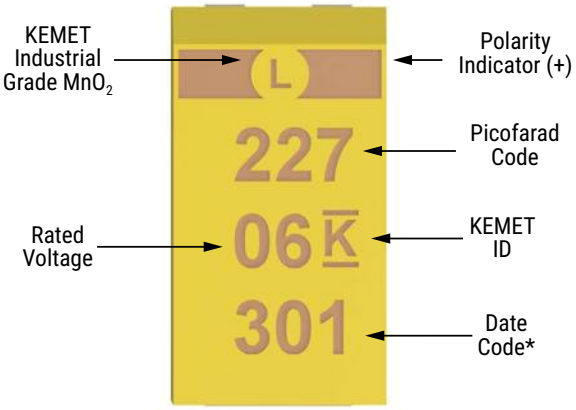
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = last number of year	0 = 2020 1 = 2021 2 = 2022 3 = 2023 4 = 2024
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

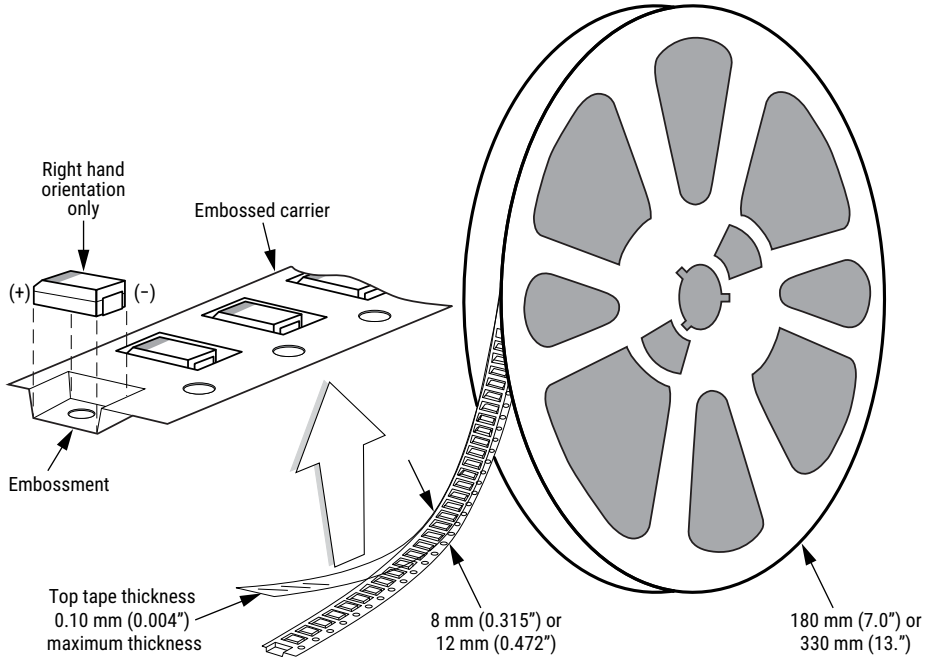


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

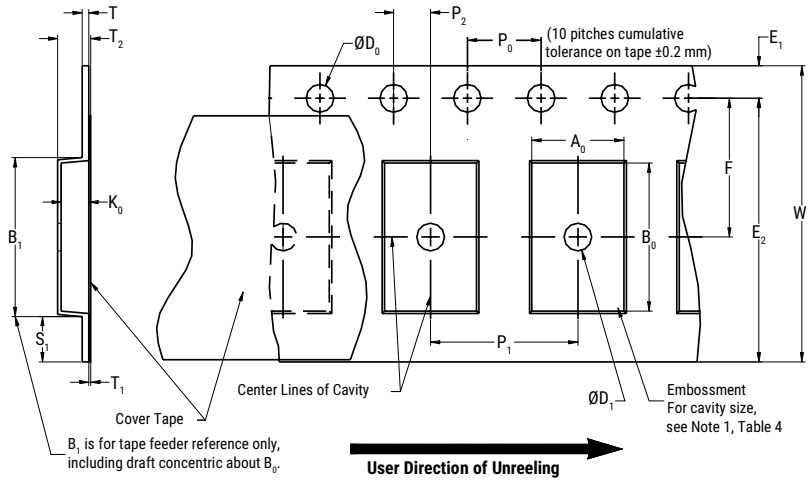


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

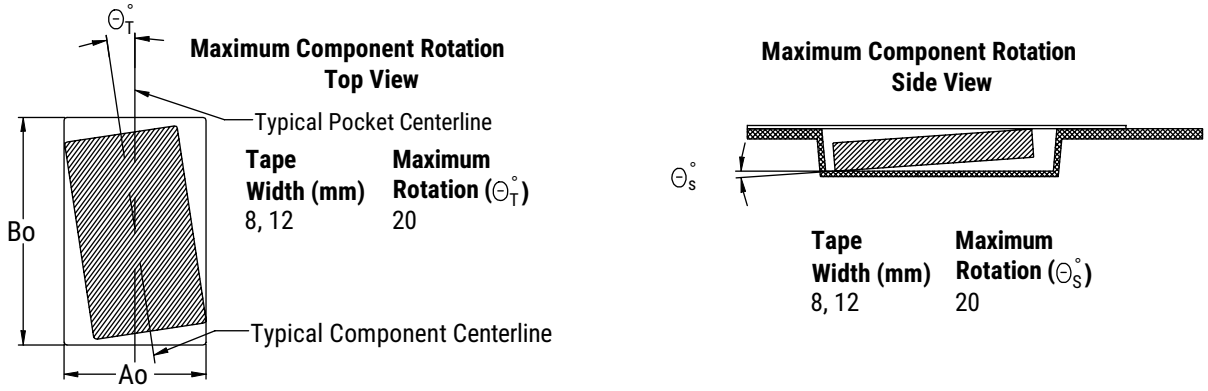


Figure 3 – Maximum Lateral Movement

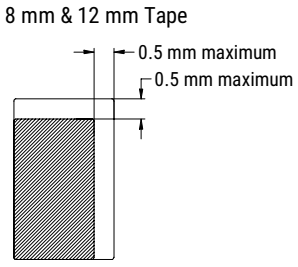


Figure 4 – Bending Radius

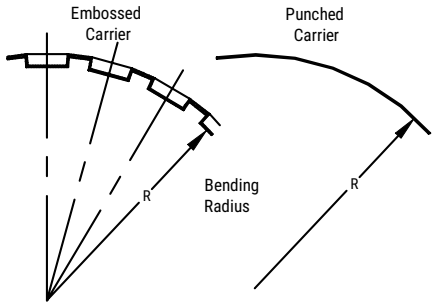
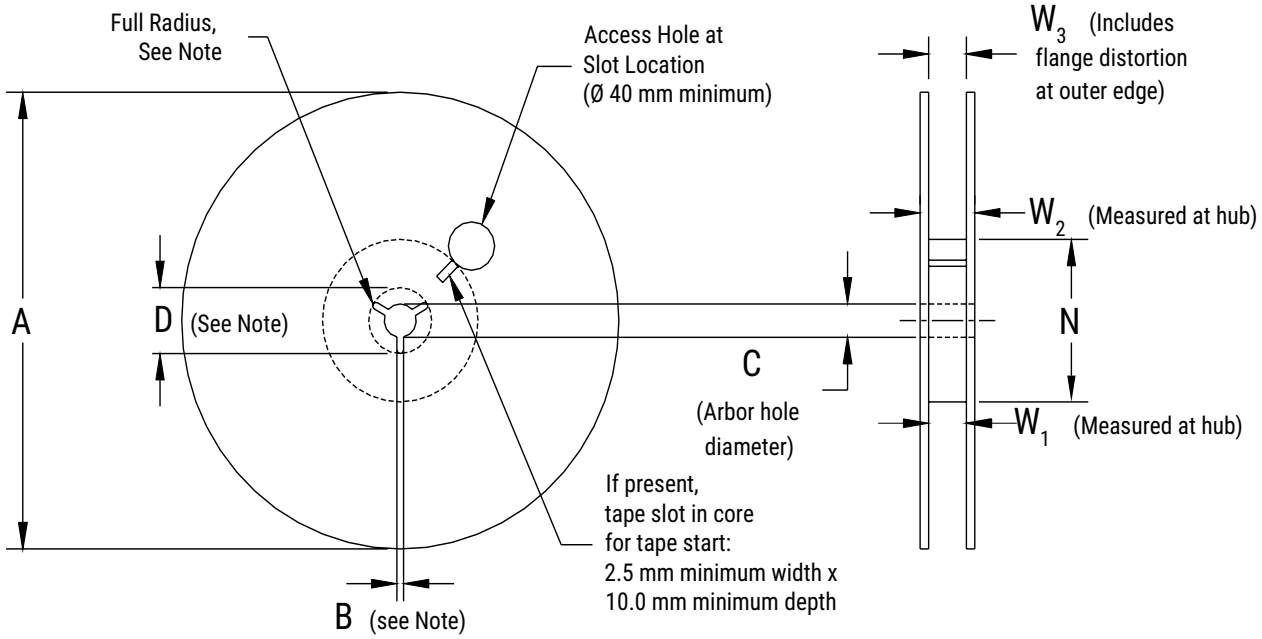


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

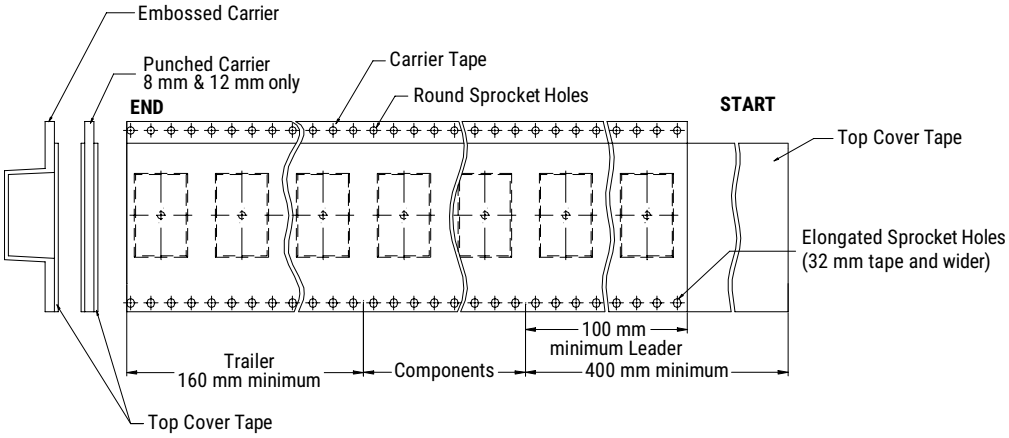
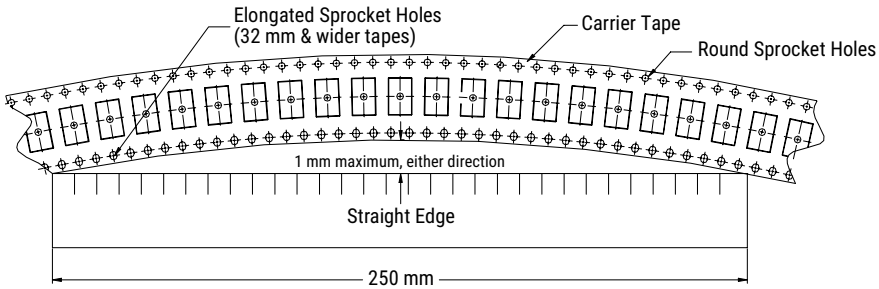


Figure 7 – Maximum Camber



Tantalum Surface Mount Capacitors – MIL-PRF (CWR Style)

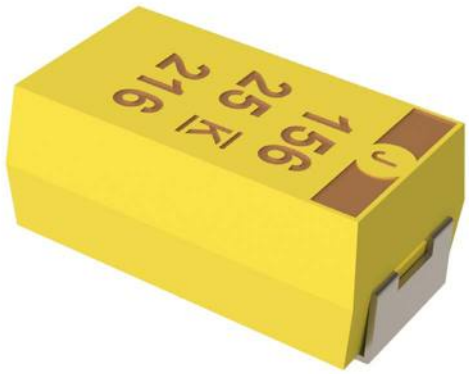
T409 MIL-PRF-55365/4 (CWR09 Style)

Overview

The KEMET T409 is approved to MIL-PRF-55365/4 (CWR09 Style) with Weibull failure rates of B level (0.1% failures per 1,000 hours), C level (0.01% failures per 1,000 hours), D level (0.001% failures per 1,000 hours), or T level (0.01% failures per 1,000 hours, option C surge current, DPA, radiographic inspection, 100% visual inspection, DCL and ESR measurements within +3 standard deviations, and Group C inspection). This CWR09 product is a precision-molded device, with compliant terminations and indelible laser marking. Tape & Reel packaging per EIA 481 are standard.

Benefits

- Established reliability options
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Qualified to MIL-PRF-55365/4 (CWR09 Style)
- Termination options B, C, H, and K
- Weibull failure options B, C, D, and T
- Exponential failure rates M, P, R, and S
- Voltage rating of 4 – 50 VDC
- Operating temperature range of −55°C to +125°C



Applications

Typical applications include decoupling and filtering in military and aerospace applications requiring CWR09 devices.

Environmental Compliance

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

KEMET Ordering Information

T	409	A	225	K	004	A	H	4252	7280
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Design	Termination Finish	Surge (10 cycles)	Packaging (C-Spec)
T = Tantalum	CWR 09 Established reliability	A B C D E F G H	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	004 = 4 006 = 6 010 = 10 015 = 15 020 = 20 025 = 25 035 = 35 050 = 50	Weibull A = Non-ER B = (0.1%/1,000 hours) C = (0.01%/1,000 hours) D = (0.001%/1,000 hours) T = T Level* (0.01%/1,000 hours) Exponential M = (1.0%/1,000 hours) P = (0.1%/1,000 hours) R = (0.01%/1,000 hours) S = (0.001%/1,000 hours)	C = Hot solder dipped H = Standard solder-coated (SnPb 5% Pb minimum) B = Gold-plated K = Solder-fused	4250 = 25°C after Weibull 4251 = −55°C and 85°C after Weibull 4252 = −55°C and 85°C before Weibull TLVL = −55°C and 85°C before Weibull, Weibull grade level "T"	Blank = 7" Reel 7280 = 13" Reel 7611 = Bulk bag 7640 = Bulk plastic box WAFL = Waffle pack

Ordering Information – Defense MIL-PRF-55365/4

CWR09	J	H	105	K	C	A
Capacitor Style	Rated Voltage (VDC)	Termination Finish	Capacitance Code (pF)	Capacitance Tolerance	Reliability Level	Surge Current Option** (10 cylces)
Per MIL-PRF-55365/4	C = 4 D = 6 F = 10 H = 15 J = 20 K = 25 M = 35 N = 50	B = Gold-plated C = Hot solder dipped H = Solder-plated K = Solder fused	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	Weibull A = non-ER B = (0.1%/1,000 hours) C = (0.01%/1,000 hours) D = (0.001%/1,000 hours) T = T Level* (0.01%/1,000 hours) Exponential M = (1.0%/1,000 hours) P = (0.1%/1,000 hours) R = (0.01%/1,000 hours) S = (0.001%/1,000 hours)	A = +25°C after Weibull B = −55°C +85°C after Weibull C = −55°C +85°C before Weibull Blank = No surge

** When T Level is ordered, Surge Current option C must be selected.*
*** For additional surge current details, please refer to MIL-PRF-55665*

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 100 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL-STD-202, Method 107, condition B, mounted, −55C° to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +125°C, +25°C			+25°C	−55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±15%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL-STD-202, Method 213, Condition I, 100 G peak MIL-STD-202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Additional qualification tests per MIL-PRF-55365/4	Please contact KEMET for more information.					

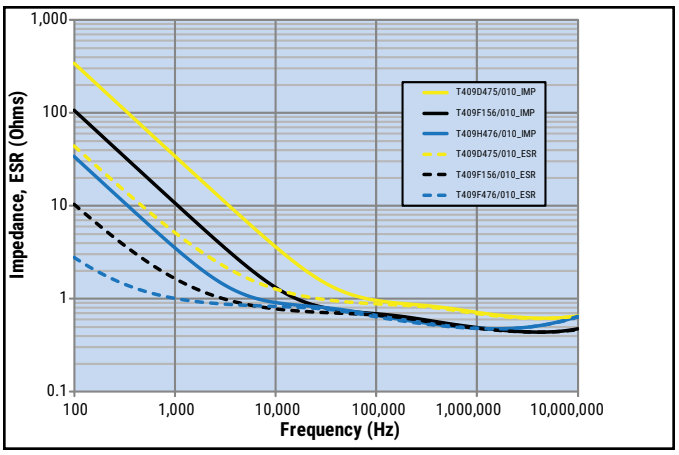
**IL = Initial limit*

Certification

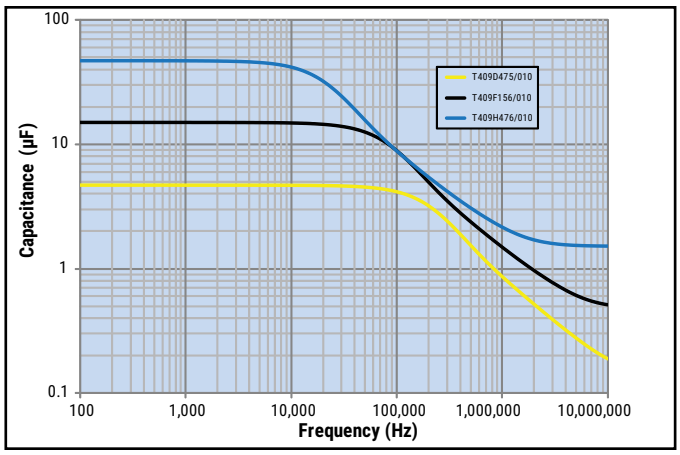
MIL-PRF-55365/4

Electrical Characteristics

ESR vs. Frequency

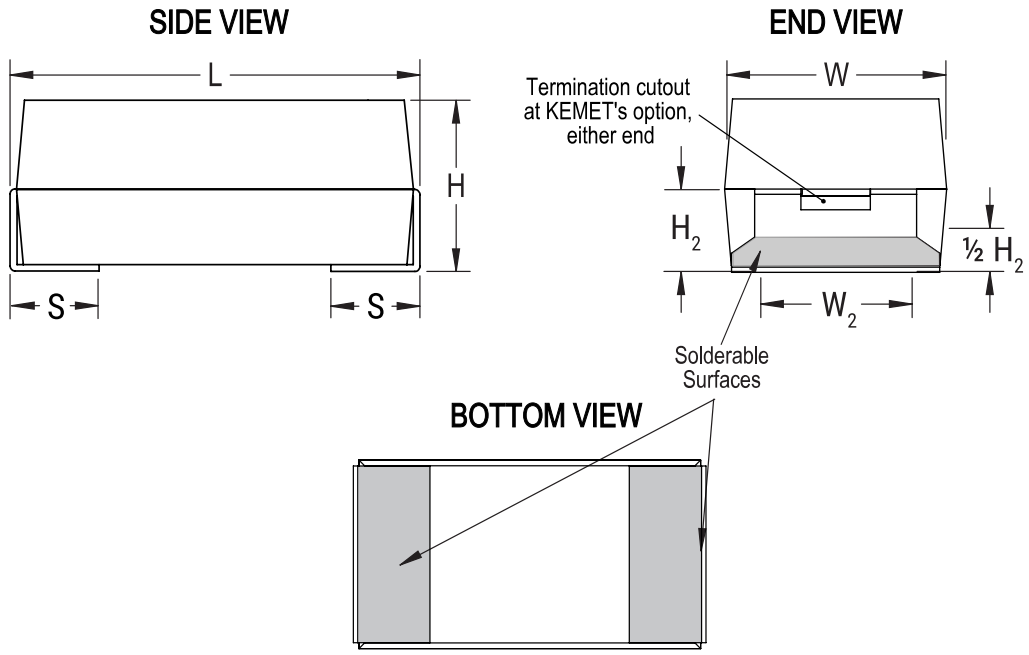


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size	Component						Typical Weight
KEMET	L ±0.38 (0.015)	W ±0.38 (0.015)	H ±0.38 (0.015)	P +0.25 (0.010), −0.13 (0.005)	W_2	H_2 Minimum	(mg)
A	2.54 (0.100)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)	39.91
B	3.81 (0.150)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)	68.73
C	5.08 (0.200)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)	146.5
D	3.81 (0.150)	2.54 (0.100)	1.27 (0.050)	0.76 (0.030)	2.41 +0.13,−0.25 (0.095 +0.005,−0.010)	0.76 (0.030)	264.12
E	5.08 (0.200)	2.54 (0.100)	1.27 (0.050)	0.76 (0.030)	2.41 +0.13,−0.25 (0.095 +0.005,−0.010)	0.76 (0.030)	421.63
F	5.59 (0.220)	3.43 (0.135)	1.78 (0.070)	0.76 (0.030)	3.30 ±0.13 (0.130 ±0.005)	1.02 (0.040)	173.63
G	6.73 (0.265)	2.79 (0.110)	2.79 (0.110)	1.27 (0.050)	2.67 ±0.13 (0.105 ±0.005)	1.52 (0.060)	266.42
H	7.24 (0.285)	3.81 (0.150)	2.79 (0.110)	1.27 (0.050)	3.68 +0.013,−0.51 (0.145 +0.005,−0.020)	1.52 (0.060)	349.01

Note: When option C is selected for lead material, add an additional 0.38 mm (0.015 inch) to the above tolerances for "L", "W", "H", "P", "W_2," and "H_2." These weights are provided as reference. If exact weights are needed, please contact your KEMET sales representative.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/4 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Maximum/5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	2.2	A/1005	T409A225(1)004(2)(3)(4)	CWR09C(3)225(1)(2)(5)	1	6.0	8.0	79	125	1
4	4.7	B/1505	T409B475(1)004(2)(3)(4)	CWR09C(3)475(1)(2)(5)	1.0	6.0	8.0	94	125	1
4	6.8	C/2005	T409C685(1)004(2)(3)(4)	CWR09C(3)685(1)(2)(5)	1.0	6.0	5.5	117	125	1
4	10	D/1510	T409D106(1)004(2)(3)(4)	CWR09C(3)106(1)(2)(5)	1.0	8.0	4.0	141	125	1
4	15	E/2010	T409E156(1)004(2)(3)(4)	CWR09C(3)156(1)(2)(5)	1.0	8.0	3.5	160	125	1
4	33	F/2214	T409F336(1)004(2)(3)(4)	CWR09C(3)336(1)(2)(5)	2.0	8.0	2.2	213	125	1
4	68	G/2711	T409G686(1)004(2)(3)(4)	CWR09C(3)686(1)(2)(5)	3.0	10.0	1.1	337	125	1
4	100	H/2915	T409H107(1)004(2)(3)(4)	CWR09C(3)107(1)(2)(5)	4.0	10.0	0.9	408	125	1
6	1.5	A/1005	T409A155(1)006(2)(3)(4)	CWR09D(3)155(1)(2)(5)	1.0	6.0	8.0	79	125	1
6	3.3	B/1505	T409B335(1)006(2)(3)(4)	CWR09D(3)335(1)(2)(5)	1.0	6.0	8.0	94	125	1
6	4.7	C/2005	T409C475(1)006(2)(3)(4)	CWR09D(3)475(1)(2)(5)	1.0	6.0	5.5	117	125	1
6	6.8	D/1510	T409D685(1)006(2)(3)(4)	CWR09D(3)685(1)(2)(5)	1.0	6.0	4.5	133	125	1
6	10	E/2010	T409E106(1)006(2)(3)(4)	CWR09D(3)106(1)(2)(5)	1.0	8.0	3.5	160	125	1
6	22	F/2214	T409F226(1)006(2)(3)(4)	CWR09D(3)226(1)(2)(5)	2.0	8.0	2.2	213	125	1
6	47	G/2711	T409G476(1)006(2)(3)(4)	CWR09D(3)476(1)(2)(5)	3.0	10.0	1.1	337	125	1
6	68	H/2915	T409H686(1)006(2)(3)(4)	CWR09D(3)686(1)(2)(5)	4.0	10.0	0.9	408	125	1
10	1	A/1005	T409A105(1)010(2)(3)(4)	CWR09F(3)105(1)(2)(5)	1.0	6.0	10.0	71	125	1
10	2.2	B/1505	T409B225(1)010(2)(3)(4)	CWR09F(3)225(1)(2)(5)	1.0	6.0	8.0	94	125	1
10	3.3	C/2005	T409C335(1)010(2)(3)(4)	CWR09F(3)335(1)(2)(5)	1.0	6.0	5.5	117	125	1
10	4.7	D/1510	T409D475(1)010(2)(3)(4)	CWR09F(3)475(1)(2)(5)	1.0	6.0	4.5	133	125	1
10	6.8	E/2010	T409E685(1)010(2)(3)(4)	CWR09F(3)685(1)(2)(5)	1.0	6.0	3.5	160	125	1
10	15	F/2214	T409F156(1)010(2)(3)(4)	CWR09F(3)156(1)(2)(5)	2.0	8.0	2.5	200	125	1
10	33	G/2711	T409G336(1)010(2)(3)(4)	CWR09F(3)336(1)(2)(5)	3.0	10.0	1.1	337	125	1
10	47	H/2915	T409H476(1)010(2)(3)(4)	CWR09F(3)476(1)(2)(5)	5.0	10.0	0.9	408	125	1
15	0.68	A/1005	T409A684(1)015(2)(3)(4)	CWR09H(3)684(1)(2)(5)	1.0	6.0	12.0	65	125	1
15	1.5	B/1505	T409B155(1)015(2)(3)(4)	CWR09H(3)155(1)(2)(5)	1.0	6.0	8.0	94	125	1
15	2.2	C/2005	T409C225(1)015(2)(3)(4)	CWR09H(3)225(1)(2)(5)	1.0	6.0	5.5	117	125	1
15	3.3	D/1510	T409D335(1)015(2)(3)(4)	CWR09H(3)335(1)(2)(5)	1.0	6.0	5.0	126	125	1
15	4.7	E/2010	T409E475(1)015(2)(3)(4)	CWR09H(3)475(1)(2)(5)	1.0	6.0	4.0	150	125	1
15	10	F/2214	T409F106(1)015(2)(3)(4)	CWR09H(3)106(1)(2)(5)	2.0	6.0	2.5	200	125	1
15	22	G/2711	T409G226(1)015(2)(3)(4)	CWR09H(3)226(1)(2)(5)	4.0	6.0	1.1	337	125	1
15	33	H/2915	T409H336(1)015(2)(3)(4)	CWR09H(3)336(1)(2)(5)	5.0	8.0	0.9	408	125	1
20	0.47	A/1005	T409A474(1)020(2)(3)(4)	CWR09J(3)474(1)(2)(5)	1.0	8.0	14.0	60	125	1
20	0.68	B/1505	T409B684(1)020(2)(3)(4)	CWR09J(3)684(1)(2)(5)	1.0	6.0	10.0	84	125	1
20	1	B/1505	T409B105(1)020(2)(3)(4)	CWR09J(3)105(1)(2)(5)	1.0	6.0	12.0	76	125	1
20	1.5	C/2005	T409C155(1)020(2)(3)(4)	CWR09J(3)155(1)(2)(5)	1.0	6.0	6.0	112	125	1
20	2.2	D/1510	T409D225(1)020(2)(3)(4)	CWR09J(3)225(1)(2)(5)	1.0	6.0	5.0	126	125	1
20	3.3	E/2010	T409E335(1)020(2)(3)(4)	CWR09J(3)335(1)(2)(5)	1.0	6.0	4.0	150	125	1
20	6.8	F/2214	T409F685(1)020(2)(3)(4)	CWR09J(3)685(1)(2)(5)	2.0	6.0	2.4	204	125	1
20	15	G/2711	T409G156(1)020(2)(3)(4)	CWR09J(3)156(1)(2)(5)	3.0	6.0	1.1	337	125	1
20	22	H/2915	T409H226(1)020(2)(3)(4)	CWR09J(3)226(1)(2)(5)	4.0	6.0	0.9	408	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Maximum/5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/4 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET/CWR part number, insert M for ±20%, K for ±10%, or J for ±5%. Designates Capacitance Tolerance.
(2) To complete KEMET/CWR part number, insert failure rate letter per the Ordering Information found on page 2. Designates Reliability Level.
(3) To complete KEMET/CWR part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder-plated or K = Solder fused. Designates termination finish.
(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = −55°C +85°C after Weibull, or 4252 = −55°C +85°C before Weibull. Designates Surge Current Option.
(5) To complete CWR part number, insert A = +25°C after Weibull, B = −55°C +85°C after Weibull, or C = −55°C +85°C before Weibull. Designates surge current option. Refer to Ordering Information for additional detail.

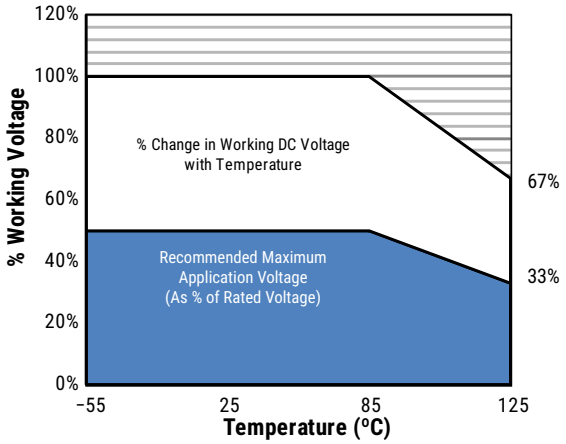
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/4 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Maximum/5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
25	0.33	A/1005	T409A334(1)025(2)(3)(4)	CWR09K(3)334(1)(2)(5)	1.0	6.0	15.0	58	125	1
25	0.68	B/1505	T409B684(1)025(2)(3)(4)	CWR09K(3)684(1)(2)(5)	1.0	6.0	7.5	97	125	1
25	1	C/2005	T409C105(1)025(2)(3)(4)	CWR09K(3)105(1)(2)(5)	1.0	6.0	6.5	107	125	1
25	1.5	D/1510	T409D155(1)025(2)(3)(4)	CWR09K(3)155(1)(2)(5)	1.0	6.0	6.5	111	125	1
25	2.2	E/2010	T409E225(1)025(2)(3)(4)	CWR09K(3)225(1)(2)(5)	1.0	6.0	3.5	160	125	1
25	4.7	F/2214	T409F475(1)025(2)(3)(4)	CWR09K(3)475(1)(2)(5)	2.0	6.0	2.5	200	125	1
25	6.8	G/2711	T409G685(1)025(2)(3)(4)	CWR09K(3)685(1)(2)(5)	2.0	6.0	1.2	323	125	1
25	10	G/2711	T409G106(1)025(2)(3)(4)	CWR09K(3)106(1)(2)(5)	3.0	6.0	1.4	299	125	1
25	15	H/2915	T409H156(1)025(2)(3)(4)	CWR09K(3)156(1)(2)(5)	4.0	6.0	1.0	387	125	1
35	0.22	A/1005	T409A224(1)035(2)(3)(4)	CWR09M(3)224(1)(2)(5)	1.0	6.0	18.0	53	125	1
35	0.47	B/1505	T409B474(1)035(2)(3)(4)	CWR09M(3)474(1)(2)(5)	1.0	6.0	10.0	84	125	1
35	0.68	C/2005	T409C684(1)035(2)(3)(4)	CWR09M(3)684(1)(2)(5)	1.0	6.0	8.0	97	125	1
35	1	D/1510	T409D105(1)035(2)(3)(4)	CWR09M(3)105(1)(2)(5)	1.0	6.0	6.5	111	125	1
35	1.5	E/2010	T409E155(1)035(2)(3)(4)	CWR09M(3)155(1)(2)(5)	1.0	6.0	4.5	141	125	1
35	3.3	F/2214	T409F335(1)035(2)(3)(4)	CWR09M(3)335(1)(2)(5)	1.0	6.0	2.5	200	125	1
35	4.7	G/2711	T409G475(1)035(2)(3)(4)	CWR09M(3)475(1)(2)(5)	2.0	6.0	1.5	289	125	1
35	6.8	H/2915	T409H685(1)035(2)(3)(4)	CWR09M(3)685(1)(2)(5)	3.0	6.0	1.3	340	125	1
50	0.1	A/1005	T409A104(1)050(2)(3)(4)	CWR09N(3)104(1)(2)(5)	1.0	6.0	22.0	48	125	1
50	0.15	A/1005	T409A154(1)050(2)(3)(4)	CWR09N(3)154(1)(2)(5)	1.0	6.0	17.0	54	125	1
50	0.22	B/1505	T409B224(1)050(2)(3)(4)	CWR09N(3)224(1)(2)(5)	1.0	6.0	14.0	71	125	1
50	0.33	B/1505	T409B334(1)050(2)(3)(4)	CWR09N(3)334(1)(2)(5)	1.0	6.0	12.0	76	125	1
50	0.47	C/2005	T409C474(1)050(2)(3)(4)	CWR09N(3)474(1)(2)(5)	1.0	6.0	8.0	97	125	1
50	0.68	D/1510	T409D684(1)050(2)(3)(4)	CWR09N(3)684(1)(2)(5)	1.0	6.0	7.0	107	125	1
50	1	E/2010	T409E105(1)050(2)(3)(4)	CWR09N(3)105(1)(2)(5)	1.0	6.0	6.0	122	125	1
50	1.5	F/2214	T409F155(1)050(2)(3)(4)	CWR09N(3)155(1)(2)(5)	1.0	6.0	4.0	158	125	1
50	2.2	F/2214	T409F225(1)050(2)(3)(4)	CWR09N(3)225(1)(2)(5)	2.0	6.0	2.5	200	125	1
50	3.3	G/2711	T409G335(1)050(2)(3)(4)	CWR09N(3)335(1)(2)(5)	2.0	6.0	2.0	250	125	1
50	4.7	H/2915	T409H475(1)050(2)(3)(4)	CWR09N(3)475(1)(2)(5)	3.0	6.0	1.5	316	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Maximum/5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/4 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET/CWR part number, insert M for ±20%, K for ±10%, or J for ±5%. Designates Capacitance Tolerance.
(2) To complete KEMET/CWR part number, insert failure rate letter per the Ordering Information found on page 2. Designates Reliability Level.
(3) To complete KEMET/CWR part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder-plated or K = Solder fused. Designates termination finish.
(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = −55°C +85°C after Weibull, or 4252 = −55°C +85°C before Weibull. Designates Surge Current Option.
(5) To complete CWR part number, insert A = +25°C after Weibull, B = −55°C +85°C after Weibull, or C = −55°C +85°C before Weibull. Designates surge current option. Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for the reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C w/+20°C Rise
A	2513	50
B	3813	70
C	5113	75
D	3825	80
E	5125	90
F	5634	100
G	6728	125
H	7238	150
X	6954	165

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

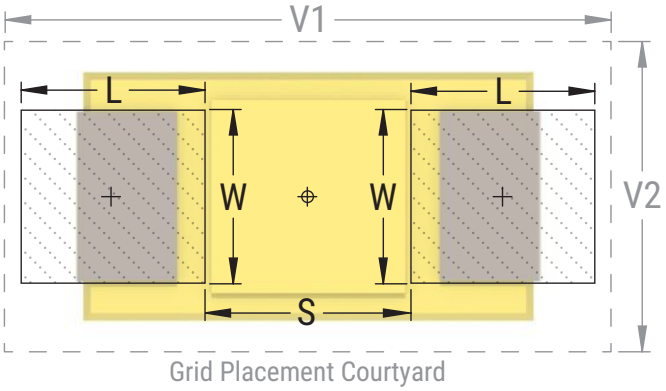
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe, plus, in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	L	W	S	V1	V2	L	W	S	V1	V2	L	W	S	V1	V2
A[1]	1005	2.19	1.44	0.15	5.54	2.66	1.89	1.32	0.15	4.44	2.16	1.52	1.22	0.29	3.58	1.90
B	1505	2.30	1.44	1.20	6.80	2.66	1.90	1.32	1.40	5.70	2.16	1.52	1.22	1.56	4.84	1.90
C	2005	2.30	1.44	2.47	8.08	2.66	1.90	1.32	2.67	6.98	2.16	1.52	1.22	2.83	6.12	1.90
D	1510	2.30	2.58	1.20	6.80	3.92	1.90	2.46	1.40	5.70	3.42	1.52	2.36	1.56	4.84	3.16
E	2010	2.30	2.58	2.47	8.08	3.92	1.90	2.46	2.67	6.98	3.42	1.52	2.36	2.83	6.12	3.16
F	2214	2.30	3.47	2.98	8.58	4.82	1.90	3.35	3.18	7.48	4.32	1.52	3.25	3.34	6.62	4.06
G	2711	2.81	2.84	3.10	9.72	4.18	2.41	2.72	3.30	8.62	3.68	2.03	2.62	3.46	7.76	3.42
H	2915	2.81	3.84	3.61	10.24	5.20	2.41	3.72	3.81	9.14	4.70	2.03	3.62	3.97	8.28	4.44
X	2824	2.73	3.22	3.46	9.92	6.80	2.33	3.10	3.66	8.82	6.30	1.95	3.00	3.82	7.96	6.04

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component desity product applications. Before adapting the minimum land pattern variations, the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Land pattern geometry is too small for silkscreen outline.*



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

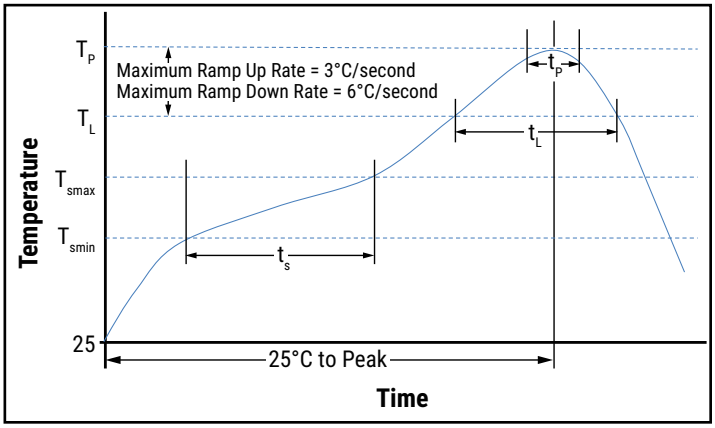
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

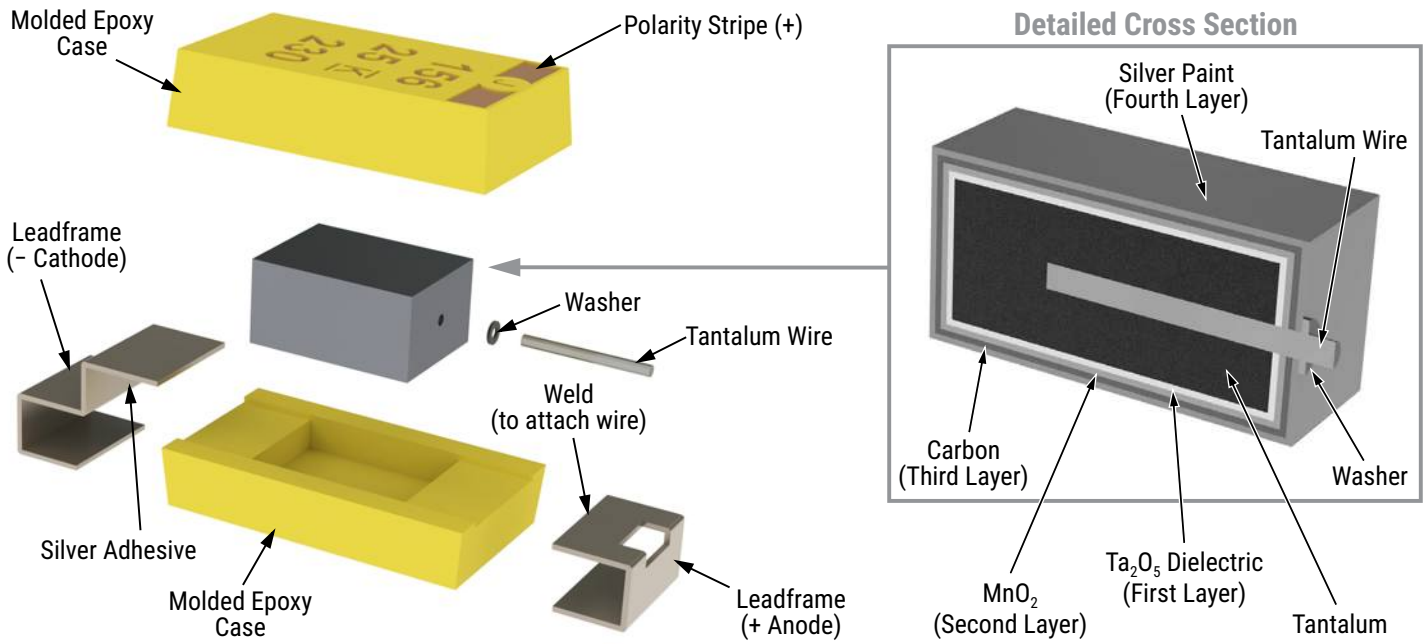
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



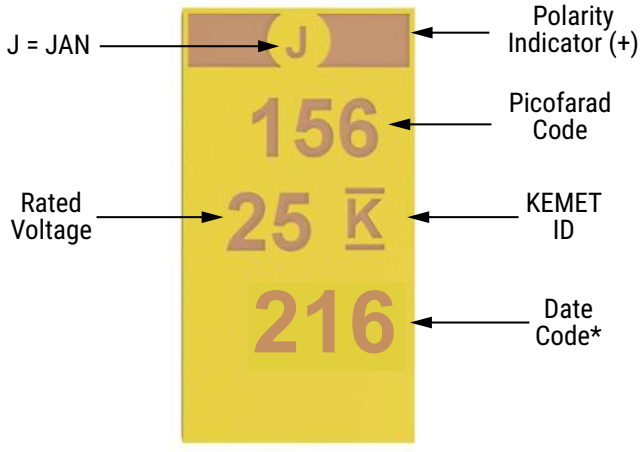
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 216 = 16th week of 2022

Date Code *	
1st digit = last number of year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded tantalum and aluminum chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

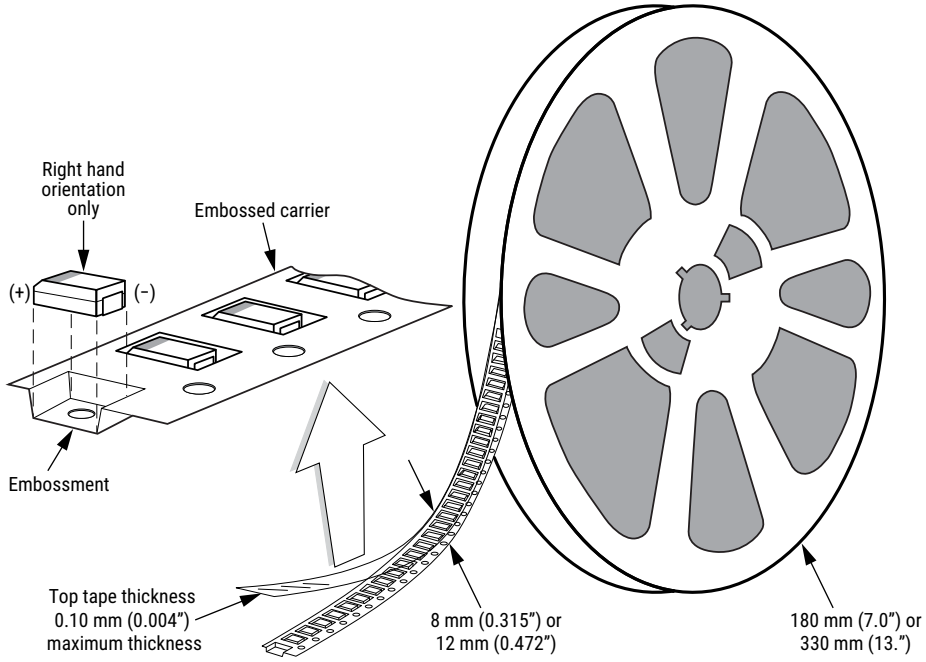


Table 3 – Packaging Quantity

KEMET Case Codes		Tape Width (mm)	Tape and Reel Dimensions	
			180 mm (7" diameter)	330 mm (13" diameter)
A	1005	8	2,500	9,500
B	1505	12	2,500	9,500
C	2005	12	2,500	9,500
D	1510	12	2,500	9,500
E	2010	12	2,500	9,500
F	2214	12	500	3,500
G	2711	12	500	2,500
H	2915	12	500	2,500
X	2824	12	500	2,500

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

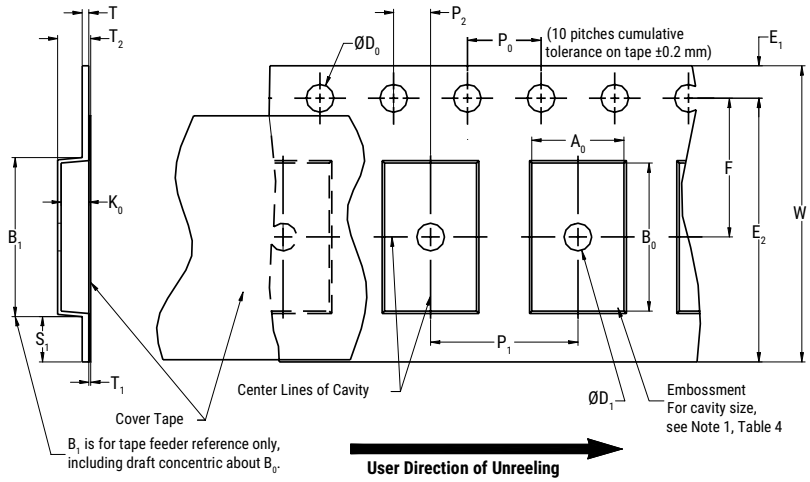


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover Tape Break Force: 1.0 kg minimum.
2. Cover Tape Peel Strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 Newton (10 to 100 gf)
12 and 16 mm	0.1 to 1.3 Newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

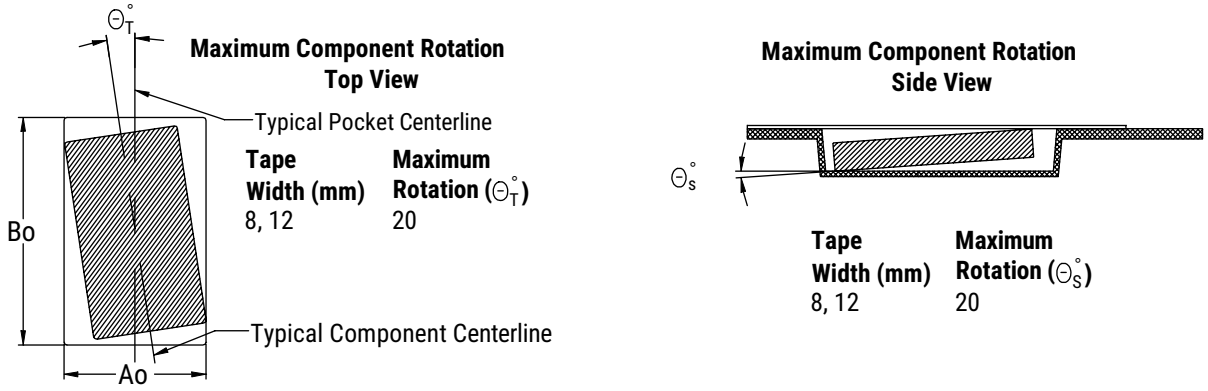


Figure 3 – Maximum Lateral Movement

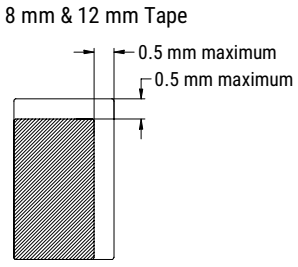


Figure 4 – Bending Radius

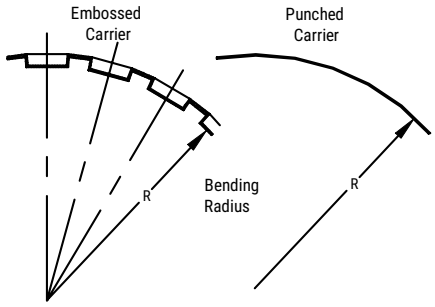
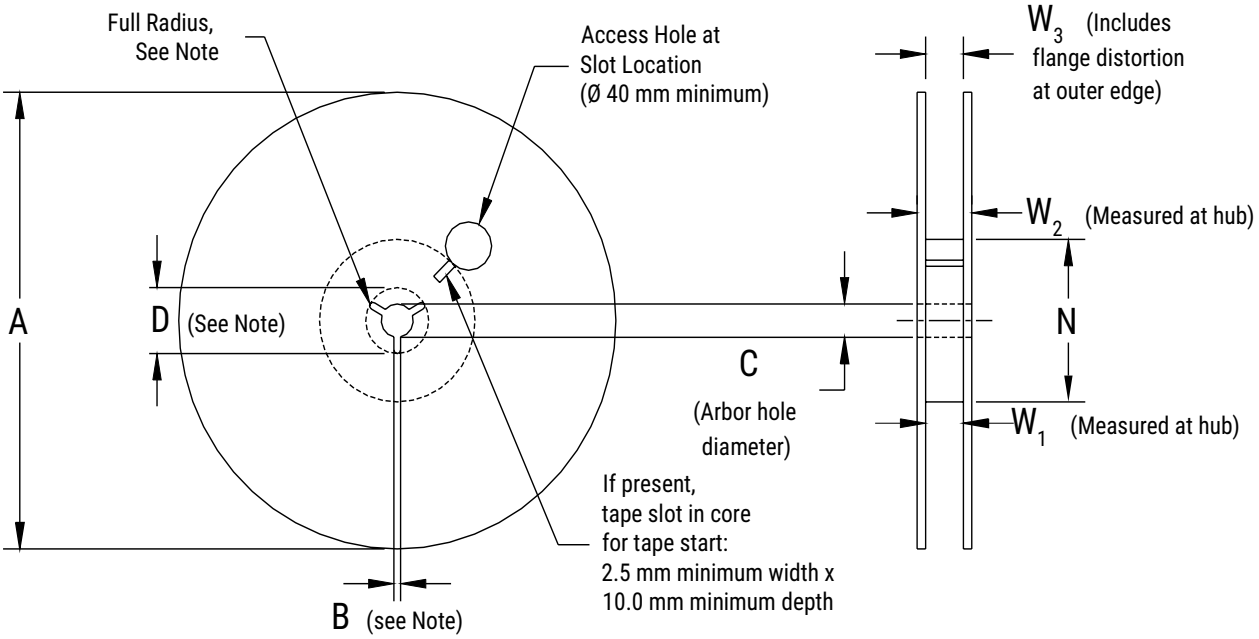


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

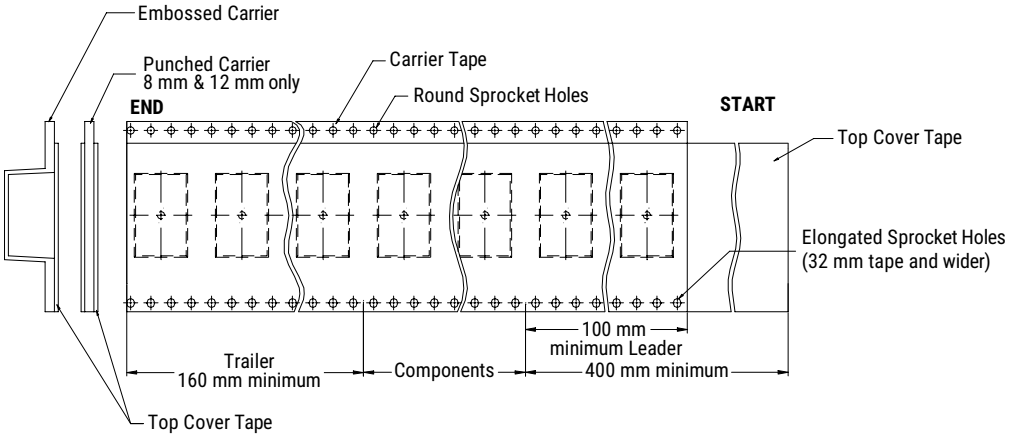
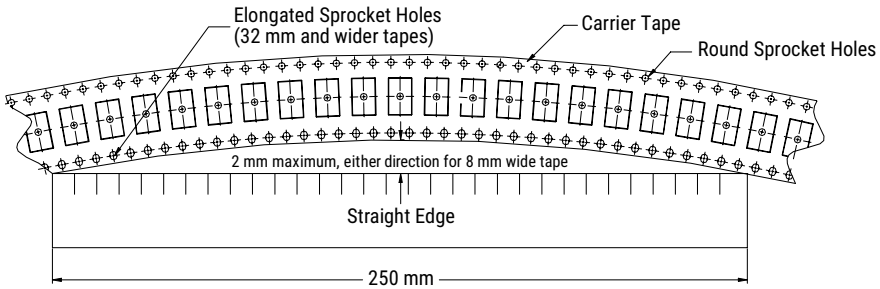


Figure 7 – Maximum Camber



Tantalum Surface Mount Capacitors – MIL-PRF (CWR Style)

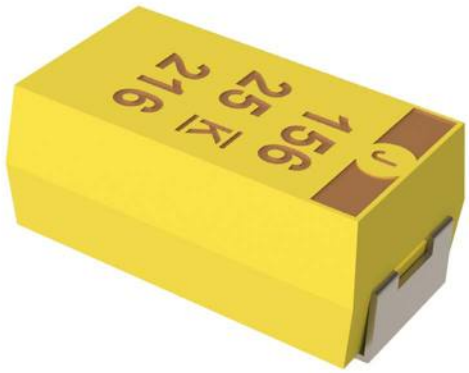
T419 MIL-PRF-55365/11 (CWR19 Style)

Overview

The KEMET T419 is approved to MIL-PRF-55365/11 (CWR19 Style) with Weibull failure rates of B level (0.1% failures per 1,000 hours), C level (0.01% failures per 1,000 hours), D level (0.001% failures per 1,000 hours), or T level (0.01% failures per 1,000 hours, Option C surge current, DPA, radiographic inspection, 100% visual inspection, DCL and ESR measurements within +3 standard deviations, and Group C inspection). This CWR19 product is a precision-molded device with compliant terminations and indelible laser marking. Tape & Reel packaging per EIA 481 is standard.

Benefits

- Established reliability options
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Qualified to MIL-PRF-55365/11 (CWR19 Style)
- Termination options B, C, H, and K
- Weibull failure options B, C, D, and T
- Exponential failure rates M, P, R, and S
- Voltage rating of 4 – 35 VDC
- Operating temperature range of −55°C to +125°C



Applications

Typical applications include decoupling and filtering in military and aerospace applications requiring CWR19 devices.

Environmental Compliance

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

KEMET Ordering Information

T	419	A	225	K	004	A	H	4251	7280
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Design	Termination Finish	Surge (10 cycles)	Packaging (C-Spec)
T = Tantalum	CWR19 Established reliability	A B C D E F G H X	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	004 = 4 006 = 6 010 = 10 015 = 15 020 = 20 025 = 25 035 = 35	Weibull A = Non-ER B = (0.1%/1, 000 hours) C = (0.01%/1,000 hours) D = (0.001%/1,000 hours) T = T Level* (0.01%/1,000 hours) Exponential M = (1.0%/1,000 hours) P = (0.1%/1,000 hours) R = (0.01%/1,000 hours) S = (0.001%/1,000 hours)	C = Hot solder dipped H = Standard solder-coated (SnPb 5% Pb minimum) B = Gold-plated K = Solder-fused	Blank = No surge 4250 = 25°C after Weibull 4251 = −55°C and 85°C after Weibull 4252 = −55°C and 85°C before Weibull TLVL = −55°C and 85°C before Weibull, Weibull grade level "T"	Blank = 7" Reel 7280 = 13" Reel 7611 = Bulk bag 7640 = Bulk plastic box WAFL = Waffle pack

Ordering Information – Defense MIL-PRF-55365/11

CWR19	K	H	225	K	C	D	A
Capacitor Style	Rated Voltage (VDC)	Termination Finish	Capacitance Code (pF)	Capacitance Tolerance	Reliability Level	Case Code	Surge Current Option** (10 cycles)
Per MIL-PRF-55365/11	C = 4 D = 6 F = 10 H = 15 J = 20 K = 25 M = 35	B = Gold-plated C = Hot solder dipped H = Solder-plated K = Solder-fused	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	Weibull A = Non-ER B = (0.1%/1,000 hours) C = (0.01%/1,000 hours) D = (0.001%/1,000 hours) T = T Level* (0.01%/1,000 hours) Exponential M = (1.0%/1,000 hours) P = (0.1%/1,000 hours) R = (0.01%/1,000 hours) S = (0.001%/1,000 hours)	A B C D E F G H X	A = +25°C after Weibull B = −55°C +85°C after Weibull C = −55°C +85°C before Weibull Z = None

** When T Level is ordered, Surge Current option C must be selected.*
*** For additional surge current details, please refer to MIL-PRF-55665*

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.33 – 330 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 35 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL-STD-202, Method 107, Condition B, mounted, −55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +125°C, +25°C			+25°C	−55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±15%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/Vibration	MIL-STD-202, Method 213, Condition I, 100 G Peak MIL-STD-202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Additional qualification tests per MIL-PRF-55365/11	Please contact KEMET for more information.					

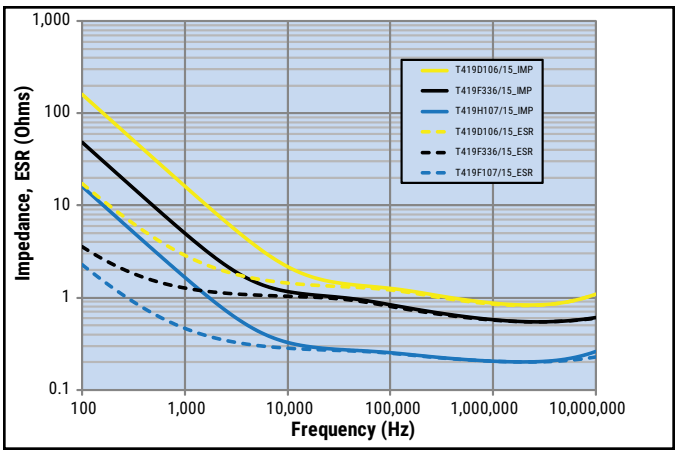
**IL = Initial limit*

Certification

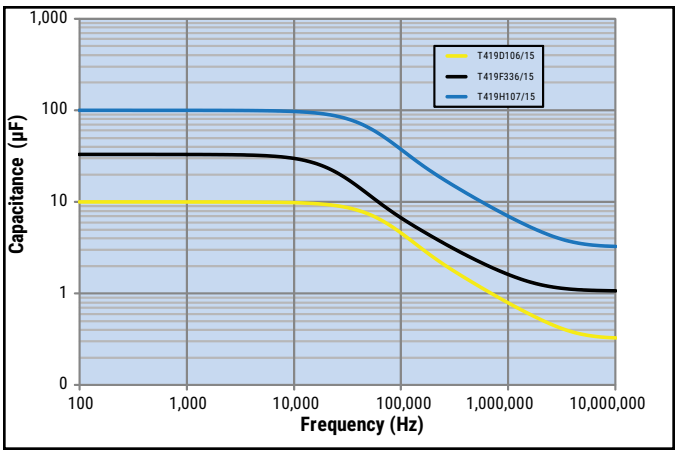
MIL-PRF-55365/11

Electrical Characteristics

ESR vs. Frequency

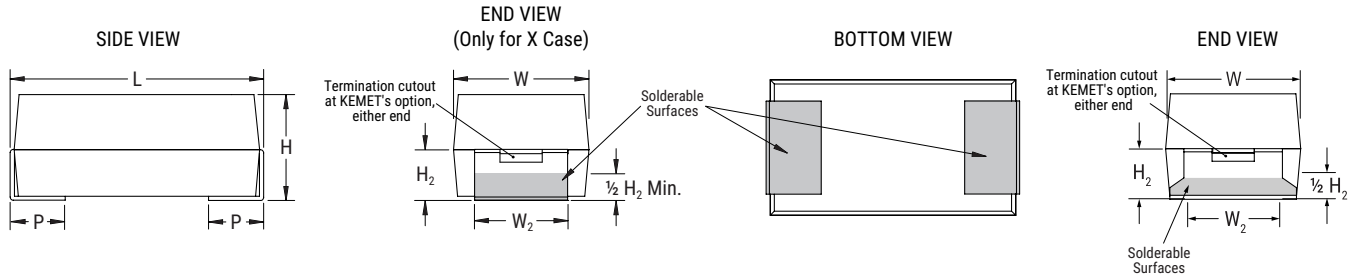


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size	Component						Typical Weight
KEMET	L ±0.38 (0.015)	W ±0.38 (0.015)	H ±0.38 (0.015)	P +0.25 (0.010), -0.13 (0.005)	W_2	H_2 Minimum	(mg)
A	2.54 (0.100)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)	39.91
B	3.81 (0.150)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)	68.73
C	5.08 (0.200)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)	146.5
D	3.81 (0.150)	2.54 (0.100)	1.27 (0.050)	0.76 (0.030)	2.41 +0.13,−0.25 (0.095 +0.005,−0.010)	0.76 (0.030)	264.12
E	5.08 (0.200)	2.54 (0.100)	1.27 (0.050)	0.76 (0.030)	2.41 +0.13,−0.25 (0.095 +0.005,−0.010)	0.76 (0.030)	421.63
F	5.59 (0.220)	3.43 (0.135)	1.78 (0.070)	0.76 (0.030)	3.30 ±0.13 (0.130 ±0.005)	1.02 (0.040)	173.63
G	6.73 (0.265)	2.79 (0.110)	2.79 (0.110)	1.27 (0.050)	2.67 ±0.13 (0.105 ±0.005)	1.52 (0.060)	266.42
H	7.24 (0.285)	3.81 (0.150)	2.79 (0.110)	1.27 (0.050)	3.68 +0.013,−0.51 (0.145 +0.005,−0.020)	1.52 (0.060)	349.01
X	6.93 (0.273)	5.41 (0.213)	2.74 (0.108)	1.19 (0.047)	3.05 ±0.13 (0.120 ±0.005)	1.22 (0.048)	590.44

Note: When solder coated terminations are required, add an additional 0.38 mm (0.015 inch) to the above tolerances for "L", "W", "H", "P" ,"W_2", and "H_2." These weights are provided as reference. If exact weights are needed, please contact your KEMET sales representative.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	3.3	A/1005	T419A335(1)004(2)(3)(4)	CWR19C(3)335(1)(2)A(5)	1.0	6.0	12.0	65	125	1
4	4.7	A/1005	T419A475(1)004(2)(3)(4)	CWR19C(3)475(1)(2)A(5)	1.0	6.0	12.0	65	125	1
4	6.8	A/1005	T419A685(1)004(2)(3)(4)	CWR19C(3)685(1)(2)A(5)	1.0	6.0	12.0	65	125	1
4	10	B/1505	T419B106(1)004(2)(3)(4)	CWR19C(3)106(1)(2)B(5)	1.0	8.0	8.0	94	125	1
4	15	B/1505	T419B156(1)004(2)(3)(4)	CWR19C(3)156(1)(2)B(5)	1.0	8.0	8.0	94	125	1
4	22	B/1505	T419B226(1)004(2)(3)(4)	CWR19C(3)226(1)(2)B(5)	1.0	8.0	8.0	94	125	1
4	22	D/1510	T419D226(1)004(2)(3)(4)	CWR19C(3)226(1)(2)D(5)	1.0	8.0	4.0	141	125	1
4	33	D/1510	T419D336(1)004(2)(3)(4)	CWR19C(3)336(1)(2)D(5)	2.0	8.0	4.0	141	125	1
4	33	E/2010	T419E336(1)004(2)(3)(4)	CWR19C(3)336(1)(2)E(5)	2.0	8.0	3.0	173	125	1
4	47	E/2010	T419E476(1)004(2)(3)(4)	CWR19C(3)476(1)(2)E(5)	2.0	8.0	3.0	173	125	1
4	68	E/2010	T419E686(1)004(2)(3)(4)	CWR19C(3)686(1)(2)E(5)	3.0	8.0	3.0	173	125	1
4	100	F/2214	T419F107(1)004(2)(3)(4)	CWR19C(3)107(1)(2)F(5)	4.0	10.0	2.0	224	125	1
4	150	G/2711	T419G157(1)004(2)(3)(4)	CWR19C(3)157(1)(2)G(5)	6.0	10.0	1.0	353	125	1
4	220	H/2915	T419H227(1)004(2)(3)(4)	CWR19C(3)227(1)(2)H(5)	8.0	10.0	1.0	387	125	1
4	330	H/2915	T419H337(1)004(2)(3)(4)	CWR19C(3)337(1)(2)H(5)	10.0	10.0	0.9	408	125	1
6	3.3	A/1005	T419A335(1)006(2)(3)(4)	CWR19D(3)335(1)(2)A(5)	1.0	6.0	12.0	65	125	1
6	4.7	A/1005	T419A475(1)006(2)(3)(4)	CWR19D(3)475(1)(2)A(5)	1.0	6.0	12.0	65	125	1
6	6.8	B/1505	T419B685(1)006(2)(3)(4)	CWR19D(3)685(1)(2)B(5)	1.0	6.0	8.0	94	125	1
6	10	B/1505	T419B106(1)006(2)(3)(4)	CWR19D(3)106(1)(2)B(5)	1.0	6.0	8.0	94	125	1
6	15	B/1505	T419B156(1)006(2)(3)(4)	CWR19D(3)156(1)(2)B(5)	1.0	8.0	8.0	94	125	1
6	15	D/1510	T419D156(1)006(2)(3)(4)	CWR19D(3)156(1)(2)D(5)	1.0	8.0	5.0	127	125	1
6	15	E/2010	T419E156(1)006(2)(3)(4)	CWR19D(3)156(1)(2)E(5)	1.0	8.0	3.0	173	125	1
6	22	D/1510	T419D226(1)006(2)(3)(4)	CWR19D(3)226(1)(2)D(5)	1.0	6.0	5.0	127	125	1
6	22	E/2010	T419E226(1)006(2)(3)(4)	CWR19D(3)226(1)(2)E(5)	2.0	8.0	3.5	160	125	1
6	33	E/2010	T419E336(1)006(2)(3)(4)	CWR19D(3)336(1)(2)E(5)	2.0	6.0	3.5	160	125	1
6	47	F/2214	T419F476(1)006(2)(3)(4)	CWR19D(3)476(1)(2)F(5)	3.0	8.0	3.5	169	125	1
6	68	F/2214	T419F686(1)006(2)(3)(4)	CWR19D(3)686(1)(2)F(5)	4.0	10.0	1.5	258	125	1
6	68	G/2711	T419G686(1)006(2)(3)(4)	CWR19D(3)686(1)(2)G(5)	4.0	10.0	1.0	353	125	1
6	100	G/2711	T419G107(1)006(2)(3)(4)	CWR19D(3)107(1)(2)G(5)	6.0	10.0	1.1	337	125	1
6	150	G/2711	T419G157(1)006(2)(3)(4)	CWR19D(3)157(1)(2)G(5)	10.0	10.0	1.1	337	125	1
6	220	H/2915	T419H227(1)006(2)(3)(4)	CWR19D(3)227(1)(2)H(5)	10.0	10.0	0.9	408	125	1
6	330	H/2915	T419H337(1)006(2)(3)(4)	CWR19D(3)337(1)(2)H(5)	20.0	10.0	0.9	408	125	1
10	2.2	A/1005	T419A225(1)010(2)(3)(4)	CWR19F(3)225(1)(2)A(5)	1.0	6.0	12.0	65	125	1
10	3.3	A/1005	T419A335(1)010(2)(3)(4)	CWR19F(3)335(1)(2)A(5)	1.0	6.0	12.0	65	125	1
10	4.7	B/1505	T419B475(1)010(2)(3)(4)	CWR19F(3)475(1)(2)B(5)	1.0	6.0	8.0	94	125	1
10	4.7	C/2005	T419C475(1)010(2)(3)(4)	CWR19F(3)475(1)(2)C(5)	1.0	6.0	5.5	117	125	1
10	6.8	B/1505	T419B685(1)010(2)(3)(4)	CWR19F(3)685(1)(2)B(5)	1.0	6.0	8.0	94	125	1
10	6.8	C/2005	T419C685(1)010(2)(3)(4)	CWR19F(3)685(1)(2)C(5)	1.0	6.0	5.5	117	125	1
10	6.8	D/1510	T419D685(1)010(2)(3)(4)	CWR19F(3)685(1)(2)D(5)	1.0	6.0	5.0	127	125	1
10	10	B/1505	T419B106(1)010(2)(3)(4)	CWR19F(3)106(1)(2)B(5)	1.0	8.0	8.0	94	125	1
10	10	C/2005	T419C106(1)010(2)(3)(4)	CWR19F(3)106(1)(2)C(5)	1.0	6.0	5.5	117	125	1
10	10	D/1510	T419D106(1)010(2)(3)(4)	CWR19F(3)106(1)(2)D(5)	1.0	6.0	4.0	141	125	1
10	10	E/2010	T419E106(1)010(2)(3)(4)	CWR19F(3)106(1)(2)E(5)	1.0	6.0	3.5	160	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA @ +20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ +20°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET/CWR part number, insert M for ±20%, K for ±10%, or J for ±5%. Designates Capacitance Tolerance.
(2) To complete KEMET/CWR part number, insert failure rate letter per the Ordering Information found on page 2. Designates Reliability Level.
(3) To complete KEMET/CWR part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder plated or K = Solder fused. Designates Termination Finish.
(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = −55°C +85°C after Weibull, or 4252 = −55°C +85°C before Weibull. Designates Surge Current Option.
(5) To complete CWR part number, insert A = +25°C after Weibull, B = −55°C +85°C after Weibull, C = −55°C +85°C before Weibull or Z = None. Designates Surge Current Option.
Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	15	D/1510	T419D156(1)010(2)(3)(4)	CWR19F(3)156(1)(2)D(5)	2.0	6.0	5.0	127	125	1
10	15	E/2010	T419E156(1)010(2)(3)(4)	CWR19F(3)156(1)(2)E(5)	2.0	8.0	3.0	173	125	1
10	22	E/2010	T419E226(1)010(2)(3)(4)	CWR19F(3)226(1)(2)E(5)	3.0	8.0	2.0	212	125	1
10	33	F/2214	T419F336(1)010(2)(3)(4)	CWR19F(3)336(1)(2)F(5)	3.0	8.0	1.5	258	125	1
10	47	F/2214	T419F476(1)010(2)(3)(4)	CWR19F(3)476(1)(2)F(5)	4.0	10.0	1.5	258	125	1
10	47	G/2711	T419G476(1)010(2)(3)(4)	CWR19F(3)476(1)(2)G(5)	4.0	10.0	1.0	353	125	1
10	68	G/2711	T419G686(1)010(2)(3)(4)	CWR19F(3)686(1)(2)G(5)	6.0	10.0	1.1	337	125	1
10	100	G/2711	T419G107(1)010(2)(3)(4)	CWR19F(3)107(1)(2)G(5)	10.0	10.0	1.1	337	125	1
10	100	H/2915	T419H107(1)010(2)(3)(4)	CWR19F(3)107(1)(2)H(5)	10.0	10.0	0.9	408	125	1
10	150	H/2915	T419H157(1)010(2)(3)(4)	CWR19F(3)157(1)(2)H(5)	15.0	10.0	0.9	408	125	1
10	150	X/2824	T419X157(1)010(2)(3)(4)	CWR19F(3)157(1)(2)X(5)	15.0	10.0	0.9	428	125	1
10	220	H/2915	T419H227(1)010(2)(3)(4)	CWR19F(3)227(1)(2)H(5)	20.0	10.0	0.9	408	125	1
15	1	A/1005	T419A105(1)015(2)(3)(4)	CWR19H(3)105(1)(2)A(5)	1.0	6.0	15.0	58	125	1
15	1.5	A/1005	T419A155(1)015(2)(3)(4)	CWR19H(3)155(1)(2)A(5)	1.0	6.0	15.0	58	125	1
15	2.2	A/1005	T419A225(1)015(2)(3)(4)	CWR19H(3)225(1)(2)A(5)	1.0	6.0	15.0	58	125	1
15	3.3	B/1505	T419B335(1)015(2)(3)(4)	CWR19H(3)335(1)(2)B(5)	1.0	6.0	9.0	88	125	1
15	4.7	B/1505	T419B475(1)015(2)(3)(4)	CWR19H(3)475(1)(2)B(5)	1.0	6.0	5.0	118	125	1
15	4.7	C/2005	T419C475(1)015(2)(3)(4)	CWR19H(3)475(1)(2)C(5)	1.0	6.0	5.5	117	125	1
15	4.7	D/1510	T419D475(1)015(2)(3)(4)	CWR19H(3)475(1)(2)D(5)	1.0	6.0	6.0	115	125	1
15	6.8	D/1510	T419D685(1)015(2)(3)(4)	CWR19H(3)685(1)(2)D(5)	1.0	6.0	6.0	115	125	1
15	6.8	E/2010	T419E685(1)015(2)(3)(4)	CWR19H(3)685(1)(2)E(5)	1.0	8.0	3.0	173	125	1
15	10	D/1510	T419D106(1)015(2)(3)(4)	CWR19H(3)106(1)(2)D(5)	2.0	6.0	6.0	115	125	1
15	10	E/2010	T419E106(1)015(2)(3)(4)	CWR19H(3)106(1)(2)E(5)	2.0	6.0	4.0	150	125	1
15	15	E/2010	T419E156(1)015(2)(3)(4)	CWR19H(3)156(1)(2)E(5)	2.0	6.0	4.0	150	125	1
15	15	F/2214	T419F156(1)015(2)(3)(4)	CWR19H(3)156(1)(2)F(5)	2.0	8.0	3.0	183	125	1
15	22	F/2214	T419F226(1)015(2)(3)(4)	CWR19H(3)226(1)(2)F(5)	3.0	8.0	3.0	183	125	1
15	33	F/2214	T419F336(1)015(2)(3)(4)	CWR19H(3)336(1)(2)F(5)	5.0	6.0	3.0	183	125	1
15	33	G/2711	T419G336(1)015(2)(3)(4)	CWR19H(3)336(1)(2)G(5)	6.0	8.0	1.1	337	125	1
15	47	G/2711	T419G476(1)015(2)(3)(4)	CWR19H(3)476(1)(2)G(5)	10.0	8.0	1.1	337	125	1
15	47	H/2915	T419H476(1)015(2)(3)(4)	CWR19H(3)476(1)(2)H(5)	10.0	8.0	0.9	408	125	1
15	68	G/2711	T419G686(1)015(2)(3)(4)	CWR19H(3)686(1)(2)G(5)	10.0	8.0	1.1	337	125	1
15	68	H/2915	T419H686(1)015(2)(3)(4)	CWR19H(3)686(1)(2)H(5)	10.0	8.0	0.9	408	125	1
15	100	H/2915	T419H107(1)015(2)(3)(4)	CWR19H(3)107(1)(2)H(5)	15.0	10.0	0.9	408	125	1
20	0.68	A/1005	T419A684(1)020(2)(3)(4)	CWR19J(3)684(1)(2)A(5)	1.0	6.0	15.0	58	125	1
20	1	A/1005	T419A105(1)020(2)(3)(4)	CWR19J(3)105(1)(2)A(5)	1.0	6.0	15.0	58	125	1
20	1.5	B/1505	T419B155(1)020(2)(3)(4)	CWR19J(3)155(1)(2)B(5)	1.0	6.0	9.0	88	125	1
20	2.2	B/1505	T419B225(1)020(2)(3)(4)	CWR19J(3)225(1)(2)B(5)	1.0	6.0	9.0	88	125	1
20	3.3	D/1510	T419D335(1)020(2)(3)(4)	CWR19J(3)335(1)(2)D(5)	1.0	6.0	6.0	115	125	1
20	4.7	E/2010	T419E475(1)020(2)(3)(4)	CWR19J(3)475(1)(2)E(5)	1.0	6.0	6.0	122	125	1
20	6.8	E/2010	T419E685(1)020(2)(3)(4)	CWR19J(3)685(1)(2)E(5)	2.0	6.0	5.0	134	125	1
20	10	E/2010	T419E106(1)020(2)(3)(4)	CWR19J(3)106(1)(2)E(5)	2.0	6.0	5.0	134	125	1
20	10	F/2214	T419F106(1)020(2)(3)(4)	CWR19J(3)106(1)(2)F(5)	2.0	6.0	3.0	183	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA @ +20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ +20°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET/CWR part number, insert M for ±20%, K for ±10%, or J for ±5%. Designates Capacitance Tolerance.
(2) To complete KEMET/CWR part number, insert failure rate letter per the Ordering Information found on page 2. Designates Reliability Level.
(3) To complete KEMET/CWR part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder plated or K = Solder fused. Designates Termination Finish.
(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = −55°C +85°C after Weibull, or 4252 = −55°C +85°C before Weibull. Designates Surge Current Option.
(5) To complete CWR part number, insert A = +25°C after Weibull, B = −55°C +85°C after Weibull, C = −55°C +85°C before Weibull or Z = None. Designates Surge Current Option.
Refer to Ordering Information for additional detail.

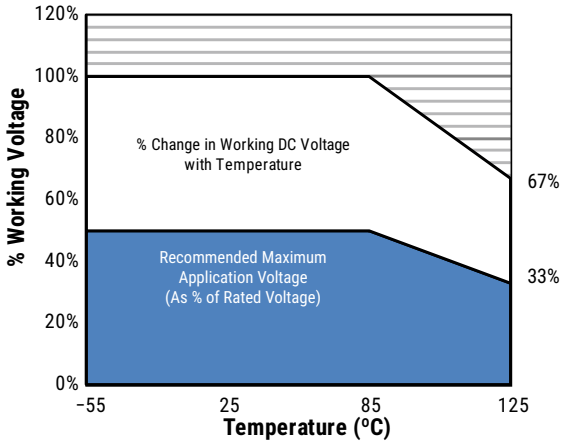
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
20	15	F/2214	T419F156(1)020(2)(3)(4)	CWR19J(3)156(1)(2)F(5)	3.0	6.0	3.0	183	125	1
20	22	G/2711	T419G226(1)020(2)(3)(4)	CWR19J(3)226(1)(2)G(5)	4.0	6.0	2.5	224	125	1
20	33	H/2915	T419H336(1)020(2)(3)(4)	CWR19J(3)336(1)(2)H(5)	6.0	8.0	0.9	408	125	1
20	47	H/2915	T419H476(1)020(2)(3)(4)	CWR19J(3)476(1)(2)H(5)	10.0	8.0	0.9	408	125	1
20	47	X/2824	T419X476(1)020(2)(3)(4)	CWR19J(3)476(1)(2)X(5)	10.0	8.0	0.9	428	125	1
25	0.47	A/1005	T419A474(1)025(2)(3)(4)	CWR19K(3)474(1)(2)A(5)	1.0	6.0	15.0	58	125	1
25	1	B/1505	T419B105(1)025(2)(3)(4)	CWR19K(3)105(1)(2)B(5)	1.0	6.0	10.0	84	125	1
25	2.2	D/1510	T419D225(1)025(2)(3)(4)	CWR19K(3)225(1)(2)D(5)	1.0	6.0	6.0	115	125	1
25	3.3	E/2010	T419E335(1)025(2)(3)(4)	CWR19K(3)335(1)(2)E(5)	1.0	6.0	4.0	150	125	1
25	6.8	F/2214	T419F685(1)025(2)(3)(4)	CWR19K(3)685(1)(2)F(5)	2.0	6.0	3.0	183	125	1
25	15	G/2711	T419G156(1)025(2)(3)(4)	CWR19K(3)156(1)(2)G(5)	4.0	6.0	1.4	299	125	1
25	22	G/2711	T419G226(1)025(2)(3)(4)	CWR19K(3)226(1)(2)G(5)	6.0	6.0	1.4	299	125	1
25	22	H/2915	T419H226(1)025(2)(3)(4)	CWR19K(3)226(1)(2)H(5)	6.0	6.0	0.9	408	125	1
25	22	X/2824	T419X226(1)025(2)(3)(4)	CWR19K(3)226(1)(2)X(5)	6.0	6.0	0.9	428	125	1
25	33	H/2915	T419H336(1)025(2)(3)(4)	CWR19K(3)336(1)(2)H(5)	10.0	8.0	0.9	408	125	1
25	33	X/2824	T419X336(1)025(2)(3)(4)	CWR19K(3)336(1)(2)X(5)	10.0	8.0	0.9	428	125	1
35	0.33	A/1005	T419A334(1)035(2)(3)(4)	CWR19M(3)334(1)(2)A(5)	1.0	6.0	22.0	48	125	1
35	6.8	G/2711	T419G685(1)035(2)(3)(4)	CWR19M(3)685(1)(2)G(5)	3.0	6.0	1.5	289	125	1
35	10	H/2915	T419H106(1)035(2)(3)(4)	CWR19M(3)106(1)(2)H(5)	4.0	8.0	0.9	408	125	1
35	15	X/2824	T419X156(1)035(2)(3)(4)	CWR19M(3)156(1)(2)X(5)	6.0	6.0	0.9	428	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA @ +20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ +20°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET/CWR part number, insert M for ±20%, K for ±10%, or J for ±5%. Designates Capacitance Tolerance.
(2) To complete KEMET/CWR part number, insert failure rate letter per the Ordering Information found on page 2. Designates Reliability Level.
(3) To complete KEMET/CWR part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder plated or K = Solder fused. Designates Termination Finish.
(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = −55°C +85°C after Weibull, or 4252 = −55°C +85°C before Weibull. Designates Surge Current Option.
(5) To complete CWR part number, insert A = +25°C after Weibull, B = −55°C +85°C after Weibull, C = −55°C +85°C before Weibull or Z = None. Designates Surge Current Option.
Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for the reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C w/+20°C Rise
A	2513	50
B	3813	70
C	5113	75
D	3825	80
E	5125	90
F	5634	100
G	6728	125
H	7238	150
X	6954	165

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

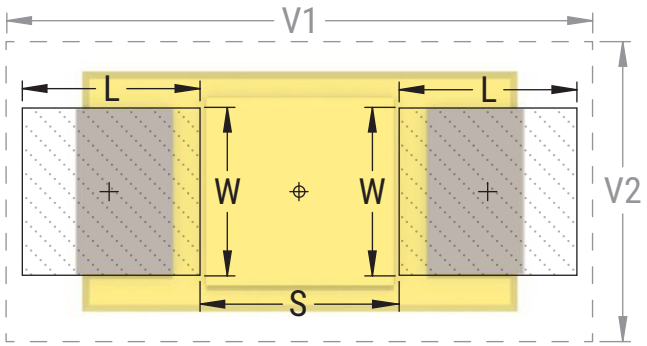
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe, plus, in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	L	W	S	V1	V2	L	W	S	V1	V2	L	W	S	V1	V2
A[1]	1005	2.19	1.44	0.15	5.54	2.66	1.89	1.32	0.15	4.44	2.16	1.52	1.22	0.29	3.58	1.90
B	1505	2.30	1.44	1.20	6.80	2.66	1.90	1.32	1.40	5.70	2.16	1.52	1.22	1.56	4.84	1.90
C	2005	2.30	1.44	2.47	8.08	2.66	1.90	1.32	2.67	6.98	2.16	1.52	1.22	2.83	6.12	1.90
D	1510	2.30	2.58	1.20	6.80	3.92	1.90	2.46	1.40	5.70	3.42	1.52	2.36	1.56	4.84	3.16
E	2010	2.30	2.58	2.47	8.08	3.92	1.90	2.46	2.67	6.98	3.42	1.52	2.36	2.83	6.12	3.16
F	2214	2.30	3.47	2.98	8.58	4.82	1.90	3.35	3.18	7.48	4.32	1.52	3.25	3.34	6.62	4.06
G	2711	2.81	2.84	3.10	9.72	4.18	2.41	2.72	3.30	8.62	3.68	2.03	2.62	3.46	7.76	3.42
H	2915	2.81	3.84	3.61	10.24	5.20	2.41	3.72	3.81	9.14	4.70	2.03	3.62	3.97	8.28	4.44
X	2824	2.73	3.22	3.46	9.92	6.80	2.33	3.10	3.66	8.82	6.30	1.95	3.00	3.82	7.96	6.04

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component desity product applications. Before adapting the minimum land pattern variations, the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Land pattern geometry is too small for silkscreen outline.*



Grid Placement Courtyard

Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

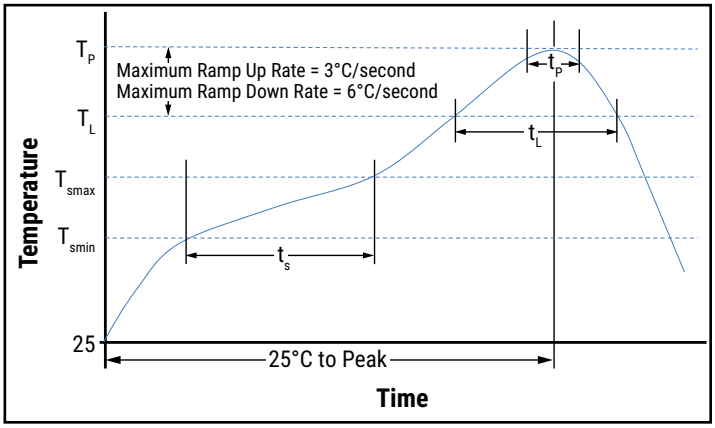
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

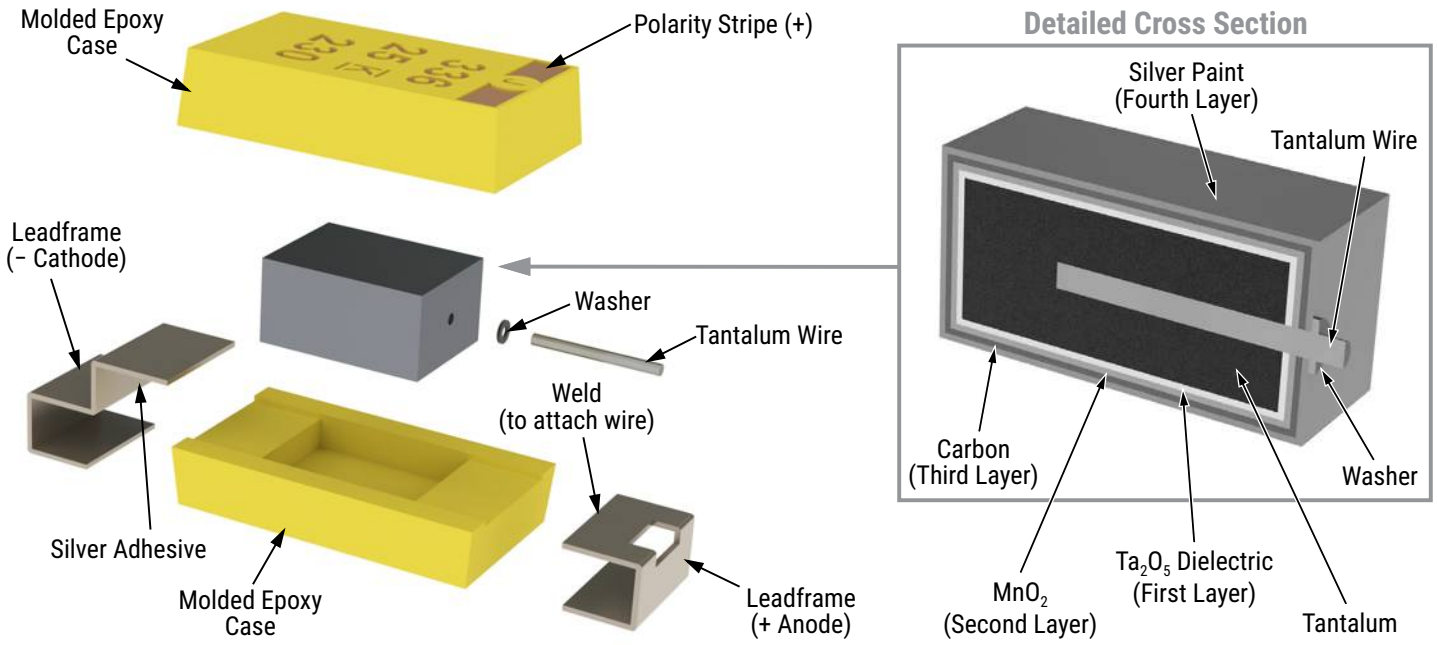
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



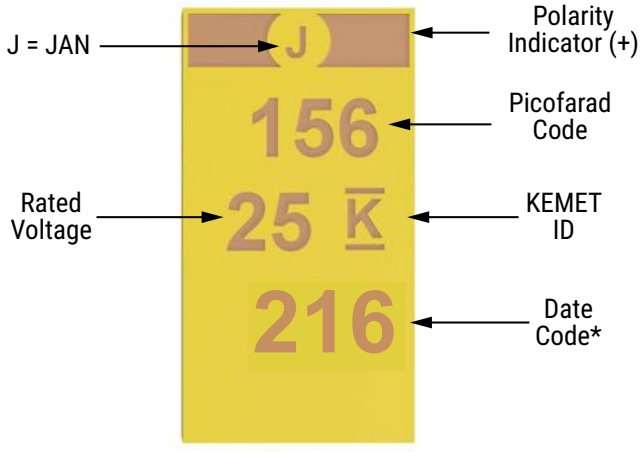
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



Date Code *	
1st digit = last number of year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

* 216 = 16th week of 2022

Tape & Reel Packaging Information

KEMET's molded tantalum and aluminum chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

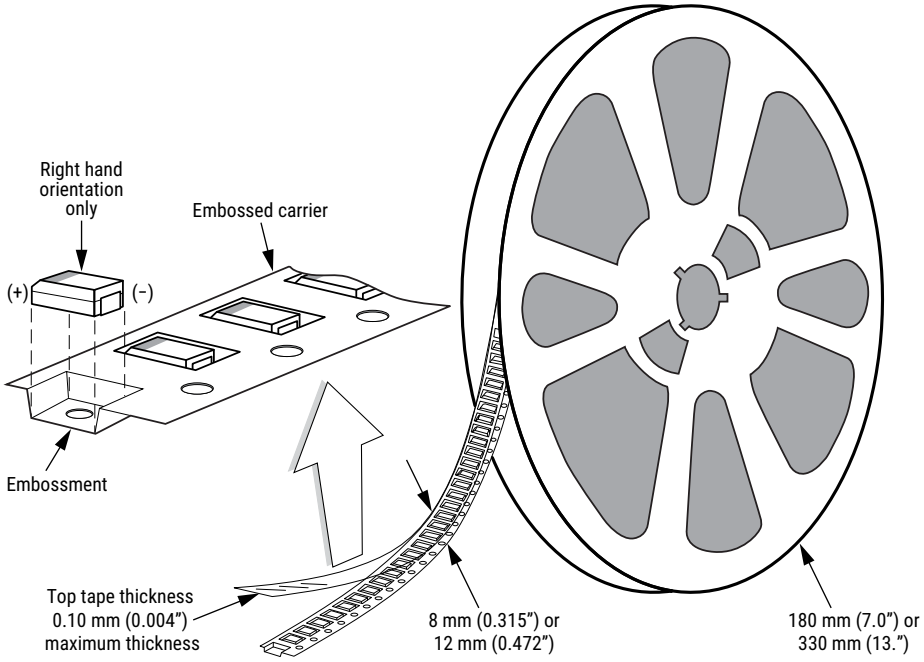


Table 3 – Packaging Quantity

KEMET Case Codes		Tape Width (mm)	Tape and Reel Dimensions	
			180 mm (7" diameter)	330 mm (13" diameter)
A	1005	8	2,500	9,500
B	1505	12	2,500	9,500
C	2005	12	2,500	9,500
D	1510	12	2,500	9,500
E	2010	12	2,500	9,500
F	2214	12	500	3,500
G	2711	12	500	2,500
H	2915	12	500	2,500
X	2824	12	500	2,500

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

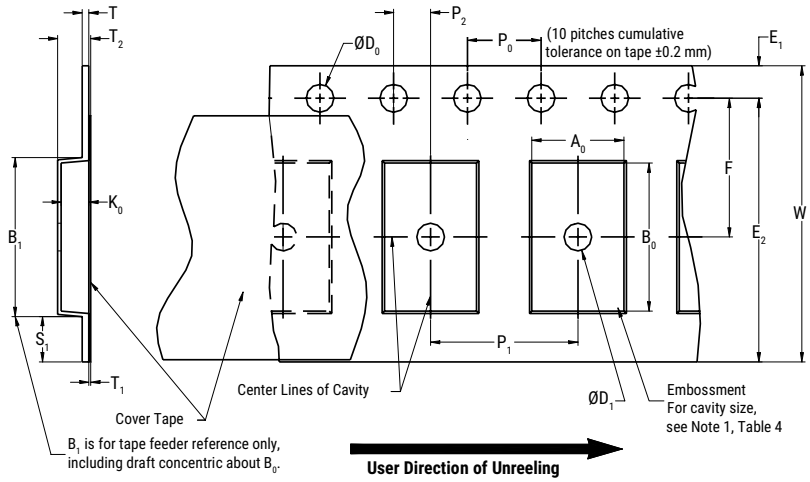


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover Tape Break Force: 1.0 kg minimum.
2. Cover Tape Peel Strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 Newton (10 to 100 gf)
12 and 16 mm	0.1 to 1.3 Newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

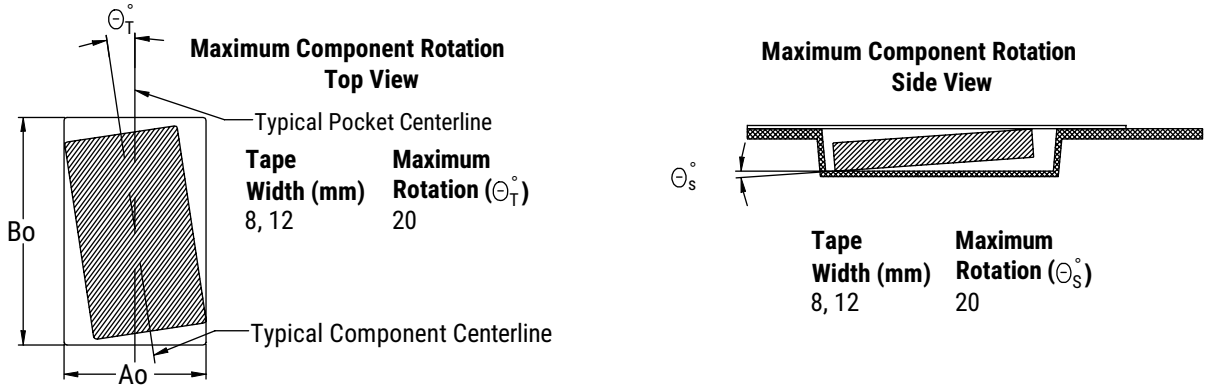


Figure 3 – Maximum Lateral Movement

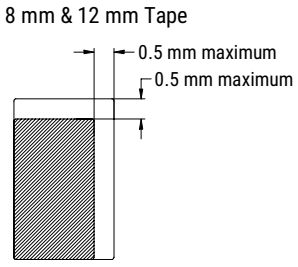


Figure 4 – Bending Radius

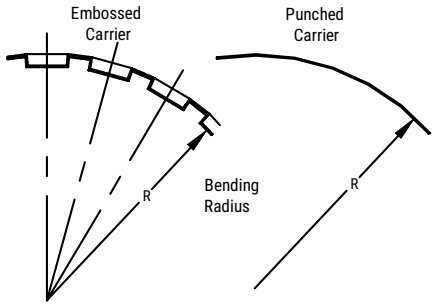
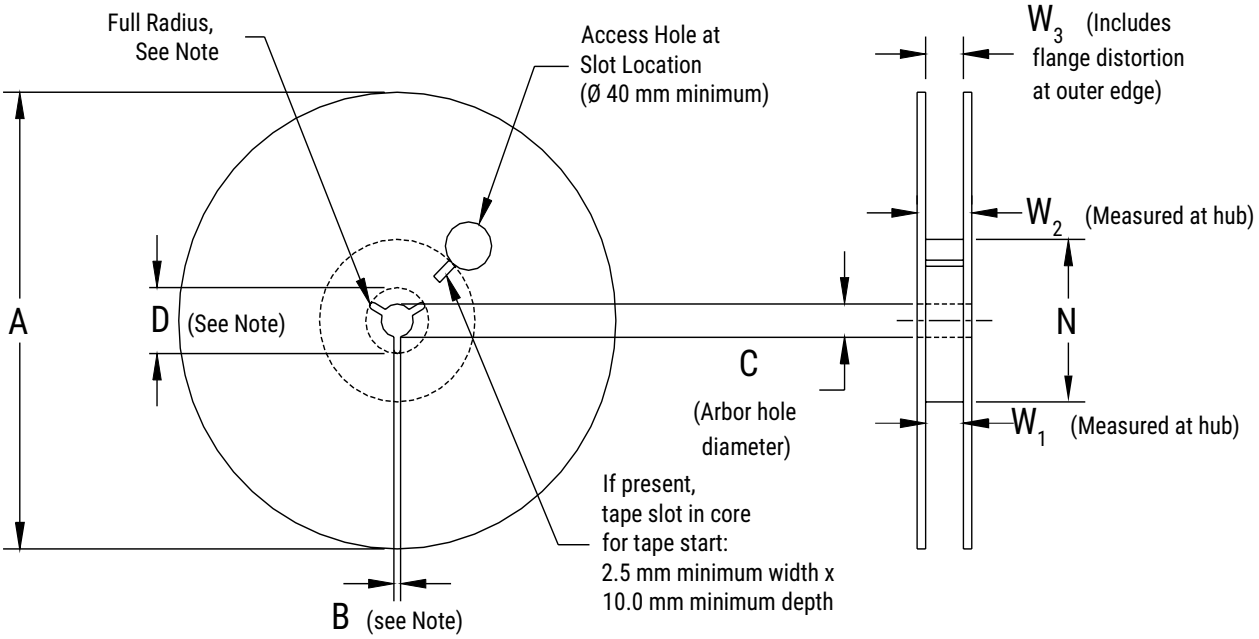


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

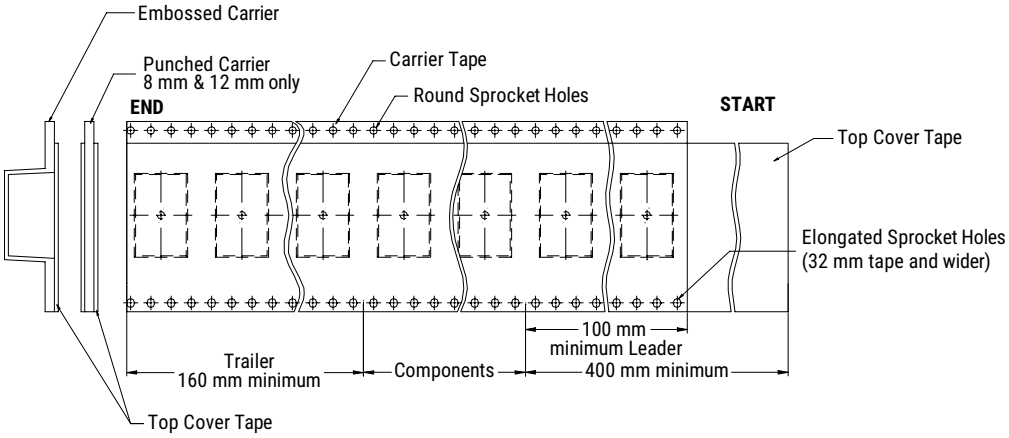
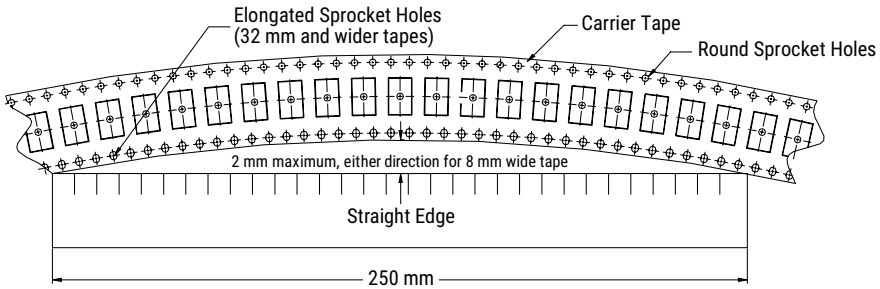


Figure 7 – Maximum Camber



Tantalum Surface Mount Capacitors – MIL-PRF (CWR Style)

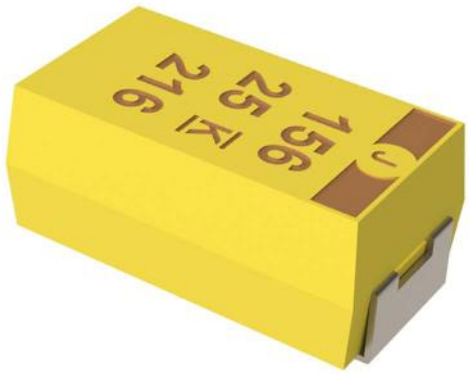
T429 MIL-PRF-55365/11 (CWR29 Style)

Overview

The KEMET T429 is approved to MIL-PRF-55365/11 (CWR29 Style) with Weibull failure rates of B level (0.1% failures per 1,000 hours), C level (0.01% failures per 1,000 hours), D level (0.001% failures per 1,000 hours), or T level (0.01% failures per 1,000 hours, Option C surge current, DPA, radiographic inspection, 100% visual inspection, DCL and ESR measurements within +3 standard deviations, and Group C inspection). This CWR29 product is a precision-molded device with compliant terminations and indelible laser marking. Tape & Reel packaging per EIA 481 is standard.

Benefits

- Established reliability options
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Qualified to MIL-PRF-55365/11 (CWR29 Style)
- Termination options B, C, H, and K
- Weibull failure options B, C, D, and T
- Exponential failure rates M, P, R, and S
- Voltage rating of 4 – 50 VDC
- Operating temperature range of −55°C to +125°C



Applications

Typical applications include decoupling and filtering in military and aerospace applications requiring CWR29 devices.

Environmental Compliance

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

KEMET Ordering Information

T	429	A	225	K	004	A	H	4251	7280
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Design	Termination Finish	Surge (10 cycles)	Packaging (C-Spec)
T = Tantalum	CWR29 Established reliability	A B C D E F G H X	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	004 = 4 006 = 6 010 = 10 015 = 15 020 = 20 025 = 25 035 = 35 050 = 50	Weibull A = Non-ER B = (0.1%/1,000 hours) C = (0.01%/1,000 hours) D = (0.001%/1,000 hours) T = T Level*(0.01%/1,000 hours) Exponential M = (1.0%/1,000 hours) P = (0.1%/1,000 hours) R = (0.01%/1,000 hours) S = (0.001%/1,000 hours)	C = Hot solder dipped H = Standard solder-coated (SnPb 5% Pb minimum) B = Gold-plated K = Solder fused	Blank = No surge 4250= 25°C after Weibull 4251 = −55°C and 85°C after Weibull 4252 = −55°C and 85°C before Weibull TLVL= −55°C and 85°C before Weibull, Weibull grade level "T"	Blank = 7" Reel 7280 = 13" Reel 7611 = Bulk bag 7640 = Bulk plastic box WAFL = Waffle pack

Ordering Information – Defense MIL-PRF-55365/11

CWR29	K	H	225	K	C	D	A
Capacitor Style	Rated Voltage (VDC)	Termination Finish	Capacitance Code (pF)	Capacitance Tolerance	Reliability Level	Case Code	Surge Current Option** (10 cycles)
Per MIL-PRF-55365/11	C = 4 D = 6 F = 10 H = 15 J = 20 K = 25 M = 35 N = 50	B = Gold-plated C = Hot solder dipped H = Solder plated K = Solder fused	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	Weibull A = non-ER B = (0.1%/1,000 hours) C = (0.01%/1,000 hours) D = (0.001%/1,000 hours) T = T Level* (0.01%/1,000 hours) Exponential M = (1.0%/1,000 hours) P = (0.1%/1,000 hours) R = (0.01%/1,000 hours) S = (0.001%/1,000 hours)	A B C D E F G H X	A = +25°C after Weibull B = −55°C +85°C after Weibull C = −55°C +85°C before Weibull Z = None

** When T Level is ordered, Surge Current option C must be selected.*
*** For additional surge current details, please refer to MIL-PRF-55665*

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 330 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL-STD-202, Method 107, Condition B, mounted, −55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +125°C, +25°C			+25°C	−55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±15%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/Vibration	MIL-STD-202, Method 213, Condition I, 100 G Peak MIL-STD-202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Additional qualification tests per MIL-PRF-55365/11	Please contact KEMET for more information.					

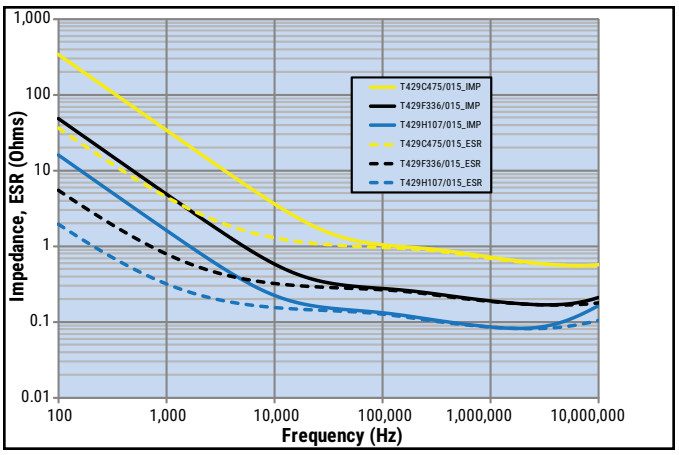
**IL = Initial limit*

Certification

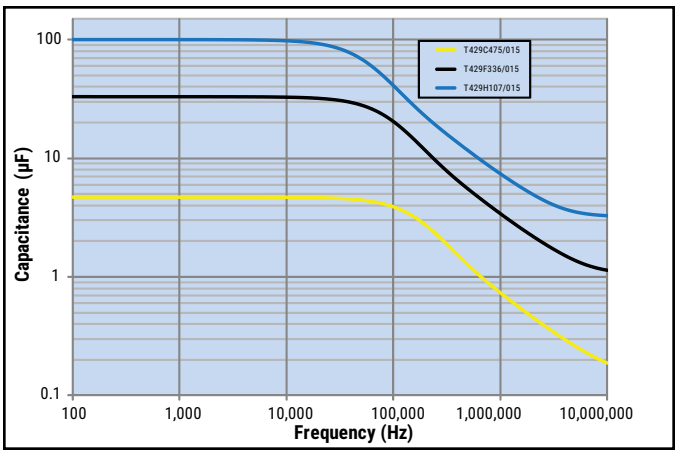
MIL-PRF-55365/11

Electrical Characteristics

ESR vs. Frequency

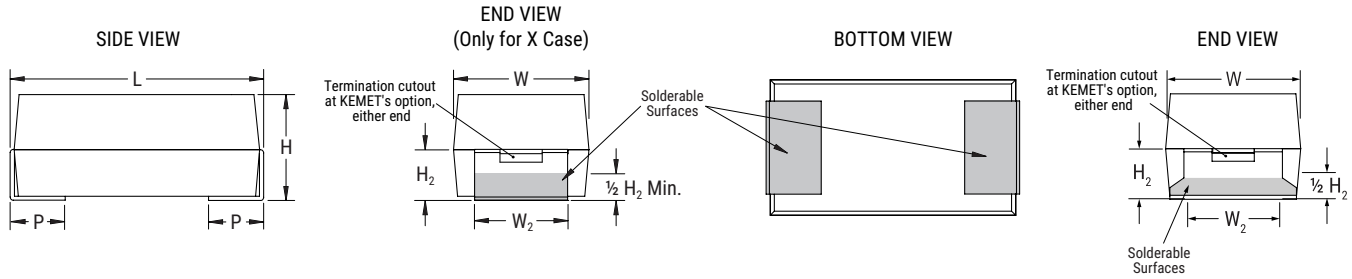


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size	Component						Typical Weight
KEMET	L ±0.38 (0.015)	W ±0.38 (0.015)	H ±0.38 (0.015)	P +0.25 (0.010), -0.13 (0.005)	W_2	H_2 Minimum	(mg)
A	2.54 (0.100)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)	39.91
B	3.81 (0.150)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)	68.73
C	5.08 (0.200)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)	146.5
D	3.81 (0.150)	2.54 (0.100)	1.27 (0.050)	0.76 (0.030)	2.41 +0.13,−0.25 (0.095 +0.005,−0.010)	0.76 (0.030)	264.12
E	5.08 (0.200)	2.54 (0.100)	1.27 (0.050)	0.76 (0.030)	2.41 +0.13,−0.25 (0.095 +0.005,−0.010)	0.76 (0.030)	421.63
F	5.59 (0.220)	3.43 (0.135)	1.78 (0.070)	0.76 (0.030)	3.30 ±0.13 (0.130 ±0.005)	1.02 (0.040)	173.63
G	6.73 (0.265)	2.79 (0.110)	2.79 (0.110)	1.27 (0.050)	2.67 ±0.13 (0.105 ±0.005)	1.52 (0.060)	266.42
H	7.24 (0.285)	3.81 (0.150)	2.79 (0.110)	1.27 (0.050)	3.68 +0.013,−0.51 (0.145 +0.005,−0.020)	1.52 (0.060)	349.01
X	6.93 (0.273)	5.41 (0.213)	2.74 (0.108)	1.19 (0.047)	3.05 ±0.13 (0.120 ±0.005)	1.22 (0.048)	590.44

Note: When solder coated terminations are required, add an additional 0.38 mm (0.015 inch) to the above tolerances for "L", "W", "H", "P" ,"W_2" and "H_2." These weights are provided as reference. If exact weights are needed, please contact your KEMET sales representative.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	2.2	A/2513	T429A225(1)004(2)(3)(4)	CWR29C(3)225(1)(2)A(5)	1.0	6.0	4.0	112	125	1
4	3.3	A/2513	T429A335(1)004(2)(3)(4)	CWR29C(3)335(1)(2)A(5)	1.0	6.0	6.0	91	125	1
4	4.7	A/2513	T429A475(1)004(2)(3)(4)	CWR29C(3)475(1)(2)A(5)	1.0	6.0	6.0	91	125	1
4	4.7	B/3813	T429B475(1)004(2)(3)(4)	CWR29C(3)475(1)(2)B(5)	1.0	6.0	3.2	148	125	1
4	6.8	A/2513	T429A685(1)004(2)(3)(4)	CWR29C(3)685(1)(2)A(5)	1.0	6.0	6.0	91	125	1
4	6.8	C/5113	T429C685(1)004(2)(3)(4)	CWR29C(3)685(1)(2)C(5)	1.0	6.0	2.2	185	125	1
4	10	B/3813	T429B106(1)004(2)(3)(4)	CWR29C(3)106(1)(2)B(5)	1.0	8.0	3.2	148	125	1
4	10	D/3825	T429D106(1)004(2)(3)(4)	CWR29C(3)106(1)(2)D(5)	1.0	8.0	1.3	248	125	1
4	15	B/3813	T429B156(1)004(2)(3)(4)	CWR29C(3)156(1)(2)B(5)	1.0	8.0	3.2	148	125	1
4	15	E/5125	T429E156(1)004(2)(3)(4)	CWR29C(3)156(1)(2)E(5)	1.0	8.0	1.0	300	125	1
4	22	B/3813	T429B226(1)004(2)(3)(4)	CWR29C(3)226(1)(2)B(5)	1.0	8.0	3.2	148	125	1
4	22	D/3825	T429D226(1)004(2)(3)(4)	CWR29C(3)226(1)(2)D(5)	1.0	8.0	1.3	248	125	1
4	33	D/3825	T429D336(1)004(2)(3)(4)	CWR29C(3)336(1)(2)D(5)	2.0	8.0	1.3	248	125	1
4	33	E/5125	T429E336(1)004(2)(3)(4)	CWR29C(3)336(1)(2)E(5)	2.0	8.0	0.9	316	125	1
4	33	F/5634	T429F336(1)004(2)(3)(4)	CWR29C(3)336(1)(2)F(5)	2.0	8.0	0.6	408	125	1
4	47	E/5125	T429E476(1)004(2)(3)(4)	CWR29C(3)476(1)(2)E(5)	2.0	8.0	0.9	316	125	1
4	68	E/5125	T429E686(1)004(2)(3)(4)	CWR29C(3)686(1)(2)E(5)	3.0	8.0	0.9	316	125	1
4	68	G/6728	T429G686(1)004(2)(3)(4)	CWR29C(3)686(1)(2)G(5)	3.0	10.0	0.275	674	125	1
4	100	F/5634	T429F107(1)004(2)(3)(4)	CWR29C(3)107(1)(2)F(5)	4.0	10.0	0.55	408	125	1
4	100	H/7238	T429H107(1)004(2)(3)(4)	CWR29C(3)107(1)(2)H(5)	4.0	10.0	0.18	913	125	1
4	150	G/6728	T429G157(1)004(2)(3)(4)	CWR29C(3)157(1)(2)H(5)	6.0	10.0	0.25	707	125	1
4	220	H/7238	T429H227(1)004(2)(3)(4)	CWR29C(3)227(1)(2)H(5)	8.0	10.0	0.20	866	125	1
4	330	H/7238	T429H337(1)004(2)(3)(4)	CWR29C(3)337(1)(2)H(5)	10.0	10.0	0.18	913	125	1
6	1.5	A/2513	T429A155(1)006(2)(3)(4)	CWR29D(3)155(1)(2)A(5)	1.0	6.0	4.0	112	125	1
6	3.3	A/2513	T429A335(1)006(2)(3)(4)	CWR29D(3)335(1)(2)A(5)	1.0	6.0	6.0	91	125	1
6	3.3	B/3813	T429B335(1)006(2)(3)(4)	CWR29D(3)335(1)(2)B(5)	1.0	6.0	3.2	148	125	1
6	4.7	A/2513	T429A475(1)006(2)(3)(4)	CWR29D(3)475(1)(2)A(5)	1.0	6.0	6.0	91	125	1
6	4.7	C/5113	T429C475(1)006(2)(3)(4)	CWR29D(3)475(1)(2)C(5)	1.0	6.0	2.2	185	125	1
6	6.8	B/3813	T429B685(1)006(2)(3)(4)	CWR29D(3)685(1)(2)B(5)	1.0	6.0	3.2	148	125	1
6	6.8	D/3825	T429D685(1)006(2)(3)(4)	CWR29D(3)685(1)(2)D(5)	1.0	6.0	1.5	231	125	1
6	10	B/3813	T429B106(1)006(2)(3)(4)	CWR29D(3)106(1)(2)B(5)	1.0	6.0	3.2	148	125	1
6	10	E/5125	T429E106(1)006(2)(3)(4)	CWR29D(3)106(1)(2)E(5)	1.0	8.0	1.0	300	125	1
6	15	B/3813	T429B156(1)006(2)(3)(4)	CWR29D(3)156(1)(2)B(5)	1.0	8.0	3.2	148	125	1
6	15	D/3825	T429D156(1)006(2)(3)(4)	CWR29D(3)156(1)(2)D(5)	1.0	8.0	1.7	217	125	1
6	15	E/5125	T429E156(1)006(2)(3)(4)	CWR29D(3)156(1)(2)E(5)	1.0	8.0	0.9	316	125	1
6	22	D/3825	T429D226(1)006(2)(3)(4)	CWR29D(3)226(1)(2)D(5)	1.0	6.0	1.7	217	125	1
6	22	E/5125	T429E226(1)006(2)(3)(4)	CWR29D(3)226(1)(2)E(5)	2.0	8.0	1.0	300	125	1
6	22	F/5634	T429F226(1)006(2)(3)(4)	CWR29D(3)226(1)(2)F(5)	2.0	8.0	0.6	408	125	1
6	33	E/5125	T429E336(1)006(2)(3)(4)	CWR29D(3)336(1)(2)E(5)	2.0	6.0	1.0	300	125	1
6	47	F/5634	T429F476(1)006(2)(3)(4)	CWR29D(3)476(1)(2)F(5)	3.0	8.0	1.0	316	125	1
6	47	G/6728	T429G476(1)006(2)(3)(4)	CWR29D(3)476(1)(2)G(5)	3.0	10.0	0.275	674	125	1
6	68	F/5634	T429F686(1)006(2)(3)(4)	CWR29D(3)686(1)(2)F(5)	4.0	10.0	0.4	500	125	1
6	68	G/6728	T429G686(1)006(2)(3)(4)	CWR29D(3)686(1)(2)G(5)	4.0	10.0	0.25	707	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET/CWR part number, insert M for ±20%, K for ±10%, or J for ±5%. Designates Capacitance Tolerance.
(2) To complete KEMET/CWR part number, insert failure rate letter per the Ordering Information found on page 2. Designates Reliability Level.
(3) To complete KEMET/CWR part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder plated or K = Solder fused. Designates Termination Finish.
(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = −55°C +85°C after Weibull, or 4252 = −55°C +85°C before Weibull. Designates Surge Current Option.
(5) To complete CWR part number, insert A = +25°C after Weibull, B = −55°C +85°C after Weibull, C = −55°C +85°C before Weibull or Z = None. Designates Surge Current Option.
Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
6	68	H/7238	T429H686(1)006(2)(3)(4)	CWR29D(3)686(1)(2)H(5)	4.0	10.0	0.18	913	125	1
6	100	G/6728	T429G107(1)006(2)(3)(4)	CWR29D(3)107(1)(2)G(5)	6.0	10.0	0.275	674	125	1
6	150	G/6728	T429G157(1)006(2)(3)(4)	CWR29D(3)157(1)(2)G(5)	10.0	10.0	0.275	674	125	1
6	220	H/7238	T429H227(1)006(2)(3)(4)	CWR29D(3)227(1)(2)H(5)	10.0	10.0	0.18	913	125	1
6	330	H/7238	T429H337(1)006(2)(3)(4)	CWR29D(3)337(1)(2)H(5)	20.0	10.0	0.18	913	125	1
10	1	A/2513	T429A105(1)010(2)(3)(4)	CWR29F(3)105(1)(2)A(5)	1.0	6.0	5.0	100	125	1
10	2.2	A/2513	T429A225(1)010(2)(3)(4)	CWR29F(3)225(1)(2)A(5)	1.0	6.0	6.0	91	125	1
10	2.2	B/3813	T429B225(1)010(2)(3)(4)	CWR29F(3)225(1)(2)B(5)	1.0	6.0	3.2	148	125	1
10	3.3	A/2513	T429A335(1)010(2)(3)(4)	CWR29F(3)335(1)(2)A(5)	1.0	6.0	6.0	91	125	1
10	3.3	C/5113	T429C335(1)010(2)(3)(4)	CWR29F(3)335(1)(2)C(5)	1.0	6.0	2.2	185	125	1
10	4.7	B/3813	T429B475(1)010(2)(3)(4)	CWR29F(3)475(1)(2)B(5)	1.0	6.0	3.2	148	125	1
10	4.7	C/5113	T429C475(1)010(2)(3)(4)	CWR29F(3)475(1)(2)C(5)	1.0	6.0	2.2	185	125	1
10	4.7	D/3825	T429D475(1)010(2)(3)(4)	CWR29F(3)475(1)(2)D(5)	1.0	6.0	1.5	231	125	1
10	6.8	B/3813	T429B685(1)010(2)(3)(4)	CWR29F(3)685(1)(2)B(5)	1.0	6.0	3.2	148	125	1
10	6.8	C/5113	T429C685(1)010(2)(3)(4)	CWR29F(3)685(1)(2)C(5)	1.0	6.0	2.2	185	125	1
10	6.8	D/3825	T429D685(1)010(2)(3)(4)	CWR29F(3)685(1)(2)D(5)	1.0	6.0	1.7	217	125	1
10	6.8	E/5125	T429E685(1)010(2)(3)(4)	CWR29F(3)685(1)(2)E(5)	1.0	6.0	1.0	300	125	1
10	10	B/3813	T429B106(1)010(2)(3)(4)	CWR29F(3)106(1)(2)B(5)	1.0	8.0	3.2	148	125	1
10	10	C/5113	T429C106(1)010(2)(3)(4)	CWR29F(3)106(1)(2)C(5)	1.0	6.0	2.2	185	125	1
10	10	D/3825	T429D106(1)010(2)(3)(4)	CWR29F(3)106(1)(2)D(5)	1.0	6.0	1.3	248	125	1
10	10	E/5125	T429E106(1)010(2)(3)(4)	CWR29F(3)106(1)(2)E(5)	1.0	6.0	1.0	300	125	1
10	15	D/3825	T429D156(1)010(2)(3)(4)	CWR29F(3)156(1)(2)D(5)	2.0	6.0	1.7	217	125	1
10	15	E/5125	T429E156(1)010(2)(3)(4)	CWR29F(3)156(1)(2)E(5)	2.0	8.0	0.9	316	125	1
10	15	F/5634	T429F156(1)010(2)(3)(4)	CWR29F(3)156(1)(2)F(5)	2.0	8.0	0.7	378	125	1
10	22	E/5125	T429E226(1)010(2)(3)(4)	CWR29F(3)226(1)(2)E(5)	3.0	8.0	0.6	387	125	1
10	33	F/5634	T429F336(1)010(2)(3)(4)	CWR29F(3)336(1)(2)F(5)	3.0	8.0	0.4	500	125	1
10	33	G/6728	T429G336(1)010(2)(3)(4)	CWR29F(3)336(1)(2)G(5)	3.0	10.0	0.275	674	125	1
10	47	F/5634	T429F476(1)010(2)(3)(4)	CWR29F(3)476(1)(2)F(5)	4.0	10.0	0.4	500	125	1
10	47	G/6728	T429G476(1)010(2)(3)(4)	CWR29F(3)476(1)(2)G(5)	4.0	10.0	0.25	707	125	1
10	47	H/7238	T429H476(1)010(2)(3)(4)	CWR29F(3)476(1)(2)H(5)	5.0	10.0	0.18	913	125	1
10	68	G/6728	T429G686(1)010(2)(3)(4)	CWR29F(3)686(1)(2)G(5)	6.0	10.0	0.275	674	125	1
10	100	G/6728	T429G107(1)010(2)(3)(4)	CWR29F(3)107(1)(2)G(5)	10.0	10.0	0.275	674	125	1
10	100	H/7238	T429H107(1)010(2)(3)(4)	CWR29F(3)107(1)(2)H(5)	10.0	10.0	0.18	913	125	1
10	150	H/7238	T429H157(1)010(2)(3)(4)	CWR29F(3)157(1)(2)H(5)	15.0	10.0	0.18	913	125	1
10	150	X/6954	T429X157(1)010(2)(3)(4)	CWR29F(3)157(1)(2)X(5)	15.0	10.0	0.065	1,593	125	1
10	220	H/7238	T429H227(1)010(2)(3)(4)	CWR29F(3)227(1)(2)H(5)	20.0	10.0	0.18	913	125	1
15	0.68	A/2513	T429A684(1)015(2)(3)(4)	CWR29H(3)684(1)(2)A(5)	1.0	6.0	6.0	91	125	1
15	1	A/2513	T429A105(1)015(2)(3)(4)	CWR29H(3)105(1)(2)A(5)	1.0	6.0	7.5	82	125	1
15	1.5	A/2513	T429A155(1)015(2)(3)(4)	CWR29H(3)155(1)(2)A(5)	1.0	6.0	7.5	82	125	1
15	1.5	B/3813	T429B155(1)015(2)(3)(4)	CWR29H(3)155(1)(2)B(5)	1.0	6.0	3.2	148	125	1
15	2.2	A/2513	T429A225(1)015(2)(3)(4)	CWR29H(3)225(1)(2)A(5)	1.0	6.0	7.5	82	125	1
15	2.2	C/5113	T429C225(1)015(2)(3)(4)	CWR29H(3)225(1)(2)C(5)	1.0	6.0	2.2	185	125	1
15	3.3	B/3813	T429B335(1)015(2)(3)(4)	CWR29H(3)335(1)(2)B(5)	1.0	6.0	3.6	139	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET/CWR part number, insert M for ±20%, K for ±10%, or J for ±5%. Designates Capacitance Tolerance.
(2) To complete KEMET/CWR part number, insert failure rate letter per the Ordering Information found on page 2. Designates Reliability Level.
(3) To complete KEMET/CWR part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder plated or K = Solder fused. Designates Termination Finish.
(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = −55°C +85°C after Weibull, or 4252 = −55°C +85°C before Weibull. Designates Surge Current Option.
(5) To complete CWR part number, insert A = +25°C after Weibull, B = −55°C +85°C after Weibull, C = −55°C +85°C before Weibull or Z = None. Designates Surge Current Option.
Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
15	3.3	D/3825	T429D335(1)015(2)(3)(4)	CWR29H(3)335(1)(2)D(5)	1.0	6.0	1.7	217	125	1
15	4.7	B/3813	T429B475(1)015(2)(3)(4)	CWR29H(3)475(1)(2)B(5)	1.0	6.0	2.0	187	125	1
15	4.7	C/5113	T429C475(1)015(2)(3)(4)	CWR29H(3)475(1)(2)C(5)	1.0	6.0	2.2	185	125	1
15	4.7	D/3825	T429D475(1)015(2)(3)(4)	CWR29H(3)475(1)(2)D(5)	1.0	6.0	2.0	200	125	1
15	4.7	E/5125	T429E475(1)015(2)(3)(4)	CWR29H(3)475(1)(2)E(5)	1.0	6.0	1.2	274	125	1
15	6.8	D/3825	T429D685(1)015(2)(3)(4)	CWR29H(3)685(1)(2)D(5)	1.0	6.0	2.0	200	125	1
15	6.8	E/5125	T429E685(1)015(2)(3)(4)	CWR29H(3)685(1)(2)E(5)	1.0	8.0	0.9	316	125	1
15	10	D/3825	T429D106(1)015(2)(3)(4)	CWR29H(3)106(1)(2)D(5)	2.0	6.0	2.0	200	125	1
15	10	E/5125	T429E106(1)015(2)(3)(4)	CWR29H(3)106(1)(2)E(5)	2.0	6.0	1.2	274	125	1
15	10	F/5634	T429F106(1)015(2)(3)(4)	CWR29H(3)106(1)(2)F(5)	2.0	6.0	0.667	378	125	1
15	15	E/5125	T429E156(1)015(2)(3)(4)	CWR29H(3)156(1)(2)E(5)	2.0	6.0	1.2	274	125	1
15	15	F/5634	T429F156(1)015(2)(3)(4)	CWR29H(3)156(1)(2)F(5)	2.0	8.0	0.8	354	125	1
15	22	F/5634	T429F226(1)015(2)(3)(4)	CWR29H(3)226(1)(2)F(5)	3.0	8.0	0.8	354	125	1
15	22	G/6728	T429G226(1)015(2)(3)(4)	CWR29H(3)226(1)(2)G(5)	4.0	6.0	0.275	674	125	1
15	33	F/5634	T429F336(1)015(2)(3)(4)	CWR29H(3)336(1)(2)F(5)	5.0	6.0	0.8	354	125	1
15	33	G/6728	T429G336(1)015(2)(3)(4)	CWR29H(3)336(1)(2)G(5)	6.0	8.0	0.275	674	125	1
15	33	H/7238	T429H336(1)015(2)(3)(4)	CWR29H(3)336(1)(2)H(5)	5.0	8.0	0.18	913	125	1
15	47	G/6728	T429G476(1)015(2)(3)(4)	CWR29H(3)476(1)(2)G(5)	10.0	8.0	0.275	674	125	1
15	47	H/7238	T429H476(1)015(2)(3)(4)	CWR29H(3)476(1)(2)H(5)	10.0	8.0	0.18	913	125	1
15	68	G/6728	T429G686(1)015(2)(3)(4)	CWR29H(3)686(1)(2)G(5)	10.0	8.0	0.275	674	125	1
15	68	H/7238	T429H686(1)015(2)(3)(4)	CWR29H(3)686(1)(2)H(5)	10.0	8.0	0.18	913	125	1
15	100	H/7238	T429H107(1)015(2)(3)(4)	CWR29H(3)107(1)(2)H(5)	15.0	10.0	0.18	913	125	1
20	0.47	A/2513	T429A474(1)020(2)(3)(4)	CWR29J(3)474(1)(2)A(5)	1.0	8.0	7.5	82	125	1
20	0.68	A/2513	T429A684(1)020(2)(3)(4)	CWR29J(3)684(1)(2)A(5)	1.0	6.0	7.5	82	125	1
20	0.68	B/3813	T429B684(1)020(2)(3)(4)	CWR29J(3)684(1)(2)B(5)	1.0	6.0	5.6	112	125	1
20	1	A/2513	T429A105(1)020(2)(3)(4)	CWR29J(3)105(1)(2)A(5)	1.0	6.0	7.5	82	125	1
20	1	B/3813	T429B105(1)020(2)(3)(4)	CWR29J(3)105(1)(2)B(5)	1.0	6.0	4.8	121	125	1
20	1.5	B/3813	T429B155(1)020(2)(3)(4)	CWR29J(3)155(1)(2)B(5)	1.0	6.0	3.6	139	125	1
20	1.5	C/5113	T429C155(1)020(2)(3)(4)	CWR29J(3)155(1)(2)C(5)	1.0	6.0	2.4	177	125	1
20	2.2	B/3813	T429B225(1)020(2)(3)(4)	CWR29J(3)225(1)(2)B(5)	1.0	6.0	3.6	139	125	1
20	2.2	D/3825	T429D225(1)020(2)(3)(4)	CWR29J(3)225(1)(2)D(5)	1.0	6.0	1.7	217	125	1
20	3.3	D/3825	T429D335(1)020(2)(3)(4)	CWR29J(3)335(1)(2)D(5)	1.0	6.0	2.0	200	125	1
20	3.3	E/5125	T429E335(1)020(2)(3)(4)	CWR29J(3)335(1)(2)E(5)	1.0	6.0	1.2	274	125	1
20	4.7	E/5125	T429E475(1)020(2)(3)(4)	CWR29J(3)475(1)(2)E(5)	1.0	6.0	1.7	230	125	1
20	6.8	E/5125	T429E685(1)020(2)(3)(4)	CWR29J(3)685(1)(2)E(5)	2.0	6.0	1.5	245	125	1
20	6.8	F/5634	T429F685(1)020(2)(3)(4)	CWR29J(3)685(1)(2)F(5)	2.0	6.0	0.7	378	125	1
20	10	E/5125	T429E106(1)020(2)(3)(4)	CWR29J(3)106(1)(2)E(5)	2.0	6.0	1.5	245	125	1
20	10	F/5634	T429F106(1)020(2)(3)(4)	CWR29J(3)106(1)(2)F(5)	2.0	6.0	0.8	354	125	1
20	15	F/5634	T429F156(1)020(2)(3)(4)	CWR29J(3)156(1)(2)F(5)	3.0	6.0	0.8	354	125	1
20	15	G/6728	T429G156(1)020(2)(3)(4)	CWR29J(3)156(1)(2)G(5)	3.0	6.0	0.275	674	125	1
20	22	G/6728	T429G226(1)020(2)(3)(4)	CWR29J(3)226(1)(2)G(5)	4.0	6.0	0.625	447	125	1
20	22	H/7238	T429H226(1)020(2)(3)(4)	CWR29J(3)226(1)(2)H(5)	4.0	6.0	0.18	913	125	1
20	33	H/7238	T429H336(1)020(2)(3)(4)	CWR29J(3)336(1)(2)H(5)	6.0	8.0	0.18	913	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET/CWR part number, insert M for ±20%, K for ±10%, or J for ±5%. Designates Capacitance Tolerance.
(2) To complete KEMET/CWR part number, insert failure rate letter per the Ordering Information found on page 2. Designates Reliability Level.
(3) To complete KEMET/CWR part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder plated or K = Solder fused. Designates Termination Finish.
(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = −55°C +85°C after Weibull, or 4252 = −55°C +85°C before Weibull. Designates Surge Current Option.
(5) To complete CWR part number, insert A = +25°C after Weibull, B = −55°C +85°C after Weibull, C = −55°C +85°C before Weibull or Z = None. Designates Surge Current Option.
Refer to Ordering Information for additional detail.

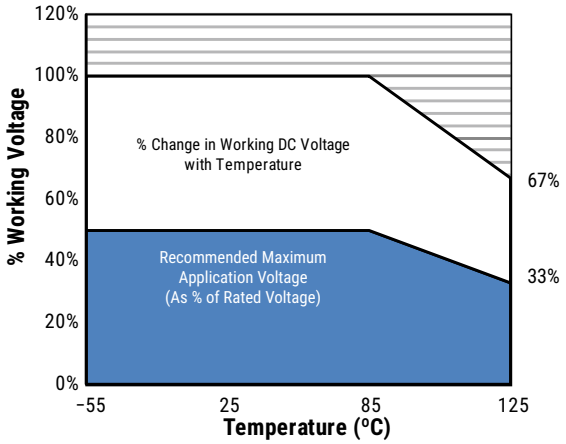
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
20	47	H/7238	T429H476(1)020(2)(3)(4)	CWR29J(3)476(1)(2)H(5)	10.0	8.0	0.18	913	125	1
20	47	X/6954	T429X476(1)020(2)(3)(4)	CWR29J(3)476(1)(2)X(5)	10.0	8.0	0.11	1,225	125	1
25	0.33	A/2513	T429A334(1)025(2)(3)(4)	CWR29K(3)334(1)(2)A(5)	1.0	6.0	7.5	82	125	1
25	0.47	A/2513	T429A474(1)025(2)(3)(4)	CWR29K(3)474(1)(2)A(5)	1.0	6.0	7.5	82	125	1
25	0.68	B/3813	T429B684(1)025(2)(3)(4)	CWR29K(3)684(1)(2)B(5)	1.0	6.0	4.0	132	125	1
25	1	B/3813	T429B105(1)025(2)(3)(4)	CWR29K(3)105(1)(2)B(5)	1.0	6.0	4.0	132	125	1
25	1	C/5113	T429C105(1)025(2)(3)(4)	CWR29K(3)105(1)(2)C(5)	1.0	6.0	2.6	170	125	1
25	1.5	D/3825	T429D155(1)025(2)(3)(4)	CWR29K(3)155(1)(2)D(5)	1.0	6.0	1.7	217	125	1
25	2.2	D/3825	T429D225(1)025(2)(3)(4)	CWR29K(3)225(1)(2)D(5)	1.0	6.0	2.0	200	125	1
25	2.2	E/5125	T429E225(1)025(2)(3)(4)	CWR29K(3)225(1)(2)E(5)	1.0	6.0	1.0	300	125	1
25	3.3	E/5125	T429E335(1)025(2)(3)(4)	CWR29K(3)335(1)(2)E(5)	1.0	6.0	1.2	274	125	1
25	4.7	F/5634	T429F475(1)025(2)(3)(4)	CWR29K(3)475(1)(2)F(5)	2.0	6.0	0.7	378	125	1
25	6.8	F/5634	T429F685(1)025(2)(3)(4)	CWR29K(3)685(1)(2)F(5)	2.0	6.0	0.8	354	125	1
25	6.8	G/6728	T429G685(1)025(2)(3)(4)	CWR29K(3)685(1)(2)G(5)	2.0	6.0	0.3	645	125	1
25	10	G/6728	T429G106(1)025(2)(3)(4)	CWR29K(3)106(1)(2)G(5)	3.0	6.0	0.35	598	125	1
25	15	G/6728	T429G156(1)025(2)(3)(4)	CWR29K(3)156(1)(2)G(5)	4.0	6.0	0.35	598	125	1
25	15	H/7238	T429H156(1)025(2)(3)(4)	CWR29K(3)156(1)(2)H(5)	4.0	6.0	0.2	866	125	1
25	22	G/6728	T429G226(1)025(2)(3)(4)	CWR29K(3)226(1)(2)G(5)	6.0	6.0	0.35	598	125	1
25	22	H/7238	T429H226(1)025(2)(3)(4)	CWR29K(3)226(1)(2)H(5)	6.0	6.0	0.18	913	125	1
25	22	X/6954	T429X226(1)025(2)(3)(4)	CWR29K(3)226(1)(2)X(5)	6.0	6.0	0.16	1,015	125	1
25	33	H/7238	T429H336(1)025(2)(3)(4)	CWR29K(3)336(1)(2)H(5)	10.0	8.0	0.18	913	125	1
25	33	X/6954	T429X336(1)025(2)(3)(4)	CWR29K(3)336(1)(2)X(5)	10.0	8.0	0.13	1,127	125	1
35	0.22	A/2513	T429A224(1)035(2)(3)(4)	CWR29M(3)224(1)(2)A(5)	1.0	6.0	12.0	65	125	1
35	0.33	A/2513	T429A334(1)035(2)(3)(4)	CWR29M(3)334(1)(2)A(5)	1.0	6.0	12.0	65	125	1
35	0.47	B/3813	T429B474(1)035(2)(3)(4)	CWR29M(3)474(1)(2)B(5)	1.0	6.0	6.8	102	125	1
35	0.68	C/5113	T429C684(1)035(2)(3)(4)	CWR29M(3)684(1)(2)C(5)	1.0	6.0	4.0	137	125	1
35	1	D/3825	T429D105(1)035(2)(3)(4)	CWR29M(3)105(1)(2)D(5)	1.0	6.0	2.2	191	125	1
35	1.5	E/5125	T429E155(1)035(2)(3)(4)	CWR29M(3)155(1)(2)E(5)	1.0	6.0	1.3	263	125	1
35	3.3	F/5634	T429F335(1)035(2)(3)(4)	CWR29M(3)335(1)(2)F(5)	1.0	6.0	0.7	378	125	1
35	4.7	G/6728	T429G475(1)035(2)(3)(4)	CWR29M(3)475(1)(2)G(5)	2.0	6.0	0.375	577	125	1
35	6.8	G/6728	T429G685(1)035(2)(3)(4)	CWR29M(3)685(1)(2)G(5)	3.0	6.0	0.375	577	125	1
35	6.8	H/7238	T429H685(1)035(2)(3)(4)	CWR29M(3)685(1)(2)H(5)	3.0	6.0	0.5	548	125	1
35	10	H/7238	T429H106(1)035(2)(3)(4)	CWR29M(3)106(1)(2)H(5)	4.0	8.0	0.5	548	125	1
35	15	X/6954	T429X156(1)035(2)(3)(4)	CWR29M(3)156(1)(2)X(5)	6.0	6.0	0.19	932	125	1
50	0.1	A/2513	T429A104(1)050(2)(3)(4)	CWR29N(3)104(1)(2)A(5)	1.0	6.0	12.0	65	125	1
50	0.15	A/2513	T429A154(1)050(2)(3)(4)	CWR29N(3)154(1)(2)A(5)	1.0	6.0	12.0	65	125	1
50	0.22	B/3813	T429B224(1)050(2)(3)(4)	CWR29N(3)224(1)(2)B(5)	1.0	6.0	6.8	102	125	1
50	0.33	B/3813	T429B334(1)050(2)(3)(4)	CWR29N(3)334(1)(2)B(5)	1.0	6.0	4.8	121	125	1
50	0.47	C/5113	T429C474(1)050(2)(3)(4)	CWR29N(3)474(1)(2)C(5)	1.0	6.0	3.2	153	125	1
50	0.68	D/3825	T429D684(1)050(2)(3)(4)	CWR29N(3)684(1)(2)D(5)	1.0	6.0	2.3	186	125	1
50	1	E/5125	T429E105(1)050(2)(3)(4)	CWR29N(3)105(1)(2)E(5)	1.0	6.0	1.7	230	125	1
50	1.5	F/5634	T429F155(1)050(2)(3)(4)	CWR29N(3)155(1)(2)F(5)	1.0	6.0	1.1	302	125	1
50	2.2	F/5634	T429F225(1)050(2)(3)(4)	CWR29N(3)225(1)(2)F(5)	2.0	6.0	0.7	378	125	1
50	3.3	G/6728	T429G335(1)050(2)(3)(4)	CWR29N(3)335(1)(2)G(5)	2.0	6.0	0.5	500	125	1
50	4.7	H/7238	T429H475(1)050(2)(3)(4)	CWR29N(3)475(1)(2)H(5)	3.0	6.0	0.5	548	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/11 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET/CWR part number, insert M for ±20%, K for ±10%, or J for ±5%. Designates Capacitance Tolerance.
(2) To complete KEMET/CWR part number, insert failure rate letter per the Ordering Information found on page 2. Designates Reliability Level.
(3) To complete KEMET/CWR part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder plated or K = Solder fused. Designates Termination Finish.
(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = −55°C +85°C after Weibull, or 4252 = −55°C +85°C before Weibull. Designates Surge Current Option.
(5) To complete CWR part number, insert A = +25°C after Weibull, B = −55°C +85°C after Weibull, C = −55°C +85°C before Weibull or Z = None. Designates Surge Current Option.
Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for the reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C w/+20°C Rise
A	2513	50
B	3813	70
C	5113	75
D	3825	80
E	5125	90
F	5634	100
G	6728	125
H	7238	150
X	6954	165

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

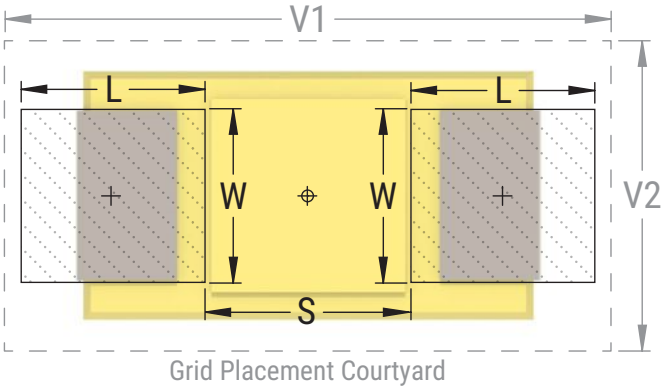
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe, plus, in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	L	W	S	V1	V2	L	W	S	V1	V2	L	W	S	V1	V2
A[1]	1005	2.19	1.44	0.15	5.54	2.66	1.89	1.32	0.15	4.44	2.16	1.52	1.22	0.29	3.58	1.90
B	1505	2.30	1.44	1.20	6.80	2.66	1.90	1.32	1.40	5.70	2.16	1.52	1.22	1.56	4.84	1.90
C	2005	2.30	1.44	2.47	8.08	2.66	1.90	1.32	2.67	6.98	2.16	1.52	1.22	2.83	6.12	1.90
D	1510	2.30	2.58	1.20	6.80	3.92	1.90	2.46	1.40	5.70	3.42	1.52	2.36	1.56	4.84	3.16
E	2010	2.30	2.58	2.47	8.08	3.92	1.90	2.46	2.67	6.98	3.42	1.52	2.36	2.83	6.12	3.16
F	2214	2.30	3.47	2.98	8.58	4.82	1.90	3.35	3.18	7.48	4.32	1.52	3.25	3.34	6.62	4.06
G	2711	2.81	2.84	3.10	9.72	4.18	2.41	2.72	3.30	8.62	3.68	2.03	2.62	3.46	7.76	3.42
H	2915	2.81	3.84	3.61	10.24	5.20	2.41	3.72	3.81	9.14	4.70	2.03	3.62	3.97	8.28	4.44
X	2824	2.73	3.22	3.46	9.92	6.80	2.33	3.10	3.66	8.82	6.30	1.95	3.00	3.82	7.96	6.04

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component desity product applications. Before adapting the minimum land pattern variations, the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Land pattern geometry is too small for silkscreen outline.*



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

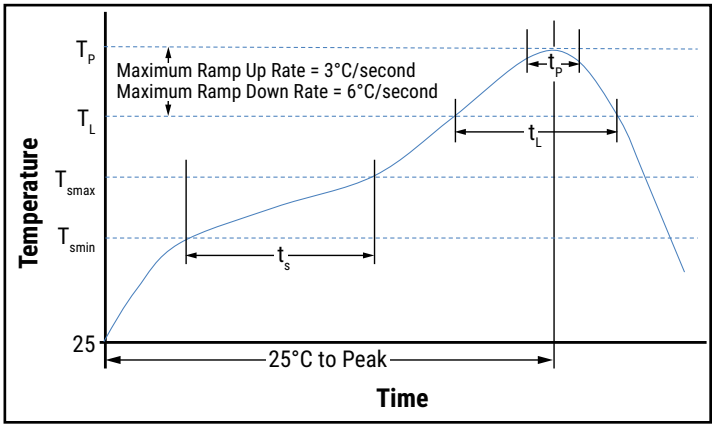
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

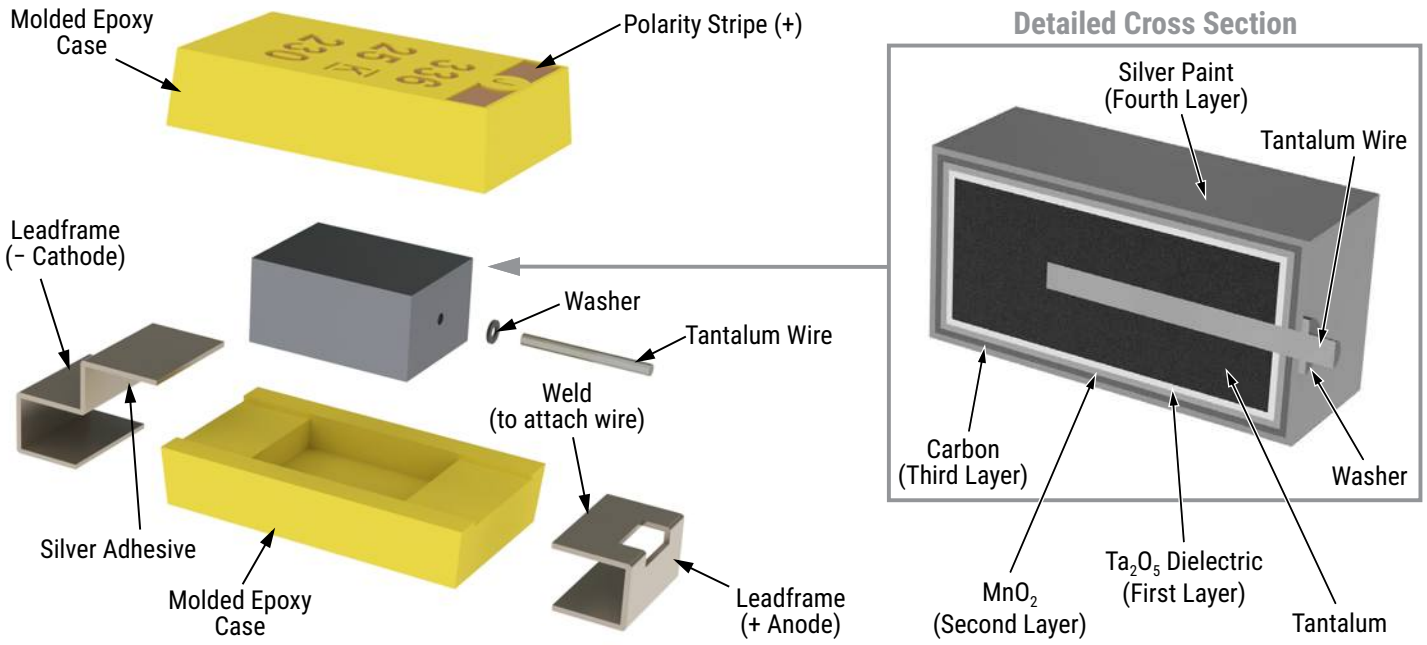
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



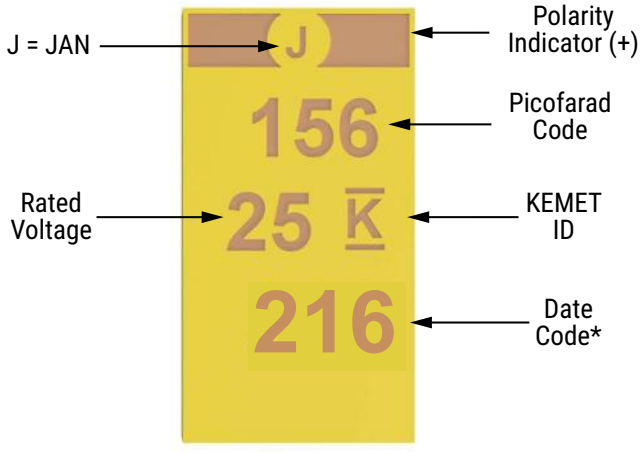
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature - reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



Date Code *	
1st digit = last number of year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

* 216 = 16th week of 2022

Tape & Reel Packaging Information

KEMET's molded tantalum and aluminum chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

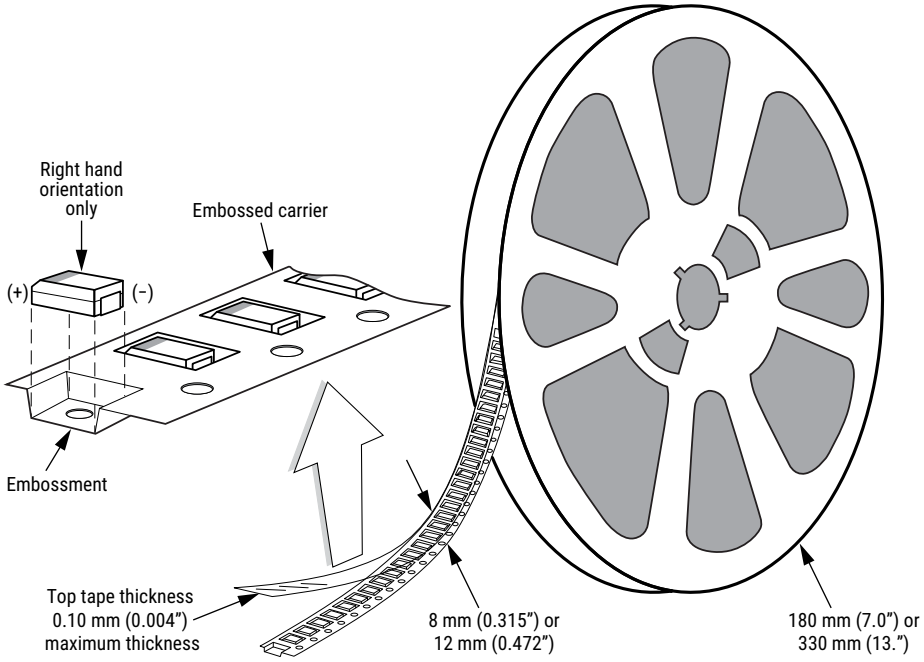


Table 3 – Packaging Quantity

KEMET Case Codes		Tape Width (mm)	Tape and Reel Dimensions	
			180 mm (7" diameter)	330 mm (13" diameter)
A	1005	8	2,500	9,500
B	1505	12	2,500	9,500
C	2005	12	2,500	9,500
D	1510	12	2,500	9,500
E	2010	12	2,500	9,500
F	2214	12	500	3,500
G	2711	12	500	2,500
H	2915	12	500	2,500
X	2824	12	500	2,500

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

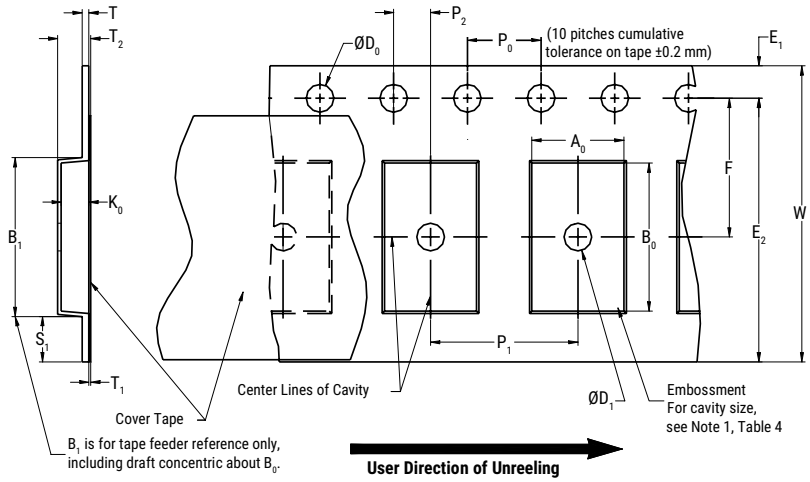


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover Tape Break Force: 1.0 kg minimum.
2. Cover Tape Peel Strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 Newton (10 to 100 gf)
12 and 16 mm	0.1 to 1.3 Newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

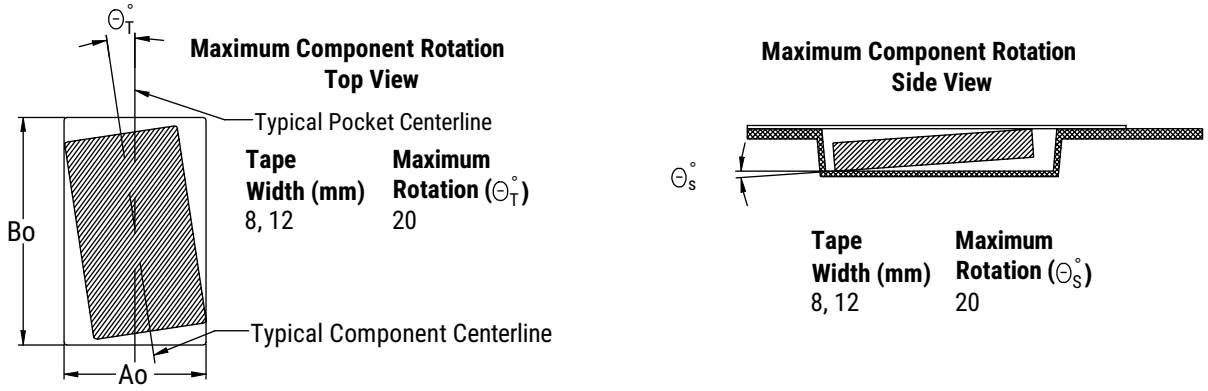


Figure 3 – Maximum Lateral Movement

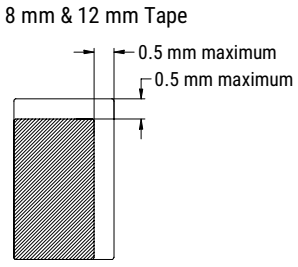


Figure 4 – Bending Radius

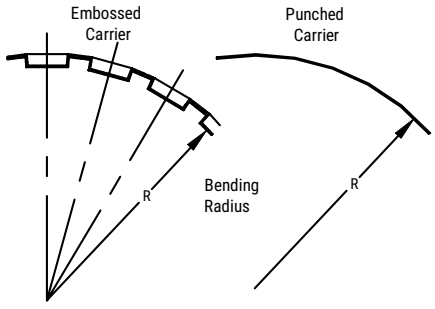
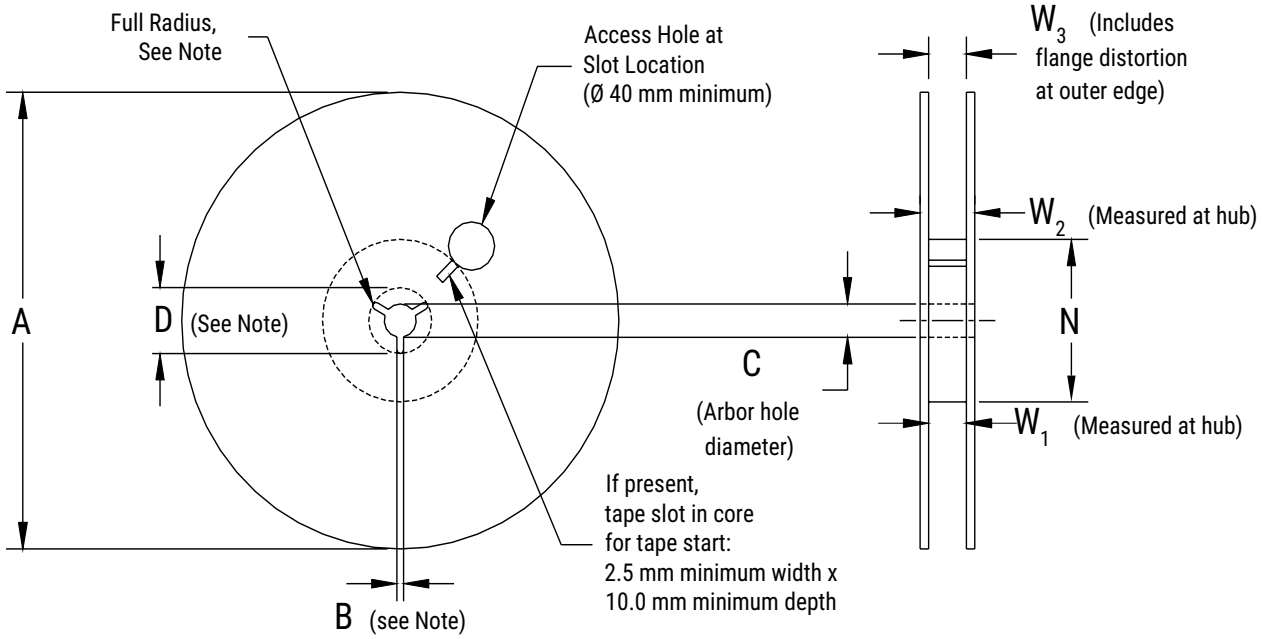


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

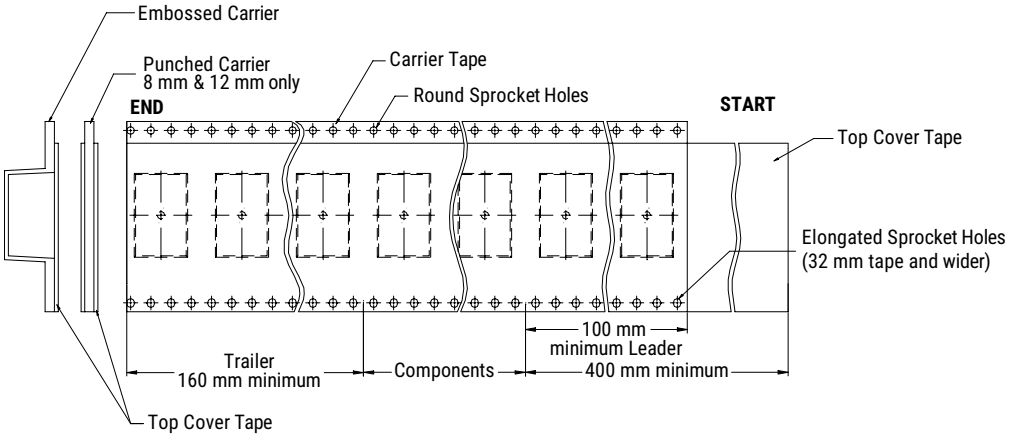
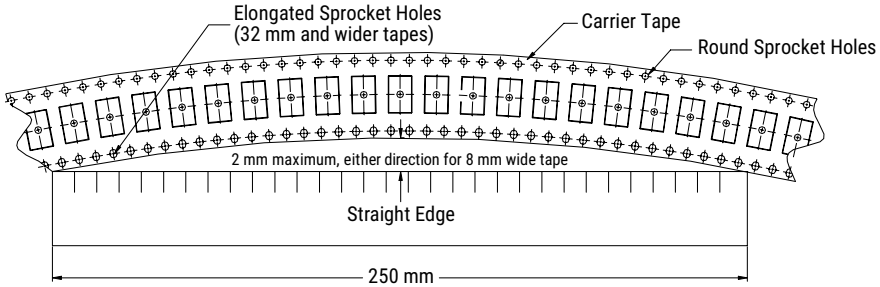


Figure 7 – Maximum Camber



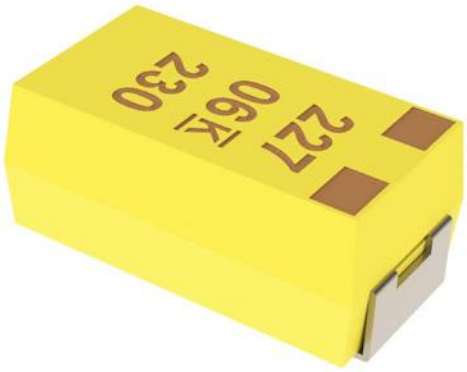
T490 Commercial Grade MnO_2

Overview

The KEMET T490, designed for customer product applications (low temperature demanding applications), meets RoHS compliance with leads constructed of 100% matte tin and a green molding compound. The T490 is classified as MSL (Moisture Sensitivity Level) 1 under J STD 020: unlimited floor lifetime at ≤ 30°C/85% RH. Tin/lead (Sn/Pb) terminations are available upon request for any part number. Gold-plated terminations are also available for use with conductive epoxy attachment processes. Standard packaging of these devices is Tape & Reel in accordance with EIA 481. This system provides perfect compatibility with all tape-fed placement units.

Benefits

- Tape & Reel standard packaging per EIA 481
- Symmetrical compliant terminations
- Optional gold-plated terminations
- Laser-marked case
- Suitable for 3 x 260°C reflow passes
- Halogen-free epoxy
- Capacitance values of 47 – 470 µF
- Tolerance of ±20%
- Voltage rating of 4 – 10 VDC
- 0.2% per 1,000 hours at 85°C 0.5 V_R Reliability
- Small and low profile case sizes
- RoHS Compliant and lead-free terminations
- MSL Reflow Temp ≤ 260°C = 1
- Operating temperature range of −55°C to +125°C



Applications

Typical applications include decoupling and filtering in communications end applications such as cellphones and consumer mobile.

Environmental Compliance

RoHS compliant when ordered with 100% Sn solder.
- Halogen-free
- Epoxy compliant with UL94 V–0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	490	B	227	M	006	A	T	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Packaging (C-Spec)
T = Tantalum	Industrial	A B T	First two digits represent significant figures. Third digit specifies number of zeros.	M = ±20%	004 = 4 006 = 6 010 = 10	A = N/A	T = 100% Matte Tin (Sn) plated H = Standard solder coated (SnPb 5% Pb minimum) G = Gold-plated (A, B only)	Blank = 7" Reel 7280 = 13" Reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	47 – 470 µF at 120 Hz/25°C
Capacitance Tolerance	M Tolerance (20%)
Rated Voltage Range	4 – 10 V
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

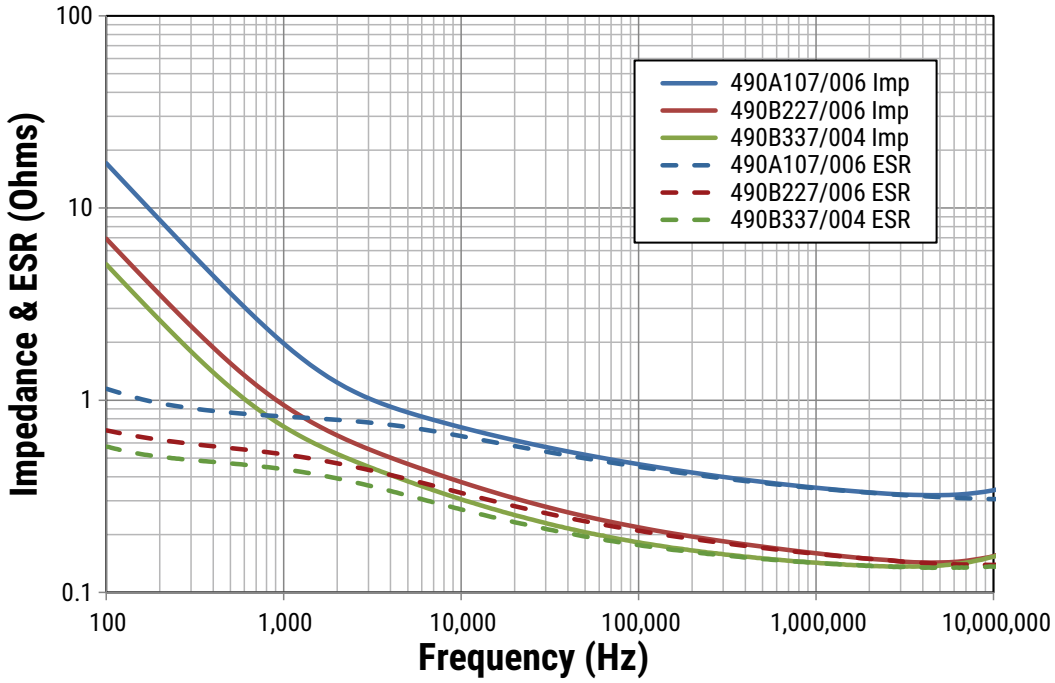
Qualification

Test	Condition		Characteristics			
Endurance	40°C at 1.0 V_R 85°C at 1/2 V_R and 125°C at 1/5 rated voltage, 1,000 hours		Δ C/C	Within +10%/−20% of initial value		
			DCL	Within 2 x initial limit		
			ESR	Within 2.5 x initial limits		
Storage Life	85°C at 0 volts, 1,000 hours		Δ C/C	Within +10%/−20% of initial value		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Humidity	40°C, 93% RH, 1,000 hours, no load		Δ C/C	Within −5%/+35% of initial value		
			DCL	Within 2.0 x initial limit		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +125°C, +25°C		+25°C	−55°C	+85°C	+125°C
		Δ C/C	IL*	±10%	±20%	±30%
		DCL	IL	N/A	10 x IL	15 x IL
Surge Voltage	40°C, 1.32 x rated voltage 1,000 cycles		Δ C/C	Within +10%/−20% of initial value		
			DCL	Within 2.0 x initial limits		
			ESR	Within 1.25 x initial limits		

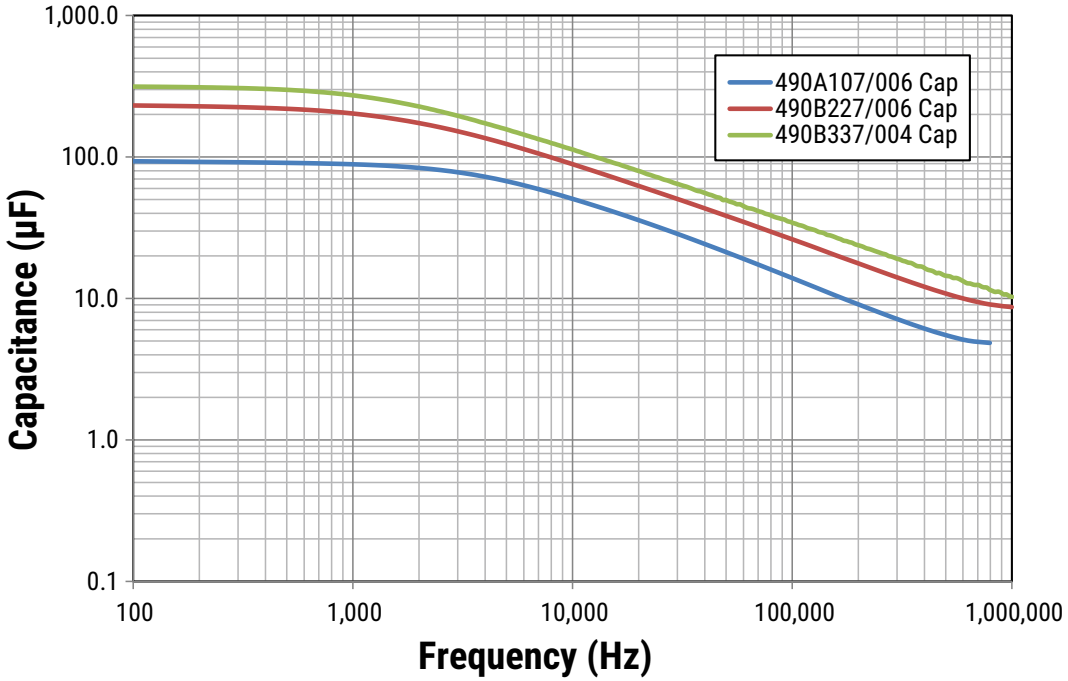
**IL = Initial limit*

Electrical Characteristics

ESR vs. Frequency

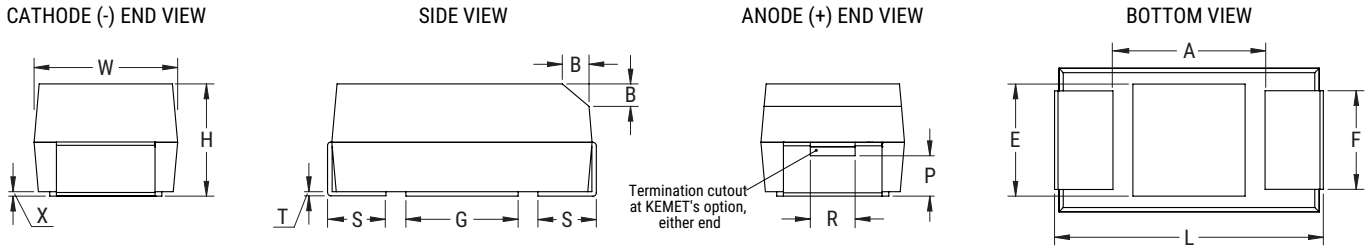


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component												
KEMET	EIA	L	W	H	F ±0.1 ±(.004)	S	B ±0.15 (Ref) ±.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216–18	3.2 ±0.2 (0.126 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.2 (0.047)	0.80 (0.032) +0.2 (0.008)/−0.3 (0.011)	0.4 (.016)	0.10 ±0.10 (0.004 ±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)
B	3528–21	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.9 ±0.2 (0.075 ±0.008)	2.2 (0.087)	0.80 (0.032) +0.2 (0.008)/−0.3 (0.011)	0.4 (.016)	0.10 ±0.10 (0.004 ±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
T	3528–12	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.1 ±0.1 (0.043 ±0.004)	2.2 (0.087)	0.80 (0.032) +0.2 (0.008)/−0.3 (0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)

Notes: (Ref) – Dimensions provided for reference only. For low profile cases, no dimensions are provided for B, P, or R because these cases do not have a bevel or a notch.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL
VDC at 40°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	100	A/3216-18	T490A107M004A(1)E500	4.0	0.5	387	125	1
4	150	A/3216-18	T490A157M004A(1)E800	6.0	0.8	306	125	1
4	150	T/3528-12	T490T157M004A(1)E1K1	6.0	1.1	252	125	1
4	220	B/3528-21	T490B227M004A(1)E500	8.8	0.5	412	125	1
4	330	B/3528-21	T490B337M004A(1)E800	13.2	0.8	326	125	1
4	470	B/3528-21	T490B477M004A(1)E1K0	18.8	1.0	291	125	1
6	47	T/3528-12	T490T476M006A(1)E800	2.8	0.8	295	125	1
6	68	A/3216-18	T490A686M006A(1)E1K0	4.1	1.0	274	125	1
6	68	T/3528-12	T490T686M006A(1)E600	4.1	0.6	342	125	1
6	100	A/3216-18	T490A107M006A(1)E500	6.0	0.5	387	125	1
6	100	A/3216-18	T490A107M006A(1)E800	6.0	0.8	306	125	1
6	100	T/3528-12	T490T107M006A(1)E1K0	6.0	1.0	265	125	1
6	150	B/3528-21	T490B157M006A(1)E500	9.0	0.5	412	125	1
6	150	B/3528-21	T490B157M006A(1)E800	9.0	0.8	326	125	1
6	220	B/3528-21	T490B227M006A(1)E300	13.2	0.3	532	125	1
6	220	B/3528-21	T490B227M006A(1)E500	13.2	0.5	412	125	1
6	330	B/3528-21	T490B337M006A(1)E800	19.8	0.8	326	125	1
10	47	T/3528-12	T490T476M010A(1)E1K0	4.7	1.0	265	125	1
10	47	A/3216-18	T490A476M010A(1)E1K0	4.7	1.0	274	125	1
10	47	A/3216-18	T490A476M010A(1)E1K2	4.7	1.2	250	125	1
10	150	B/3528-21	T490B157M010A(1)E500	15.0	0.5	412	125	1
10	150	B/3528-21	T490B157M010A(1)E800	15.0	0.8	326	125	1
10	220	B/3528-21	T490B227M010A(1)E800	22.0	0.8	326	125	1
VDC at 40°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold-plated, H = Standard solder coated (SnPb 5% Pb minimum). Designates termination finish.

Blue color text denotes "Under Development."

Refer to Ordering Information for additional detail.

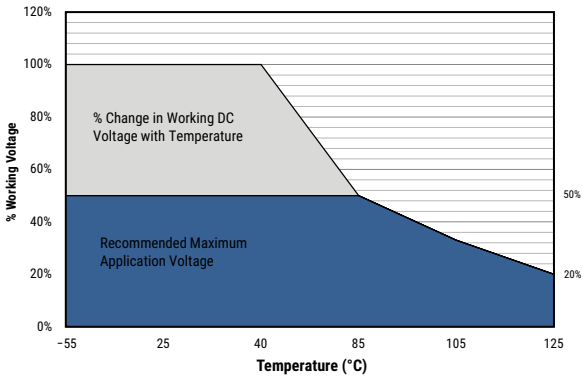
The ESR value may increase up to 1.5 x Initial Limit post mounting.

The DCL value may increase up to 2.0 x Initial Limit post mounting.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	−55°C to 40°C	40°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	100% of V_r	50% of V_r	20% of V_r
Recommended Maximum Application Voltage	50% of V_r	25% of V_r	10% of V_r



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for the reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C w/+20°C Rise
A	3216–18	75
B	3528–21	85
T	3528–12	70

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 40°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

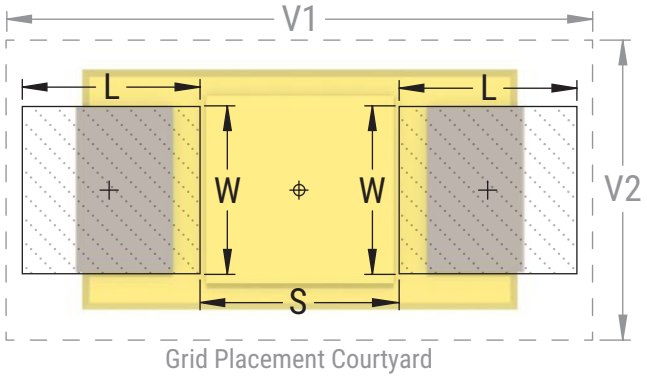
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe, plus, in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
40°C	5% of Rated Voltage
85°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
T	3528–12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component desity product applications. Before adapting the minimum land pattern variations, the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*
[2] *Land pattern geometry is too small for silkscreen outline.*



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

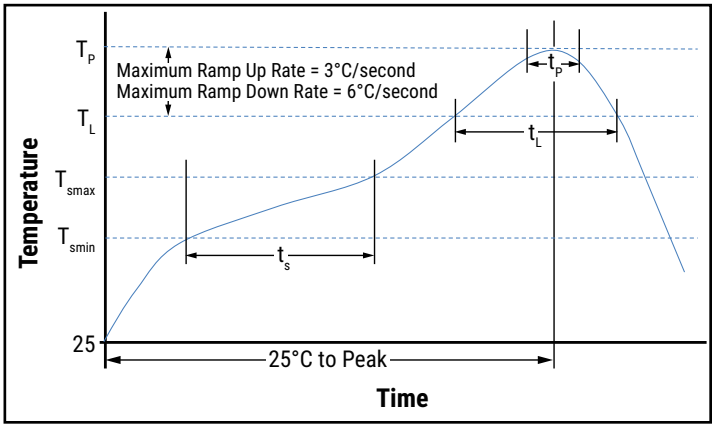
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

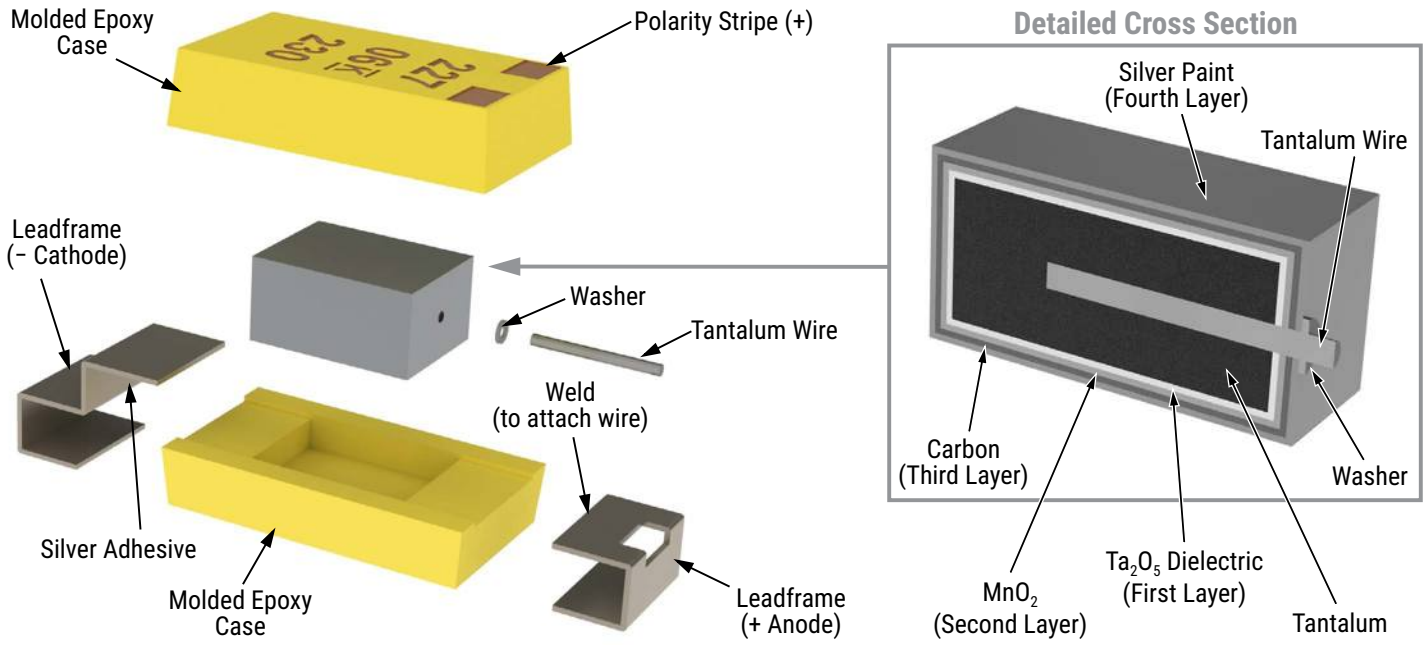
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



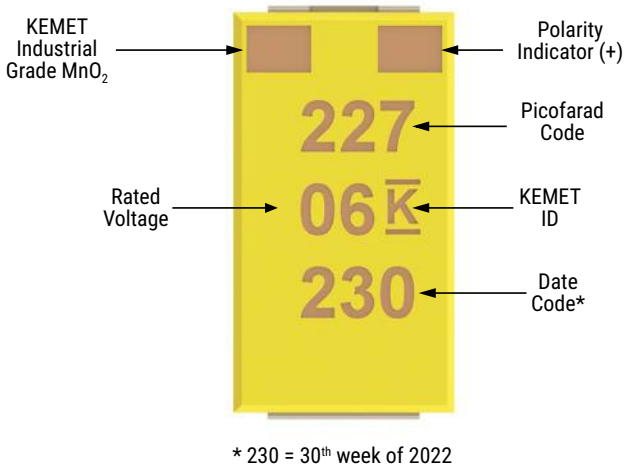
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 230 = 30th week of 2022

Date Code *	
1st digit = last number of year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

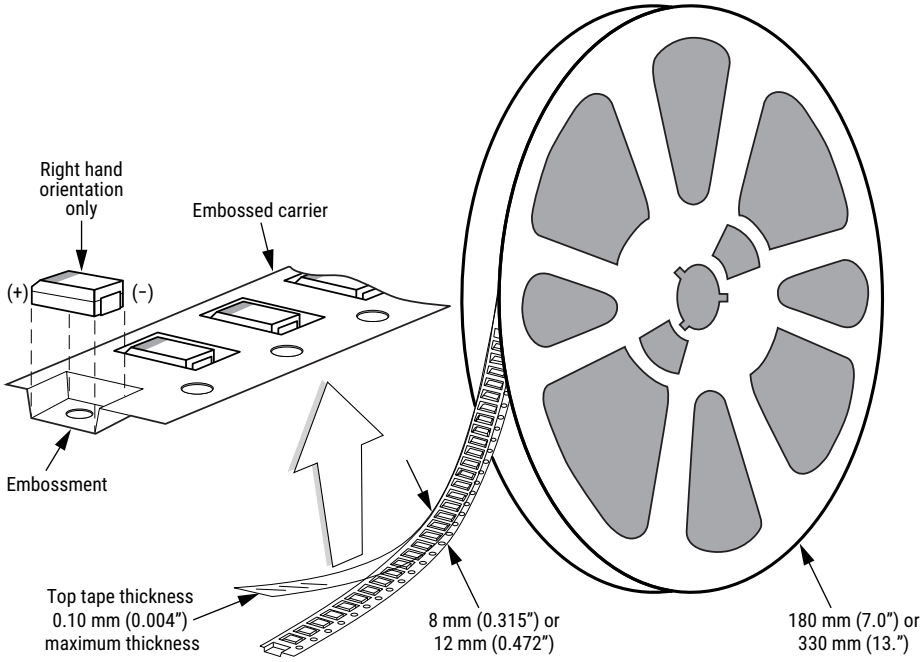


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

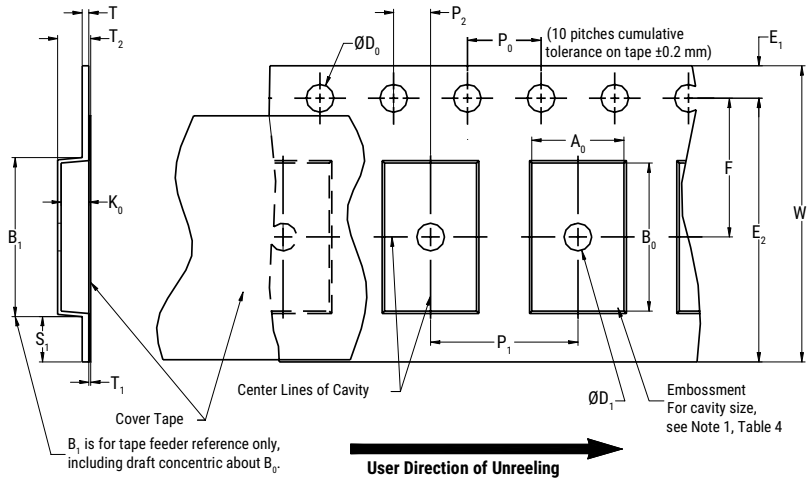


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

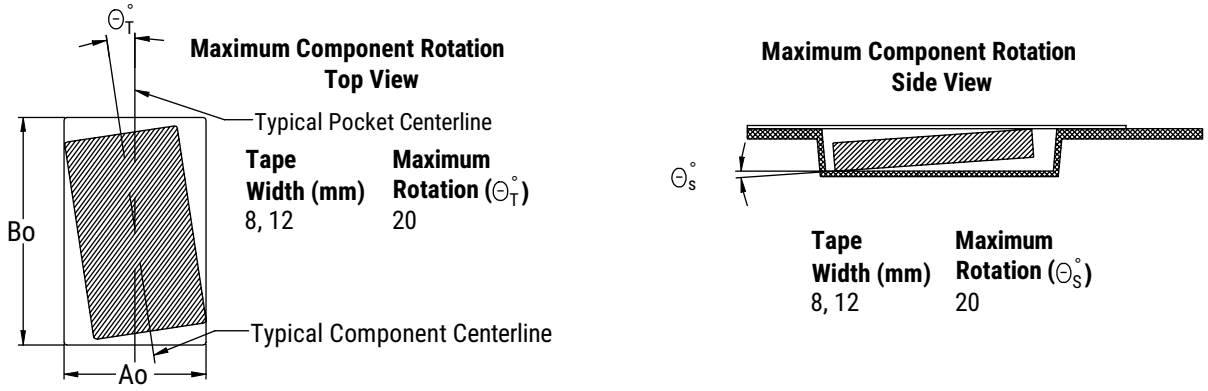


Figure 3 – Maximum Lateral Movement

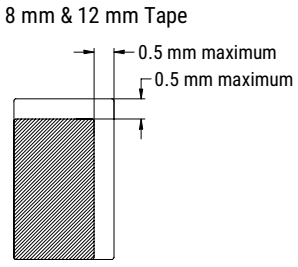


Figure 4 – Bending Radius

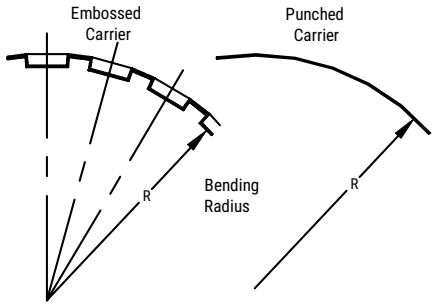
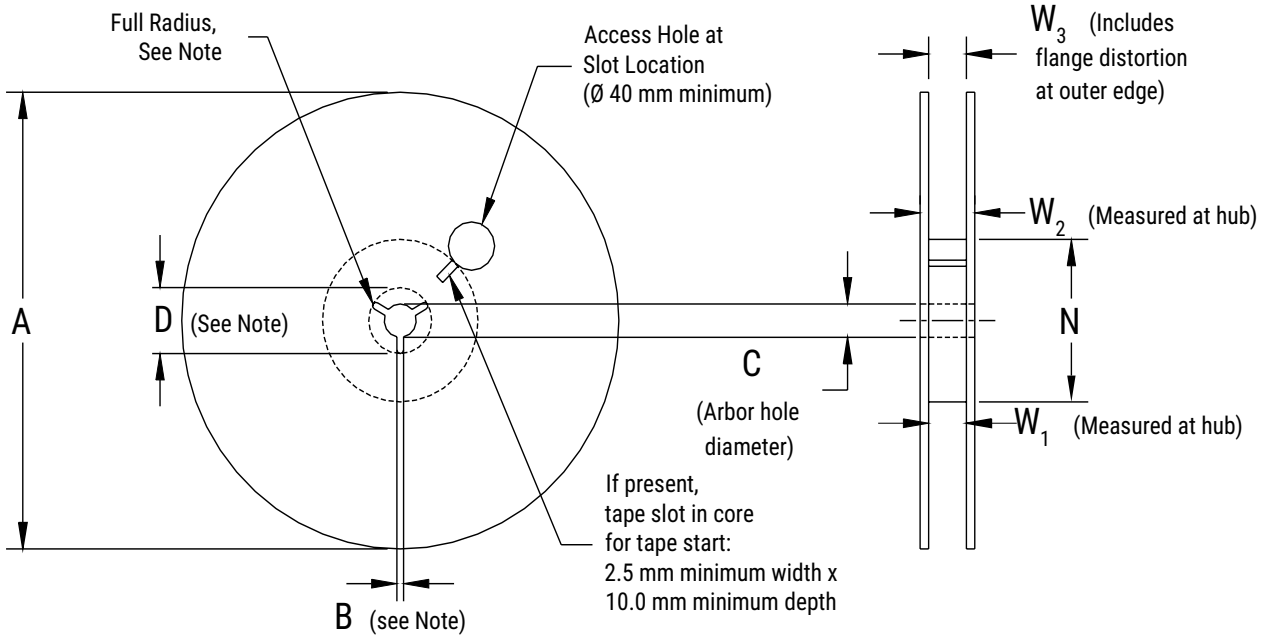


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

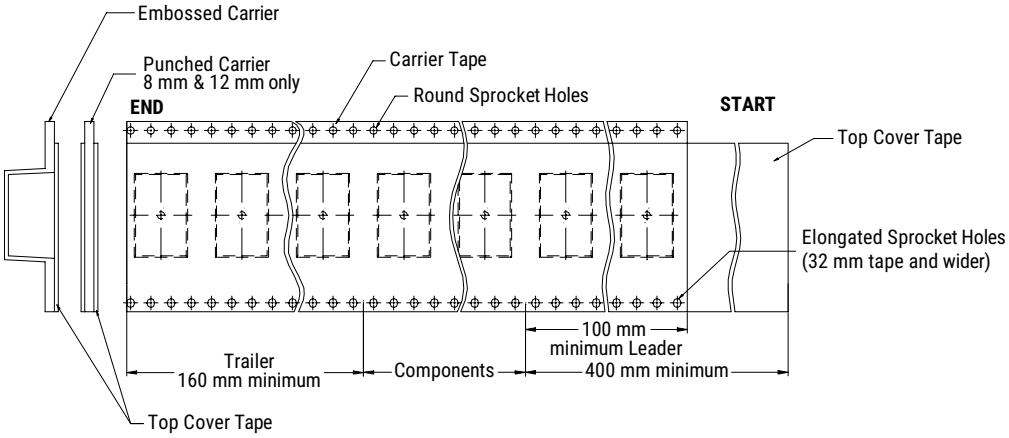
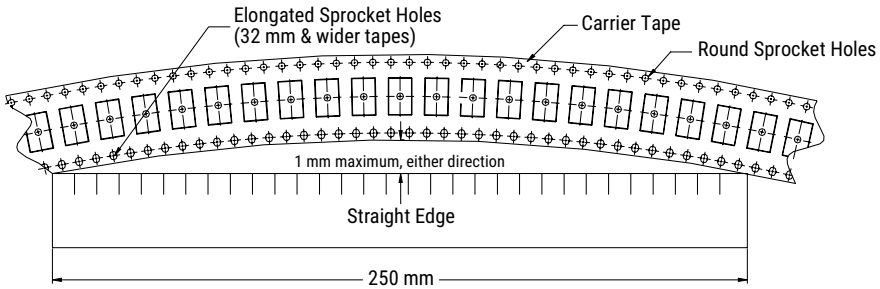


Figure 7 – Maximum Camber



T491 Industrial Grade MnO_2

Overview

The KEMET T491, designed specifically for today's highly automated surface mount processes and equipment, is the leading choice for surface mount designs. The T491 combines KEMET's proven solid tantalum technology, acclaimed and respected throughout the world, with the latest in materials, processes, and automation, resulting in unsurpassed total performance and value. This product meets or exceeds the requirements of EIA standard 535BAAC. The T491 is classified as moisture sensitivity level (MSL) 1 under J STD 020, with unlimited floor life time at ≤ 30°C/85% RH. The T491 standard terminations are available in 100% matte tin and provide excellent wetting characteristics and compatibility with today's surface mount solder systems. Tin/lead (Sn/Pb) terminations are available upon request for any part number. Gold-plated terminations are also available for use with conductive epoxy attachment processes. Standard packaging of these devices is Tape & Reel in accordance with EIA 481. This system provides perfect compatibility with all tape-fed placement units.

Benefits

- Meets or exceeds EIA Standard 535BAAC
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Optional gold-plated terminations
- Laser-marked case
- 100% surge current test on C, D, E, U, V, and X sizes
- Halogen free epoxy
- Capacitance 0.1 – 1,000 µF
- Tolerance ±10%, ±20%
- Voltage 2.5 – 50 VDC
- Extended range values
- Low profile case sizes
- RoHS compliant and lead-free terminations
- Operating temperature range of −55°C to +125°C

Applications

Typical applications include decoupling and filtering in many end applications, such as DC/DC converters, portable electronics, telecommunications, and control units.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder, Gold-plated or Non-magnetic 100% Sn solder.

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	491	X	157	K	020	A	T	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Packaging (C-Spec)
T = Tantalum	Industrial	A, B, C, D, E, M, S, T, U, V, W, X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	2R5 = 2.5 003 = 3 004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte tin (Sn)-plated H = Standard solder coated (SnPb 5% Pb minimum) G = Gold-plated (A, B, C, D, X only) N = Non-magnetic 100% tin (Sn) M = Non-magnetic (SnPb)	Blank = 7" reel 7280 = 13" reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 1,000 µF at 120 Hz/25°C
Capacitance Tolerance	K tolerance (10%), M tolerance (20%)
Rated Voltage Range	2.5 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

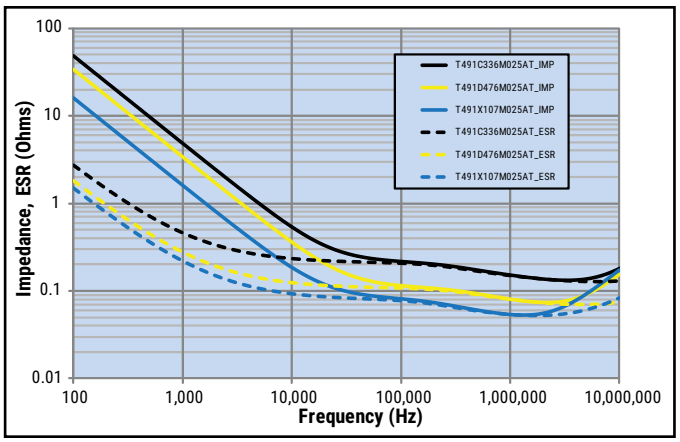
Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL-STD-202, Method 107, Condition B, mounted, −55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +125°C, +25°C.			+25°C	−55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage).		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL-STD-202, Method 213, Condition I, 100 G peak MIL-STD-202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

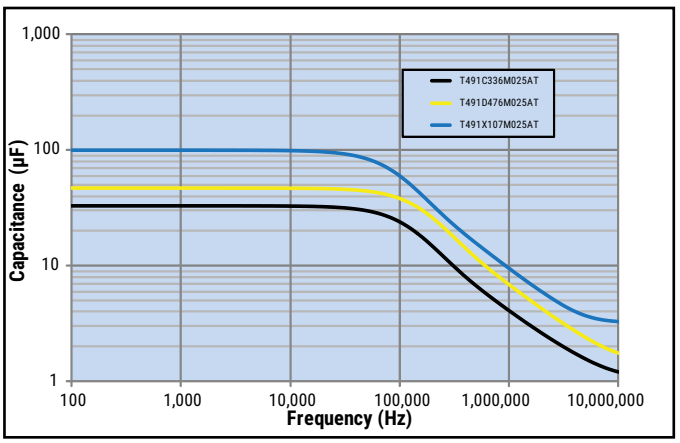
**IL = Initial limit*

Electrical Characteristics

ESR vs. Frequency



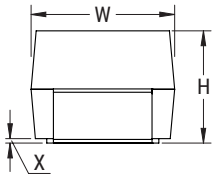
Capacitance vs. Frequency



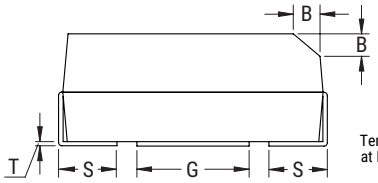
Dimensions – Millimeters (Inches)

Metric will govern

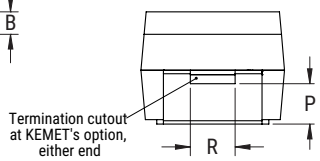
CATHODE (-) END VIEW



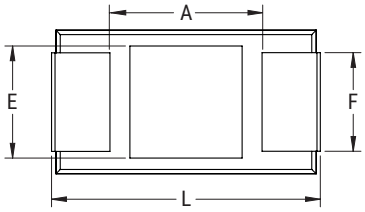
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component												
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S	B ±0.15 (Ref)±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216–18	3.2 ±0.2 (0.126 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.2 (0.047)	0.80(0.032) +0.2(0.008)/–0.3(0.011)	0.4 (0.016)	0.10 ±0.10 (0.004 ±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)
B	3528–21	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.9 ±0.2 (0.075 ±0.008)	2.2 (0.087)	0.80(0.032) +0.1(0.004)/–0.3(0.011)	0.4 (0.016)	0.10 ±0.10 (0.004 ±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
C	6032–28	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.3 (0.126 ±0.012)	2.5 ±0.3 (0.098 ±0.012)	2.2 (0.087)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.9 (0.114)	2.8 (0.110)	2.4 (0.094)
D	7343–31	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	2.8 ±0.3 (0.110 ±0.012)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
X	7343–43	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
E	7360–38	7.3 ±0.3 (0.287 ±0.012)	6.0 ±0.3 (0.236 ±0.012)	3.6 ±0.2 (0.142 ±0.008)	4.1 (0.161)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
M	3528–15	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.4 ±0.1 (0.055 ±0.004)	2.2 (.087)	0.8 (0.031)	N/A	0.05 (0.002)	N/A	N/A	0.13 (.005)	1.9 (0.075)	1.8 (.071)	2.2 (.087)
S	3216–12	3.2 ±0.2 (0.126 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.1 ±0.1 (0.043 ±0.004)	1.2 (0.047)	0.80(0.032) +0.2(0.008)/–0.3(0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)
T	3528–12	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.1 ±0.1 (0.043 ±0.004)	2.2 (0.087)	0.80(0.032) +0.1(0.004)/–0.3(0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
U	6032–15	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.2 (0.110 ±0.008)	1.4 ±0.1 (0.055 ±0.004)	2.2 (0.087)	1.30 (0.051) ±0.3 (0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	2.9 (0.114)	2.8 (0.110)	2.4 (0.094)
V	7343–20	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	1.8 ±0.2 (0.071 ± 0.008)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
W	7343–15	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	1.4 ±0.1 (0.055 ±0.004)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (.0138)	3.5 (0.138)

Notes: (Ref) – Dimensions provided for reference only. For low profile cases, no dimensions are provided for B, P or R because these cases do not have a bevel or a notch.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
2.5	100	T/3528-12	T491T107(1)2R5A(2)	2.5	24.0	3.9	134	121	54	125	1
2.5	220	D/7343-31	T491D227(1)2R5A(2)	5.5	8.0	0.3	707	636	283	125	1
3	33	A/3216-18	T491A336(1)003A(2)	1.0	6.0	4.0	137	123	55	125	1
4	3.3	A/3216-18	T491A335(1)004A(2)	0.5	6.0	8.0	97	87	39	125	1
4	4.7	A/3216-18	T491A475(1)004A(2)	0.5	6.0	8.0	97	87	39	125	1
4	6.8	A/3216-18	T491A685(1)004A(2)	0.5	6.0	6.0	112	101	45	125	1
4	6.8	S/3216-12	T491S685(1)004A(2)	0.5	6.0	15.0	63	57	25	125	1
4	10	B/3528-21	T491B106(1)004A(2)	0.5	6.0	3.5	156	140	62	125	1
4	10	A/3216-18	T491A106(1)004A(2)	0.5	6.0	4.5	129	116	52	125	1
4	10	S/3216-12	T491S106(1)004A(2)	0.5	6.0	15.0	63	57	25	125	1
4	15	B/3528-21	T491B156(1)004A(2)	0.6	6.0	3.5	156	140	62	125	1
4	15	A/3216-18	T491A156(1)004A(2)	0.6	6.0	4.0	137	123	55	125	1
4	15	T/3528-12	T491T156(1)004A(2)	0.6	6.0	5.0	118	106	47	125	1
4	15	S/3216-12	T491S156(1)004A(2)	0.6	10.0	15.0	63	57	25	125	1
4	22	C/6032-28	T491C226(1)004A(2)	0.9	6.0	1.8	247	222	99	125	1
4	22	B/3528-21	T491B226(1)004A(2)	0.9	6.0	3.0	168	151	67	125	1
4	22	A/3216-18	T491A226(1)004A(2)	0.9	6.0	3.5	137	123	55	125	1
4	22	T/3528-12	T491T226(1)004A(2)	0.9	6.0	5.0	118	106	47	125	1
4	22	S/3216-12	T491S226(1)004A(2)	0.9	10.0	10.0	77	69	31	125	1
4	33	C/6032-28	T491C336(1)004A(2)	1.3	6.0	1.8	247	222	99	125	1
4	33	U/6032-15	T491U336(1)004A(2)	1.3	6.0	1.8	224	202	90	125	1
4	33	B/3528-21	T491B336(1)004A(2)	1.3	6.0	2.5	184	166	74	125	1
4	33	A/3216-18	T491A336(1)004A(2)	1.3	6.0	3.0	137	123	55	125	1
4	33	T/3528-12	T491T336(1)004A(2)	1.3	8.0	5.0	118	106	47	125	1
4	47	C/6032-28	T491C476(1)004A(2)	1.9	6.0	1.6	262	236	105	125	1
4	47	U/6032-15	T491U476(1)004A(2)	1.9	6.0	1.8	224	202	90	125	1
4	47	B/3528-21	T491B476(1)004A(2)	1.9	6.0	2.0	206	185	82	125	1
4	47	A/3216-18	T491A476(1)004A(2)	1.9	10.0	2.5	173	156	69	125	1
4	47	T/3528-12	T491T476(M)004A(2)	1.9	12.0	6.0	108	97	43	125	1
4	68	D/7343-31	T491D686(1)004A(2)	2.7	6.0	0.8	433	390	173	125	1
4	68	C/6032-28	T491C686(1)004A(2)	2.7	6.0	1.5	271	244	108	125	1
4	68	U/6032-15	T491U686(1)004A(2)	2.7	6.0	1.8	224	202	90	125	1
4	68	B/3528-21	T491B686(1)004A(2)	2.7	6.0	1.8	217	195	87	125	1
4	68	A/3216-18	T491A686(1)004A(2)	2.7	30.0	4.0	137	123	55	125	1
4	100	D/7343-31	T491D107(1)004A(2)	4.0	8.0	0.8	433	390	173	125	1
4	100	C/6032-28	T491C107(1)004A(2)	4.0	8.0	1.2	303	273	121	125	1
4	100	U/6032-15	T491U107(1)004A(2)	4.0	10.0	1.8	224	202	90	125	1
4	100	B/3528-21	T491B107(1)004A(2)	4.0	8.0	0.9	307	276	123	125	1
4	100	A/3216-18	T491A107(M)004A(2)	4.0	30.0	4.0	137	123	55	125	1
4	100	T/3528-12	T491T107(M)004A(2)	4.0	30.0	5.0	118	106	47	125	1
4	150	D/7343-31	T491D157(1)004A(2)	6.0	8.0	0.8	433	390	173	125	1
4	150	U/6032-15	T491U157(1)004A(2)	6.0	8.0	1.3	263	237	105	125	1
4	150	V/7343-20	T491V157(1)004A(2)	6.0	8.0	0.7	423	381	169	125	1
4	150	C/6032-28	T491C157(1)004A(2)	6.0	8.0	1.2	303	273	121	125	1
4	150	B/3528-21	T491B157(1)004A(2)	6.0	12.0	2.0	206	185	82	125	1
4	220	V/7343-20	T491V227(1)004A(2)	8.8	8.0	0.7	423	381	169	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance Tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard solder coated (SnPb 5% Pb minimum), N = Non-magnetic 100% Tin (Sn), M = Non-magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional details.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
4	220	B/3528-21	T491B227(1)004A(2)	8.8	18.0	0.5	412	371	165	125	1
4	220	C/6032-28	T491C227(1)004A(2)	8.8	15.0	1.2	303	273	121	125	1
4	220	D/7343-31	T491D227(1)004A(2)	8.8	8.0	0.8	433	390	173	125	1
4	220	W/7343-15	T491W227(1)004AT	8.8	8.0	0.8	474	427	190	125	1
4	330	D/7343-31	T491D337(1)004A(2)	13.2	8.0	0.7	463	417	185	125	1
4	330	V/7343-20	T491V337(1)004A(2)	13.2	12.0	0.7	423	381	169	125	1
4	330	C/6032-28	T491C337(1)004A(2)	13.2	10.0	0.9	350	315	140	125	1
4	330	X/7343-43	T491X337(1)004A(2)	13.2	8.0	0.8	454	409	182	125	1
4	470	X/7343-43	T491X477(1)004A(2)	18.8	8.0	0.5	574	517	230	125	1
4	470	D/7343-31	T491D477(1)004A(2)	18.8	8.0	0.8	433	390	173	125	1
4	680	X/7343-43	T491X687(1)004A(2)	27.2	12.0	0.5	574	517	230	125	1
4	680	D/7343-31	T491D687(1)004A(2)	27.2	12.0	0.5	548	493	219	125	1
4	1000	X/7343-43	T491X108(1)004A(2)	40.0	12.0	0.5	574	517	230	125	1
4	1000	E/7360-38	T491E108(M)004A(2)	40.0	15.0	0.2	1000	900	400	125	1
6.3	2.2	A/3216-18	T491A225(1)006A(2)	0.5	6.0	8.0	97	87	39	125	1
6.3	3.3	A/3216-18	T491A335(1)006A(2)	0.5	6.0	7.0	97	87	39	125	1
6.3	4.7	A/3216-18	T491A475(1)006A(2)	0.5	6.0	5.5	112	101	45	125	1
6.3	4.7	S/3216-12	T491S475(1)006A(2)	0.5	6.0	15.0	63	57	25	125	1
6.3	6.8	B/3528-21	T491B685(1)006A(2)	0.5	6.0	3.5	156	140	62	125	1
6.3	6.8	A/3216-18	T491A685(1)006A(2)	0.5	6.0	6.0	112	101	45	125	1
6.3	6.8	S/3216-12	T491S685(1)006A(2)	0.5	6.0	15.0	63	57	25	125	1
6.3	10	B/3528-21	T491B106(1)006A(2)	0.6	6.0	3.5	156	140	62	125	1
6.3	10	A/3216-18	T491A106(1)006A(2)	0.6	6.0	4.0	137	123	55	125	1
6.3	10	T/3528-12	T491T106(1)006A(2)	0.6	6.0	5.0	118	106	47	125	1
6.3	10	S/3216-12	T491S106(1)006A(2)	0.6	10.0	15.0	63	57	25	125	1
6.3	15	C/6032-28	T491C156(1)006A(2)	0.9	6.0	1.8	247	222	99	125	1
6.3	15	B/3528-21	T491B156(1)006A(2)	0.9	6.0	3.0	168	151	67	125	1
6.3	15	A/3216-18	T491A156(1)006A(2)	0.9	6.0	3.5	146	131	58	125	1
6.3	15	T/3528-12	T491T156(1)006A(2)	0.9	6.0	3.5	141	127	56	125	1
6.3	15	S/3216-12	T491S156(1)006A(2)	0.9	15.0	10.0	77	69	31	125	1
6.3	22	C/6032-28	T491C226(1)006A(2)	1.4	6.0	1.8	247	222	99	125	1
6.3	22	U/6032-15	T491U226(1)006A(2)	1.4	6.0	1.8	224	202	90	125	1
6.3	22	B/3528-21	T491B226(1)006A(2)	1.4	6.0	2.0	206	185	82	125	1
6.3	22	A/3216-18	T491A226(1)006A(2)	1.4	6.0	3.0	158	142	63	125	1
6.3	22	T/3528-12	T491T226(1)006A(2)	1.4	8.0	5.0	118	106	47	125	1
6.3	33	C/6032-28	T491C336(1)006A(2)	2.1	6.0	1.6	247	222	99	125	1
6.3	33	U/6032-15	T491U336(1)006A(2)	2.1	6.0	1.8	224	202	90	125	1
6.3	33	B/3528-21	T491B336(1)006A(2)	2.1	6.0	2.2	168	151	67	125	1
6.3	33	A/3216-18	T491A336(1)006A(2)	2.1	12.0	2.5	173	156	69	125	1
6.3	33	T/3528-12	T491T336(1)006A(2)	2.1	12.0	6.0	108	97	43	125	1
6.3	47	D/7343-31	T491D476(1)006A(2)	3.0	6.0	0.8	433	390	173	125	1
6.3	47	C/6032-28	T491C476(1)006A(2)	3.0	6.0	1.5	262	236	105	125	1
6.3	47	U/6032-15	T491U476(1)006A(2)	3.0	6.0	1.8	224	202	90	125	1
6.3	47	V/7343-20	T491V476(1)006A(2)	3.0	6.0	0.7	423	381	169	125	1
6.3	47	B/3528-21	T491B476(1)006A(2)	3.0	6.0	2.0	206	185	82	125	1
6.3	47	A/3216-18	T491A476(1)006A(2)	3.0	12.0	3.5	146	131	58	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance Tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard solder coated (SnPb 5% Pb minimum), N = Non-magnetic 100% Tin (Sn), M = Non-magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional details.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
6.3	47	T/3528-12	T491T476(1)006A(2)	3.0	10.0	2.0	187	168	75	125	1
6.3	68	D/7343-31	T491D686(1)006A(2)	4.3	6.0	0.8	433	390	173	125	1
6.3	68	C/6032-28	T491C686(1)006A(2)	4.3	6.0	1.2	303	273	121	125	1
6.3	68	U/6032-15	T491U686(1)006A(2)	4.3	10.0	1.8	224	202	90	125	1
6.3	68	V/7343-20	T491V686(1)006A(2)	4.3	6.0	0.7	423	381	169	125	1
6.3	68	B/3528-21	T491B686(1)006A(2)	4.3	8.0	0.9	307	276	123	125	1
6.3	68	A/3216-18	T491A686(1)006A(2)	4.3	30.0	4.0	137	123	55	125	1
6.3	100	D/7343-31	T491D107(1)006A(2)	6.3	8.0	0.8	433	390	173	125	1
6.3	100	V/7343-20	T491V107(1)006A(2)	6.3	8.0	0.7	423	381	169	125	1
6.3	100	C/6032-28	T491C107(1)006A(2)	6.3	8.0	0.9	350	315	140	125	1
6.3	100	U/6032-15	T491U107(1)006A(2)	6.3	10.0	1.8	224	202	90	125	1
6.3	100	B/3528-21	T491B107(1)006A(2)	6.3	12.0	2.0	206	185	82	125	1
6.3	100	M/3528-15	T491M107(1)006A(2)	6.3	20.0	3.0	200	180	80	125	1
6.3	150	B/3528-21	T491B157(1)006A(2)	9.5	15.0	3.0	168	151	67	125	1
6.3	150	D/7343-31	T491D157(1)006A(2)	9.5	8.0	0.7	463	417	185	125	1
6.3	150	C/6032-28	T491C157(1)006A(2)	9.5	8.0	1.2	303	273	121	125	1
6.3	150	V/7343-20	T491V157(1)006A(2)	9.5	8.0	0.7	423	381	169	125	1
6.3	150	U/6032-15	T491U157(1)006A(2)	9.5	8.0	0.6	387	348	155	125	1
6.3	150	W/7343-15	T491W157(1)006AT	9.5	8.0	0.8	474	427	190	125	1
6.3	150	X/7343-43	T491X157(1)006A(2)	9.5	8.0	0.7	486	437	194	125	1
6.3	220	X/7343-43	T491X227(1)006A(2)	13.9	8.0	0.7	486	437	194	125	1
6.3	220	D/7343-31	T491D227(1)006A(2)	13.9	8.0	0.7	463	417	185	125	1
6.3	220	C/6032-28	T491C227(1)006A(2)	13.9	10.0	1.0	332	299	133	125	1
6.3	220	V/7343-20	T491V227(1)006A(2)	13.9	8.0	0.7	423	381	169	125	1
6.3	220	W/7343-15	T491W227(1)006AT	13.9	8.0	0.8	474	427	190	125	1
6.3	330	C/6032-28	T491C337(1)006A(2)	20.8	12.0	1.2	303	273	121	125	1
6.3	330	V/7343-20	T491V337(1)006A(2)	20.8	8.0	0.7	423	381	169	125	1
6.3	330	X/7343-43	T491X337(1)006A(2)	20.8	8.0	0.4	642	578	257	125	1
6.3	330	D/7343-31	T491D337(1)006A(2)	20.8	8.0	0.4	612	551	245	125	1
6.3	330	E/7360-38	T491E337(1)006A(2)	20.8	8.0	0.5	632	569	253	125	1
6.3	470	X/7343-43	T491X477(1)006A(2)	29.6	8.0	0.4	642	578	257	125	1
6.3	470	D/7343-31	T491D477(1)006A(2)	29.6	12.0	0.4	612	551	245	125	1
6.3	470	V/7343-20	T491V477(1)006A(2)	29.6	15.0	0.7	423	381	169	125	1
6.3	470	E/7360-38	T491E477(1)006A(2)	29.6	10.0	0.4	707	636	283	125	1
6.3	680	X/7343-43	T491X687(1)006A(2)	42.8	15.0	0.6	524	472	210	125	1
6.3	680	E/7360-38	T491E687(M)006A(2)	42.8	12.0	0.5	632	569	253	125	1
6.3	1000	X/7343-43	T491X108(1)006A(2)	63.0	15.0	0.6	524	472	210	125	1
10	1	A/3216-18	T491A105(1)010A(2)	0.5	4.0	10.0	87	78	35	125	1
10	1.5	A/3216-18	T491A155(1)010A(2)	0.5	6.0	8.0	97	87	39	125	1
10	2.2	B/3528-21	T491B225(1)010A(2)	0.5	6.0	3.5	156	140	62	125	1
10	2.2	A/3216-18	T491A225(1)010A(2)	0.5	6.0	7.0	97	87	39	125	1
10	3.3	A/3216-18	T491A335(1)010A(2)	0.5	6.0	5.5	117	105	47	125	1
10	3.3	S/3216-12	T491S335(1)010A(2)	0.5	6.0	15.0	63	57	25	125	1
10	4.7	B/3528-21	T491B475(1)010A(2)	0.5	6.0	3.5	156	140	62	125	1
10	4.7	A/3216-18	T491A475(1)010A(2)	0.5	6.0	4.0	137	123	55	125	1
10	4.7	S/3216-12	T491S475(1)010A(2)	0.5	6.0	15.0	63	57	25	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance Tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard solder coated (SnPb 5% Pb minimum), N = Non-magnetic 100% Tin (Sn), M = Non-magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional details.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
10	6.8	B/3528-21	T491B685(1)010A(2)	0.7	6.0	3.5	156	140	62	125	1
10	6.8	A/3216-18	T491A685(1)010A(2)	0.7	6.0	4.0	137	123	55	125	1
10	6.8	T/3528-12	T491T685(1)010A(2)	0.7	6.0	5.0	118	106	47	125	1
10	6.8	S/3216-12	T491S685(1)010A(2)	0.7	10.0	15.0	63	57	25	125	1
10	10	C/6032-28	T491C106(1)010A(2)	1.0	6.0	1.8	247	222	99	125	1
10	10	B/3528-21	T491B106(1)010A(2)	1.0	6.0	3.0	156	140	62	125	1
10	10	A/3216-18	T491A106(1)010A(2)	1.0	6.0	3.8	137	123	55	125	1
10	10	T/3528-12	T491T106(1)010A(2)	1.0	6.0	3.0	153	138	61	125	1
10	10	S/3216-12	T491S106(1)010A(2)	1.0	10.0	15.0	63	57	25	125	1
10	15	C/6032-28	T491C156(1)010A(2)	1.5	6.0	1.8	247	222	99	125	1
10	15	U/6032-15	T491U156(1)010A(2)	1.5	6.0	1.8	224	202	90	125	1
10	15	B/3528-21	T491B156(1)010A(2)	1.5	6.0	2.0	206	185	82	125	1
10	15	A/3216-18	T491A156(1)010A(2)	1.5	8.0	6.0	112	101	45	125	1
10	15	T/3528-12	T491T156(1)010A(2)	1.5	6.0	2.8	158	142	63	125	1
10	22	D/7343-31	T491D226(1)010A(2)	2.2	6.0	0.8	433	390	173	125	1
10	22	C/6032-28	T491C226(1)010A(2)	2.2	6.0	1.6	247	222	99	125	1
10	22	U/6032-15	T491U226(1)010A(2)	2.2	6.0	1.8	224	202	90	125	1
10	22	B/3528-21	T491B226(1)010A(2)	2.2	6.0	2.0	206	185	82	125	1
10	22	A/3216-18	T491A226(1)010A(2)	2.2	8.0	3.2	112	101	45	125	1
10	22	T/3528-12	T491T226(1)010A(2)	2.2	12.0	8.0	94	85	38	125	1
10	33	D/7343-31	T491D336(1)010A(2)	3.3	6.0	0.8	433	390	173	125	1
10	33	V/7343-20	T491V336(1)010A(2)	3.3	6.0	0.7	423	381	169	125	1
10	33	C/6032-28	T491C336(1)010A(2)	3.3	6.0	1.5	271	244	108	125	1
10	33	U/6032-15	T491U336(1)010A(2)	3.3	6.0	1.8	224	202	90	125	1
10	33	B/3528-21	T491B336(1)010A(2)	3.3	6.0	1.8	217	195	87	125	1
10	33	T/3528-12	T491T336(1)010A(2)	3.3	24.0	5.0	118	106	47	125	1
10	33	A/3216-18	T491A336(1)010A(2)	3.3	15.0	6.0	112	101	45	125	1
10	47	D/7343-31	T491D476(1)010A(2)	4.7	6.0	0.8	433	390	173	125	1
10	47	V/7343-20	T491V476(1)010A(2)	4.7	6.0	0.7	423	381	169	125	1
10	47	C/6032-28	T491C476(1)010A(2)	4.7	6.0	1.2	303	273	121	125	1
10	47	U/6032-15	T491U476(1)010A(2)	4.7	6.0	1.4	254	229	102	125	1
10	47	B/3528-21	T491B476(1)010A(2)	4.7	8.0	1.0	292	263	117	125	1
10	68	D/7343-31	T491D686(1)010A(2)	6.8	6.0	0.8	433	390	173	125	1
10	68	V/7343-20	T491V686(1)010A(2)	6.8	6.0	0.7	423	381	169	125	1
10	68	C/6032-28	T491C686(1)010A(2)	6.8	6.0	1.0	332	299	133	125	1
10	68	W/7343-15	T491W686(1)010AT	6.8	6.0	1.2	387	348	155	125	1
10	68	U/6032-15	T491U686(1)010A(2)	6.8	10.0	1.8	224	202	90	125	1
10	68	B/3528-21	T491B686(1)010A(2)	6.8	8.0	1.0	292	263	117	125	1
10	100	B/3528-21	T491B107(1)010A(2)	10.0	15.0	1.2	266	239	106	125	1
10	100	D/7343-31	T491D107(1)010A(2)	10.0	8.0	0.7	463	417	185	125	1
10	100	U/6032-15	T491U107(1)010A(2)	10.0	8.0	0.7	359	323	144	125	1
10	100	W/7343-15	T491W107(1)010AT	10.0	8.0	0.8	474	427	190	125	1
10	100	C/6032-28	T491C107(1)010A(2)	10.0	8.0	1.0	332	299	133	125	1
10	100	V/7343-20	T491V107(1)010A(2)	10.0	8.0	0.7	423	381	169	125	1
10	150	X/7343-43	T491X157(1)010A(2)	15.0	8.0	0.7	486	437	194	125	1
10	150	D/7343-31	T491D157(1)010A(2)	15.0	8.0	0.7	463	417	185	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance Tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard solder coated (SnPb 5% Pb minimum), N = Non-magnetic 100% Tin (Sn), M = Non-magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional details.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
10	150	C/6032-28	T491C157(1)010A(2)	15.0	10.0	0.9	350	315	140	125	1
10	150	V/7343-20	T491V157(1)010A(2)	15.0	8.0	0.7	423	381	169	125	1
10	220	C/6032-28	T491C227(1)010A(2)	22.0	10.0	0.9	350	315	140	125	1
10	220	X/7343-43	T491X227(1)010A(2)	22.0	8.0	0.5	574	517	230	125	1
10	220	D/7343-31	T491D227(1)010A(2)	22.0	8.0	0.5	548	493	219	125	1
10	220	V/7343-20	T491V227(1)010A(2)	22.0	8.0	0.7	423	381	169	125	1
10	330	D/7343-31	T491D337(1)010A(2)	33.0	10.0	0.5	548	493	219	125	1
10	330	V/7343-20	T491V337(1)010A(2)	33.0	12.0	0.7	423	381	169	125	1
10	330	X/7343-43	T491X337(1)010A(2)	33.0	10.0	0.5	574	517	230	125	1
10	330	E/7360-38	T491E337(1)010A(2)	33.0	10.0	0.5	632	569	253	125	1
10	470	X/7343-43	T491X477(1)010A(2)	47	10	0.2	908	817.2	363.2	125	1
10	470	E/7360-38	T491E477(1)010A(2)	47.0	12.0	0.5	632	569	253	125	1
16	1	A/3216-18	T491A105(1)016A(2)	0.5	4.0	10.0	87	78	35	125	1
16	1.5	A/3216-18	T491A155(1)016A(2)	0.5	6.0	8.0	97	87	39	125	1
16	2.2	A/3216-18	T491A225(1)016A(2)	0.5	6.0	6.0	112	101	45	125	1
16	2.2	S/3216-12	T491S225(1)016A(2)	0.5	6.0	15.0	63	57	25	125	1
16	2.2	B/3528-21	T491B225(1)016A(2)	0.5	6.0	3.5	156	140	62	125	1
16	3.3	B/3528-21	T491B335(1)016A(2)	0.5	6.0	3.5	156	140	62	125	1
16	3.3	A/3216-18	T491A335(1)016A(2)	0.5	6.0	5.0	122	110	49	125	1
16	4.7	C/6032-28	T491C475(1)016A(2)	0.8	6.0	2.4	214	193	86	125	1
16	4.7	B/3528-21	T491B475(1)016A(2)	0.8	6.0	3.5	156	140	62	125	1
16	4.7	A/3216-18	T491A475(1)016A(2)	0.8	6.0	4.0	137	123	55	125	1
16	4.7	T/3528-12	T491T475(1)016A(2)	0.8	6.0	5.0	118	106	47	125	1
16	6.8	C/6032-28	T491C685(1)016A(2)	1.1	6.0	1.9	241	217	96	125	1
16	6.8	B/3528-21	T491B685(1)016A(2)	1.1	6.0	2.5	184	166	74	125	1
16	6.8	A/3216-18	T491A685(1)016A(2)	1.1	6.0	3.5	146	131	58	125	1
16	10	C/6032-28	T491C106(1)016A(2)	1.6	6.0	1.8	247	222	99	125	1
16	10	U/6032-15	T491U106(1)016A(2)	1.6	6.0	1.8	224	202	90	125	1
16	10	B/3528-21	T491B106(1)016A(2)	1.6	6.0	2.0	206	185	82	125	1
16	10	A/3216-18	T491A106(1)016A(2)	1.6	6.0	3.0	158	142	63	125	1
16	10	T/3528-12	T491T106(1)016A(2)	1.6	8.0	8.0	94	85	38	125	1
16	15	D/7343-31	T491D156(1)016A(2)	2.4	6.0	1.0	387	348	155	125	1
16	15	C/6032-28	T491C156(1)016A(2)	2.4	6.0	1.6	247	222	99	125	1
16	15	U/6032-15	T491U156(1)016A(2)	2.4	6.0	1.8	224	202	90	125	1
16	15	B/3528-21	T491B156(1)016A(2)	2.4	6.0	2.0	192	173	77	125	1
16	15	A/3216-18	T491A156(1)016A(2)	2.4	8.0	3.5	146	131	58	125	1
16	22	D/7343-31	T491D226(1)016A(2)	3.5	6.0	0.8	433	390	173	125	1
16	22	C/6032-28	T491C226(1)016A(2)	3.5	6.0	1.5	262	236	105	125	1
16	22	U/6032-15	T491U226(1)016A(2)	3.5	10.0	3.0	173	156	69	125	1
16	22	B/3528-21	T491B226(1)016A(2)	3.5	6.0	2.2	197	177	79	125	1
16	33	D/7343-31	T491D336(1)016A(2)	5.3	6.0	0.8	433	390	173	125	1
16	33	C/6032-28	T491C336(1)016A(2)	5.3	6.0	1.2	303	273	121	125	1
16	33	U/6032-15	T491U336(1)016A(2)	5.3	6.0	1.0	300	270	120	125	1
16	33	B/3528-21	T491B336(1)016A(2)	5.3	8.0	2.0	206	185	82	125	1
16	47	D/7343-31	T491D476(1)016A(2)	7.5	6.0	0.8	433	390	173	125	1
16	47	V/7343-20	T491V476(1)016A(2)	7.5	6.0	0.7	423	381	169	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance Tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard solder coated (SnPb 5% Pb minimum), N = Non-magnetic 100% Tin (Sn), M = Non-magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional details.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
16	47	C/6032-28	T491C476(1)016A(2)	7.5	6.0	1.0	332	299	133	125	1
16	68	V/7343-20	T491V686(1)016A(2)	10.9	6.0	0.7	423	381	169	125	1
16	68	C/6032-28	T491C686(1)016A(2)	10.9	6.0	1.0	303	273	121	125	1
16	68	W/7343-15	T491W686(1)016AT	10.9	6.0	0.8	474	427	190	125	1
16	68	D/7343-31	T491D686(1)016A(2)	10.9	6.0	0.7	463	417	185	125	1
16	100	X/7343-43	T491X107(1)016A(2)	16.0	8.0	0.7	486	437	194	125	1
16	100	C/6032-28	T491C107(1)016A(2)	16.0	10.0	1.0	332	299	133	125	1
16	100	V/7343-20	T491V107(1)016A(2)	16.0	8.0	0.7	423	381	169	125	1
16	100	D/7343-31	T491D107(1)016A(2)	16.0	8.0	0.7	463	417	185	125	1
16	150	X/7343-43	T491X157(1)016A(2)	24.0	8.0	0.5	574	517	230	125	1
16	150	D/7343-31	T491D157(1)016A(2)	24.0	10.0	0.7	463	417	185	125	1
16	220	D/7343-31	T491D227(1)016A(2)	35.2	15.0	0.9	408	367	163	125	1
16	220	X/7343-43	T491X227(1)016A(2)	35.2	10.0	0.5	574	517	230	125	1
16	220	E/7360-38	T491E227(1)016A(2)	35.2	7.2	0.9	471	424	188	125	1
20	0.68	A/3216-18	T491A684(1)020A(2)	0.5	4.0	12.0	79	71	32	125	1
20	0.47	A/3216-18	T491A474(1)020A(2)	0.5	4.0	14.0	73	66	29	125	1
20	1	A/3216-18	T491A105(1)020A(2)	0.5	4.0	9.0	91	82	36	125	1
20	1	S/3216-12	T491S105(1)020A(2)	0.5	6.0	18.0	58	52	23	125	1
20	1.5	A/3216-18	T491A155(1)020A(2)	0.5	6.0	6.5	107	96	43	125	1
20	1.5	S/3216-12	T491S155(1)020A(2)	0.5	6.0	15.0	63	57	25	125	1
20	2.2	B/3528-21	T491B225(1)020A(2)	0.5	6.0	3.5	156	140	62	125	1
20	2.2	A/3216-18	T491A225(1)020A(2)	0.5	6.0	6.0	104	94	42	125	1
20	3.3	B/3528-21	T491B335(1)020A(2)	0.7	6.0	3.0	168	151	67	125	1
20	3.3	A/3216-18	T491A335(1)020A(2)	0.7	6.0	4.0	129	116	52	125	1
20	3.3	T/3528-12	T491T335(1)020A(2)	0.7	6.0	5.0	118	106	47	125	1
20	4.7	C/6032-28	T491C475(1)020A(2)	0.9	6.0	2.4	214	193	86	125	1
20	4.7	B/3528-21	T491B475(1)020A(2)	0.9	6.0	3.0	168	151	67	125	1
20	4.7	A/3216-18	T491A475(1)020A(2)	0.9	6.0	4.0	137	123	55	125	1
20	6.8	C/6032-28	T491C685(1)020A(2)	1.4	6.0	1.9	241	217	96	125	1
20	6.8	U/6032-15	T491U685(1)020A(2)	1.4	6.0	1.9	218	196	87	125	1
20	6.8	B/3528-21	T491B685(1)020A(2)	1.4	6.0	2.0	206	185	82	125	1
20	6.8	A/3216-18	T491A685(1)020A(2)	1.4	8.0	6.0	112	101	45	125	1
20	10	D/7343-31	T491D106(1)020A(2)	2.0	6.0	1.0	387	349	155	125	1
20	10	C/6032-28	T491C106(1)020A(2)	2.0	6.0	1.6	247	222	99	125	1
20	10	U/6032-15	T491U106(1)020A(2)	2.0	6.0	1.8	224	202	90	125	1
20	10	B/3528-21	T491B106(1)020A(2)	2.0	6.0	2.0	201	181	80	125	1
20	10	A/3216-18	T491A106(1)020A(2)	2.0	10.0	5.0	122	110	49	125	1
20	15	D/7343-31	T491D156(1)020A(2)	3.0	6.0	1.0	387	348	155	125	1
20	15	B/3528-21	T491B156(1)020A(2)	3.0	6.0	2.0	206	185	82	125	1
20	15	C/6032-28	T491C156(1)020A(2)	3.0	6.0	1.7	254	229	102	125	1
20	22	D/7343-31	T491D226(1)020A(2)	4.4	6.0	0.8	433	390	173	125	1
20	22	V/7343-20	T491V226(1)020A(2)	4.4	6.0	0.7	423	381	169	125	1
20	22	C/6032-28	T491C226(1)020A(2)	4.4	6.0	1.2	303	273	121	125	1
20	22	B/3528-21	T491B226(1)020A(2)	4.4	8.0	4.0	146	131	58	125	1
20	33	D/7343-31	T491D336(1)020A(2)	6.6	6.0	0.8	433	390	173	125	1
20	33	C/6032-28	T491C336(1)020A(2)	6.6	6.0	1.2	303	273	121	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance Tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard solder coated (SnPb 5% Pb minimum), N = Non-magnetic 100% Tin (Sn), M = Non-magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional details.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
20	33	V/7343-20	T491V336(1)020A(2)	6.6	8.0	0.7	423	381	169	125	1
20	33	B/3528-21	T491B336(M)020A(2)	6.6	10.0	4.0	146	131	58	125	1
20	47	C/6032-28	T491C476(1)020A(2)	9.4	6.0	0.9	350	315	140	125	1
20	47	X/7343-43	T491X476(1)020A(2)	9.4	6.0	0.8	454	409	182	125	1
20	47	D/7343-31	T491D476(1)020A(2)	9.4	6.0	0.7	463	417	185	125	1
20	68	X/7343-43	T491X686(1)020A(2)	13.6	6.0	0.7	486	437	194	125	1
20	68	D/7343-31	T491D686(1)020A(2)	13.6	6.0	0.7	463	417	185	125	1
20	68	C/6032-28	T491C686(1)020A(2)	13.6	8.0	0.5	469	422	188	125	1
20	100	X/7343-43	T491X107(1)020A(2)	20.0	8.0	0.5	574	517	230	125	1
20	100	D/7343-31	T491D107(1)020A(2)	20.0	8.0	0.9	408	367	163	125	1
20	100	E/7360-38	T491E107(1)020A(2)	20.0	8.0	0.5	632	569	253	125	1
20	150	X/7343-43	T491X157(1)020A(2)	30.0	10.0	0.4	642	578	257	125	1
25	0.33	A/3216-18	T491A334(1)025A(2)	0.5	4.0	15.0	71	64	28	125	1
25	0.47	A/3216-18	T491A474(1)025A(2)	0.5	4.0	13.0	76	68	30	125	1
25	0.68	A/3216-18	T491A684(1)025A(2)	0.5	4.0	10.0	87	78	35	125	1
25	1	B/3528-21	T491B105(1)025A(2)	0.5	4.0	5.0	130	117	52	125	1
25	1	A/3216-18	T491A105(1)025A(2)	0.5	4.0	8.0	97	87	39	125	1
25	1	S/3216-12	T491S105(1)025A(2)	0.5	6.0	18.0	58	52	23	125	1
25	1.5	B/3528-21	T491B155(1)025A(2)	0.5	6.0	5.0	130	117	52	125	1
25	1.5	A/3216-18	T491A155(1)025A(2)	0.5	6.0	7.0	104	94	42	125	1
25	2.2	C/6032-28	T491C225(1)025A(2)	0.6	6.0	3.5	177	159	71	125	1
25	2.2	A/3216-18	T491A225(1)025A(2)	0.6	6.0	7.0	104	94	42	125	1
25	2.2	B/3528-21	T491B225(1)025A(2)	0.6	6.0	4.5	137	123	55	125	1
25	3.3	C/6032-28	T491C335(1)025A(2)	0.8	6.0	2.5	210	189	84	125	1
25	3.3	A/3216-18	T491A335(1)025A(2)	0.8	6.0	7.0	104	94	42	125	1
25	3.3	B/3528-21	T491B335(1)025A(2)	0.8	6.0	3.5	156	140	62	125	1
25	4.7	C/6032-28	T491C475(1)025A(2)	1.2	6.0	2.3	214	193	86	125	1
25	4.7	B/3528-21	T491B475(1)025A(2)	1.2	6.0	1.5	238	214	95	125	1
25	4.7	A/3216-18	T491A475(1)025A(2)	1.2	8.0	6.0	112	101	45	125	1
25	6.8	D/7343-31	T491D685(1)025A(2)	1.7	6.0	1.8	289	260	116	125	1
25	6.8	C/6032-28	T491C685(1)025A(2)	1.7	6.0	1.9	241	217	96	125	1
25	6.8	B/3528-21	T491B685(1)025A(2)	1.7	6.0	2.8	174	157	70	125	1
25	10	D/7343-31	T491D106(1)025A(2)	2.5	6.0	1.0	387	348	155	125	1
25	10	C/6032-28	T491C106(1)025A(2)	2.5	6.0	1.5	271	244	108	125	1
25	10	B/3528-21	T491B106(1)025A(2)	2.5	6.0	2.0	168	151	67	125	1
25	15	D/7343-31	T491D156(1)025A(2)	3.8	6.0	1.0	387	348	155	125	1
25	15	V/7343-20	T491V156(1)025A(2)	3.8	6.0	1.0	354	319	142	125	1
25	15	C/6032-28	T491C156(1)025A(2)	3.8	6.0	1.5	271	244	108	125	1
25	15	B/3528-21	T491B156(1)025A(2)	3.8	8.0	4.0	146	131	58	125	1
25	22	D/7343-31	T491D226(1)025A(2)	5.5	6.0	0.8	433	390	173	125	1
25	22	C/6032-28	T491C226(1)025A(2)	5.5	6.0	1.0	280	252	112	125	1
25	22	V/7343-20	T491V226(1)025A(2)	5.5	6.0	0.7	423	381	169	125	1
25	33	X/7343-43	T491X336(1)025A(2)	8.3	6.0	0.7	486	437	194	125	1
25	33	D/7343-31	T491D336(1)025A(2)	8.3	6.0	0.7	463	417	185	125	1
25	33	C/6032-28	T491C336(1)025A(2)	8.3	6.0	0.9	350	315	140	125	1
25	47	X/7343-43	T491X476(1)025A(2)	11.8	6.0	0.7	486	437	194	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance Tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard solder coated (SnPb 5% Pb minimum), N = Non-magnetic 100% Tin (Sn), M = Non-magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional details.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
25	47	D/7343-31	T491D476(1)025A(2)	11.8	6.0	0.7	463	417	185	125	1
25	68	X/7343-43	T491X686(1)025A(2)	17.0	6.0	0.7	486	437	194	125	1
25	68	D/7343-31	T491D686(1)025A(2)	17.0	10.0	0.7	463	417	185	125	1
25	100	X/7343-43	T491X107(1)025A(2)	25.0	8.0	0.3	742	668	297	125	1
25	100	E/7360-38	T491E107(1)025A(2)	25.0	8.0	0.5	632	569	253	125	1
35	0.1	A/3216-18	T491A104(1)035A(2)	0.5	4.0	20.0	61	55	24	125	1
35	0.15	A/3216-18	T491A154(1)035A(2)	0.5	4.0	19.0	63	57	25	125	1
35	0.22	A/3216-18	T491A224(1)035A(2)	0.5	4.0	18.0	65	59	26	125	1
35	0.33	A/3216-18	T491A334(1)035A(2)	0.5	4.0	15.0	71	64	28	125	1
35	0.47	B/3528-21	T491B474(1)035A(2)	0.5	4.0	8.0	103	93	41	125	1
35	0.47	A/3216-18	T491A474(1)035A(2)	0.5	4.0	11.0	79	71	32	125	1
35	0.68	B/3528-21	T491B684(1)035A(2)	0.5	4.0	6.5	114	103	46	125	1
35	0.68	A/3216-18	T491A684(1)035A(2)	0.5	4.0	8.0	97	87	39	125	1
35	1	B/3528-21	T491B105(1)035A(2)	0.5	4.0	5.0	130	117	52	125	1
35	1	A/3216-18	T491A105(1)035A(2)	0.5	4.0	7.0	100	90	40	125	1
35	1.5	A/3216-18	T491A155(1)035A(2)	0.5	6.0	7.0	104	94	42	125	1
35	1.5	C/6032-28	T491C155(1)035A(2)	0.5	6.0	4.5	156	140	62	125	1
35	1.5	B/3528-21	T491B155(1)035A(2)	0.5	6.0	5.0	130	117	52	125	1
35	2.2	C/6032-28	T491C225(1)035A(2)	0.8	6.0	3.2	185	167	74	125	1
35	2.2	A/3216-18	T491A225(1)035A(2)	0.8	6.0	4.0	129	116	52	125	1
35	2.2	B/3528-21	T491B225(1)035A(2)	0.8	6.0	4.0	146	131	58	125	1
35	3.3	C/6032-28	T491C335(1)035A(2)	1.2	6.0	2.0	235	212	94	125	1
35	3.3	B/3528-21	T491B335(1)035A(2)	1.2	6.0	3.5	156	140	62	125	1
35	3.3	D/7343-31	T491D335(1)035A(2)	1.2	6.0	2.0	274	247	110	125	1
35	4.7	D/7343-31	T491D475(1)035A(2)	1.6	6.0	1.5	316	284	126	125	1
35	4.7	B/3528-21	T491B475(1)035A(2)	1.6	6.0	3.0	166	149	66	125	1
35	4.7	C/6032-28	T491C475(1)035A(2)	1.6	6.0	2.0	224	202	90	125	1
35	6.8	D/7343-31	T491D685(1)035A(2)	2.4	6.0	1.2	340	306	136	125	1
35	6.8	V/7343-20	T491V685(1)035A(2)	2.4	6.0	1.2	323	291	129	125	1
35	6.8	C/6032-28	T491C685(1)035A(2)	2.4	6.0	1.8	247	222	99	125	1
35	10	D/7343-31	T491D106(1)035A(2)	3.5	6.0	1.0	387	348	155	125	1
35	10	C/6032-28	T491C106(1)035A(2)	3.5	6.0	1.6	262	236	105	125	1
35	10	V/7343-20	T491V106(1)035A(2)	3.5	6.0	1.0	250	225	100	125	1
35	15	C/6032-28	T491C156(1)035A(2)	5.3	6.0	1.0	332	299	133	125	1
35	15	X/7343-43	T491X156(1)035A(2)	5.3	6.0	0.9	428	385	171	125	1
35	15	D/7343-31	T491D156(1)035A(2)	5.3	6.0	0.8	433	390	173	125	1
35	22	X/7343-43	T491X226(1)035A(2)	7.7	6.0	0.7	486	437	194	125	1
35	22	D/7343-31	T491D226(1)035A(2)	7.7	6.0	0.7	463	417	185	125	1
35	33	X/7343-43	T491X336(1)035A(2)	11.6	6.0	0.6	524	472	210	125	1
35	33	D/7343-31	T491D336(1)035A(2)	11.6	6.0	0.6	500	450	200	125	1
35	47	X/7343-43	T491X476(1)035A(2)	16.5	6.0	0.6	524	472	210	125	1
35	47	E/7360-38	T491E476(1)035A(2)	16.5	10.0	0.5	632	569	253	125	1
50	0.1	A/3216-18	T491A104(1)050A(2)	0.5	4.0	20.0	61	55	24	125	1
50	0.15	B/3528-21	T491B154(1)050A(2)	0.5	4.0	16.0	73	66	29	125	1
50	0.15	A/3216-18	T491A154(1)050A(2)	0.5	4.0	15.0	71	64	28	125	1
50	0.22	B/3528-21	T491B224(1)050A(2)	0.5	4.0	14.0	78	70	31	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance Tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard solder coated (SnPb 5% Pb minimum), N = Non-magnetic 100% Tin (Sn), M = Non-magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional details.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

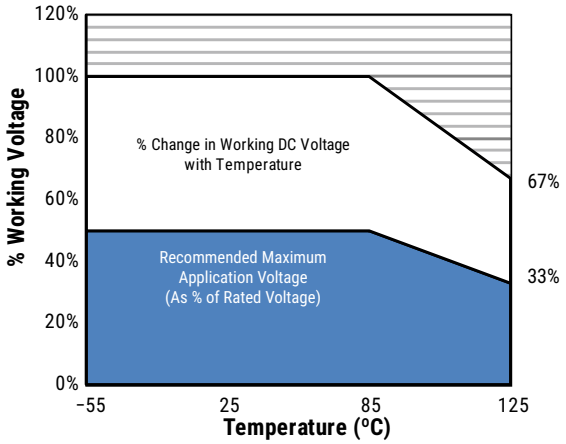
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
50	0.22	A/3216-18	T491A224(1)050A(2)	0.5	4.0	18.0	65	59	26	125	1
50	0.33	A/3216-18	T491A334(1)050A(2)	0.5	4.0	14.0	73	66	29	125	1
50	0.33	B/3528-21	T491B334(1)050A(2)	0.5	4.0	10.0	92	83	37	125	1
50	0.47	A/3216-18	T491A474(1)050A(2)	0.5	4.0	9.5	280	253	112	125	1
50	0.47	C/6032-28	T491C474(1)050A(2)	0.5	4.0	7.2	117	105	47	125	1
50	0.47	B/3528-21	T491B474(1)050A(2)	0.5	4.0	9.0	97	87	39	125	1
50	0.68	A/3216-18	T491A684(1)050A(2)	0.5	4.0	8.0	97	87	39	125	1
50	0.68	C/6032-28	T491C684(1)050A(2)	0.5	4.0	6.4	125	113	50	125	1
50	0.68	B/3528-21	T491B684(1)050A(2)	0.5	4.0	8.0	103	93	41	125	1
50	1	A/3216-18	T491A105(1)050A(2)	0.5	4.0	7.0	104	94	42	125	1
50	1	C/6032-28	T491C105(1)050A(2)	0.5	4.0	4.8	148	133	59	125	1
50	1	B/3528-21	T491B105(1)050A(2)	0.5	6.0	6.0	119	107	48	125	1
50	1	V/7343-20	T491V105(1)050A(2)	0.5	4.0	6.0	144	130	58	125	1
50	1.5	D/7343-31	T491D155(1)050A(2)	0.8	6.0	3.5	207	186	83	125	1
50	1.5	C/6032-28	T491C155(1)050A(2)	0.8	6.0	4.0	166	149	66	125	1
50	2.2	D/7343-31	T491D225(1)050A(2)	1.1	6.0	2.5	245	221	98	125	1
50	2.2	C/6032-28	T491C225(1)050A(2)	1.1	6.0	3.0	191	172	76	125	1
50	3.3	C/6032-28	T491C335(1)050A(2)	1.7	6.0	2.0	235	212	94	125	1
50	3.3	D/7343-31	T491D335(1)050A(2)	1.7	6.0	1.6	274	247	110	125	1
50	4.7	C/6032-28	T491C475(1)050A(2)	2.4	4.0	1.4	280	252	112	125	1
50	4.7	D/7343-31	T491D475(1)050A(2)	2.4	6.0	1.2	354	319	142	125	1
50	6.8	X/7343-43	T491X685(1)050A(2)	3.4	6.0	0.8	406	365	162	125	1
50	6.8	D/7343-31	T491D685(1)050A(2)	3.4	6.0	0.8	387	348	155	125	1
50	10	X/7343-43	T491X106(1)050A(2)	5.0	6.0	0.7	486	437	194	125	1
50	10	D/7343-31	T491D106(1)050A(2)	5.0	6.0	0.8	433	390	173	125	1
50	15	X/7343-43	T491X156(1)050A(2)	7.5	8.0	0.7	486	437	194	125	1
50	22	X/7343-43	T491X226(1)050A(2)	11.0	10.0	0.6	524	472	210	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260 °C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance Tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard solder coated (SnPb 5% Pb minimum), N = Non-magnetic 100% Tin (Sn), M = Non-magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional details.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	67% of V_R
Recommended maximum application voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for the reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C w/+20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
M	3528–15	120
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
W	7343–15	180
T510X	7343–43	270
T510E	7360–38	285

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

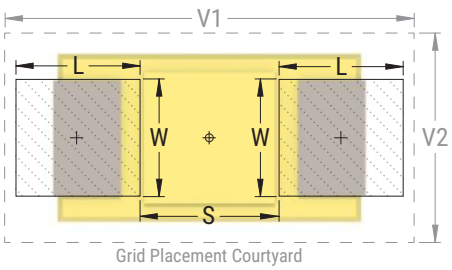
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe, plus, in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
M	3528-15	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
S[2]	3216–12	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
T	3528–12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
U	6032–15	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
V	7343–21	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
W	7343–15	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations, the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J-STD-020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

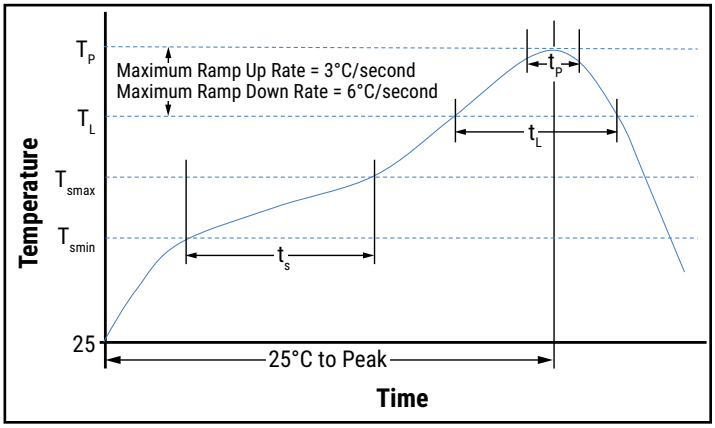
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

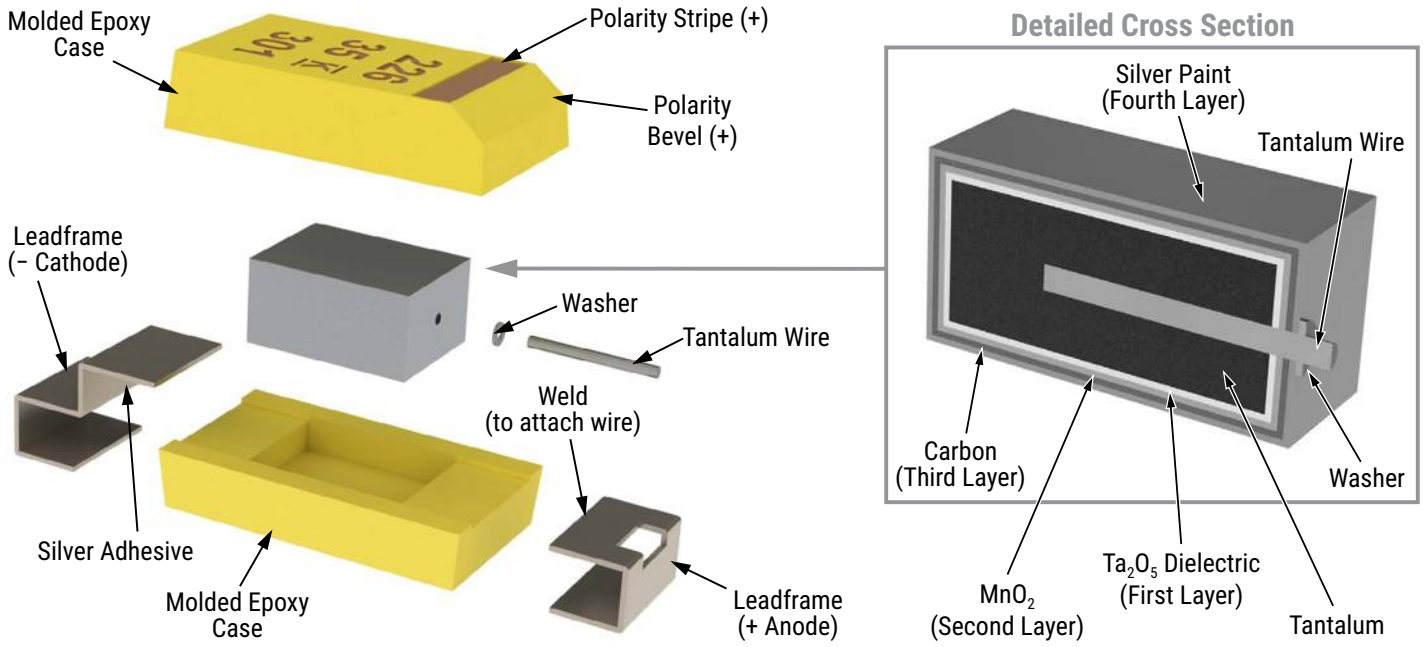
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



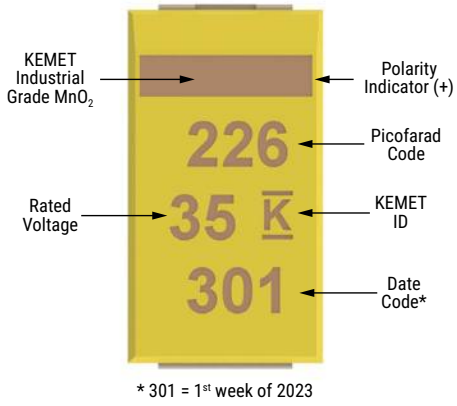
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = last number of year	8 = 2018 9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

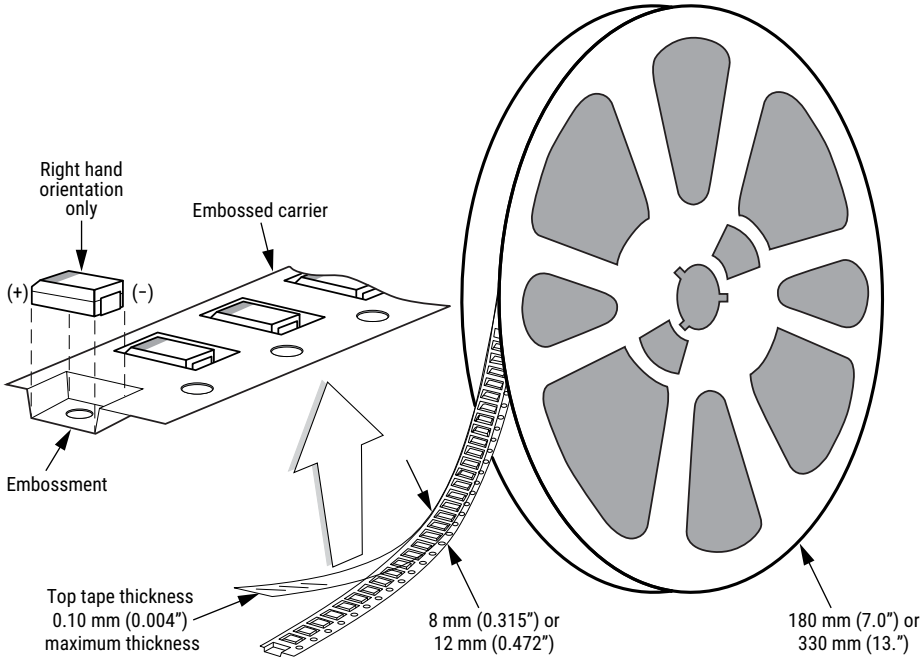


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

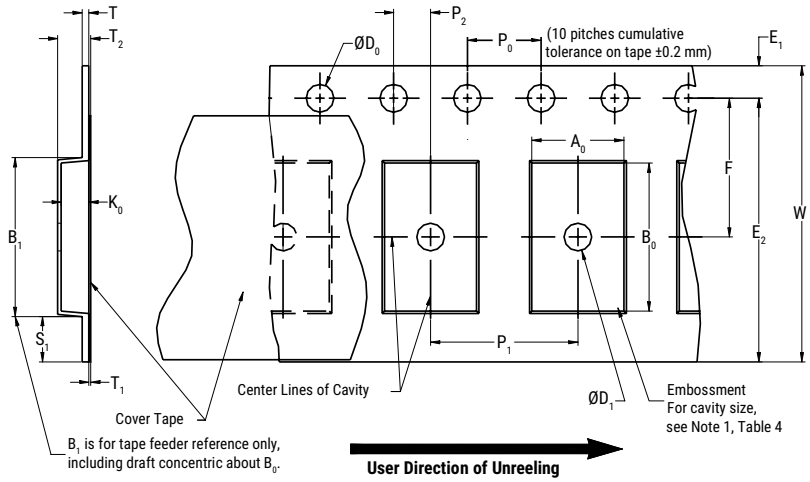


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

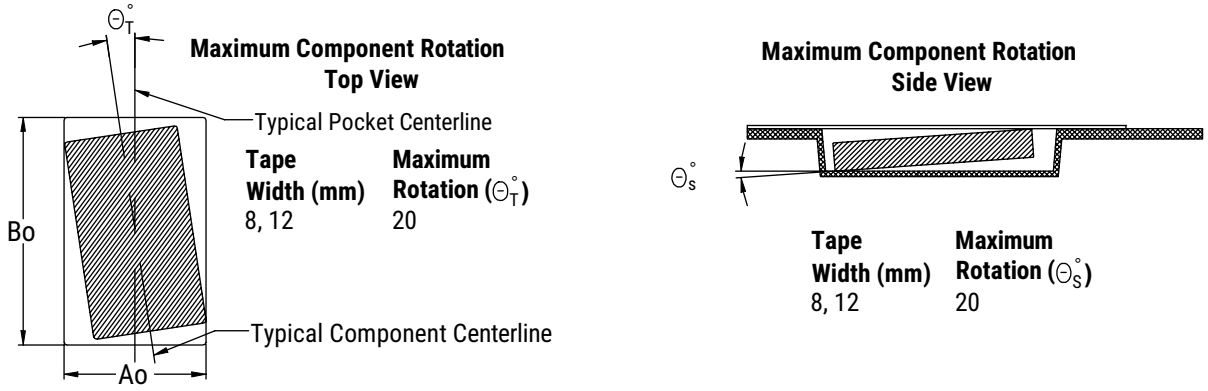


Figure 3 – Maximum Lateral Movement

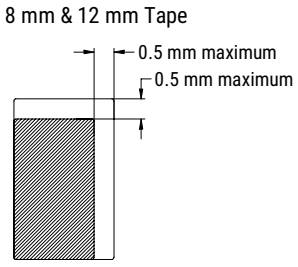


Figure 4 – Bending Radius

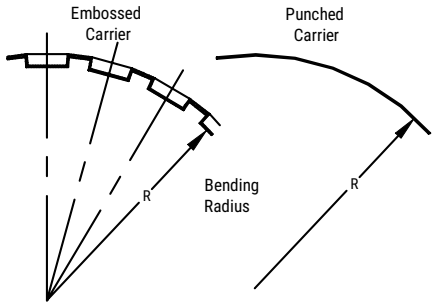
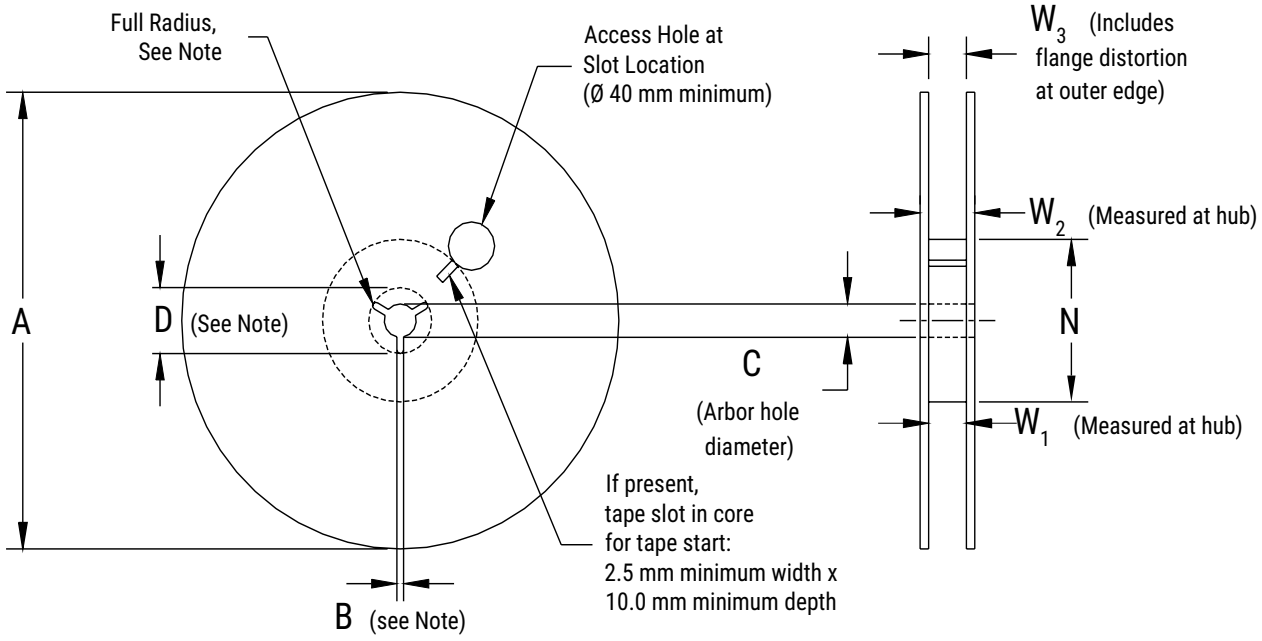


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

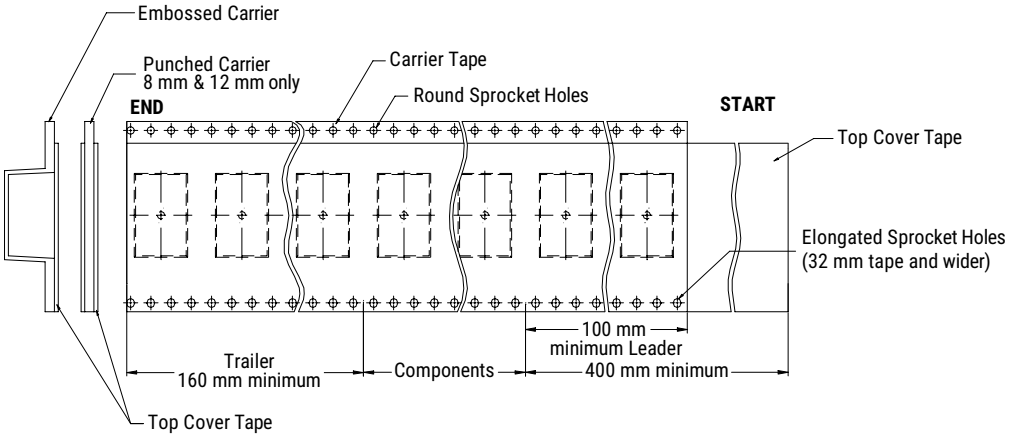
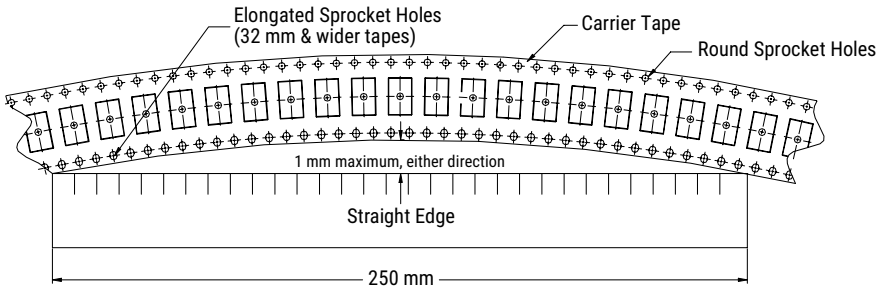


Figure 7 – Maximum Camber



Tantalum Surface Mount Capacitors – MIL-PRF (CWR Style)

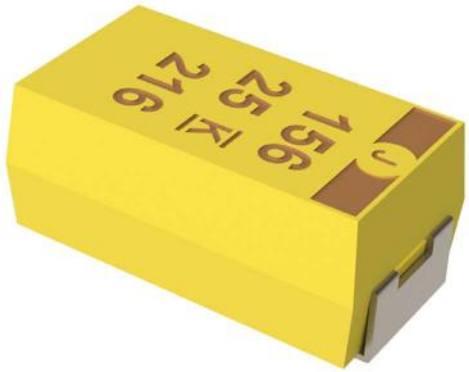
T492 MIL-PRF-55365/8 (CWR11 Style)

Overview

The KEMET T492 is approved to MIL-PRF-55365/8 (CWR11) with Weibull failure rates of B level (0.1% failures per 1,000 hours), C level (0.01% failures per 1,000 hours), D level (0.001% failures per 1,000 hours), or T level (0.01% failures per 1,000 hours, Option C surge current, DPA, radiographic inspection, 100% visual inspection, DCL and ESR measurements within +3 standard deviations, and Group C inspection). This CWR11 product is a precision-molded device with compliant terminations and indelible laser marking. This is the military version of the global IEC/EIA standard, represented by KEMET's T491. Tape & Reel per EIA 481 are standard.

Benefits

- Established reliability options
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Qualified to MIL-PRF-55365/8 (CWR11 Style)
- Termination options B, C, H (S), and K
- Weibull failure options B, C, D, and T
- Exponential failure rates M, P, R, and S
- Voltage rating of 4 – 50 VDC
- Operating temperature range of −55°C to +125°C



Applications

Typical applications include decoupling and filtering in military and aerospace applications requiring CWR11 devices.

Environmental Compliance

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

KEMET Ordering Information

T	492	D	156	K	020	A	C	4251	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Surge (C-Spec) (10 cycles)	Packaging (C-Spec)
T = Tantalum	CWR11 Established reliability	A B C D	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	004 = 4 006 = 6 010 = 10 015 = 15 020 = 20 025 = 25 035 = 35 050 = 50	Weibull A = non-ER B = (0.1%/ 1,000 hours) C = (0.01%/ 1,000 hours) D = (0.001%/ 1,000 hours) T = T Level* (0.01%/ 1,000 hours) Exponential M = (1.0%/ 1,000 hours) P = (0.1%/ 1,000 hours) R = (0.01%/ 1,000 hours) S = (0.001%/ 1,000 hours	C = Hot solder dipped H / S = Standard solder coated (SnPb 5% Pb minimum) B = Gold-plated K = Solder fused	Blank = No Surge 4250 = 25°C after Weibull 4251 = –55°C and 85°C after Weibull 4252 = –55°C and 85°C before Weibull TLVL = –55°C and 85°C before Weibull, Weibull grade level "T"	Blank = 7" Reel 7280 = 13" Reel 7611 = Bulk bag 7640 = Bulk plastic box WAFL = Waffle pack

Ordering Information – Defense MIL-PRF-55365/8

CWR11	M	H	105	K	B	A
Capacitor Style	Rated Voltage (VDC)	Termination Finish	Capacitance Code (pF)	Capacitance Tolerance	Reliability Level	Surge Current Option** (10 cycles)
Per MIL-PRF-55365/8	C = 4 D = 6 F = 10 H = 15 J = 20 K = 25 M = 35 N = 50	B = Gold-plated C = Hot solder dipped H = Solder-plated K = Solder fused	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	Weibull A = non-ER B = (0.1%/1,000 hours) C = (0.01%/1,000 hours) D = (0.001%/1,000 hours) T= T Level* (0.01%/1,000 hours) Exponential M = (1.0%/1,000 hours) P = (0.1%/1,000 hours) R = (0.01%/1,000 hours) S = (0.001%/1,000 hours	A = +25°C after Weibull B = –55°C +85°C after Weibull C = –55°C +85°C before Weibull Blank = No Surge

** When T Level is ordered, Surge Current option C must be selected.*

*** For additional surge current details, please refer to MIL-PRF-55665*

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 100 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, −55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +125°C, +25°C			+25°C	−55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±15%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	n/a	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Additional qualification tests per MIL-PRF-55365/8	Please contact KEMET for more information.					

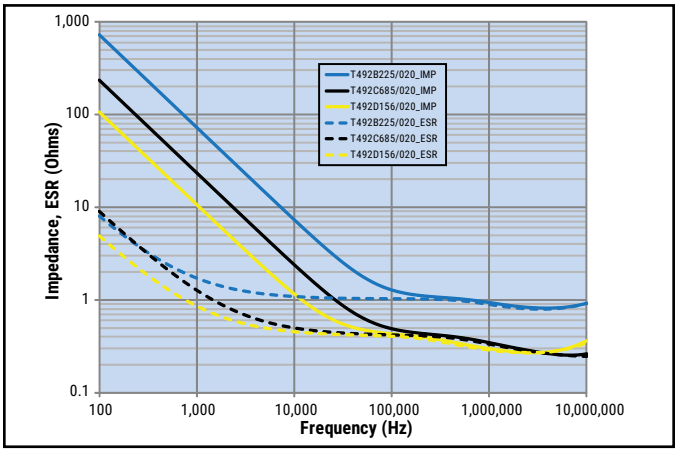
**IL = Initial Limit*

Certification

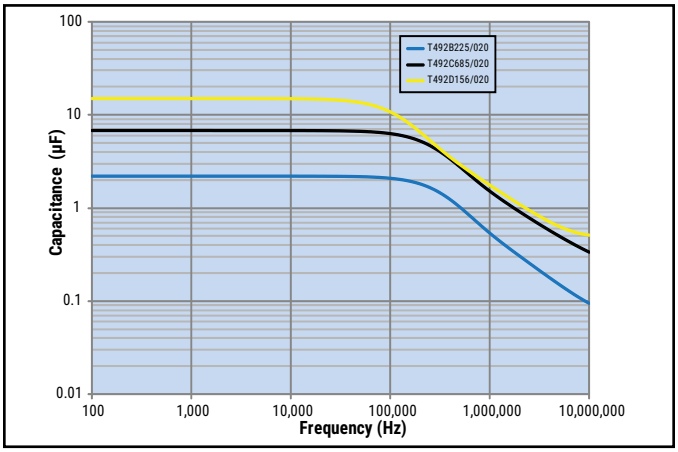
MIL-PRF-55365/8

Electrical Characteristics

ESR vs. Frequency



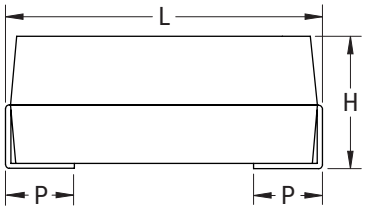
Capacitance vs. Frequency



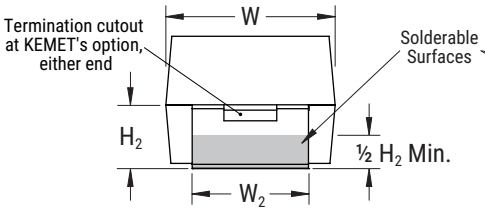
Dimensions – Millimeters (Inches)

Metric will govern

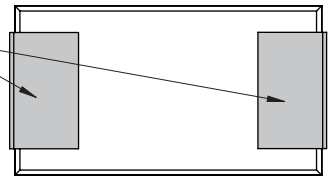
SIDE VIEW



END VIEW



BOTTOM VIEW



Case Size	Component						Typical Weight
KEMET	H	H_2 Minimum	L	P ±0.3 (0.012)	W	W_2 ±0.1 (0.004)	(mg)
A	1.6 ±0.2 (0.063 ±0.008)	0.7 (0.028)	3.2 ±0.2 (0.126 ±0.008)	0.8 (0.031)	1.6 ±0.2 (0.063 ±0.008)	1.2 (0.047)	58.97
B	1.9 ±0.2 (0.075 ±0.008)	0.7 (0.028)	3.5 ±0.2 (0.138 ±0.008)	0.8 (0.031)	2.8 ±0.2 (0.110 ±0.008)	2.2 (0.087)	102.3
C	2.5 ±0.3 (0.098 ±0.012)	1.0 (0.039)	6.0 ±0.3 (0.236 ±0.012)	1.3 (0.051)	3.2 ±0.3 (0.126 ±0.012)	2.2 (0.087)	224.2
D	2.8 ±0.3 (0.110 ±0.012)	1.0 (0.039)	7.3 ±0.3 (0.287 ±0.012)	1.3 (0.051)	4.3 ±0.3 (0.169 ±0.012)	2.4 (0.094)	412.33

Note: When option C is selected for lead material, add an additional 0.38 mm (0.015 inch) to the above tolerances for "L", "W", "H", "P", "W_2" and "H_2." These weights are provided as reference. If exact weights are needed, please contact your KEMET sales representative.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/8 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	2.2	A/3216-18	T492A225(1)004(2)(3)(4)	CWR11C(6)225(1)(2)(5)	0.5	6.0	8.0	97.0	125	1
4	4.7	A/3216-18	T492A475(1)004(2)(3)(4)	CWR11C(6)475(1)(2)(5)	0.5	6.0	8.0	97.0	125	1
4	6.8	B/3528-21	T492B685(1)004(2)(3)(4)	CWR11C(6)685(1)(2)(5)	0.5	6.0	5.5	124	125	1
4	10	B/3528-21	T492B106(1)004(2)(3)(4)	CWR11C(6)106(1)(2)(5)	0.5	6.0	4.0	146	125	1
4	15	B/3528-21	T492B156(1)004(2)(3)(4)	CWR11C(6)156(1)(2)(5)	0.6	6.0	3.5	156	125	1
4	33	C/6032-28	T492C336(1)004(2)(3)(4)	CWR11C(6)336(1)(2)(5)	1.3	6.0	2.2	224	125	1
4	68	D/7343-31	T492D686(1)004(2)(3)(4)	CWR11C(6)686(1)(2)(5)	2.7	6.0	1.1	369	125	1
4	100	D/7343-31	T492D107(1)004(2)(3)(4)	CWR11C(6)107(1)(2)(5)	4.0	8.0	0.9	408	125	1
6	1.5	A/3216-18	T492A155(1)006(2)(3)(4)	CWR11D(6)155(1)(2)(5)	0.5	6.0	8.0	97.0	125	1
6	2.2	A/3216-18	T492A225(1)006(2)(3)(4)	CWR11D(6)225(1)(2)(5)	0.5	6.0	8.0	97.0	125	1
6	3.3	A/3216-18	T492A335(1)006(2)(3)(4)	CWR11D(6)335(1)(2)(5)	0.5	6.0	8.0	97.0	125	1
6	4.7	B/3528-21	T492B475(1)006(2)(3)(4)	CWR11D(6)475(1)(2)(5)	0.5	6.0	5.5	124	125	1
6	6.8	B/3528-21	T492B685(1)006(2)(3)(4)	CWR11D(6)685(1)(2)(5)	0.5	6.0	4.5	137	125	1
6	10	B/3528-21	T492B106(1)006(2)(3)(4)	CWR11D(6)106(1)(2)(5)	0.6	6.0	3.5	156	125	1
6	15	C/6032-28	T492C156(1)006(2)(3)(4)	CWR11D(6)156(1)(2)(5)	0.9	6.0	3.0	191	125	1
6	22	C/6032-28	T492C226(1)006(2)(3)(4)	CWR11D(6)226(1)(2)(5)	1.3	6.0	2.2	224	125	1
6	47	D/7343-31	T492D476(1)006(2)(3)(4)	CWR11D(6)476(1)(2)(5)	2.8	6.0	1.1	369	125	1
6	68	D/7343-31	T492D686(1)006(2)(3)(4)	CWR11D(6)686(1)(2)(5)	4.1	6.0	0.9	408	125	1
10	1	A/3216-18	T492A105(1)010(2)(3)(4)	CWR11F(6)105(1)(2)(5)	0.5	4.0	10.0	87.0	125	1
10	1.5	A/3216-18	T492A155(1)010(2)(3)(4)	CWR11F(6)155(1)(2)(5)	0.5	6.0	8.0	97.0	125	1
10	2.2	A/3216-18	T492A225(1)010(2)(3)(4)	CWR11F(6)225(1)(2)(5)	0.5	6.0	8.0	97.0	125	1
10	3.3	B/3528-21	T492B335(1)010(2)(3)(4)	CWR11F(6)335(1)(2)(5)	0.5	6.0	5.5	124	125	1
10	4.7	B/3528-21	T492B475(1)010(2)(3)(4)	CWR11F(6)475(1)(2)(5)	0.5	6.0	4.5	137	125	1
10	6.8	B/3528-21	T492B685(1)010(2)(3)(4)	CWR11F(6)685(1)(2)(5)	0.7	6.0	3.5	156	125	1
10	15	C/6032-28	T492C156(1)010(2)(3)(4)	CWR11F(6)156(1)(2)(5)	1.5	6.0	2.5	210	125	1
10	33	D/7343-31	T492D336(1)010(2)(3)(4)	CWR11F(6)336(1)(2)(5)	3.3	6.0	1.1	369	125	1
10	47	D/7343-31	T492D476(1)010(2)(3)(4)	CWR11F(6)476(1)(2)(5)	4.7	6.0	0.9	408	125	1
15	0.68	A/3216-18	T492A684(1)015(2)(3)(4)	CWR11H(6)684(1)(2)(5)	0.5	4.0	12.0	79.0	125	1
15	1	A/3216-18	T492A105(1)015(2)(3)(4)	CWR11H(6)105(1)(2)(5)	0.5	4.0	10.0	87.0	125	1
15	1.5	A/3216-18	T492A155(1)015(2)(3)(4)	CWR11H(6)155(1)(2)(5)	0.5	6.0	8.0	97.0	125	1
15	2.2	B/3528-21	T492B225(1)015(2)(3)(4)	CWR11H(6)225(1)(2)(5)	0.5	6.0	5.5	124	125	1
15	3.3	B/3528-21	T492B335(1)015(2)(3)(4)	CWR11H(6)335(1)(2)(5)	0.5	6.0	5.0	130	125	1
15	4.7	B/3528-21	T492B475(1)015(2)(3)(4)	CWR11H(6)475(1)(2)(5)	0.7	6.0	4.0	146	125	1
15	10	C/6032-28	T492C106(1)015(2)(3)(4)	CWR11H(6)106(1)(2)(5)	1.5	6.0	2.5	210	125	1
15	22	D/7343-31	T492D226(1)015(2)(3)(4)	CWR11H(6)226(1)(2)(5)	3.3	6.0	1.1	369	125	1
15	33	D/7343-31	T492D336(1)015(2)(3)(4)	CWR11H(6)336(1)(2)(5)	5.0	6.0	0.9	408	125	1
20	0.47	A/3216-18	T492A474(1)020(2)(3)(4)	CWR11J(6)474(1)(2)(5)	0.5	4.0	14.0	73.0	125	1
20	0.68	A/3216-18	T492A684(1)020(2)(3)(4)	CWR11J(6)684(1)(2)(5)	0.5	4.0	12.0	79.0	125	1
20	1	A/3216-18	T492A105(1)020(2)(3)(4)	CWR11J(6)105(1)(2)(5)	0.5	4.0	10.0	87.0	125	1
20	1.5	B/3528-21	T492B155(1)020(2)(3)(4)	CWR11J(6)155(1)(2)(5)	0.5	6.0	6.0	119	125	1
20	2.2	B/3528-21	T492B225(1)020(2)(3)(4)	CWR11J(6)225(1)(2)(5)	0.5	6.0	5.0	130	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/8 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET/CWR part number, insert M for ±20%, K for ±10%, or J for ±5%. Designates Capacitance tolerance.

(2) To complete KEMET/CWR part number, insert failure rate letter per the Ordering Information found on page 2. Designates Reliability Level.

(3) To complete KEMET part number, insert B = Gold-plated, C = Hot solder dipped, H or S = Solder-plated or K = Solder fused. Designates Termination Finish.

(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = −55°C +85°C after Weibull, or 4252 = −55°C +85°C before Weibull. Designates Surge Current Option.

(5) To complete CWR part number, insert A = +25°C after Weibull, B = −55°C +85°C after Weibull, C = −55°C +85°C before Weibull or Z = None. Designates Surge Current Option.

(6) To complete CWR part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder-plated or K = Solder fused. Designates Termination Finish. Refer to Ordering Information for additional details.

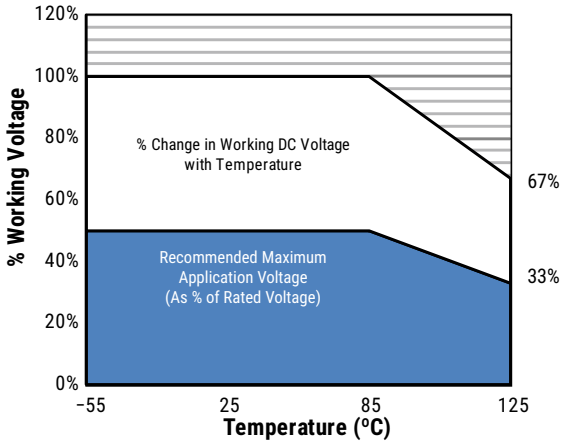
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/8 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
20	3.3	B/3528-21	T492B335(1)020(2)(3)(4)	CWR11J(6)335(1)(2)(5)	0.7	6.0	4.0	146	125	1
20	4.7	C/6032-28	T492C475(1)020(2)(3)(4)	CWR11J(6)475(1)(2)(5)	0.9	6.0	3.0	191	125	1
20	6.8	C/6032-28	T492C685(1)020(2)(3)(4)	CWR11J(6)685(1)(2)(5)	1.4	6.0	2.4	214	125	1
20	15	D/7343-31	T492D156(1)020(2)(3)(4)	CWR11J(6)156(1)(2)(5)	3.0	6.0	1.1	369	125	1
20	22	D/7343-31	T492D226(1)020(2)(3)(4)	CWR11J(6)226(1)(2)(5)	4.4	6.0	0.9	408	125	1
25	0.33	A/3216-18	T492A334(1)025(2)(3)(4)	CWR11K(6)334(1)(2)(5)	0.5	4.0	15.0	71.0	125	1
25	0.47	A/3216-18	T492A474(1)025(2)(3)(4)	CWR11K(6)474(1)(2)(5)	0.5	4.0	14.0	73.0	125	1
25	0.68	B/3528-21	T492B684(1)025(2)(3)(4)	CWR11K(6)684(1)(2)(5)	0.5	4.0	7.5	106	125	1
25	1	B/3528-21	T492B105(1)025(2)(3)(4)	CWR11K(6)105(1)(2)(5)	0.5	4.0	6.5	114	125	1
25	1.5	B/3528-21	T492B155(1)025(2)(3)(4)	CWR11K(6)155(1)(2)(5)	0.5	6.0	6.5	114	125	1
25	2.2	C/6032-28	T492C225(1)025(2)(3)(4)	CWR11K(6)225(1)(2)(5)	0.6	6.0	3.5	177	125	1
25	3.3	C/6032-28	T492C335(1)025(2)(3)(4)	CWR11K(6)335(1)(2)(5)	0.8	6.0	3.5	177	125	1
25	4.7	C/6032-28	T492C475(1)025(2)(3)(4)	CWR11K(6)475(1)(2)(5)	1.2	6.0	2.5	210	125	1
25	6.8	D/7343-31	T492D685(1)025(2)(3)(4)	CWR11K(6)685(1)(2)(5)	1.7	6.0	1.4	327	125	1
25	10	D/7343-31	T492D106(1)025(2)(3)(4)	CWR11K(6)106(1)(2)(5)	2.5	6.0	1.2	354	125	1
25	15	D/7343-31	T492D156(1)025(2)(3)(4)	CWR11K(6)156(1)(2)(5)	3.8	6.0	1.0	387	125	1
35	0.1	A/3216-18	T492A104(1)035(2)(3)(4)	CWR11M(6)104(1)(2)(5)	0.5	4.0	24.0	56.0	125	1
35	0.15	A/3216-18	T492A154(1)035(2)(3)(4)	CWR11M(6)154(1)(2)(5)	0.5	4.0	21.0	60.0	125	1
35	0.22	A/3216-18	T492A224(1)035(2)(3)(4)	CWR11M(6)224(1)(2)(5)	0.5	4.0	18.0	65.0	125	1
35	0.33	A/3216-18	T492A334(1)035(2)(3)(4)	CWR11M(6)334(1)(2)(5)	0.5	4.0	15.0	71.0	125	1
35	0.47	B/3528-21	T492B474(1)035(2)(3)(4)	CWR11M(6)474(1)(2)(5)	0.5	4.0	10.0	92	125	1
35	0.68	B/3528-21	T492B684(1)035(2)(3)(4)	CWR11M(6)684(1)(2)(5)	0.5	4.0	8.0	103	125	1
35	1	B/3528-21	T492B105(1)035(2)(3)(4)	CWR11M(6)105(1)(2)(5)	0.5	4.0	6.5	114	125	1
35	1.5	C/6032-28	T492C155(1)035(2)(3)(4)	CWR11M(6)155(1)(2)(5)	0.5	6.0	4.5	156	125	1
35	2.2	C/6032-28	T492C225(1)035(2)(3)(4)	CWR11M(6)225(1)(2)(5)	0.8	6.0	3.5	177	125	1
35	3.3	C/6032-28	T492C335(1)035(2)(3)(4)	CWR11M(6)335(1)(2)(5)	1.2	6.0	2.5	210	125	1
35	4.7	D/7343-31	T492D475(1)035(2)(3)(4)	CWR11M(6)475(1)(2)(5)	1.6	6.0	1.5	316	125	1
35	6.8	D/7343-31	T492D685(1)035(2)(3)(4)	CWR11M(6)685(1)(2)(5)	2.4	6.0	1.3	340	125	1
50	0.1	A/3216-18	T492A104(1)050(2)(3)(4)	CWR11N(6)104(1)(2)(5)	0.5	6.0	22.0	58.0	125	1
50	0.15	B/3528-21	T492B154(1)050(2)(3)(4)	CWR11N(6)154(1)(2)(5)	0.5	4.0	17.0	71	125	1
50	0.22	B/3528-21	T492B224(1)050(2)(3)(4)	CWR11N(6)224(1)(2)(5)	0.5	4.0	14.0	78	125	1
50	0.33	B/3528-21	T492B334(1)050(2)(3)(4)	CWR11N(6)334(1)(2)(5)	0.5	4.0	12.0	84	125	1
50	0.47	C/6032-28	T492C474(1)050(2)(3)(4)	CWR11N(6)474(1)(2)(5)	0.5	4.0	8.0	117	125	1
50	0.68	C/6032-28	T492C684(1)050(2)(3)(4)	CWR11N(6)684(1)(2)(5)	0.5	4.0	7.0	125	125	1
50	1	C/6032-28	T492C105(1)050(2)(3)(4)	CWR11N(6)105(1)(2)(5)	0.5	4.0	6.0	135	125	1
50	1.5	D/7343-31	T492D155(1)050(2)(3)(4)	CWR11N(6)155(1)(2)(5)	0.8	6.0	4.0	194	125	1
50	2.2	D/7343-31	T492D225(1)050(2)(3)(4)	CWR11N(6)225(1)(2)(5)	1.1	6.0	2.5	245	125	1
50	3.3	D/7343-31	T492D335(1)050(2)(3)(4)	CWR11N(6)335(1)(2)(5)	1.7	6.0	2.0	274	125	1
50	4.7	D/7343-31	T492D475(1)050(2)(3)(4)	CWR11N(6)475(1)(2)(5)	2.4	6.0	1.5	316	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at +25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-PRF-55365/8 Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Maximum Operating Temp	MSL

(1) To complete KEMET/CWR part number, insert M for ±20%, K for ±10%, or J for ±5%. Designates Capacitance tolerance.
(2) To complete KEMET/CWR part number, insert failure rate letter per the Ordering Information found on page 2. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold-plated, C = Hot solder dipped, H or S = Solder-plated or K = Solder fused. Designates Termination Finish.
(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = −55°C +85°C after Weibull, or 4252 = −55°C +85°C before Weibull. Designates Surge Current Option.
(5) To complete CWR part number, insert A = +25°C after Weibull, B = −55°C +85°C after Weibull, C = −55°C +85°C before Weibull or Z = None. Designates Surge Current Option.
(6) To complete CWR part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder-plated or K = Solder fused. Designates Termination Finish. Refer to Ordering Information for additional details.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for the reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the Pmax of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

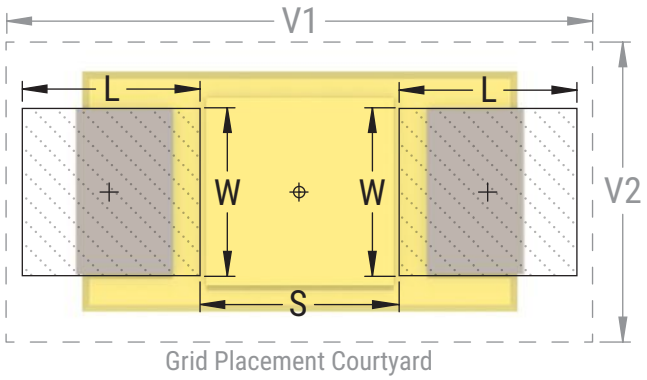
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe, plus, in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–25	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component desity product applications. Before adapting the minimum land pattern variations, the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

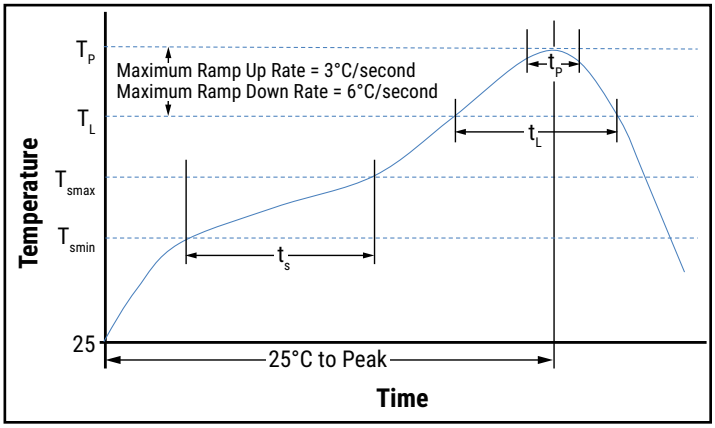
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

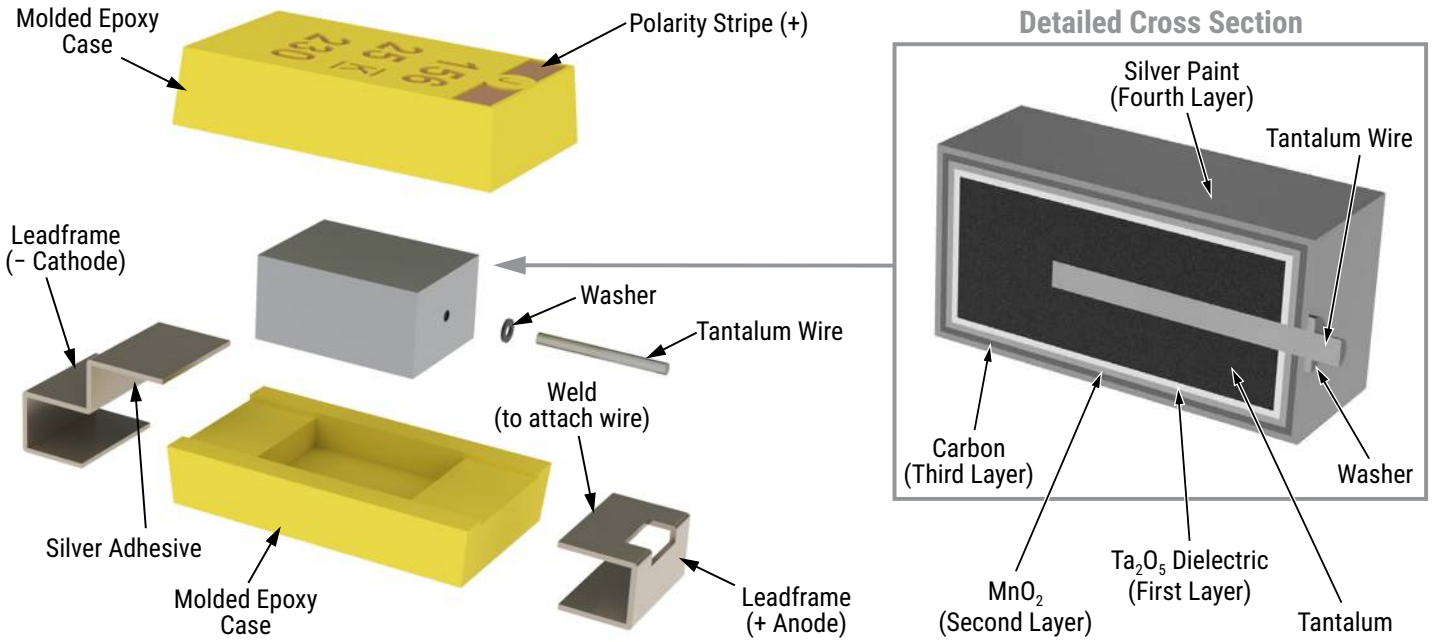
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



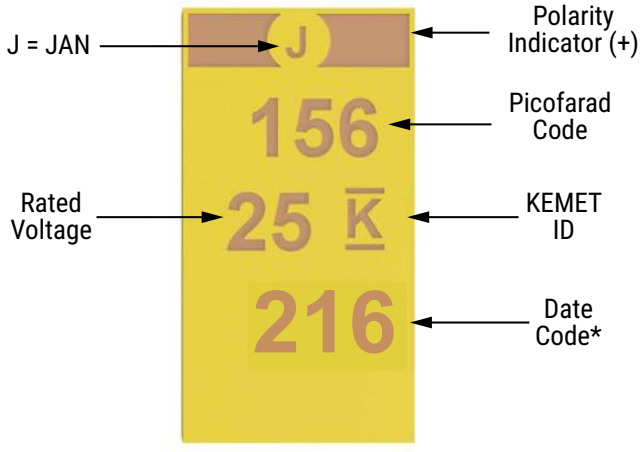
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 216 = 16th week of 2022

Date Code *	
1st digit = last number of year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

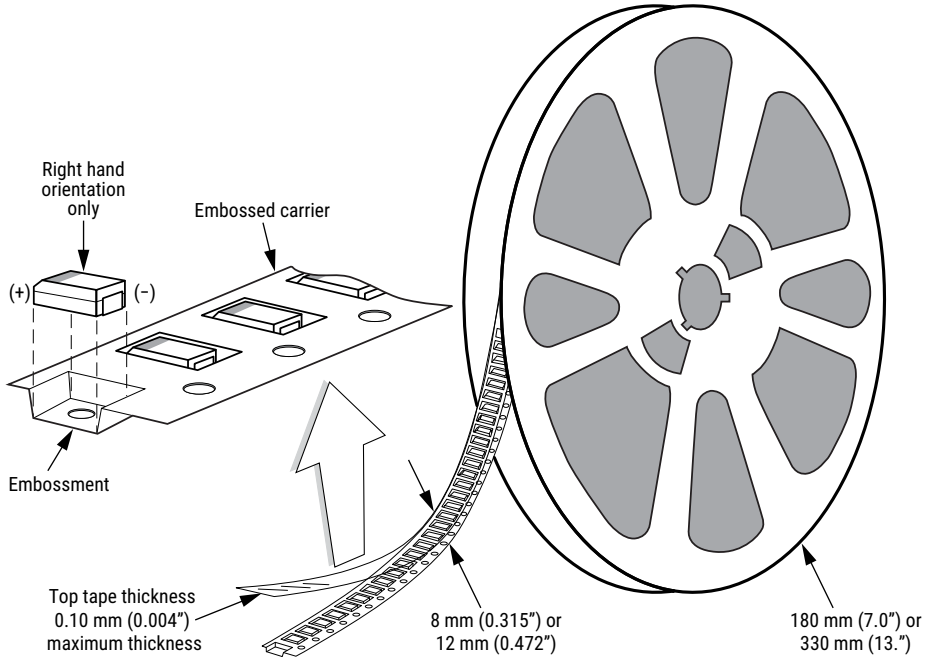


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

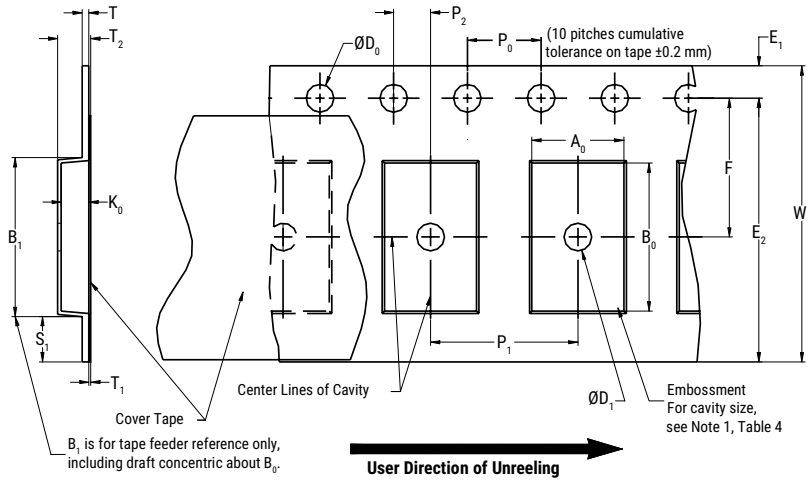


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

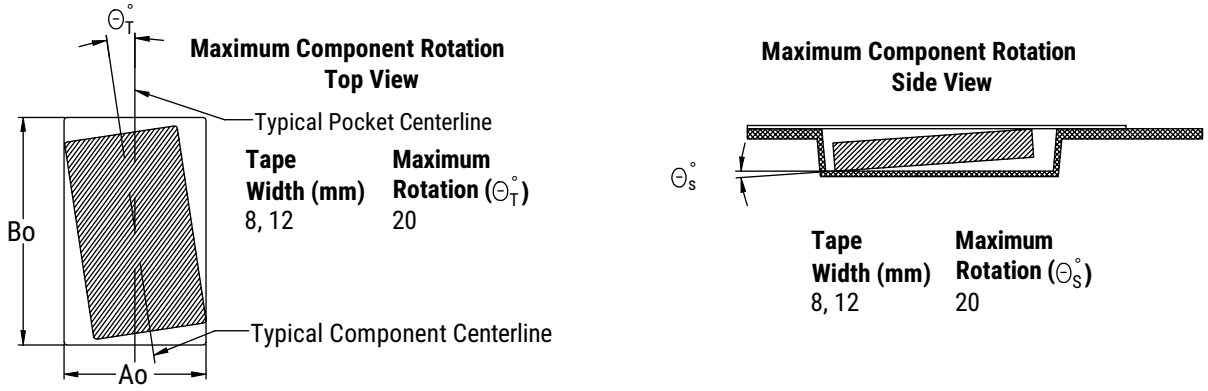


Figure 3 – Maximum Lateral Movement

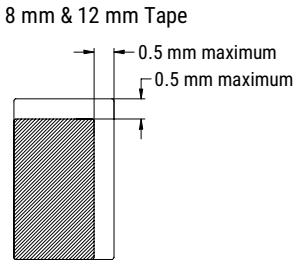


Figure 4 – Bending Radius

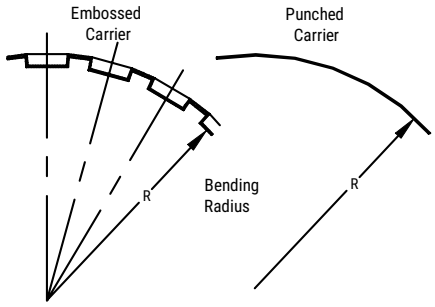
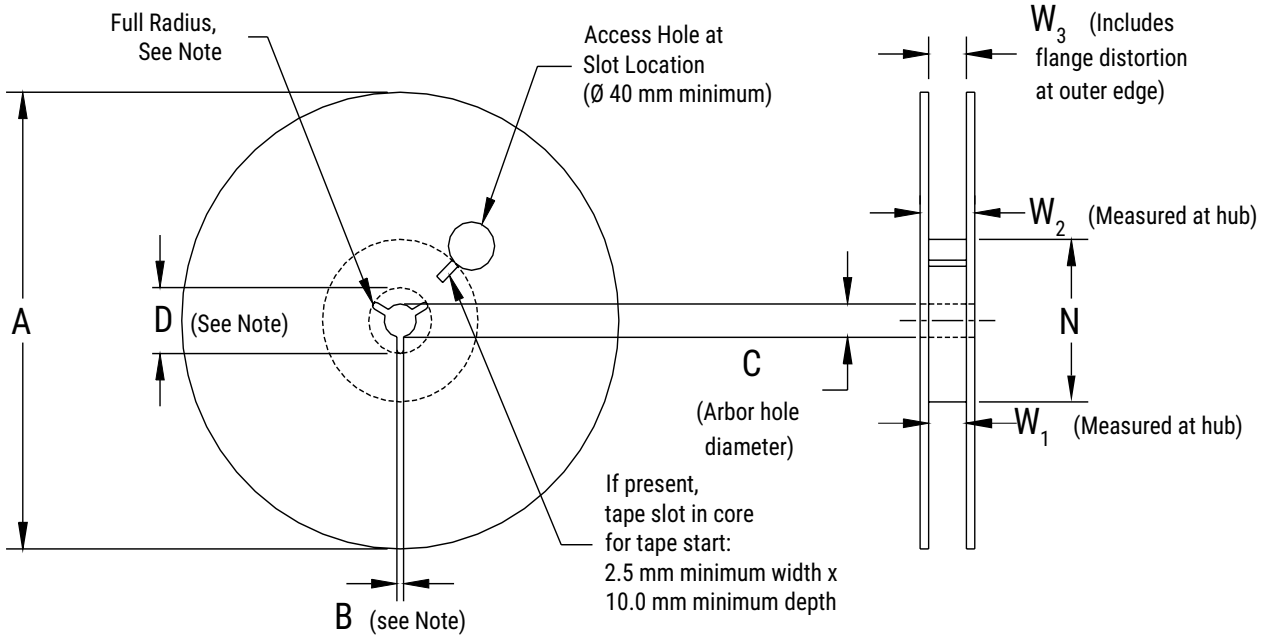


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				
Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

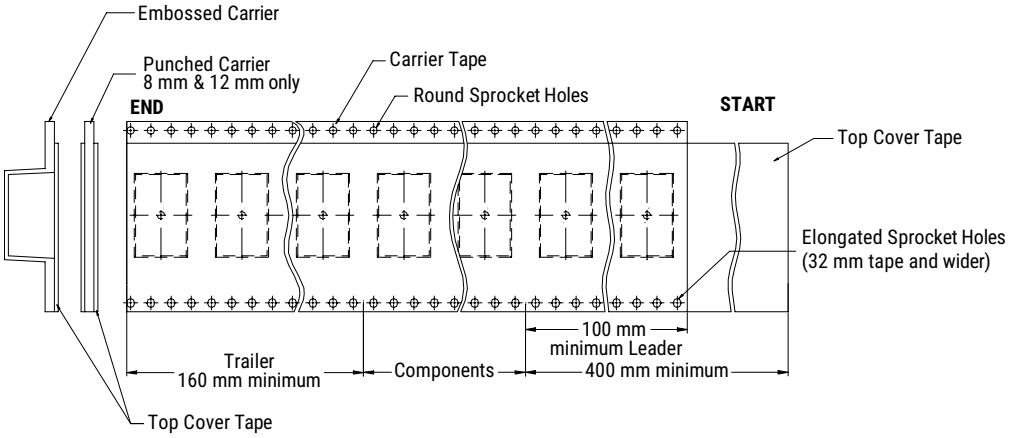
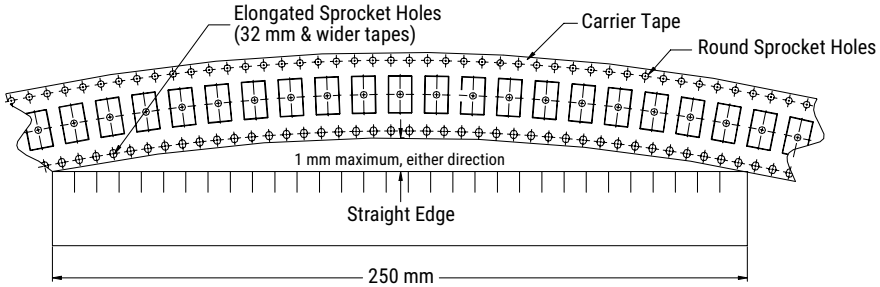


Figure 7 – Maximum Camber



T493 High Reliability Alternative MnO_2 (CWR11 Style)

Overview

The KEMET T493 Series is designed for the High Reliability Series (HRA) requirements of military and aerospace applications. This series is a surface mount product offering various lead-frame plating options, Weibull grading options, surge current testing, F-Tech (an improved anode manufacturing process) and Simulated Breakdown Voltage (SBDV) screening options to improve long term reliability. Standard, low, and ultra-low ESR options are available. All lots of this series are conditioned with MIL–PRF–55365 Group A testing. This series is also approved for DLA Drawing 07016 (please see part number list specific to this drawing).

KEMET's F-Tech eliminates hidden defects in the dielectric which continue to grow in the field, causing capacitor failures. Based on the fundamental understanding of degradation mechanisms in tantalum and niobium capacitors, F-Tech incorporates multiple process methodologies. Some minimize the oxygen and carbon content in the anodes which become contaminants and can lead to the crystallization of the anodic oxide dielectric. This process methodology reduces the contaminants, improving quality of the dielectric. An additional technology provides a stronger mechanical connection point between the tantalum lead wire and tantalum anode, enhancing robustness and product reliability. The benefit of F-Tech is illustrated by a 2,000 hour, 85°C, 1.32 X rated voltage accelerated life test. F-Tech parts see no degradation while standard tantalum's have 1.5 orders of magnitude degradation in leakage current.

The KEMET patented Simulated Breakdown Screening (SBDS) is a nondestructive testing technique that simulates the breakdown voltage (BDV) of a capacitor without damage to its dielectric or to the general population of capacitors. This screening identifies hidden defects in the dielectric, providing the highest level of dielectric testing. SBDS is based on the simulation of breakdown voltage (BDV), the ultimate test of the dielectric in a capacitor.

Low BDV indicates defects in the dielectric, and therefore, a higher probability of failure in the field. High BDV indicates a stronger dielectric and high-reliability performance in the field. This new screening method allows KEMET to identify the breakdown voltage of each individual capacitor and provide only the strongest capacitors from each lot.

SBDS is currently available on select part types in the T493 and T497 Series. Please contact KEMET for details on ordering other part types with these capabilities.

KEMET offers these technologies per the following options:
- F-Tech only
- SBDS only
- Combination of both F-Tech and SBDS for the ultimate protection

Benefits

- F-Tech and Simulated Breakdown Voltage (SBDS) screening options available
- Taped and reeled per EIA 481
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Termination options B, C, H, K, T, N, and M
- Weibull failure options B and C
- All parts tested per Group A of MIL–PRF–55365
- Approved for DLA Drawing 07016 applications*

** Defense Logistics Agency (DLA), previously identified as DSCC*

Applications

Typical applications include decoupling and filtering in military and aerospace applications.

Environmental Compliance

RoHS Compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder.

Ordering Information

T	493	D	227	K	006	C	H	61	20	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Surge	ESR	Packaging (C-Spec)
T = Tantalum	Military HRA	A, B, C, D, E, X	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50 063 = 63	A = N/A B = 0.1% /1,000 hours C = 0.01% /1,000 hours	C = Hot solder dipped H = Standard solder coated (SnPb 5% Pb minimum) B = Gold plated K = Solder fused T = 100% Tin N = Non-magnetic 100% Tin (Sn) M = Non-magnetic (SnPb)	61 = None 62 = 10 Cycles after Weibull, 25°C 63 = 10 cycles after Weibull, −55°C and 85°C after Weibull 64 = 10 cycles before Weibull,−55° and +85°C	10 = ESR – Standard 20 = ESR – Low 30 = ESR – Ultra low	Blank = 7" Reel 7280 = 13" Reel 7610 = Bulk Bag 7640 = Bluk plastic box WAFL = Waffle Pack

For detailed part number offerings, please refer to:
Table 1A – KEMET HRA
Table 1B – DLA Drawing 07016

Ordering Information – DLA Drawing 07016

07016-	001	K	B	H	A
Drawing Number	Dash Number	Capacitance Tolerance	Reliability Grade	Termination Finish	Surge
	See Part Number Table	J = ±5% K = ±10% M = ±20%	B = 0.1%/1,000 hours C = 0.01%/1,000 hours	C = Hot solder dipped H = Standard solder coated (SnPb 5% Pb minimum) B = Gold plated	A = + 25°C after Weibull B = −55°C and +85°C after Weibull C = −55°C and + 85°C before Weibull Z or no option= No test required

For detailed part number offerings, please refer to:
Table 1A –KEMET HRA
Table 1B – DLA Drawing 07016

Ordering Information – F-Tech & Simulated Breakdown Screening (SBDS)

T	493	D	226	K	020	C	H	61	20	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Surge	Screening/ESR	Packaging (C-Spec)
T = Tantalum	Military HRA	A, B, C, D, E, X	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	025 = 25 035 = 35 050 = 50 063 = 63	A = N/A B = 0.1% /1,000 hours C = 0.01% /1,000 hours	C = Hot solder dipped H = Standard solder coated (SnPb 5% Pb minimum) B = Gold plated K = Solder fused K = Solder fused T = 100% Tin N = Non-magnetic 100% Tin (Sn) M = Non-magnetic (SnPb)	61 = None 62 = 10 Cycles after Weibull, 25°C 63 = 10 cycles after Weibull, −55°C and 85°C after Weibull 64 = 10 cycles before Weibull, −55° and +85°C	11 = F-Tech + SBDS * 12 = SBDS 13 = F-Tech * 21 = Low ESR + 11 22= Low ESR + 12 23 = Low ESR + 13 31= Ultra Low ESR + 11 32 = Ultra Low ESR + 12 33 = Ultra Low ESR + 13	Blank = 7" Reel 7280 = 13" Reel 7610 = Bulk Bag 7640 = Bluk plastic box WAFL = Waffle Pack

** F-Tech screening option not available on A and B case size part types. F-Tech is available in select "C", "D", and "X" case sizes in 20 V and higher rated voltage*

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55° C to 125° C
Rated Capacitance Range	0.1 – 470 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 63 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±15%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

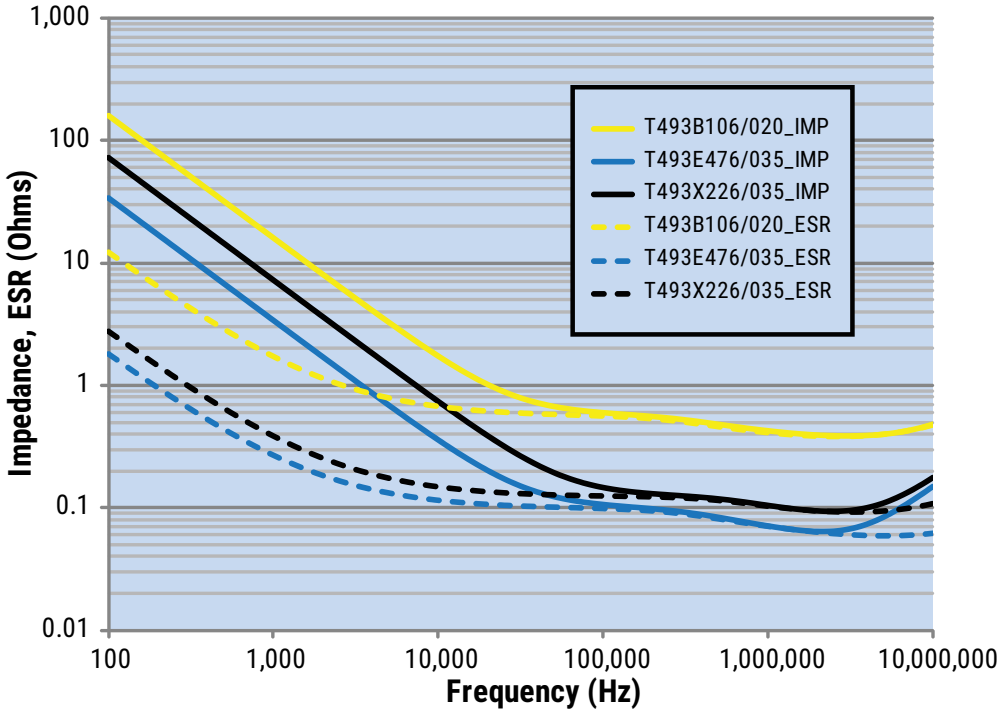
**IL = Initial limit*

Certification

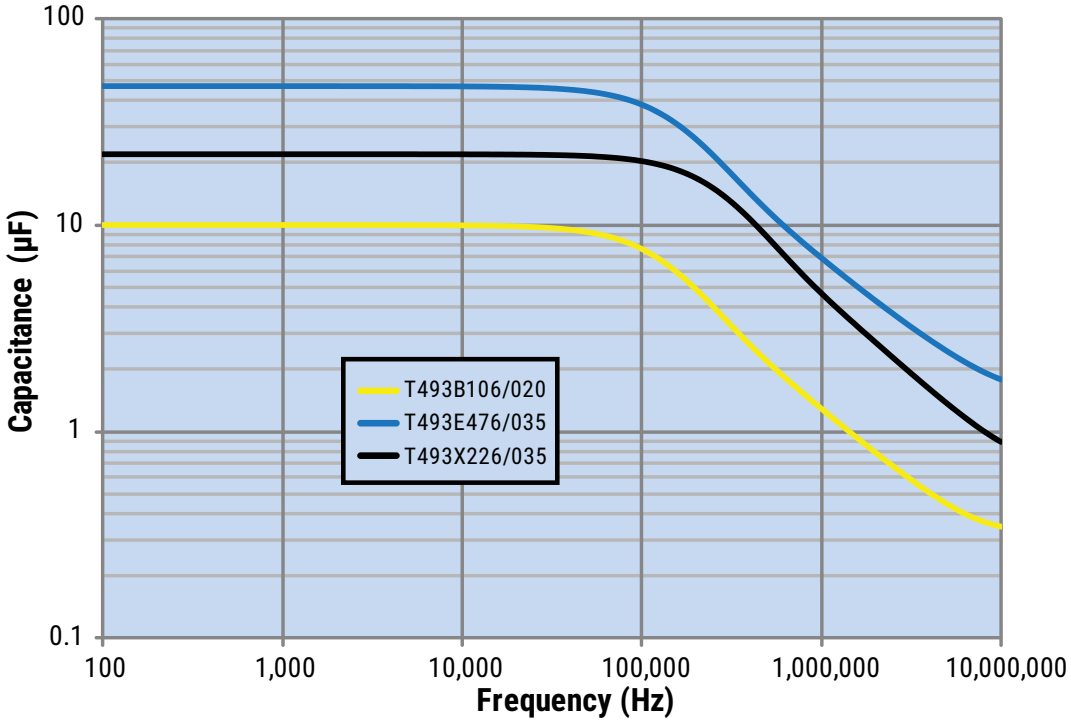
MIL–PRF–55365/8
DLA Drawing 07016

Electrical Characteristics

ESR vs. Frequency

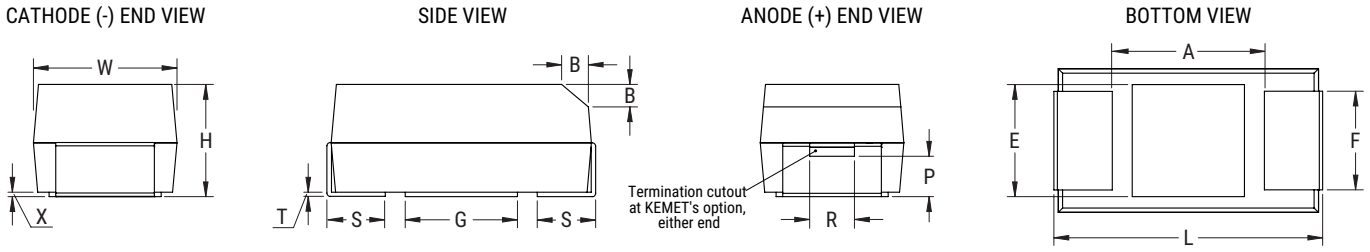


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern

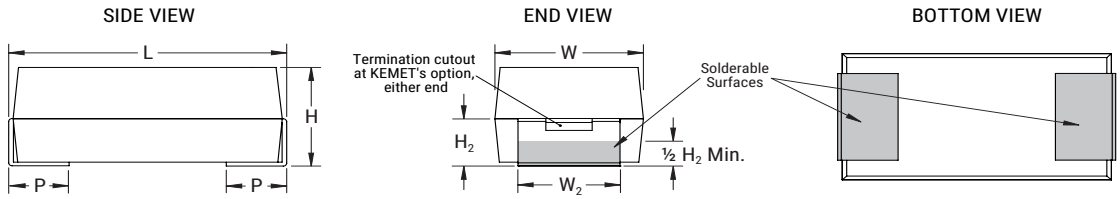


Case Size		Component													Typical Weight
KEMET	EIA	L	W	H	F ±0.1 ±(.004)	S ±0.3 ±(.012)	B ±0.15 (Ref) ±.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)	(mg)
A	3216–18	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	1.2 (0.047)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)	58.97
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9±0.2 (0.075±0.008)	2.2 (0.087)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)	102.3
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.1 (0.122)	2.8 (0.110)	2.4 (0.094)	224.2
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	412.33
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	652.04
E	7360–38	7.3±0.3 (0.287±0.012)	6.0±0.3 (0.236±0.012)	3.6±0.2 (0.142±0.008)	3.1 (0.120)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	N/A	N/A	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	803.76

Notes: (Ref) – Dimensions provided for reference only. For low profile cases, no dimensions are provided for B, P or R because these cases do not have a bevel or a notch.

These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative

Dimensions – Millimeters (Inches) DLA Drawing 07016



Case Size	Component					Typical Weight
KEMET	H	L	P ±0.3 (0.012)	W	W_2 ±0.1 (0.004)	(mg)
A	1.6±0.2 (0.063±0.008)	3.2±0.2 (0.126±0.008)	0.8 (0.031)	1.6±0.2 (0.063±0.008)	1.2 (0.047)	58.97
B	1.9±0.2 (0.075±0.008)	3.5±0.2 (0.138±0.008)	0.8 (0.031)	2.8±0.2 (0.110±0.008)	2.2 (0.087)	102.3
C	2.5±0.3 (0.098±0.012)	6.0±0.3 (0.236±0.012)	1.3 (0.051)	3.2±0.3 (0.126±0.012)	2.2 (0.087)	224.2
D	2.8±0.3 (0.110±0.012)	7.3±0.3 (0.287±0.012)	1.3 (0.051)	4.3±0.3 (0.169±0.012)	2.4 (0.094)	412.33
X	4.0±0.3 (0.157±0.012)	7.3±0.3 (0.287±0.012)	1.3 (0.051)	4.3±0.3 (0.169±0.012)	2.4 (0.094)	652.04
E	3.6±0.2 (0.142±0.008)	7.3±0.3 (0.287±0.012)	1.3 (0.051)	6.0±0.3 (0.236±0.012)	3.1 (0.120)*	803.76

** Previously, KEMET'S "W_2" dimension was 4.10 (0.161) for the "E" case.*
These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative

Table 1A – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	2.2	A/3216-18	T493A225(1)004(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	97	112	N/A	125	1
4	3.3	A/3216-18	T493A335(1)004(2)(3)(4)(5)	0.5	6.0	8.0	4.0	N/A	97	137	N/A	125	1
4	4.7	A/3216-18	T493A475(1)004(2)(3)(4)(5)	0.5	6.0	8.0	3.5	N/A	97	146	N/A	125	1
4	6.8	A/3216-18	T493A685(1)004(2)(3)(4)(5)	0.5	6.0	6.0	3.0	N/A	112	158	N/A	125	1
4	6.8	B/3528-21	T493B685(1)004(2)(3)(4)(5)	0.5	6.0	5.5	2.0	N/A	124	194	N/A	125	1
4	10	A/3216-18	T493A106(1)004(2)(3)(4)(5)	0.5	6.0	6.0	2.0	N/A	112	194	N/A	125	1
4	10	B/3528-21	T493B106(1)004(2)(3)(4)(5)	0.5	6.0	3.5	1.2	N/A	156	250	N/A	125	1
4	15	A/3216-18	T493A156(1)004(2)(3)(4)(5)	0.6	6.0	4.0	1.5	N/A	137	223	N/A	125	1
4	15	B/3528-21	T493B156(1)004(2)(3)(4)(5)	0.6	6.0	3.5	1.2	N/A	156	250	N/A	125	1
4	22	A/3216-18	T493A226(1)004(2)(3)(4)(5)	0.9	6.0	4.0	1.5	N/A	137	223	N/A	125	1
4	22	B/3528-21	T493B226(1)004(2)(3)(4)(5)	0.9	6.0	3.5	0.6	N/A	156	354	N/A	125	1
4	22	C/6032-28	T493C226(1)004(2)(3)(4)(5)	0.9	6.0	1.8	0.5	N/A	247	469	N/A	125	1
4	33	A/3216-18	T493A336(1)004(2)(3)(4)(5)	1.3	6.0	4.0	3.0	N/A	137	158	N/A	125	1
4	33	B/3528-21	T493B336(1)004(2)(3)(4)(5)	1.3	6.0	3.5	0.5	N/A	156	387	N/A	125	1
4	33	C/6032-28	T493C336(1)004(2)(3)(4)(5)	1.3	6.0	1.8	0.5	N/A	247	469	N/A	125	1
4	47	B/3528-21	T493B476(1)004(2)(3)(4)(5)	1.9	6.0	3.0	0.5	N/A	158	387	N/A	125	1
4	47	C/6032-28	T493C476(1)004(2)(3)(4)(5)	1.9	6.0	1.8	0.5	N/A	247	469	N/A	125	1
4	68	B/3528-21	T493B686(1)004(2)(3)(4)(5)	2.7	6.0	3.5	2.0	N/A	156	194	N/A	125	1
4	68	C/6032-28	T493C686(1)004(2)(3)(4)(5)	2.7	6.0	1.6	0.25	N/A	262	663	N/A	125	1
4	68	D/7343-31	T493D686(1)004(2)(3)(4)(5)	2.7	6.0	0.8	0.2	N/A	433	866	N/A	125	1
4	100	A/3216-18	T493A107(1)004(2)(3)(4)(5)	4	30.0	1.4	N/A	N/A	231	N/A	N/A	125	1
4	100	B/3528-21	T493B107(1)004(2)(3)(4)(5)	4	8.0	1.0	0.7	0.50	274	327	387	125	1
4	100	C/6032-28	T493C107(1)004(2)(3)(4)(5)	4	8.0	1.2	0.2	N/A	303	742	N/A	125	1
4	100	D/7343-31	T493D107(1)004(2)(3)(4)(5)	4	8.0	0.8	0.2	N/A	433	866	N/A	125	1
4	150	C/6032-28	T493C157(1)004(2)(3)(4)(5)	6	8.0	1.2	0.3	0.25	303	606	663	125	1
4	150	D/7343-31	T493D157(1)004(2)(3)(4)(5)	6	8.0	0.8	0.15	N/A	433	1000	N/A	125	1
4	220	D/7343-31	T493D227(1)004(2)(3)(4)(5)	8.8	8.0	0.9	0.7	N/A	408	463	N/A	125	1
4	330	D/7343-31	T493D337(1)004(2)(3)(4)(5)	13.2	8.0	0.7	0.15	N/A	463	1000	N/A	125	1
4	330	X/7343-43	T493X337(1)004(2)(3)(4)(5)	13.2	8.0	0.5	0.2	N/A	574	908	N/A	125	1
6.3	1.5	A/3216-18	T493A155(1)006(2)(3)(4(5)	0.5	6.0	8.0	6.0	N/A	97	112	N/A	125	1
6.3	2.2	A/3216-18	T493A225(1)006(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	97	112	N/A	125	1
6.3	3.3	A/3216-18	T493A335(1)006(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	97	112	N/A	125	1
6.3	4.7	A/3216-18	T493A475(1)006(2)(3)(4)(5)	0.5	6.0	6.0	3.5	N/A	112	146	N/A	125	1
6.3	4.7	B/3528-21	T493B475(1)006(2)(3)(4)(5)	0.5	6.0	5.5	3.5	N/A	124	194	N/A	125	1
6.3	6.8	A/3216-18	T493A685(1)006(2)(3)(4)(5)	0.5	6.0	6.0	2.0	N/A	112	194	N/A	125	1
6.3	6.8	B/3528-21	T493B685(1)006(2)(3)(4)(5)	0.5	6.0	3.5	1.2	N/A	156	250	N/A	125	1
6.3	10	A/3216-18	T493A106(1)006(2)(3)(4)(5)	0.6	6.0	4.0	2.0	N/A	137	194	N/A	125	1
6.3	10	B/3528-21	T493B106(1)006(2)(3)(4)(5)	0.6	6.0	3.5	1.0	N/A	156	274	N/A	125	1
6.3	15	A/3216-18	T493A156(1)006(2)(3)(4)(5)	0.9	6.0	4.0	1.5	N/A	137	223	N/A	125	1
6.3	15	B/3528-21	T493B156(1)006(2)(3)(4)(5)	0.9	6.0	3.5	0.7	N/A	156	327	N/A	125	1
6.3	15	C/6032-28	T493C156(1)006(2)(3)(4)(5)	0.9	6.0	1.8	0.6	N/A	247	428	N/A	125	1
6.3	22	A/3216-18	T493A226(1)006(2)(3)(4)(5)	1.4	6.0	4.0	3.0	N/A	137	158	N/A	125	1
6.3	22	B/3528-21	T493B226(1)006(2)(3)(4)(5)	1.4	6.0	3.5	0.6	N/A	156	354	N/A	125	1
6.3	22	C/6032-28	T493C226(1)006(2)(3)(4)(5)	1.4	6.0	1.8	0.5	N/A	247	469	N/A	125	1
6.3	33	B/3528-21	T493B336(1)006(2)(3)(4)(5)	2.1	6.0	3.0	0.6	N/A	158	354	N/A	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 Hours), C (0.01%/1,000 Hours) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold Plated, C = Hot solder dipped, H = Solder Plated, K = Solder Fused or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull 64 = 10 cycles −55°C +85°C before Weibull or 6(X)11, 6(X)12, 6(X)13, 6(X)21, 6(X)22, 6(X)23, 6(X)31, 6(X)32, 6(X)33. Designates screening options.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
Refer to Ordering Information for additional detail.

Table 1A – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
6.3	33	C/6032-28	T493C336(1)006(2)(3)(4)(5)	2.1	6.0	1.8	0.3	N/A	247	606	N/A	125	1
6.3	47	B/3528-21	T493B476(1)006(2)(3)(4)(5)	3.0	6.0	3.5	2.0	N/A	156	194	N/A	125	1
6.3	47	C/6032-28	T493C476(1)006(2)(3)(4)(5)	3.0	6.0	1.6	0.25	N/A	262	663	N/A	125	1
6.3	47	D/7343-31	T493D476(1)006(2)(3)(4)(5)	3.0	6.0	0.8	0.22	N/A	433	826	N/A	125	1
6.3	68	B/3528-21	T493B686(1)006(2)(3)(4)(5)	4.3	8.0	1.0	0.65	N/A	274	340	N/A	125	1
6.3	68	C/6032-28	T493C686(1)006(2)(3)(4)(5)	4.3	6.0	1.2	0.2	N/A	303	742	N/A	125	1
6.3	68	D/7343-31	T493D686(1)006(2)(3)(4)(5)	4.3	6.0	0.8	0.2	0.18	433	866	913	125	1
6.3	100	B/3528-21	T493B107(1)006(2)(3)(4)(5)	6.3	15.0	10.0	8.0	0.70	87	97	327	125	1
6.3	100	C/6032-28	T493C107(1)006(2)(3)(4)(5)	6.3	8.0	1.2	0.3	0.15	303	606	856	125	1
6.3	100	D/7343-31	T493D107(1)006(2)(3)(4)(5)	6.3	8.0	0.8	0.15	N/A	433	1000	N/A	125	1
6.3	150	C/6032-28	T493C157(1)006(2)(3)(4)(5)	9.5	8.0	1.2	0.3	0.20	303	606	742	125	1
6.3	150	D/7343-31	T493D157(1)006(2)(3)(4)(5)	9.5	8.0	0.7	0.15	N/A	463	1000	N/A	125	1
6.3	220	C/6032-28	T493C227(1)006(2)(3)(4)(5)	13.9	10.0	1.2	0.3	0.23	303	606	692	125	1
6.3	220	D/7343-31	T493D227(1)006(2)(3)(4)(5)	13.9	8.0	0.7	0.1	0.10	463	1225	1225	125	1
6.3	220	X/7343-43	T493X227(1)006(2)(3)(4)(5)	13.9	8.0	0.7	0.15	0.07	485	1049	1535	125	1
6.3	330	D/7343-31	T493D337(1)006(2)(3)(4)(5)	20.8	8.0	0.5	0.15	0.10	548	1000	1225	125	1
6.3	330	X/7343-43	T493X337(1)006(2)(3)(4)(5)	20.8	8.0	0.5	0.1	0.07	574	1285	1535	125	1
6.3	470	X/7343-43	T493X477(1)006(2)(3)(4)(5)	29.6	10.0	0.2	0.1	0.05	908	1285	1817	125	1
10	1	A/3216-18	T493A105(1)010(2)(3)(4)(5)	0.5	4.0	10.0	6.0	N/A	87	112	N/A	125	1
10	1.5	A/3216-18	T493A155(1)010(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	97	112	N/A	125	1
10	2.2	A/3216-18	T493A225(1)010(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	97	112	N/A	125	1
10	3.3	A/3216-18	T493A335(1)010(2)(3)(4)(5)	0.5	6.0	6.0	4.0	N/A	112	137	N/A	125	1
10	3.3	B/3528-21	T493B335(1)010(2)(3)(4)(5)	0.5	6.0	5.5	3.5	N/A	124	156	N/A	125	1
10	4.7	A/3216-18	T493A475(1)010(2)(3)(4)(5)	0.5	6.0	6.0	3.0	N/A	112	158	N/A	125	1
10	4.7	B/3528-21	T493B475(1)010(2)(3)(4)(5)	0.5	6.0	3.5	1.5	1.3	156	224	240	125	1
10	6.8	A/3216-18	T493A685(1)010(2)(3)(4)(5)	0.7	6.0	6.0	3.0	N/A	112	158	N/A	125	1
10	6.8	B/3528-21	T493B685(1)010(2)(3)(4)(5)	0.7	6.0	3.5	1.2	0.90	156	250	289	125	1
10	10	A/3216-18	T493A106(1)010(2)(3)(4)(5)	1	6.0	4.0	1.8	N/A	137	204	N/A	125	1
10	10	B/3528-21	T493B106(1)010(2)(3)(4)(5)	1	6.0	3.5	0.8	0.75	156	306	316	125	1
10	10	C/6032-28	T493C106(1)010(2)(3)(4)(5)	1	6.0	1.8	0.6	N/A	247	428	N/A	125	1
10	15	A/3216-18	T493A156(1)010(2)(3)(4)(5)	1.5	8.0	6.0	4.0	3.2	112	137	153	125	1
10	15	B/3528-21	T493B156(1)010(2)(3)(4)(5)	1.5	6.0	3.5	0.7	N/A	156	327	N/A	125	1
10	15	C/6032-28	T493C156(1)010(2)(3)(4)(5)	1.5	6.0	1.8	0.5	0.48	247	469	479	125	1
10	22	B/3528-21	T493B226(1)010(2)(3)(4)(5)	2.2	6.0	3.0	0.7	N/A	158	327	N/A	125	1
10	22	C/6032-28	T493C226(1)010(2)(3)(4)(5)	2.2	6.0	1.8	0.4	0.29	247	524	616	125	1
10	33	B/3528-21	T493B336(1)010(2)(3)(4)(5)	3.3	6.0	3.5	2.0	N/A	156	194	N/A	125	1
10	33	C/6032-28	T493C336(1)010(2)(3)(4)(5)	3.3	6.0	1.6	0.3	N/A	262	606	N/A	125	1
10	33	D/7343-31	T493D336(1)010(2)(3)(4)(5)	3.3	6.0	0.8	0.3	N/A	433	707	N/A	125	1
10	47	C/6032-28	T493C476(1)010(2)(3)(4)(5)	4.7	6.0	1.2	0.3	N/A	303	606	N/A	125	1
10	47	D/7343-31	T493D476(1)010(2)(3)(4)(5)	4.7	6.0	0.8	0.2	0.08	433	866	1369	125	1
10	68	C/6032-28	T493C686(1)010(2)(3)(4)(5)	6.8	6.0	1.2	0.3	0.23	303	606	692	125	1
10	68	D/7343-31	T493D686(1)010(2)(3)(4)(5)	6.8	6.0	0.8	0.2	0.09	433	866	1290	125	1
10	68	X/7343-43	T493X686(1)010(2)(3)(4)(5)	6.8	4.0	0.5	0.15	N/A	574	1049	N/A	125	1
10	100	C/6032-28	T493C107(1)010(2)(3)(4)(5)	10	8.0	1.2	0.3	N/A	303	606	N/A	125	1
10	100	D/7343-31	T493D107(1)010(2)(3)(4)(5)	10	8.0	0.7	0.1	0.08	463	1225	1369	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 Hours), C (0.01%/1,000 Hours) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold Plated, C = Hot solder dipped, H = Solder Plated, K = Solder Fused or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull 64 = 10 cycles −55°C +85°C before Weibull or 6(X)11, 6(X)12, 6(X)13, 6(X)21, 6(X)22, 6(X)23, 6(X)31, 6(X)32, 6(X)33. Designates screening options.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
Refer to Ordering Information for additional detail.

Table 1A – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	150	D/7343-31	T493D157(1)010(2)(3)(4)(5)	15	8.0	0.7	0.1	0.08	463	1225	1369	125	1
10	150	X/7343-43	T493X157(1)010(2)(3)(4)(5)	15	8.0	0.7	0.2	0.09	485	908	1354	125	1
10	220	D/7343-31	T493D227(1)010(2)(3)(4)(5)	22	8.0	0.5	0.2	0.08	548	866	1369	125	1
10	220	X/7343-43	T493X227(1)010(2)(3)(4)(5)	22	8.0	0.5	0.1	0.05	574	1285	1817	125	1
10	330	X/7343-43	T493X337(1)010(2)(3)(4)(5)	33	10.0	0.5	0.1	0.05	574	1285	1817	125	1
10	470	X/7343-43	T493X477(1)010(2)(3)(4)(5)	47	10.0	0.2	0.05	N/A	908	1817	N/A	125	1
16	0.68	A/3216-18	T493A684(1)016(2)(3)(4)(5)	0.5	6.0	12.0	8.0	N/A	79	97	N/A	125	1
16	1	A/3216-18	T493A105(1)016(2)(3)(4)(5)	0.5	4.0	10.0	6.0	N/A	87	112	N/A	125	1
16	1.5	A/3216-18	T493A155(1)016(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	97	112	N/A	125	1
16	2.2	A/3216-18	T493A225(1)016(2)(3)(4)(5)	0.5	6.0	6.0	4.0	N/A	112	137	N/A	125	1
16	3.3	A/3216-18	T493A335(1)016(2)(3)(4)(5)	0.5	6.0	6.0	3.5	N/A	112	146	N/A	125	1
16	3.3	B/3528-21	T493B335(1)016(2)(3)(4)(5)	0.5	6.0	3.5	2.0	N/A	156	194	N/A	125	1
16	4.7	A/3216-18	T493A475(1)016(2)(3)(4)(5)	0.8	6.0	6.0	3.0	N/A	112	158	N/A	125	1
16	4.7	B/3528-21	T493B475(1)016(2)(3)(4)(5)	0.8	6.0	3.5	1.5	N/A	156	224	N/A	125	1
16	6.8	A/3216-18	T493A685(1)016(2)(3)(4)(5)	1.1	6.0	7.0	3.0	N/A	103	158	N/A	125	1
16	6.8	B/3528-21	T493B685(1)016(2)(3)(4)(5)	1.1	6.0	3.5	1.2	N/A	156	250	N/A	125	1
16	6.8	C/6032-28	T493C685(1)016(2)(3)(4)(5)	1.1	6.0	1.9	0.8	0.75	240	370	383	125	1
16	10	A/3216-18	T493A106(1)016(2)(3)(4)(5)	1.6	6.0	3.0	N/A	N/A	158	N/A	N/A	125	1
16	10	B/3528-21	T493B106(1)016(2)(3)(4)(5)	1.6	6.0	3.5	0.8	N/A	156	306	N/A	125	1
16	10	C/6032-28	T493C106(1)016(2)(3)(4)(5)	1.6	6.0	1.8	0.6	N/A	247	428	N/A	125	1
16	15	B/3528-21	T493B156(1)016(2)(3)(4)(5)	2.4	6.0	3.0	0.8	N/A	158	306	N/A	125	1
16	15	C/6032-28	T493C156(1)016(2)(3)(4)(5)	2.4	6.0	1.8	0.4	N/A	247	524	N/A	125	1
16	22	B/3528-21	T493B226(1)016(2)(3)(4)(5)	3.5	6.0	2.2	0.8	0.6	185	306	N/A	125	1
16	22	C/6032-28	T493C226(1)016(2)(3)(4)(5)	3.5	6.0	1.6	0.4	N/A	262	524	N/A	125	1
16	22	D/7343-31	T493D226(1)016(2)(3)(4)(5)	3.5	6.0	0.8	0.3	N/A	433	775	N/A	125	1
16	33	C/6032-28	T493C336(1)016(2)(3)(4)(5)	5.3	6.0	1.2	0.3	0.23	303	606	692	125	1
16	33	D/7343-31	T493D336(1)016(2)(3)(4)(5)	5.3	6.0	0.8	0.25	0.15	433	775	1000	125	1
16	47	C/6032-28	T493C476(1)016(2)(3)(4)(5)	7.5	6.0	1.2	0.5	0.35	303	469	560	125	1
16	47	D/7343-31	T493D476(1)016(2)(3)(4)(5)	7.5	6.0	0.8	0.2	0.10	433	866	1225	125	1
16	68	D/7343-31	T493D686(1)016(2)(3)(4)(5)	10.9	6.0	0.7	0.2	0.15	463	866	1000	125	1
16	100	D/7343-31	T493D107(1)016(2)(3)(4)(5)	16	8.0	0.7	0.125	0.10	463	1095	1225	125	1
16	100	X/7343-43	T493X107(1)016(2)(3)(4)(5)	16	8.0	0.7	0.1	0.08	485	1285	1436	125	1
16	150	D/7343-31	T493D157(1)016(2)(3)(4)(5)	24	8.0	0.7	0.4	0.15	463	612	1000	125	1
16	150	X/7343-43	T493X157(1)016(2)(3)(4)(5)	24	8.0	0.5	0.2	0.10	574	908	1285	125	1
16	220	X/7343-43	T493X227(1)016(2)(3)(4)(5)	35.2	12.0	0.5	0.2	0.10	574	908	1285	125	1
20	0.47	A/3216-18	T493A474(1)020(2)(3)(4)(5)	0.5	4.0	14.0	9.0	N/A	73	91	N/A	125	1
20	0.68	A/3216-18	T493A684(1)020(2)(3)(4)(5)	0.5	4.0	12.0	8.0	N/A	79	97	N/A	125	1
20	1	A/3216-18	T493A105(1)020(2)(3)(4)(5)	0.5	4.0	10.0	5.5	N/A	87	117	N/A	125	1
20	1.5	A/3216-18	T493A155(1)020(2)(3)(4)(5)	0.5	6.0	8.0	4.5	N/A	97	129	N/A	125	1
20	1.5	B/3528-21	T493B155(1)020(2)(3)(4)(5)	0.5	6.0	6.0	4.0	N/A	112	548	N/A	125	1
20	2.2	A/3216-18	T493A225(1)020(2)(3)(4)(5)	0.5	6.0	7.0	4.0	N/A	103	137	N/A	125	1
20	2.2	B/3528-21	T493B225(1)020(2)(3)(4)(5)	0.5	6.0	3.5	1.5	N/A	156	224	N/A	125	1
20	3.3	A/3216-18	T493A335(1)020(2)(3)(4)(5)	0.7	6.0	7.0	4.0	N/A	103	137	N/A	125	1
20	3.3	B/3528-21	T493B335(1)020(2)(3)(4)(5)	0.7	6.0	3.5	1.3	N/A	156	240	N/A	125	1
20	4.7	A/3216-18	T493A475(1)020(2)(3)(4)(5)	0.9	8.0	6.0	1.8	N/A	112	204	N/A	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 Hours), C (0.01%/1,000 Hours) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold Plated, C = Hot solder dipped, H = Solder Plated, K = Solder Fused or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull 64 = 10 cycles −55°C +85°C before Weibull or 6(X)11, 6(X)12, 6(X)13, 6(X)21, 6(X)22, 6(X)23, 6(X)31, 6(X)32, 6(X)33. Designates screening options.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
Refer to Ordering Information for additional detail.

Table 1A – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
20	4.7	B/3528-21	T493B475(1)020(2)(3)(4)(5)	0.9	6.0	3.5	1.0	N/A	156	274	N/A	125	1
20	4.7	C/6032-28	T493C475(1)020(2)(3)(4)(5)	0.9	6.0	2.4	0.6	N/A	214	428	N/A	125	1
20	6.8	B/3528-21	T493B685(1)020(2)(3)(4)(5)	1.4	6.0	3.5	1.0	N/A	156	274	N/A	125	1
20	6.8	C/6032-28	T493C685(1)020(2)(3)(4)(5)	1.4	6.0	1.9	0.6	N/A	240	428	N/A	125	1
20	10	B/3528-21	T493B106(1)020(2)(3)(4)(5)	2	6.0	3.0	1.0	N/A	158	274	N/A	125	1
20	10	C/6032-28	T493C106(1)020(2)(3)(4)(5)	2	6.0	1.8	0.5	0.48	247	469	479	125	1
20	15	C/6032-28	T493C156(1)020(2)(3)(4)(5)	3	6.0	1.7	0.4	0.38	254	524	538	125	1
20	15	D/7343-31	T493D156(1)020(2)(3)(4)(5)	3	6.0	1.0	0.35	0.28	332	655	732	125	1
20	22	C/6032-28	T493C226(1)020(2)(3)(4)(5)	4.4	6.0	1.2	0.4	N/A	303	524	N/A	125	1
20	22	D/7343-31	T493D226(1)020(2)(3)(4)(5)	4.4	6.0	0.8	0.3	0.18	433	707	913	125	1
20	33	D/7343-31	T493D336(1)020(2)(3)(4)(5)	6.6	6.0	0.8	0.2	0.15	433	866	1000	125	1
20	47	D/7343-31	T493D476(1)020(2)(3)(4)(5)	9.4	6.0	0.7	0.2	0.10	463	866	1225	125	1
20	47	X/7343-43	T493X476(1)020(2)(3)(4)(5)	9.4	4.0	0.7	0.15	0.10	485	1049	1285	125	1
20	68	D/7343-31	T493D686(1)020(2)(3)(4)(5)	13.6	8.0	0.7	0.2	0.15	463	866	1000	125	1
20	68	X/7343-43	T493X686(1)020(2)(3)(4)(5)	13.6	6.0	0.7	0.15	0.12	485	1049	1173	125	1
25	0.33	A/3216-18	T493A334(1)025(2)(3)(4)(5)	0.5	4.0	15.0	10.0	N/A	71	87	N/A	125	1
25	0.47	A/3216-18	T493A474(1)025(2)(3)(4)(5)	0.5	4.0	14.0	9.0	N/A	73	91	N/A	125	1
25	0.68	A/3216-18	T493A684(1)025(2)(3)(4)(5)	0.5	4.0	10.0	6.0	N/A	87	112	N/A	125	1
25	0.68	B/3528-21	T493B684(1)025(2)(3)(4)(5)	0.5	4.0	7.5	5.5	N/A	100	124	N/A	125	1
25	1	A/3216-18	T493A105(1)025(2)(3)(4)(5)	0.5	4.0	8.0	4.0	N/A	97	137	N/A	125	1
25	1	B/3528-21	T493B105(1)025(2)(3)(4)(5)	0.5	4.0	5.0	2.0	N/A	122	194	N/A	125	1
25	1.5	A/3216-18	T493A155(1)025(2)(3)(4)(5)	0.5	6.0	10.0	3.0	N/A	87	158	N/A	125	1
25	1.5	B/3528-21	T493B155(1)025(2)(3)(4)(5)	0.5	6.0	5.0	1.5	N/A	122	224	N/A	125	1
25	2.2	A/3216-18	T493A225(1)025(2)(3)(4)(5)	0.6	6.0	7.0	N/A	N/A	103	N/A	N/A	125	1
25	2.2	B/3528-21	T493B225(1)025(2)(3)(4)(5)	0.6	6.0	4.5	1.2	N/A	129	250	N/A	125	1
25	2.2	C/6032-28	T493C225(1)025(2)(3)(4)(5)	0.6	6.0	3.5	2.2	1.30	177	224	290	125	1
25	3.3	B/3528-21	T493B335(1)025(2)(3)(4)(5)	0.8	6.0	3.5	2.0	N/A	156	194	N/A	125	1
25	3.3	C/6032-28	T493C335(1)025(2)(3)(4)(5)	0.8	6.0	2.5	1.2	0.75	210	303	383	125	1
25	4.7	A/3216-18	T493A475(1)025(2)(3)(4)(5)	1.2	6.0	3.1	N/A	N/A	155	N/A	N/A	125	1
25	4.7	B/3528-21	T493B475(1)025(2)(3)(4)(5)	1.2	6.0	1.5	1.0	N/A	224	274	N/A	125	1
25	4.7	C/6032-28	T493C475(1)025(2)(3)(4)(5)	1.2	6.0	2.4	0.6	0.58	214	428	435	125	1
25	6.8	B/3528-21	T493B685(1)025(2)(3)(4)(5)	1.7	6.0	2.8	0.7	N/A	164	327	N/A	125	1
25	6.8	C/6032-28	T493C685(1)025(2)(3)(4)(5)	1.7	6.0	1.9	0.6	0.49	240	428	474	125	1
25	6.8	D/7343-31	T493D685(1)025(2)(3)(4)(5)	1.7	6.0	1.4	1.0	N/A	327	332	N/A	125	1
25	10	C/6032-28	T493C106(1)025(2)(3)(4)(5)	2.5	6.0	1.5	0.5	0.45	270	469	494	125	1
25	10	D/7343-31	T493D106(1)025(2)(3)(4)(5)	2.5	6.0	1.0	0.4	N/A	332	612	N/A	125	1
25	15	C/6032-28	T493C156(1)025(2)(3)(4)(5)	3.8	6.0	1.5	0.9	N/A	270	350	N/A	125	1
25	15	D/7343-31	T493D156(1)025(2)(3)(4)(5)	3.8	6.0	1.0	0.35	0.28	332	655	732	125	1
25	15	X/7343-43	T493X156(1)025(2)(3)(4)(5)	3.8	6.0	0.7	0.2	N/A	485	908	N/A	125	1
25	22	C/6032-28	T493C226(1)025(2)(3)(4)(5)	5.5	6.0	0.4	.275	N/A	524	632	N/A	125	1
25	22	D/7343-31	T493D226(1)025(2)(3)(4)(5)	5.5	6.0	0.8	0.2	N/A	433	866	N/A	125	1
25	22	X/7343-43	T493X226(1)025(2)(3)(4)(5)	5.5	4.0	0.7	0.23	N/A	485	847	N/A	125	1
25	33	D/7343-31	T493D336(1)025(2)(3)(4)(5)	8.3	6.0	0.7	0.4	0.09	463	612	1290	125	1
25	33	X/7343-43	T493X336(1)025(2)(3)(4)(5)	8.3	6.0	0.7	0.3	0.18	485	742	957	125	1
25	47	D/7343-31	T493D476(1)025(2)(3)(4)(5)	11.8	10.0	0.7	0.2	0.12	463	866	1118	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 Hours), C (0.01%/1,000 Hours) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold Plated, C = Hot solder dipped, H = Solder Plated, K = Solder Fused or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull 64 = 10 cycles −55°C +85°C before Weibull or 6(X)11, 6(X)12, 6(X)13, 6(X)21, 6(X)22, 6(X)23, 6(X)31, 6(X)32, 6(X)33. Designates screening options.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
Refer to Ordering Information for additional detail.

Table 1A – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
25	47	X/7343-43	T493X476(1)025(2)(3)(4)(5)	11.8	6.0	0.7	0.3	0.15	485	742	1049	125	1
25	68	X/7343-43	T493X686(1)025(2)(3)(4)(5)	17	8.0	0.3	N/A	N/A	742	N/A	N/A	125	1
25	68	E/7360-38	T493E686(1)025(2)(3)(4)(5)	17	8.0	0.1	N/A	N/A	1414	N/A	N/A	125	1
35	0.1	A/3216-18	T493A104(1)035(2)(3)(4)(5)	0.5	4.0	20.0	10.0	N/A	61	87	N/A	125	1
35	0.15	A/3216-18	T493A154(1)035(2)(3)(4)(5)	0.5	4.0	19.0	6.0	N/A	63	112	N/A	125	1
35	0.22	A/3216-18	T493A224(1)035(2)(3)(4)(5)	0.5	4.0	18.0	6.0	N/A	65	112	N/A	125	1
35	0.33	A/3216-18	T493A334(1)035(2)(3)(4)(5)	0.5	4.0	15.0	6.0	N/A	71	112	N/A	125	1
35	0.47	A/3216-18	T493A474(1)035(2)(3)(4)(5)	0.5	4.0	14.0	4.0	N/A	73	137	N/A	125	1
35	0.47	B/3528-21	T493B474(1)035(2)(3)(4)(5)	0.5	4.0	8.0	2.5	1.5	97	173	224	125	1
35	0.68	A/3216-18	T493A684(1)035(2)(3)(4)(5)	0.5	4.0	10.0	6.0	N/A	87	112	N/A	125	1
35	0.68	B/3528-21	T493B684(1)035(2)(3)(4)(5)	0.5	4.0	6.5	2.5	N/A	107	173	N/A	125	1
35	1	A/3216-18	T493A105(1)035(2)(3)(4)(5)	0.5	4.0	10.0	6.0	N/A	87	112	N/A	125	1
35	1	B/3528-21	T493B105(1)035(2)(3)(4)(5)	0.5	4.0	5.0	2.0	1.5	122	206	224	125	1
35	1.5	A/3216-18	T493A155(1)035(2)(3)(4)(5)	0.5	6.0	7.5	N/A	N/A	100	N/A	N/A	125	1
35	1.5	B/3528-21	T493B155(1)035(2)(3)(4)(5)	0.5	6.0	5.0	3.0	N/A	122	158	N/A	125	1
35	1.5	C/6032-28	T493C155(1)035(2)(3)(4)(5)	0.5	6.0	4.5	2.5	N/A	156	210	N/A	125	1
35	2.2	B/3528-21	T493B225(1)035(2)(3)(4)(5)	0.8	6.0	4.0	2.5	1.5	137	173	224	125	1
35	2.2	C/6032-28	T493C225(1)035(2)(3)(4)(5)	0.8	6.0	3.5	1.5	0.75	177	270	383	125	1
35	3.3	B/3528-21	T493B335(1)035(2)(3)(4)(5)	1.2	6.0	3.5	1.3	N/A	156	224	N/A	125	1
35	3.3	C/6032-28	T493C335(1)035(2)(3)(4)(5)	1.2	6.0	2.5	0.8	0.60	210	370	428	125	1
35	4.7	B/3528-21	T493B475(1)035(2)(3)(4)(5)	1.6	6.0	1.5	N/A	N/A	224	N/A	N/A	125	1
35	4.7	C/6032-28	T493C475(1)035(2)(3)(4)(5)	1.6	6.0	2.5	0.6	0.45	210	428	494	125	1
35	4.7	D/7343-31	T493D475(1)035(2)(3)(4)(5)	1.6	6.0	1.5	0.7	N/A	316	463	N/A	125	1
35	6.8	C/6032-28	T493C685(1)035(2)(3)(4)(5)	2.4	6.0	2.0	0.9	N/A	234	350	N/A	125	1
35	6.8	D/7343-31	T493D685(1)035(2)(3)(4)(5)	2.4	6.0	1.3	0.5	0.40	340	548	612	125	1
35	10	C/6032-28	T493C106(1)035(2)(3)(4)(5)	3.5	6.0	2.0	1.2	N/A	234	303	N/A	125	1
35	10	D/7343-31	T493D106(1)035(2)(3)(4)(5)	3.5	6.0	1.0	0.3	0.25	332	707	775	125	1
35	10	X/7343-43	T493X106(1)035(2)(3)(4)(5)	3.5	4.0	0.9	0.25	0.18	428	812	957	125	1
35	15	C/6032-28	T493C156(1)035(2)(3)(4)(5)	5.3	6.0	0.45	N/A	N/A	494	N/A	N/A	125	1
35	15	D/7343-31	T493D156(1)035(2)(3)(4)(5)	5.3	6.0	0.8	0.3	0.23	433	707	808	125	1
35	15	X/7343-43	T493X156(1)035(2)(3)(4)(5)	5.3	6.0	0.9	0.3	0.20	428	742	908	125	1
35	22	D/7343-31	T493D226(1)035(2)(3)(4)(5)	7.7	6.0	0.7	0.4	0.20	463	612	866	125	1
35	22	X/7343-43	T493X226(1)035(2)(3)(4)(5)	7.7	6.0	0.7	0.3	0.20	485	742	908	125	1
35	33	D/7343-31	T493D336M035(2)(3)(4)(5)	11.6	6.0	0.3	N/A	N/A	707	N/A	N/A	125	1
35	33	X/7343-43	T493X336(1)035(2)(3)(4)(5)	11.6	6.0	0.6	0.3	0.18	524	742	957	125	1
35	47	X/7343-43	T493X476(1)035(2)(3)(4)(5)	16.5	6.0	0.25	N/A	N/A	812	N/A	N/A	125	1
35	47	E/7360-38	T493E476(1)035(2)(3)(4)(5)	16.5	10.0	0.5	0.3	N/A	632	816	N/A	125	1
50	0.1	A/3216-18	T493A104(1)050(2)(3)(4)(5)	0.5	4.0	20.0	10.0	N/A	61	87	N/A	125	1
50	0.15	A/3216-18	T493A154(1)050(2)(3)(4)(5)	0.5	4.0	19.0	10.0	N/A	63	87	N/A	125	1
50	0.15	B/3528-21	T493B154(1)050(2)(3)(4)(5)	0.5	4.0	16.0	10.0	N/A	68	87	N/A	125	1
50	0.22	A/3216-18	T493A224(1)050(2)(3)(4)(5)	0.5	4.0	18.0	N/A	N/A	65	N/A	N/A	125	1
50	0.22	B/3528-21	T493B224(1)050(2)(3)(4)(5)	0.5	4.0	14.0	10.0	N/A	73	87	N/A	125	1
50	0.33	B/3528-21	T493B334(1)050(2)(3)(4)(5)	0.5	4.0	10.0	2.5	N/A	87	173	N/A	125	1
50	0.47	B/3528-21	T493B474(1)050(2)(3)(4)(5)	0.5	4.0	9.0	2.0	N/A	91	194	N/A	125	1
50	0.47	C/6032-28	T493C474(1)050(2)(3)(4)(5)	0.5	4.0	8.0	1.8	N/A	117	247	N/A	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 Hours), C (0.01%/1,000 Hours) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold Plated, C = Hot solder dipped, H = Solder Plated, K = Solder Fused or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull 64 = 10 cycles −55°C +85°C before Weibull or 6(X)11, 6(X)12, 6(X)13, 6(X)21, 6(X)22, 6(X)23, 6(X)31, 6(X)32, 6(X)33. Designates screening options.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
Refer to Ordering Information for additional detail.

Table 1A – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
50	0.68	A/3216-18	T493A684(1)050(2)(3)(4)(5)	0.5	4.0	7.9	N/A	N/A	97	N/A	N/A	125	1
50	0.68	C/6032-28	T493C684(1)050(2)(3)(4)(5)	0.5	4.0	7.0	1.6	N/A	125	262	N/A	125	1
50	1	B/3528-21	T493B105(1)050(2)(3)(4)(5)	0.5	4.0	7.0	N/A	N/A	103	N/A	N/A	125	1
50	1	C/6032-28	T493C105(1)050(2)(3)(4)(5)	0.5	4.0	5.5	1.6	1.3	141	262	290	125	1
50	1.5	C/6032-28	T493C155(1)050(2)(3)(4)(5)	0.8	6.0	4.5	1.5	N/A	156	270	N/A	125	1
50	1.5	D/7343-31	T493D155(1)050(2)(3)(4)(5)	0.8	6.0	3.5	1.0	N/A	207	332	N/A	125	1
50	2.2	C/6032-28	T493C225(1)050(2)(3)(4)(5)	1.1	6.0	3.5	1.5	N/A	177	270	N/A	125	1
50	2.2	D/7343-31	T493D225(1)050(2)(3)(4)(5)	1.1	6.0	2.5	0.8	0.60	245	433	500	125	1
50	3.3	D/7343-31	T493D335(1)050(2)(3)(4)(5)	1.7	6.0	2.0	0.8	0.70	274	433	463	125	1
50	4.7	D/7343-31	T493D475(1)050(2)(3)(4)(5)	2.4	6.0	1.5	0.6	0.28	316	500	732	125	1
50	4.7	X/7343-43	T493X475(1)050(2)(3)(4)(5)	2.4	4.0	0.9	0.3	N/A	428	742	N/A	125	1
50	6.8	D/7343-31	T493D685(1)050(2)(3)(4)(5)	3.4	6.0	0.6	0.3	N/A	500	707	N/A	125	1
50	6.8	X/7343-43	T493X685(1)050(2)(3)(4)(5)	3.4	6.0	1.0	0.5	N/A	406	574	N/A	125	1
50	10	X/7343-43	T493X106(1)050(2)(3)(4)(5)	5	6.0	0.7	0.4	N/A	485	642	N/A	125	1
50	15	X/7343-43	T493X156(1)050(2)(3)(4)(5)	7.5	6.0	1.0	N/A	N/A	406	N/A	N/A	125	1
63	6.8	X/7343-43	T493X685(1)063(2)(3)(4)(5)	4.3	6.0	1.0	0.6	0.3	406	524	742	125	1
63	10	X/7343-43	T493X106(1)063(2)(3)(4)(5)	6.3	6.0	0.6	0.4	0.2	524	642	908	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 Hours), C (0.01%/1,000 Hours) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold Plated, C = Hot solder dipped, H = Solder Plated, K = Solder Fused or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull 64 = 10 cycles −55°C +85°C before Weibull or 6(X)11, 6(X)12, 6(X)13, 6(X)21, 6(X)22, 6(X)23, 6(X)31, 6(X)32, 6(X)33. Designates screening options.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
Refer to Ordering Information for additional detail.

Table 1B – DLA Drawing 07016, Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Ripple Current STD ESR (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See page 2 for Ordering Information)	(See page 2 for Ordering Information)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at+25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	33	A/3216-18	T493A336(1)004(2)(3)(4)20	07016-001(1)(2)(3)(4)	1.3	6.0	3.0	158	125	1
4	100	A/3216-18	T493A107(1)004(2)(3)(4)10	07016-003(1)(2)(3)(4)	4.0	30.0	1.4	230	125	1
4	100	B/3528-20	T493B107(1)004(2)(3)(4)20	07016-004(1)(2)(3)(4)	4.0	8.0	0.9	307	125	1
6.3	3.3	A/3216-18	T493A335(1)006(2)(3)(4)10	07016-006(1)(2)(3)(4)	0.5	6.0	8.0	97	125	1
6.3	4.7	A/3216-18	T493A475(1)006(2)(3)(4)10	07016-007(1)(2)(3)(4)	0.5	6.0	6.0	112	125	1
6.3	6.8	A/3216-18	T493A685(1)006(2)(3)(4)20	07016-008(1)(2)(3)(4)	0.5	6.0	5.0	122	125	1
6.3	10	A/3216-18	T493A106(1)006(2)(3)(4)10	07016-009(1)(2)(3)(4)	0.6	6.0	4.0	137	125	1
6.3	15	A/3216-18	T493A156(1)006(2)(3)(4)20	07016-010(1)(2)(3)(4)	0.9	6.0	3.5	146	125	1
6.3	22	A/3216-18	T493A226(1)006(2)(3)(4)20	07016-011(1)(2)(3)(4)	1.4	6.0	3.0	158	125	1
6.3	22	B/3528-20	T493B226(1)006(2)(3)(4)20	07016-012(1)(2)(3)(4)	1.4	6.0	0.6	376	125	1
6.3	33	B/3528-20	T493B336(1)006(2)(3)(4)20	07016-013(1)(2)(3)(4)	2.1	6.0	0.6	376	125	1
6.3	47	C/6032-28	T493C476(1)006(2)(3)(4)20	07016-014(1)(2)(3)(4)	3.0	6.0	0.3	606	125	1
6.3	68	B/3528-20	T493B686(1)006(2)(3)(4)10	07016-015(1)(2)(3)(4)	4.3	8.0	0.5	412	125	1
6.3	68	C/6032-28	T493C686(1)006(2)(3)(4)20	07016-016(1)(2)(3)(4)	4.3	6.0	0.2	742	125	1
6.3	100	C/6032-28	T493C107(1)006(2)(3)(4)30	07016-017(1)(2)(3)(4)	6.3	6.0	0.15	856	125	1
6.3	150	D/7343-31	T493D157(1)006(2)(3)(4)10	07016-019(1)(2)(3)(4)	9.5	6.0	0.125	1095	125	1
6.3	220	D/7343-31	T493D227(1)006(2)(3)(4)20	07016-020(1)(2)(3)(4)	13.9	8.0	0.1	1225	125	1
6.3	330	X/7343-43	T493X337(1)006(2)(3)(4)10	07016-021(1)(2)(3)(4)	20.8	8.0	0.1	1285	125	1
6.3	330	X/7343-43	T493X337(1)006(2)(3)(4)20	07016-022(1)(2)(3)(4)	20.8	8.0	0.05	1817	125	1
6.3	470	X/7343-43	T493X477M006(2)(3)(4)10	07016-023M(2)(3)(4)	29.6	10.0	0.20	908	125	1
6.3	470	X/7343-43	T493X477M006(2)(3)(4)20	07016-024M(2)(3)(4)	29.6	10.0	0.05	1817	125	1
10	4.7	A/3216-18	T493A475(1)010(2)(3)(4)20	07016-026(1)(2)(3)(4)	0.5	6.0	5.0	122	125	1
10	6.8	A/3216-18	T493A685(1)010(2)(3)(4)20	07016-027(1)(2)(3)(4)	0.7	6.0	4.0	137	125	1
10	10	A/3216-18	T493A106(1)010(2)(3)(4)10	07016-028(1)(2)(3)(4)	1.0	6.0	3.0	158	125	1
10	10	A/3216-18	T493A106(1)010(2)(3)(4)20	07016-029(1)(2)(3)(4)	1.0	6.0	1.8	204	125	1
10	15	A/3216-18	T493A156(1)010(2)(3)(4)30	07016-030(1)(2)(3)(4)	1.5	6.0	3.2	153	125	1
10	15	B/3528-20	T493B156(1)010(2)(3)(4)20	07016-032(1)(2)(3)(4)	1.5	6.0	0.6	376	125	1
10	22	B/3528-20	T493B226(1)010(2)(3)(4)10	07016-033(1)(2)(3)(4)	2.2	6.0	0.7	348	125	1
10	22	B/3528-20	T493B226(1)010(2)(3)(4)20	07016-034(1)(2)(3)(4)	2.2	6.0	0.5	412	125	1
10	22	C/6032-28	T493C226(1)010(2)(3)(4)30	07016-035(1)(2)(3)(4)	2.2	6.0	0.3	606	125	1
10	33	B/3528-20	T493B336(1)010(2)(3)(4)10	07016-037(1)(2)(3)(4)	3.3	6.0	0.6	376	125	1
10	33	B/3528-20	T493B336(1)010(2)(3)(4)20	07016-038(1)(2)(3)(4)	3.3	6.0	0.425	447	125	1
10	33	C/6032-28	T493C336(1)010(2)(3)(4)20	07016-039(1)(2)(3)(4)	3.3	6.0	0.5	469	125	1
10	47	C/6032-28	T493C476(1)010(2)(3)(4)10	07016-040(1)(2)(3)(4)	4.7	6.0	0.3	606	125	1
10	47	C/6032-28	T493C476(1)010(2)(3)(4)20	07016-041(1)(2)(3)(4)	4.7	6.0	0.2	742	125	1
10	68	C/6032-28	T493C686(1)010(2)(3)(4)20	07016-042(1)(2)(3)(4)	6.8	8.0	0.3	606	125	1
10	68	D/7343-31	T493D686(1)010(2)(3)(4)30	07016-044(1)(2)(3)(4)	6.8	6.0	0.15	1000	125	1
10	100	C/6032-28	T493C107(1)010(2)(3)(4)10	07016-045(1)(2)(3)(4)	10.0	8.0	0.2	742	125	1
10	220	D/7343-31	T493D227(1)010(2)(3)(4)30	07016-049(1)(2)(3)(4)	22.0	8.0	0.15	1000	125	1
10	220	X/7343-43	T493X227(1)010(2)(3)(4)30	07016-051(1)(2)(3)(4)	22.0	8.0	0.05	1817	125	1
10	330	X/7343-43	T493X337(1)010(2)(3)(4)20	07016-054(1)(2)(3)(4)	33.0	8.0	0.1	1285	125	1
10	330	X/7343-43	T493X337(1)010(2)(3)(4)30	07016-055(1)(2)(3)(4)	33.0	8.0	0.05	1817	125	1
10	470	X/7343-43	T493X477M010(2)(3)(4)10	07016-057M(2)(3)(4)	47.0	10.0	0.2	908	125	1
10	470	X/7343-43	T493X477M010(2)(3)(4)20	07016-058M(2)(3)(4)	47.0	10.0	0.05	1817	125	1
16	2.2	A/3216-18	T493A225(1)016(2)(3)(4)30	07016-060(1)(2)(3)(4)	0.5	6.0	5.5	117	125	1
16	3.3	A/3216-18	T493A335(1)016(2)(3)(4)10	07016-061(1)(2)(3)(4)	0.5	6.0	5.0	122	125	1
VDC at 85°C	µF	KEMET/EIA	(See page 2 for Ordering Information)	(See page 2 for Ordering Information)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at+25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Ripple Current STD ESR (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET/DLA part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET/DLA part number, insert B (0.1%/1,000 Hours) or C (0.01%/1,000 Hours). Designates Reliability Level.
(3) To complete KEMET/DLA part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder-plated. Designates Termination Finish.
(4) To complete KEMET/DLA part number, insert A = + 25°C after Weibull, B = −55°C and +85°C after Weibull, C = −55°C and + 85°C before Weibull or Z or no option= No test required. Designates surge testing option.

Table 1B – DLA Drawing 07016, Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Ripple Current STD ESR (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See page 2 for Ordering Information)	(See page 2 for Ordering Information)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at+25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
16	3.3	A/3216-18	T493A335(1)016(2)(3)(4)20	07016-062(1)(2)(3)(4)	0.5	6.0	3.5	146	125	1
16	4.7	A/3216-18	T493A475(1)016(2)(3)(4)10	07016-063(1)(2)(3)(4)	0.8	6.0	2.0	194	125	1
16	6.8	A/3216-18	T493A685(1)016(2)(3)(4)10	07016-064(1)(2)(3)(4)	1.1	6.0	1.5	224	125	1
16	6.8	B/3528-20	T493B685(1)016(2)(3)(4)20	07016-065(1)(2)(3)(4)	1.1	6.0	1.2	266	125	1
16	10	A/3216-18	T493A106(1)016(2)(3)(4)10	07016-066(1)(2)(3)(4)	1.6	6.0	3.0	158	125	1
16	10	B/3528-20	T493B106(1)016(2)(3)(4)20	07016-067(1)(2)(3)(4)	1.6	6.0	0.9	307	125	1
16	15	B/3528-20	T493B156(1)016(2)(3)(4)10	07016-068(1)(2)(3)(4)	2.4	6.0	0.8	326	125	1
16	15	B/3528-20	T493B156(1)016(2)(3)(4)20	07016-069(1)(2)(3)(4)	2.4	6.0	0.5	412	125	1
16	22	B/3528-20	T493B226(1)016(2)(3)(4)30	07016-070(1)(2)(3)(4)	3.6	6.0	0.6	376	125	1
16	22	C/6032-28	T493C226(1)016(2)(3)(4)20	07016-071(1)(2)(3)(4)	3.5	6.0	0.375	542	125	1
16	33	C/6032-28	T493C336(1)016(2)(3)(4)20	07016-074(1)(2)(3)(4)	5.3	6.0	0.3	606	125	1
16	47	C/6032-28	T493C476(1)016(2)(3)(4)30	07016-076(1)(2)(3)(4)	7.5	6.0	0.35	561	125	1
16	68	D/7343-31	T493D686(1)016(2)(3)(4)30	07016-079(1)(2)(3)(4)	10.9	6.0	0.15	1000	125	1
16	100	D/7343-31	T493D107(1)016(2)(3)(4)20	07016-080(1)(2)(3)(4)	16.0	6.0	0.125	1095	125	1
16	150	D/7343-31	T493D157M016(2)(3)(4)20	07016-082M(1)(2)(3)(4)	24.0	6.0	0.15	1000	125	1
16	150	D/7343-31	T493D157M016(2)(3)(4)30	07016-083M(1)(2)(3)(4)	24.0	6.0	0.06	1581	125	1
16	150	E/7360-38	T493E157(1)016(2)(3)(4)10	07016-084(1)(2)(3)(4)	24.0	6.0	0.05	2000	125	1
16	220	E/7360-38	T493E227(1)016(2)(3)(4)10	07016-085(1)(2)(3)(4)	35.2	8.0	0.05	2000	125	1
20	1.5	A/3216-18	T493A155(1)020(2)(3)(4)20	07016-086(1)(2)(3)(4)	0.5	6.0	6.5	107	125	1
20	2.2	A/3216-18	T493A225(1)020(2)(3)(4)10	07016-087(1)(2)(3)(4)	0.5	6.0	3.0	158	125	1
20	4.7	A/3216-18	T493A475(1)020(2)(3)(4)10	07016-088(1)(2)(3)(4)	0.9	6.0	4.0	137	125	1
20	4.7	A/3216-18	T493A475(1)020(2)(3)(4)20	07016-089(1)(2)(3)(4)	0.9	6.0	1.8	204	125	1
20	4.7	B/3528-20	T493B475(1)020(2)(3)(4)20	07016-090(1)(2)(3)(4)	0.9	6.0	1.0	292	125	1
20	6.8	B/3528-20	T493B685(1)020(2)(3)(4)20	07016-091(1)(2)(3)(4)	1.4	6.0	1.0	292	125	1
20	10	B/3528-20	T493B106(1)020(2)(3)(4)10	07016-092(1)(2)(3)(4)	2.0	6.0	1.0	292	125	1
20	10	B/3528-20	T493B106(1)020(2)(3)(4)20	07016-093(1)(2)(3)(4)	0.7	6.0	0.5	412	125	1
20	10	C/6032-28	T493C106(1)020(2)(3)(4)20	07016-094(1)(2)(3)(4)	2.0	6.0	0.7	396	125	1
20	15	C/6032-28	T493C156(1)020(2)(3)(4)20	07016-096(1)(2)(3)(4)	3.0	6.0	0.4	524	125	1
20	22	C/6032-28	T493C226(1)020(2)(3)(4)20	07016-098(1)(2)(3)(4)	4.4	6.0	0.4	524	125	1
20	33	D/7343-31	T493D336(1)020(2)(3)(4)20	07016-100(1)(2)(3)(4)	6.6	6.0	0.2	866	125	1
20	47	D/7343-31	T493D476(1)020(2)(3)(4)20	07016-102(1)(2)(3)(4)	9.4	6.0	0.2	866	125	1
20	68	D/7343-31	T493D686(1)020(2)(3)(4)20	07016-104(1)(2)(3)(4)	13.6	6.0	0.2	866	125	1
20	68	X/7343-43	T493X686(1)020(2)(3)(4)20	07016-106(1)(2)(3)(4)	13.6	6.0	0.2	908	125	1
25	0.68	A/3216-18	T493A684(1)025(2)(3)(4)10	07016-108M(1)(2)(3)(4)	0.5	4.0	10.0	87	125	1
25	1	A/3216-18	T493A105(1)025(2)(3)(4)10	07016-109(1)(2)(3)(4)	0.5	4.0	8.0	97	125	1
25	1.5	A/3216-18	T493A155(1)025(2)(3)(4)10	07016-110(1)(2)(3)(4)	0.5	6.0	7.5	100	125	1
25	1.5	A/3216-18	T493A155(1)025(2)(3)(4)20	07016-111(1)(2)(3)(4)	0.5	6.0	3.0	158	125	1
25	2.2	A/3216-18	T493A225(1)025(2)(3)(4)10	07016-112(1)(2)(3)(4)	0.5	6.0	7.0	104	125	1
25	2.2	B/3528-20	T493B225(1)025(2)(3)(4)20	07016-113(1)(2)(3)(4)	0.6	6.0	2.0	206	125	1
25	3.3	B/3528-20	T493B335(1)025(2)(3)(4)20	07016-114(1)(2)(3)(4)	0.8	6.0	2.0	206	125	1
25	4.7	A/3216-18	T493A475(1)025(2)(3)(4)10	07016-115(1)(2)(3)(4)	1.2	6.0	3.1	156	125	1
25	4.7	B/3528-20	T493B475(1)025(2)(3)(4)10	07016-118(1)(2)(3)(4)	1.7	6.0	2.8	174	125	1
25	4.7	B/3528-20	T493B475(1)025(2)(3)(4)20	07016-116(1)(2)(3)(4)	1.2	6.0	1.5	238	125	1
25	4.7	B/3528-20	T493B475(1)025(2)(3)(4)30	07016-119(1)(2)(3)(4)	1.2	6.0	0.7	348	125	1
25	6.8	C/6032-28	T493C685(1)025(2)(3)(4)20	07016-120(1)(2)(3)(4)	1.7	6.0	0.7	396	125	1
25	10	C/6032-28	T493C106(1)025(2)(3)(4)10	07016-121(1)(2)(3)(4)	2.5	6.0	0.5	469	125	1
VDC at 85°C	µF	KEMET/EIA	(See page 2 for Ordering Information)	(See page 2 for Ordering Information)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at+25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Ripple Current STD ESR (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET/DLA part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET/DLA part number, insert B (0.1%/1,000 Hours) or C (0.01%/1,000 Hours). Designates Reliability Level.
(3) To complete KEMET/DLA part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder-plated. Designates Termination Finish.
(4) To complete KEMET/DLA part number, insert A = + 25°C after Weibull, B = −55°C and +85°C after Weibull, C = −55°C and + 85°C before Weibull or Z or no option= No test required. Designates surge testing option.

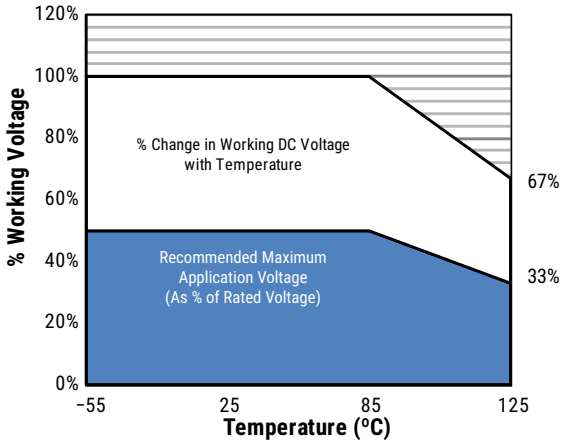
Table 1B – DLA Drawing 07016, Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Ripple Current STD ESR (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See page 2 for Ordering Information)	(See page 2 for Ordering Information)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at+25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
25	10	C/6032-28	T493C106(1)025(2)(3)(4)20	07016-122(1)(2)(3)(4)	2.5	6.0	0.3	606	125	1
25	22	C/6032-28	T493C226(1)025(2)(3)(4)10	07016-123(1)(2)(3)(4)	5.5	6.0	0.4	524	125	1
25	22	C/6032-28	T493C226(1)025(2)(3)(4)20	07016-124(1)(2)(3)(4)	5.5	6.0	0.275	632	125	1
25	22	D/7343-31	T493D226(1)025(2)(3)(4)20	07016-125(1)(2)(3)(4)	5.5	6.0	0.2	866	125	1
25	33	D/7343-31	T493D336(1)025(2)(3)(4)20	07016-127(1)(2)(3)(4)	8.3	6.0	0.3	707	125	1
25	33	D/7343-31	T493D336(1)025(2)(3)(4)30	07016-128(1)(2)(3)(4)	8.3	6.0	0.09	1290	125	1
25	47	D/7343-31	T493D476(1)025(2)(3)(4)20	07016-130M(1)(2)(3)(4)	11.8	6.0	0.25	775	125	1
25	47	D/7343-31	T493D476(1)025(2)(3)(4)30	07016-131M(1)(2)(3)(4)	11.8	6.0	0.175	926	125	1
25	68	E/7360-38	T493E686(1)025(2)(3)(4)10	07016-132(1)(2)(3)(4)	17.0	8.0	0.1	1414	125	1
35	0.47	A/3216-18	T493A474(1)035(2)(3)(4)20	07016-133M(1)(2)(3)(4)	0.5	4.0	12.0	79	125	1
35	0.68	A/3216-18	T493A684(1)035(2)(3)(4)20	07016-134M(1)(2)(3)(4)	0.5	4.0	8.0	97	125	1
35	1	A/3216-18	T493A105(1)035(2)(3)(4)20	07016-135(1)(2)(3)(4)	0.5	4.0	7.5	100	125	1
35	1.5	A/3216-18	T493A155(1)035(2)(3)(4)10	07016-136(1)(2)(3)(4)	0.5	6.0	7.5	100	125	1
35	1.5	B/3528-20	T493B155(1)035(2)(3)(4)10	07016-137(1)(2)(3)(4)	0.5	6.0	5.2	128	125	1
35	2.2	B/3528-20	T493B225(1)035(2)(3)(4)30	07016-138(1)(2)(3)(4)	0.8	6.0	2.0	206	125	1
35	4.7	B/3528-20	T493B475(1)035(2)(3)(4)10	07016-140(1)(2)(3)(4)	1.6	6.0	1.5	238	125	1
35	4.7	D/7343-31	T493D475(1)035(2)(3)(4)10	07016-141(1)(2)(3)(4)	1.6	6.0	0.45	577	125	1
35	6.8	C/6032-28	T493C685(1)035(2)(3)(4)10	07016-142(1)(2)(3)(4)	2.4	6.0	0.35	561	125	1
35	6.8	D/7343-31	T493D685(1)035(2)(3)(4)30	07016-143(1)(2)(3)(4)	2.4	6.0	0.4	612	125	1
35	10	C/6032-28	T493C106(1)035(2)(3)(4)20	07016-144(1)(2)(3)(4)	3.5	6.0	1.6	262	125	1
35	15	C/6032-28	T493C156(1)035(2)(3)(4)10	07016-146(1)(2)(3)(4)	5.3	6.0	0.45	494	125	1
35	15	D/7343-31	T493D156(1)035(2)(3)(4)10	07016-147(1)(2)(3)(4)	5.3	6.0	0.3	707	125	1
35	15	D/7343-31	T493D156(1)035(2)(3)(4)20	07016-148(1)(2)(3)(4)	5.3	6.0	0.1	1225	125	1
35	22	D/7343-31	T493D226(1)035(2)(3)(4)20	07016-149(1)(2)(3)(4)	7.7	6.0	0.4	612	125	1
35	33	D/7343-31	T493D336M035(2)(3)(4)10	07016-152M(2)(3)(4)	11.6	6.0	0.3	707	125	1
35	33	D/7343-31	T493D336M035(2)(3)(4)20	07016-153M(2)(3)(4)	11.6	6.0	0.2	866	125	1
35	33	X/7343-43	T493X336(1)035(2)(3)(4)20	07016-154M(1)(2)(3)(4)	11.6	6.0	0.3	742	125	1
35	47	X/7343-43	T493X476M035(2)(3)(4)10	07016-155M(1)(2)(3)(4)	16.5	6.0	0.25	812	125	1
35	47	E/7360-38	T493E476M035(2)(3)(4)10	07016-156M(1)(2)(3)(4)	16.5	6.0	0.20	1000	125	1
50	0.15	A/3216-18	T493A154(1)050(2)(3)(4)20	07016-157M(1)(2)(3)(4)	0.5	4.0	15.0	71	125	1
50	0.22	A/3216-18	T493A224M050(2)(3)(4)10	07016-158M(1)(2)(3)(4)	0.5	4.0	18.0	65	125	1
50	0.47	B/3528-20	T493B474(1)050(2)(3)(4)20	07016-160(1)(2)(3)(4)	0.5	4.0	9.5	95	125	1
50	0.68	A/3216-18	T493A684(1)050(2)(3)(4)10	07016-161(1)(2)(3)(4)	0.5	4.0	7.9	97	125	1
50	1	B/3528-20	T493B105(1)050(2)(3)(4)10	07016-163(1)(2)(3)(4)	0.5	4.0	7.0	110	125	1
50	1.5	C/6032-28	T493C155(1)050(2)(3)(4)20	07016-164(1)(2)(3)(4)	0.8	6.0	2.0	235	125	1
50	1.5	D/7343-31	T493D155(1)050(2)(3)(4)20	07016-165(1)(2)(3)(4)	0.8	6.0	1.5	316	125	1
50	2.2	D/7343-31	T493D225(1)050(2)(3)(4)20	07016-166(1)(2)(3)(4)	1.1	6.0	1.2	354	125	1
50	3.3	D/7343-31	T493D335(1)050(2)(3)(4)20	07016-167(1)(2)(3)(4)	1.7	6.0	0.8	433	125	1
50	4.7	D/7343-31	T493D475(1)050(2)(3)(4)30	07016-168(1)(2)(3)(4)	2.4	6.0	0.3	707	125	1
50	6.8	D/7343-31	T493D685(1)050(2)(3)(4)10	07016-169(1)(2)(3)(4)	3.4	6.0	0.6	500	125	1
50	6.8	D/7343-31	T493D685(1)050(2)(3)(4)20	07016-170(1)(2)(3)(4)	3.4	6.0	0.3	707	125	1
50	6.8	X/7343-43	T493X685(1)050(2)(3)(4)20	07016-171(1)(2)(3)(4)	3.4	6.0	0.4	642	125	1
VDC at 85°C	µF	KEMET/EIA	(See page 2 for Ordering Information)	(See page 2 for Ordering Information)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	Ω at+25°C 100 kHz Max	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Ripple Current STD ESR (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET/DLA part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET/DLA part number, insert B (0.1%/1,000 Hours) or C (0.01%/1,000 Hours). Designates Reliability Level.
(3) To complete KEMET/DLA part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder-plated. Designates Termination Finish.
(4) To complete KEMET/DLA part number, insert A = + 25°C after Weibull, B = −55°C and +85°C after Weibull, C = −55°C and + 85°C before Weibull or Z or no option= No test required. Designates surge testing option.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C w/+20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

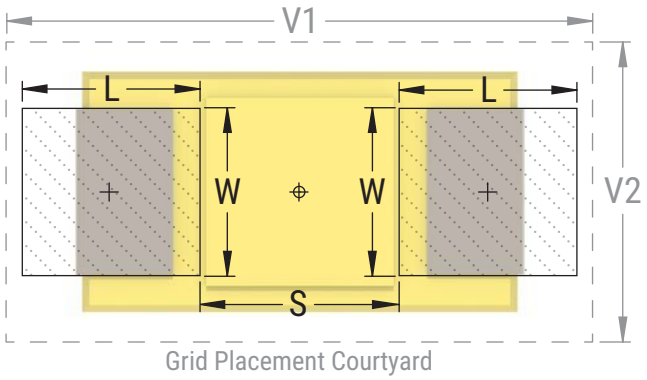
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated voltage
85°C	5% of Rated voltage
125°C	1% of Rated voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–25	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
E[1]	7360–38	3.25	2.77	3.67	10.22	7.30	3.13	2.37	3.87	9.12	6.80	3.03	1.99	4.03	8.26	6.54
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component desity product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*



Grid Placement Courtyard

Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

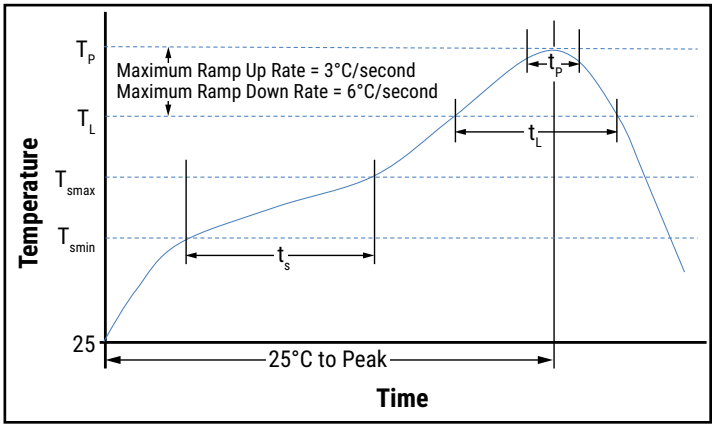
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/seconds maximum	3°C/seconds maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

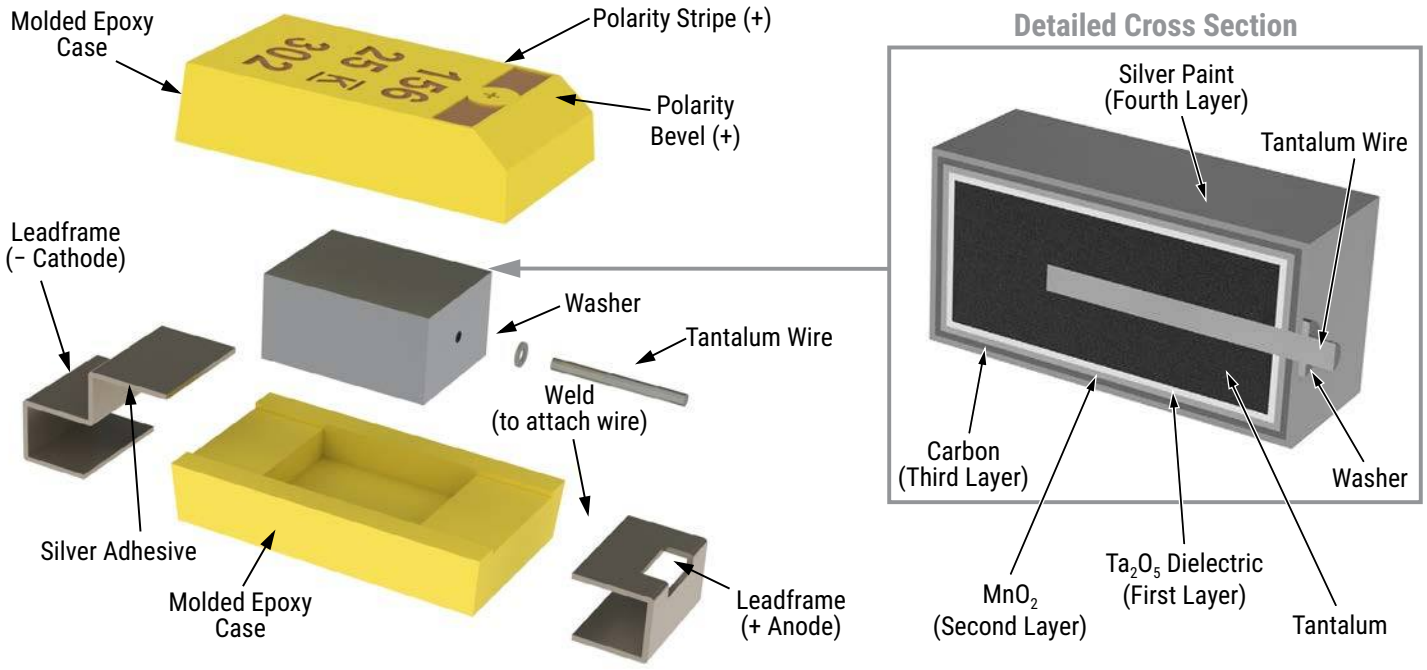
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
**Case Size D, E, P, Y, and X*
***Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z*



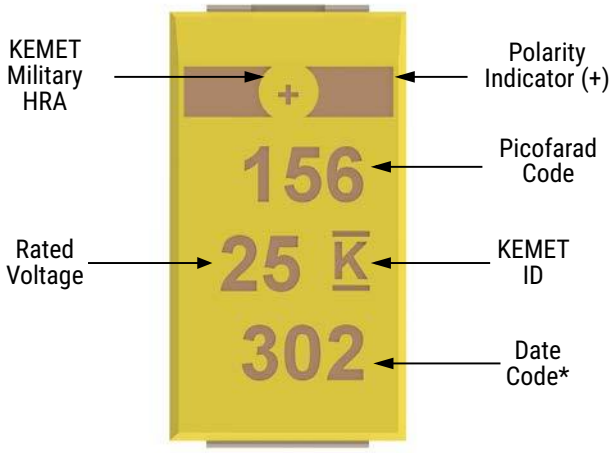
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40ºC and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 302 = 2nd week of 2023

Date Code *	
1st digit = Last number of Year	0 = 2020 1 = 2021 2 = 2022 3 = 2023 4 = 2024
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

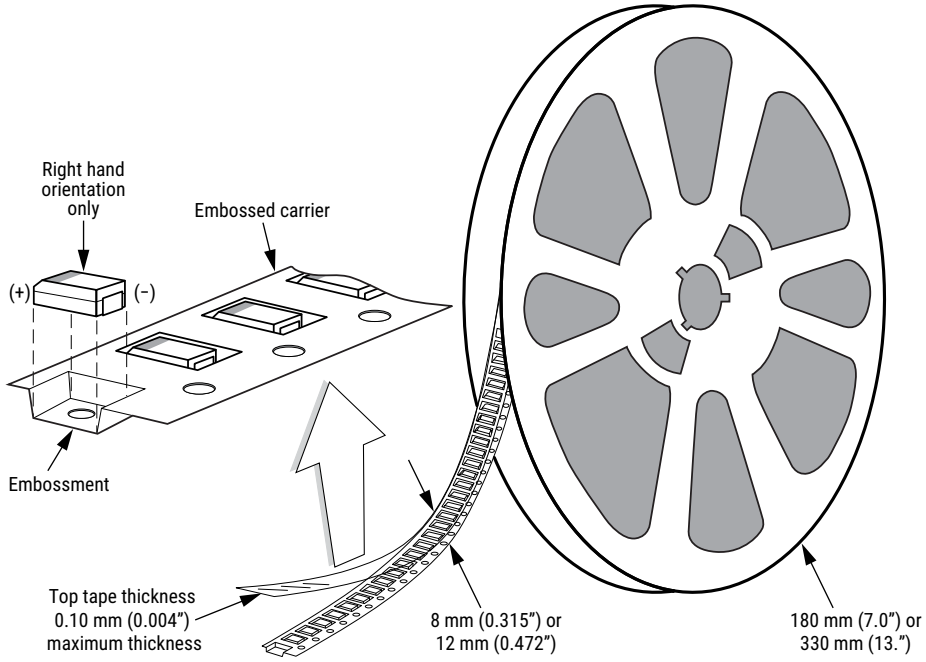


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

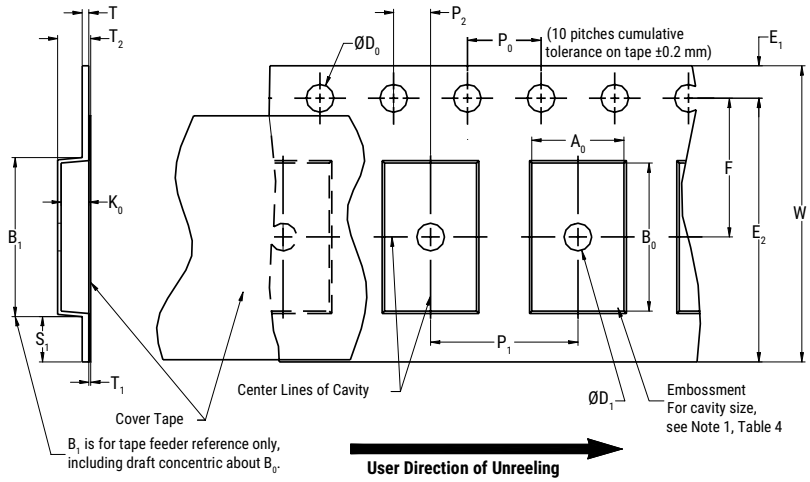


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

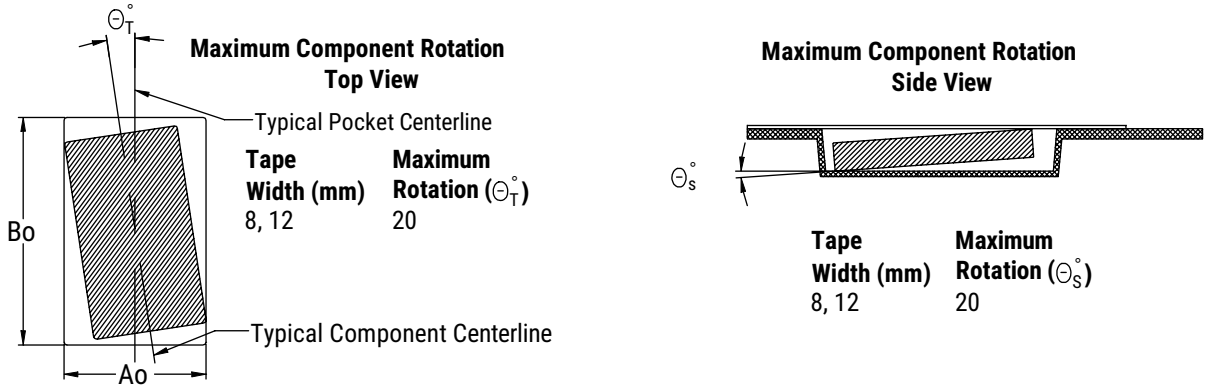


Figure 3 – Maximum Lateral Movement

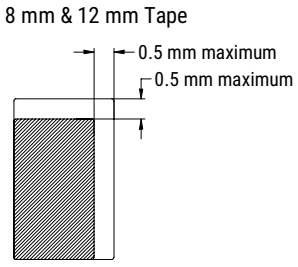


Figure 4 – Bending Radius

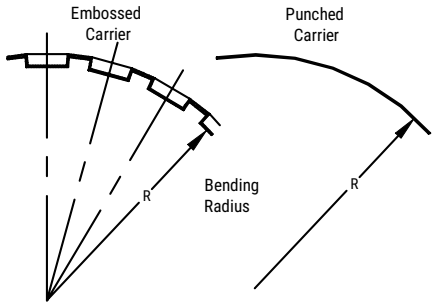
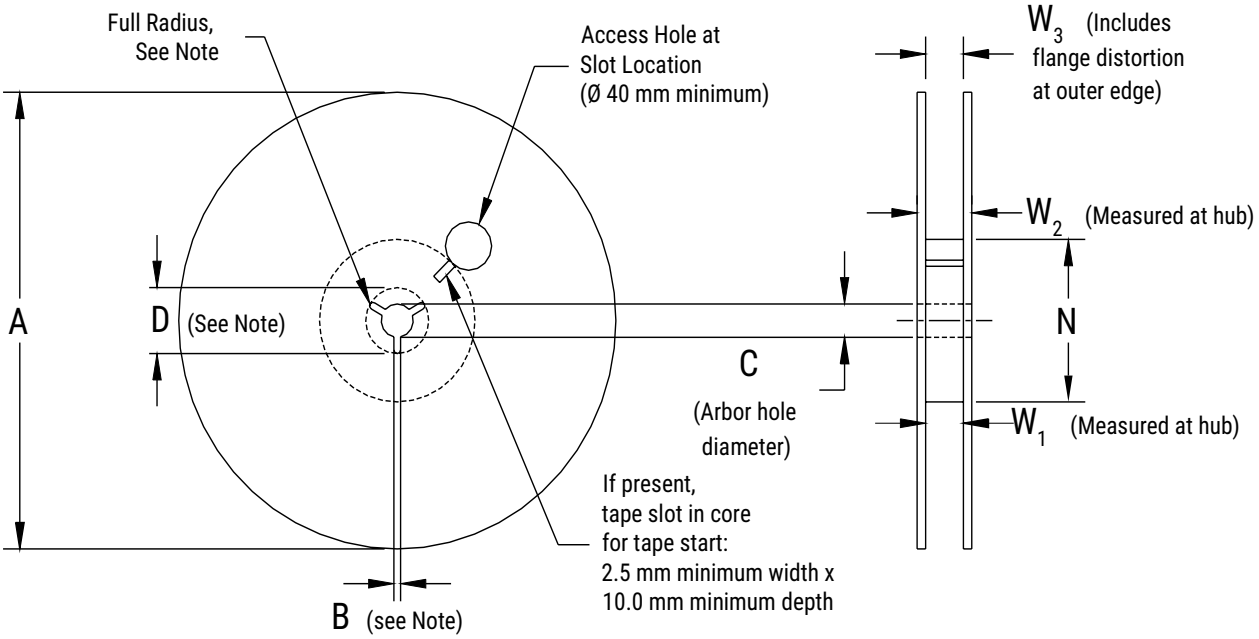


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

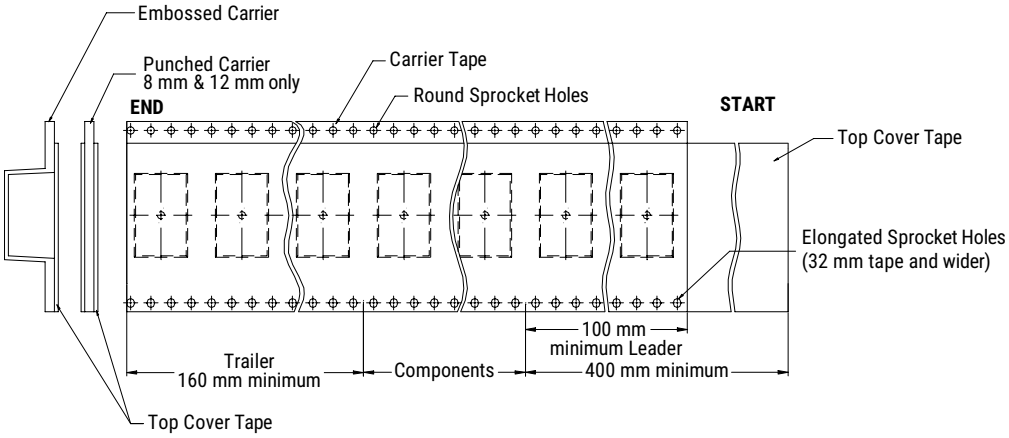
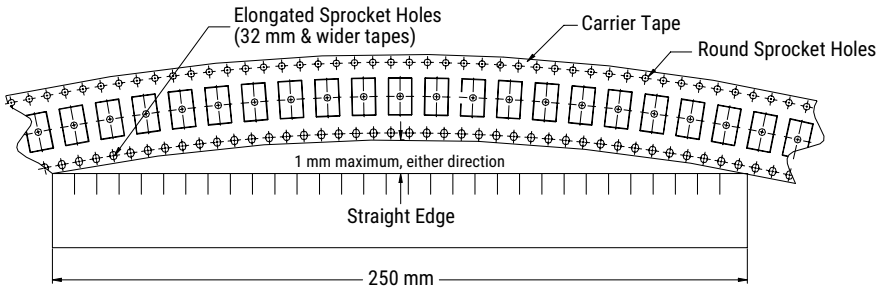


Figure 7 – Maximum Camber



T494 Industrial Grade MnO_2

Overview

The KEMET T494 is a lower ESR version of the popular T491, designed specifically for today's highly automated surface mount processes and equipment. The T494 combines KEMET's proven solid tantalum technology, acclaimed and respected throughout the world, with the latest in materials, processes and automation, resulting in unsurpassed total performance and value. This product meets or exceeds the requirements of EIA standard 535BAAC. The T494 is classified as MSL (Moisture Sensitivity Level) 1 under J STD 020: unlimited floorlife time at ≤ 30°C/85% RH. The T494 standard terminations are available in 100% matte tin and provide excellent wetting characteristics and compatibility with today's surface mount solder systems. Tin/lead (Sn/Pb) terminations are available upon request for any part number. Gold-plated terminations are also available for use with conductive epoxy attachment processes. Standard packaging of these devices is tape-and-reel in accordance with EIA 481. This system provides perfect compatibility with all tape-fed placement units.

Benefits

- Meets or exceeds EIA Standard 535BAAC
- Taped and reeled per EIA 481
- Symmetrical, compliant terminations
- Optional gold-plated terminations
- Laser-marked case
- 100% surge current test on C, D, E, U, V, and X sizes
- Halogen-free epoxy
- Capacitance values of 0.1 to 1,000 µF
- Tolerances of ±10% and ±20%
- Voltage rating of 2.5 – 50 VDC
- Extended range values
- Low profile case sizes
- RoHS compliant and lead-free terminations
- Operating temperature range of −55°C to +125°C

Applications

Typical applications include decoupling and filtering in many end applications, such as DC/DC converters, portable electronics, telecommunications, and control units.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder, Gold-plated or Non-magnetic 100% Sn solder.

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	494	T	336	M	004	A	T	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Packaging (C-Spec)
T = Tantalum	Industrial – Low ESR	A, B, C, D, E, S, T, U, V, X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	2R5 = 2.5 003 = 3 004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte tin (Sn) plated H = Standard solder coated (SnPb 5% Pb minimum) G = Gold-plated (A, B, C, D, X only) N = Non-magnetic 100% tin (Sn) M = Non-magnetic (SnPb)	Blank = 7" reel 7280 = 13" reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	–55°C to 125°C
Rated Capacitance Range	0.1 – 1,000 µF at 120 Hz/25°C
Capacitance Tolerance	K tolerance (10%), M tolerance (20%)
Rated Voltage Range	2.5 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

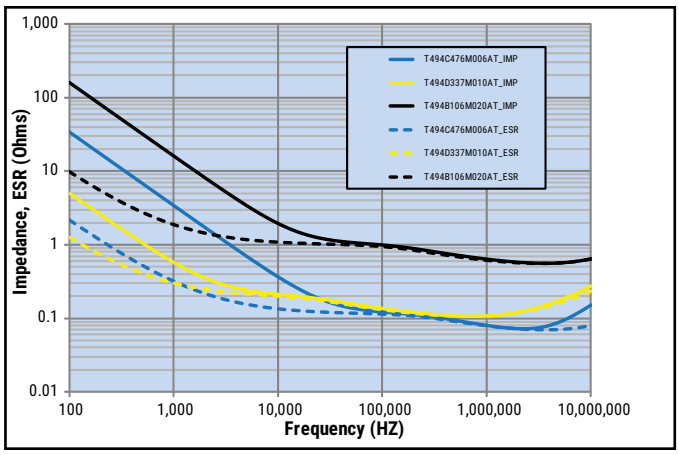
Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C.			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage).		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

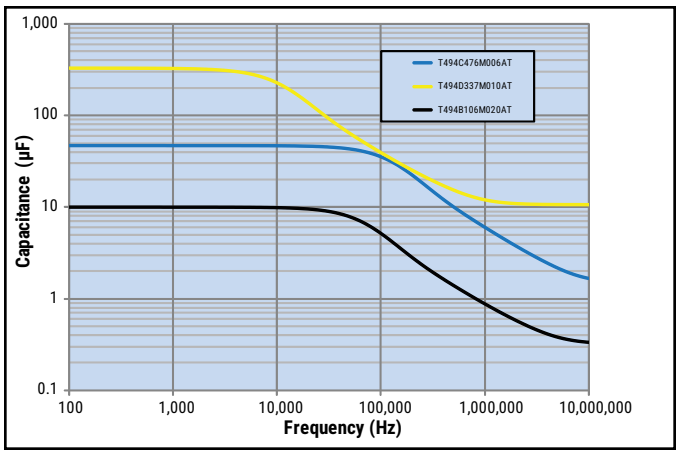
**IL = Initial limit*

Electrical Characteristics

ESR vs. Frequency



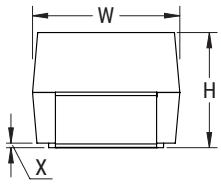
Capacitance vs. Frequency



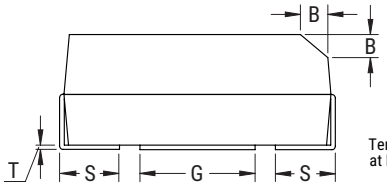
Dimensions – Millimeters (Inches)

Metric will govern

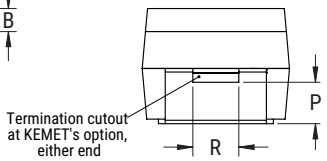
CATHODE (-) END VIEW



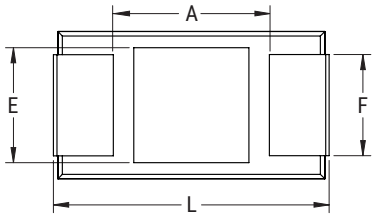
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component												
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216–18	3.2 ±0.2 (0.126 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.2 (0.047)	0.80 (0.032) +0.2 (0.008) /–0.3(0.011)	0.4 (0.016)	0.10 ±0.10 (0.004 ±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)
B	3528–21	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.9 ±0.2 (0.075 ±0.008)	2.2 (0.087)	0.80 (0.032) +0.1 (0.004) /–0.3(0.011)	0.4 (0.016)	0.10 ±0.10 (0.004 ±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
C	6032–28	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.3 (0.126 ±0.012)	2.5 ±0.3 (0.098 ±0.012)	2.2 (0.087)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.9 (0.114)	2.8 (0.110)	2.4 (0.094)
D	7343–31	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	2.8 ±0.3 (0.110 ±0.012)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
X	7343–43	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
E	7360-38	7.3 ±0.3 (0.287 ±0.012)	6.0 ±0.3 (0.236 ±0.012)	3.6 ±0.2 (0.142 ±0.008)	4.1 (0.161)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
S	3216–12	3.2 ±0.2 (0.126 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.1 ±0.1 (0.043 ±0.004)	1.2 (0.047)	0.80 (0.032) +0.2 (0.008) /–0.3(0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)
T	3528–12	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.1 ±0.1 (0.043 ±0.004)	2.2 (0.087)	0.80 (0.032) +0.1 (0.004) /–0.3(0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
U	6032–15	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.2 (0.110 ±0.008)	1.4 ±0.1 (0.055 ±0.004)	2.2 (0.087)	1.30 (0.051) ±0.3 (0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	2.9 (0.114)	2.8 (0.110)	2.4 (0.094)
V	7343-20	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	1.8 ±0.2 (0.071 ± 0.008)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)

Notes: (Ref) – Dimensions provided for reference only. For low profile cases, no dimensions are provided for B, P or R because these cases do not have a bevel or a notch.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
2.5	100	T/3528-12	T494T107(1)2R5A(2)	2.5	24.0	3.5	141	127	56	125	1
2.5	220	D/7343-31	T494D227(1)2R5A(2)	5.5	8.0	0.2	866	779	346	125	1
3	33	A/3216-18	T494A336(1)003A(2)	1.0	6.0	2.0	194	175	78	125	1
4	3.3	A/3216-18	T494A335(1)004A(2)	0.5	6.0	4.0	137	123	55	125	1
4	4.7	A/3216-18	T494A475(1)004A(2)	0.5	6.0	3.5	146	131	58	125	1
4	6.8	A/3216-18	T494A685(1)004A(2)	0.5	6.0	3.0	158	142	63	125	1
4	6.8	S/3216-12	T494S685(1)004A(2)	0.5	6.0	7.0	93	84	37	125	1
4	10	B/3528-21	T494B106(1)004A(2)	0.5	6.0	1.2	266	239	106	125	1
4	10	A/3216-18	T494A106(1)004A(2)	0.5	6.0	2.0	194	175	78	125	1
4	10	S/3216-12	T494S106(1)004A(2)	0.5	6.0	9.0	82	74	33	125	1
4	15	B/3528-21	T494B156(1)004A(2)	0.6	6.0	1.2	266	239	106	125	1
4	15	A/3216-18	T494A156(1)004A(2)	0.6	6.0	1.5	224	202	90	125	1
4	15	T/3528-12	T494T156(1)004A(2)	0.6	6.0	2.0	187	168	75	125	1
4	15	S/3216-12	T494S156(M)004A(2)	0.6	10.0	9.0	82	74	33	125	1
4	22	C/6032-28	T494C226(1)004A(2)	0.9	6.0	0.5	469	422	188	125	1
4	22	B/3528-21	T494B226(1)004A(2)	0.9	6.0	0.6	376	338	150	125	1
4	22	A/3216-18	T494A226(1)004A(2)	0.9	6.0	1.5	224	202	90	125	1
4	22	S/3216-12	T494S226(M)004A(2)	0.9	10.0	8.0	87	78	35	125	1
4	22	T/3528-12	T494T226(1)004A(2)	0.9	6.0	2.5	167	150	67	125	1
4	33	C/6032-28	T494C336(1)004A(2)	1.3	6.0	0.5	469	422	188	125	1
4	33	U/6032-15	T494U336(1)004A(2)	1.3	6.0	0.6	387	348	155	125	1
4	33	B/3528-21	T494B336(1)004A(2)	1.3	6.0	0.5	412	371	165	125	1
4	33	A/3216-18	T494A336(1)004A(2)	1.3	6.0	3.0	158	142	63	125	1
4	33	T/3528-12	T494T336(M)004A(2)	1.3	8.0	3.5	141	127	56	125	1
4	47	C/6032-28	T494C476(1)004A(2)	1.9	6.0	0.5	469	422	188	125	1
4	47	U/6032-15	T494U476(1)004A(2)	1.9	6.0	0.6	387	348	155	125	1
4	47	B/3528-21	T494B476(1)004A(2)	1.9	6.0	0.5	412	371	165	125	1
4	47	A/3216-18	T494A476(M)004A(2)	1.9	12.0	2.0	194	175	78	125	1
4	47	T/3528-12	T494T476(M)004A(2)	1.9	12.0	4.0	132	119	53	125	1
4	68	D/7343-31	T494D686(1)004A(2)	2.7	6.0	0.20	866	779	346	125	1
4	68	C/6032-28	T494C686(1)004A(2)	2.7	6.0	0.25	663	597	265	125	1
4	68	U/6032-15	T494U686(1)004A(2)	2.7	6.0	0.60	387	348	155	125	1
4	68	B/3528-21	T494B686(1)004A(2)	2.7	6.0	2.00	206	185	82	125	1
4	68	A/3216-18	T494A686(1)004A(2)	2.7	30.0	3.00	158	142	63	125	1
4	100	D/7343-31	T494D107(1)004A(2)	4.0	8.0	0.20	866	779	346	125	1
4	100	C/6032-28	T494C107(1)004A(2)	4.0	8.0	0.20	742	668	297	125	1
4	100	U/6032-15	T494U107(1)004A(2)	4.0	10.0	1.00	300	270	120	125	1
4	100	B/3528-21	T494B107(M)004A(2)	4.0	8.0	0.65	362	326	145	125	1
4	100	A/3216-18	T494A107(M)004A(2)	4.0	30.0	3.00	158	142	63	125	1
4	100	T/3528-12	T494T107(M)004A(2)	4.0	30.0	4.50	125	113	50	125	1
4	150	D/7343-31	T494D157(1)004A(2)	6.0	8.0	0.15	1,000	900	400	125	1
4	150	V/7343-20	T494V157(1)004A(2)	6.0	8.0	0.20	791	712	316	125	1
4	150	C/6032-28	T494C157(1)004A(2)	6.0	8.0	0.30	606	545	242	125	1
4	150	B/3528-21	T494B157(1)004A(2)	6.0	12.0	1.00	292	263	117	125	1
4	220	V/7343-20	T494V227(1)004A(2)	8.8	8.0	0.30	645	581	258	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-Plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	220	B/3528-21	T494B227(1)004A(2)	8.8	8.0	0.40	461	415	184	125	1
4	330	D/7343-31	T494D337(1)004A(2)	13.2	8.0	0.15	1,000	900	400	125	1
4	330	C/6032-28	T494C337(1)004A(2)	13.2	10.0	0.09	1,106	995	442	125	1
4	330	V/7343-20	T494V337(1)004A(2)	13.2	12.0	0.30	645	581	258	125	1
4	470	X/7343-43	T494X477(1)004A(2)	18.8	8.0	0.15	1,049	944	420	125	1
4	470	D/7343-31	T494D477(1)004A(2)	18.8	8.0	0.15	1,000	900	400	125	1
4	680	X/7343-43	T494X687(M)004A(2)	27.2	12.0	0.10	1,285	1157	514	125	1
4	680	D/7343-31	T494D687(M)004A(2)	27.2	12.0	0.15	1,000	900	400	125	1
4	1000	X/7343-43	T494X108(1)004A(2)	40.0	12.0	0.10	1,285	1157	514	125	1
4	1000	E/7360-38	T494E108(M)004A(2)	40.0	15.0	0.08	1,581	1423	632	125	1
6.3	2.2	A/3216-18	T494A225(1)006A(2)	0.5	6.0	6.0	112	101	45	125	1
6.3	3.3	A/3216-18	T494A335(1)006A(2)	0.5	6.0	6.0	112	101	45	125	1
6.3	4.7	A/3216-18	T494A475(1)006A(2)	0.5	6.0	3.5	146	131	58	125	1
6.3	4.7	S/3216-12	T494S475(1)006A(2)	0.5	6.0	8.0	87	78	35	125	1
6.3	6.8	B/3528-21	T494B685(1)006A(2)	0.5	6.0	1.2	266	239	106	125	1
6.3	6.8	A/3216-18	T494A685(1)006A(2)	0.5	6.0	2.0	194	175	78	125	1
6.3	6.8	S/3216-12	T494S685(1)006A(2)	0.5	6.0	9.0	82	74	33	125	1
6.3	10	B/3528-21	T494B106(1)006A(2)	0.6	6.0	1.0	292	263	117	125	1
6.3	10	A/3216-18	T494A106(1)006A(2)	0.6	6.0	2.0	194	175	78	125	1
6.3	10	T/3528-12	T494T106(1)006A(2)	0.6	6.0	1.2	242	218	97	125	1
6.3	10	S/3216-12	T494S106(M)006A(2)	0.6	10.0	9.0	82	74	33	125	1
6.3	15	C/6032-28	T494C156(1)006A(2)	0.9	6.0	0.6	428	385	171	125	1
6.3	15	B/3528-21	T494B156(1)006A(2)	0.9	6.0	0.7	348	313	139	125	1
6.3	15	A/3216-18	T494A156(1)006A(2)	0.9	6.0	2.0	194	175	78	125	1
6.3	15	T/3528-12	T494T156(1)006A(2)	0.9	6.0	2.5	167	150	67	125	1
6.3	15	S/3216-12	T494S156(M)006A(2)	0.9	10.0	10.0	77	69	31	125	1
6.3	22	C/6032-28	T494C226(1)006A(2)	1.4	6.0	0.5	469	422	188	125	1
6.3	22	U/6032-15	T494U226(1)006A(2)	1.4	6.0	0.8	335	302	134	125	1
6.3	22	B/3528-21	T494B226(1)006A(2)	1.4	6.0	0.6	376	338	150	125	1
6.3	22	A/3216-18	T494A226(1)006A(2)	1.4	6.0	3.0	158	142	63	125	1
6.3	22	T/3528-12	T494T226(M)006A(2)	1.4	8.0	3.5	141	127	56	125	1
6.3	33	C/6032-28	T494C336(1)006A(2)	2.1	6.0	0.3	606	545	242	125	1
6.3	33	U/6032-15	T494U336(1)006A(2)	2.1	6.0	0.6	387	348	155	125	1
6.3	33	B/3528-21	T494B336(1)006A(2)	2.1	6.0	0.6	376	338	150	125	1
6.3	33	A/3216-18	T494A336(1)006A(2)	2.1	12.0	2.0	194	175	78	125	1
6.3	33	T/3528-12	T494T336(M)006A(2)	2.1	12.0	4.0	132	119	53	125	1
6.3	47	D/7343-31	T494D476(1)006A(2)	3.0	6.0	0.22	826	743	330	125	1
6.3	47	C/6032-28	T494C476(1)006A(2)	3.0	6.0	0.25	663	597	265	125	1
6.3	47	U/6032-15	T494U476(1)006A(2)	3.0	6.0	0.60	387	348	155	125	1
6.3	47	B/3528-21	T494B476(1)006A(2)	3.0	6.0	0.50	412	371	165	125	1
6.3	47	A/3216-18	T494A476(M)006A(2)	3.0	12.0	2.50	173	156	69	125	1
6.3	47	T/3528-12	T494T476(1)006A(2)	3.0	24.0	4.00	132	119	53	125	1
6.3	68	D/7343-31	T494D686(1)006A(2)	4.3	6.0	0.20	866	779	346	125	1
6.3	68	C/6032-28	T494C686(1)006A(2)	4.3	6.0	0.20	742	668	297	125	1
6.3	68	U/6032-15	T494U686(1)006A(2)	4.3	10.0	1.00	300	270	120	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-Plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
6.3	68	B/3528-21	T494B686(M)006A(2)	4.3	8.0	0.65	362	326	145	125	1
6.3	68	A/3216-18	T494A686(1)006A(2)	4.3	30.0	3.00	158	142	63	125	1
6.3	100	D/7343-31	T494D107(1)006A(2)	6.3	8.0	0.15	1,000	900	400	125	1
6.3	100	V/7343-20	T494V107(1)006A(2)	6.3	8.0	0.20	791	712	316	125	1
6.3	100	C/6032-28	T494C107(1)006A(2)	6.3	8.0	0.30	606	545	242	125	1
6.3	100	U/6032-15	T494U107(M)006A(2)	6.3	10.0	1.20	274	247	110	125	1
6.3	100	B/3528-21	T494B107(1)006A(2)	6.3	15.0	1.50	238	214	95	125	1
6.3	150	B/3528-21	T494B157(1)006A(2)	9.5	15.0	2.25	194	175	78	125	1
6.3	150	D/7343-31	T494D157(1)006A(2)	9.5	8.0	0.15	1,000	900	400	125	1
6.3	150	C/6032-28	T494C157(M)006A(2)	9.5	8.0	0.30	606	545	242	125	1
6.3	150	V/7343-20	T494V157(1)006A(2)	9.5	8.0	0.30	645	581	258	125	1
6.3	220	X/7343-43	T494X227(1)006A(2)	13.9	8.0	0.15	1,049	944	420	125	1
6.3	220	D/7343-31	T494D227(1)006A(2)	13.9	8.0	0.15	1,000	900	400	125	1
6.3	220	C/6032-28	T494C227(M)006A(2)	13.9	10.0	0.30	606	545	242	125	1
6.3	220	V/7343-20	T494V227(M)006A(2)	13.9	12.0	0.30	645	581	258	125	1
6.3	330	X/7343-43	T494X337(1)006A(2)	20.8	8.0	0.15	1,049	944	420	125	1
6.3	330	D/7343-31	T494D337(1)006A(2)	20.8	8.0	0.15	1,000	900	400	125	1
6.3	330	E/7360-38	T494E337(1)006A(2)	20.8	8.0	0.25	894	805	358	125	1
6.3	470	X/7343-43	T494X477(1)006A(2)	29.6	10.0	0.10	1,285	1157	514	125	1
6.3	470	D/7343-31	T494D477(M)006A(2)	29.6	12.0	0.15	1,000	900	400	125	1
6.3	470	E/7360-38	T494E477(1)006A(2)	29.6	10.0	0.20	1,000	900	400	125	1
6.3	680	E/7360-38	T494E687(M)006A(2)	42.8	12.0	0.10	1,414	1273	566	125	1
6.3	680	X/7343-43	T494X687(1)006A(2)	42.8	12.0	0.10	1,285	1157	514	125	1
10	1.5	A/3216-18	T494A155(1)010A(2)	0.5	6.0	6.0	112	101	45	125	1
10	2.2	B/3528-21	T494B225(1)010A(2)	0.5	6.0	1.5	238	214	95	125	1
10	2.2	A/3216-18	T494A225(1)010A(2)	0.5	6.0	6.0	112	101	45	125	1
10	3.3	A/3216-18	T494A335(1)010A(2)	0.5	6.0	4.0	137	123	55	125	1
10	3.3	S/3216-12	T494S335(1)010A(2)	0.5	6.0	9.0	82	74	33	125	1
10	4.7	B/3528-21	T494B475(1)010A(2)	0.5	6.0	1.5	238	214	95	125	1
10	4.7	A/3216-18	T494A475(1)010A(2)	0.5	6.0	3.0	158	142	63	125	1
10	4.7	S/3216-12	T494S475(1)010A(2)	0.5	6.0	9.0	82	74	33	125	1
10	6.8	B/3528-21	T494B685(1)010A(2)	0.7	6.0	1.2	266	239	106	125	1
10	6.8	A/3216-18	T494A685(1)010A(2)	0.7	6.0	3.0	158	142	63	125	1
10	6.8	T/3528-12	T494T685(1)010A(2)	0.7	6.0	2.0	187	168	75	125	1
10	6.8	S/3216-12	T494S685(M)010A(2)	0.7	10.0	9.0	82	74	33	125	1
10	10	C/6032-28	T494C106(1)010A(2)	1.0	6.0	0.6	428	385	171	125	1
10	10	B/3528-21	T494B106(1)010A(2)	1.0	6.0	0.8	326	293	130	125	1
10	10	A/3216-18	T494A106(1)010A(2)	1.0	6.0	1.8	204	184	82	125	1
10	10	T/3528-12	T494T106(1)010A(2)	1.0	6.0	3.5	141	127	56	125	1
10	10	S/3216-12	T494S106(M)010A(2)	1.0	10.0	12.0	71	64	28	125	1
10	15	C/6032-28	T494C156(1)010A(2)	1.5	6.0	0.5	469	422	188	125	1
10	15	U/6032-15	T494U156(1)010A(2)	1.5	6.0	0.8	335	302	134	125	1
10	15	B/3528-21	T494B156(1)010A(2)	1.5	6.0	0.7	348	313	139	125	1
10	15	A/3216-18	T494A156(1)010A(2)	1.5	6.0	3.2	153	138	61	125	1
10	15	T/3528-12	T494T156(M)010A(2)	1.5	8.0	3.5	141	127	56	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-Plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	22	D/7343-31	T494D226(1)010A(2)	2.2	6.0	0.4	612	551	245	125	1
10	22	C/6032-28	T494C226(1)010A(2)	2.2	6.0	0.4	524	472	210	125	1
10	22	U/6032-15	T494U226(1)010A(2)	2.2	6.0	0.8	335	302	134	125	1
10	22	B/3528-21	T494B226(1)010A(2)	2.2	6.0	0.7	348	313	139	125	1
10	22	A/3216-18	T494A226(1)010A(2)	2.2	10.0	4.5	129	116	52	125	1
10	22	T/3528-12	T494T226(M)010A(2)	2.2	12.0	6.0	108	97	43	125	1
10	33	D/7343-31	T494D336(1)010A(2)	3.3	6.0	0.25	775	698	310	125	1
10	33	V/7343-20	T494V336(1)010A(2)	3.3	6.0	0.30	645	581	258	125	1
10	33	C/6032-28	T494C336(1)010A(2)	3.3	6.0	0.30	606	545	242	125	1
10	33	U/6032-15	T494U336(1)010A(2)	3.3	6.0	0.60	387	348	155	125	1
10	33	T/3528-12	T494T336(1)010A(2)	3.3	24.0	3.75	137	123	55	125	1
10	33	B/3528-21	T494B336(1)010A(2)	3.3	6.0	1.40	246	221	98	125	1
10	33	A/3216-18	T494A336(1)010A(2)	3.3	15.0	4.00	137	123	55	125	1
10	47	D/7343-31	T494D476(1)010A(2)	4.7	6.0	0.22	826	743	330	125	1
10	47	V/7343-20	T494V476(1)010A(2)	4.7	6.0	0.30	645	581	258	125	1
10	47	C/6032-28	T494C476(1)010A(2)	4.7	6.0	0.30	606	545	242	125	1
10	47	U/6032-15	T494U476(1)010A(2)	4.7	10.0	1.20	274	247	110	125	1
10	47	B/3528-21	T494B476(1)010A(2)	4.7	8.0	0.65	362	326	145	125	1
10	68	D/7343-31	T494D686(1)010A(2)	6.8	6.0	0.20	866	779	346	125	1
10	68	C/6032-28	T494C686(1)010A(2)	6.8	6.0	0.30	606	545	242	125	1
10	68	V/7343-20	T494V686(1)010A(2)	6.8	6.0	0.30	645	581	258	125	1
10	68	U/6032-15	T494U686(M)010A(2)	6.8	10.0	1.20	274	247	110	125	1
10	68	B/3528-21	T494B686(M)010A(2)	6.8	10.0	1.50	238	214	95	125	1
10	100	B/3528-21	T494B107(1)010A(2)	10.0	15.0	1.0	292	263	117	125	1
10	100	D/7343-31	T494D107(1)010A(2)	10.0	8.0	0.15	1,000	900	400	125	1
10	100	C/6032-28	T494C107(1)010A(2)	10.0	8.0	0.20	742	668	297	125	1
10	100	V/7343-20	T494V107(1)010A(2)	10.0	8.0	0.40	559	503	224	125	1
10	150	X/7343-43	T494X157(1)010A(2)	15.0	8.0	0.15	1,049	944	420	125	1
10	150	D/7343-31	T494D157(1)010A(2)	15.0	8.0	0.15	1,000	900	400	125	1
10	150	C/6032-28	T494C157(1)010A(2)	15.0	10.0	0.70	396	356	158	125	1
10	150	V/7343-20	T494V157(M)010A(2)	15.0	8.0	0.30	645	581	258	125	1
10	220	X/7343-43	T494X227(1)010A(2)	22.0	8.0	0.15	1,049	944	420	125	1
10	220	D/7343-31	T494D227(1)010A(2)	22.0	8.0	0.15	1,000	900	400	125	1
10	330	X/7343-43	T494X337(1)010A(2)	33.0	10.0	0.10	1,285	1157	514	125	1
10	330	D/7343-31	T494D337(1)010A(2)	33.0	10.0	0.15	1,000	900	400	125	1
10	330	E/7360-38	T494E337(1)010A(2)	33.0	10.0	0.25	894	805	358	125	1
10	470	X/7343-43	T494X477(1)010A(2)	47.0	10.0	0.10	1,285	1157	514	125	1
10	470	E/7360-38	T494E477(M)010A(2)	47.0	12.0	0.10	1,414	1273	566	125	1
16	1	A/3216-18	T494A105(1)016A(2)	0.5	4.0	6.0	112	101	45	125	1
16	1.5	A/3216-18	T494A155(1)016A(2)	0.5	6.0	6.0	112	101	45	125	1
16	2.2	A/3216-18	T494A225(1)016A(2)	0.5	6.0	4.0	137	123	55	125	1
16	2.2	S/3216-12	T494S225(1)016A(2)	0.5	6.0	10.0	77	69	31	125	1
16	3.3	B/3528-21	T494B335(1)016A(2)	0.5	6.0	2.0	206	185	82	125	1
16	3.3	A/3216-18	T494A335(1)016A(2)	0.5	6.0	4.0	137	123	55	125	1
16	4.7	B/3528-21	T494B475(1)016A(2)	0.8	6.0	1.5	238	214	95	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-Plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
16	4.7	A/3216-18	T494A475(1)016A(2)	0.8	6.0	3.0	158	142	63	125	1
16	4.7	T/3528-12	T494T475(1)016A(2)	0.8	6.0	3.0	153	138	61	125	1
16	6.8	C/6032-28	T494C685(1)016A(2)	1.1	6.0	0.8	371	334	148	125	1
16	6.8	B/3528-21	T494B685(1)016A(2)	1.1	6.0	1.2	266	239	106	125	1
16	6.8	A/3216-18	T494A685(1)016A(2)	1.1	6.0	3.0	158	142	63	125	1
16	10	C/6032-28	T494C106(1)016A(2)	1.6	6.0	0.6	428	385	171	125	1
16	10	U/6032-15	T494U106(1)016A(2)	1.6	6.0	1.0	300	270	120	125	1
16	10	B/3528-21	T494B106(1)016A(2)	1.6	6.0	0.8	326	293	130	125	1
16	10	A/3216-18	T494A106(1)016A(2)	1.6	8.0	3.0	158	142	63	125	1
16	10	T/3528-12	T494T106(1)016A(2)	1.6	8.0	6.0	108	97	43	125	1
16	15	C/6032-28	T494C156(1)016A(2)	2.4	6.0	0.4	524	472	210	125	1
16	15	U/6032-15	T494U156(1)016A(2)	2.4	6.0	0.8	335	302	134	125	1
16	15	B/3528-21	T494B156(1)016A(2)	2.4	6.0	0.8	326	293	130	125	1
16	22	D/7343-31	T494D226(1)016A(2)	3.5	6.0	0.25	775	698	310	125	1
16	22	C/6032-28	T494C226(1)016A(2)	3.5	6.0	0.35	561	505	224	125	1
16	22	U/6032-15	T494U226(1)016A(2)	3.5	10.0	1.80	224	202	90	125	1
16	22	B/3528-21	T494B226(1)016A(2)	3.5	6.0	1.00	292	263	117	125	1
16	33	D/7343-31	T494D336(1)016A(2)	5.3	6.0	0.25	775	698	310	125	1
16	33	C/6032-28	T494C336(1)016A(2)	5.3	6.0	0.30	606	545	242	125	1
16	33	U/6032-15	T494U336(1)016A(2)	5.3	12.0	2.20	202	182	81	125	1
16	33	B/3528-21	T494B336(1)016A(2)	5.3	8.0	1.20	266	239	106	125	1
16	47	D/7343-31	T494D476(1)016A(2)	7.5	6.0	0.2	866	779	346	125	1
16	47	V/7343-20	T494V476(1)016A(2)	7.5	6.0	0.3	645	581	258	125	1
16	47	C/6032-28	T494C476(1)016A(2)	7.5	6.0	0.5	469	422	188	125	1
16	68	D/7343-31	T494D686(1)016A(2)	10.9	6.0	0.15	1,000	900	400	125	1
16	68	V/7343-20	T494V686(1)016A(2)	10.9	6.0	0.5	500	450	200	125	1
16	68	C/6032-28	T494C686(1)016A(2)	10.9	12.0	1.0	332	299	133	125	1
16	100	X/7343-43	T494X107(1)016A(2)	16.0	8.0	0.15	1,049	944	420	125	1
16	100	D/7343-31	T494D107(1)016A(2)	16.0	8.0	0.15	1,000	900	400	125	1
16	100	V/7343-20	T494V107(1)016A(2)	16.0	12.0	0.5	500	450	200	125	1
16	100	C/6032-28	T494C107(1)016A(2)	16.0	10.0	0.75	383	345	153	125	1
16	150	X/7343-43	T494X157(1)016A(2)	24.0	8.0	0.15	1,049	944	420	125	1
16	150	D/7343-31	T494D157(1)016A(2)	24.0	12.0	0.4	612	551	245	125	1
16	220	D/7343-31	T494D227(1)016A(2)	35.2	15.0	0.68	470	423	188	125	1
16	220	X/7343-43	T494X227(1)016A(2)	35.2	10.0	0.4	642	578	257	125	1
16	220	E/7360-38	T494E227(1)016A(2)	35.2	7.2	0.5	632	569	253	125	1
20	0.68	A/3216-18	T494A684(1)020A(2)	0.5	4.0	8.0	97	87	39	125	1
20	1	A/3216-18	T494A105(1)020A(2)	0.5	4.0	5.5	117	105	47	125	1
20	1	S/3216-12	T494S105(1)020A(2)	0.5	6.0	10.0	77	69	31	125	1
20	1.5	A/3216-18	T494A155(1)020A(2)	0.5	6.0	4.5	129	116	52	125	1
20	1.5	S/3216-12	T494S155(1)020A(2)	0.5	6.0	9.0	82	74	33	125	1
20	2.2	B/3528-21	T494B225(1)020A(2)	0.5	6.0	1.5	238	214	95	125	1
20	2.2	A/3216-18	T494A225(1)020A(2)	0.5	6.0	4.0	137	123	55	125	1
20	3.3	B/3528-21	T494B335(1)020A(2)	0.7	6.0	1.3	256	230	102	125	1
20	3.3	A/3216-18	T494A335(1)020A(2)	0.7	6.0	4.0	137	123	55	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-Plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
20	3.3	T/3528-12	T494T335(1)020A(2)	0.7	6.0	4.0	132	119	53	125	1
20	4.7	C/6032-28	T494C475(1)020A(2)	0.9	6.0	0.6	428	385	171	125	1
20	4.7	B/3528-21	T494B475(1)020A(2)	0.9	6.0	1.0	292	263	117	125	1
20	4.7	A/3216-18	T494A475(1)020A(2)	0.9	6.0	3.0	158	142	63	125	1
20	6.8	C/6032-28	T494C685(1)020A(2)	1.4	6.0	0.6	428	385	171	125	1
20	6.8	U/6032-15	T494U685(1)020A(2)	1.4	6.0	1.4	254	229	102	125	1
20	6.8	B/3528-21	T494B685(1)020A(2)	1.4	6.0	1.0	292	263	117	125	1
20	6.8	A/3216-18	T494A685(M)020A(2)	1.4	8.0	3.0	158	142	63	125	1
20	10	C/6032-28	T494C106(1)020A(2)	2.0	6.0	0.5	469	422	188	125	1
20	10	U/6032-15	T494U106(1)020A(2)	2.0	6.0	0.8	335	302	134	125	1
20	10	B/3528-21	T494B106(1)020A(2)	2.0	6.0	1.0	292	263	117	125	1
20	10	A/3216-18	T494A106(1)020A(2)	2.0	10.0	3.0	158	142	63	125	1
20	15	D/7343-31	T494D156(1)020A(2)	3.0	6.0	0.35	655	590	262	125	1
20	15	C/6032-28	T494C156(1)020A(2)	3.0	6.0	0.40	524	472	210	125	1
20	22	D/7343-31	T494D226(1)020A(2)	4.4	6.0	0.3	707	636	283	125	1
20	22	V/7343-20	T494V226(1)020A(2)	4.4	6.0	0.4	559	503	224	125	1
20	22	C/6032-28	T494C226(1)020A(2)	4.4	6.0	0.4	524	472	210	125	1
20	22	B/3528-21	T494B226(1)020A(2)	4.4	8.0	3.0	168	151	67	125	1
20	33	D/7343-31	T494D336(1)020A(2)	6.6	6.0	0.25	775	698	310	125	1
20	33	C/6032-28	T494C336(M)020A(2)	6.6	6.0	0.40	524	472	210	125	1
20	33	V/7343-20	T494V336(1)020A(2)	6.6	8.0	0.40	559	503	224	125	1
20	33	B/3528-21	T494B336(M)020A(2)	6.6	10.0	3.00	168	151	67	125	1
20	47	C/6032-28	T494C476(M)020A(2)	9.4	10.0	0.80	371	334	148	125	1
20	47	D/7343-31	T494D476(1)020A(2)	9.4	6.0	0.20	866	779	346	125	1
20	68	X/7343-43	T494X686(1)020A(2)	13.6	6.0	0.20	908	817	363	125	1
20	68	D/7343-31	T494D686(1)020A(2)	13.6	8.0	0.20	866	779	346	125	1
20	68	C/6032-28	T494C686(1)020A(2)	13.6	8.0	0.38	542	488	217	125	1
20	100	D/7343-31	T494D107(1)020A(2)	20.0	6.0	0.68	471	424	188	125	1
20	100	X/7343-43	T494X107(1)020A(2)	20.0	8.0	0.15	1,049	944	420	125	1
20	100	E/7360-38	T494E107(1)020A(2)	20.0	8.0	0.30	816	734	326	125	1
20	150	X/7343-43	T494X157(1)020A(2)	30.0	10.0	0.30	742	668	297	125	1
25	0.33	A/3216-18	T494A334(1)025A(2)	0.5	4.0	10.0	87	78	35	125	1
25	0.47	A/3216-18	T494A474(1)025A(2)	0.5	4.0	9.0	91	82	36	125	1
25	0.68	A/3216-18	T494A684(1)025A(2)	0.5	4.0	6.0	112	101	45	125	1
25	1	B/3528-21	T494B105(1)025A(2)	0.5	4.0	2.0	206	185	82	125	1
25	1	A/3216-18	T494A105(1)025A(2)	0.5	4.0	4.0	137	123	55	125	1
25	1.5	B/3528-21	T494B155(1)025A(2)	0.5	6.0	1.5	238	214	95	125	1
25	1.5	A/3216-18	T494A155(1)025A(2)	0.5	6.0	3.0	158	142	63	125	1
25	2.2	C/6032-28	T494C225(1)025A(2)	0.6	6.0	2.2	224	202	90	125	1
25	2.2	B/3528-21	T494B225(1)025A(2)	0.6	6.0	1.2	266	239	106	125	1
25	2.2	A/3216-18	T494A225(1)025A(2)	0.6	6.0	3.0	158	142	63	125	1
25	3.3	C/6032-28	T494C335(1)025A(2)	0.8	6.0	1.2	303	273	121	125	1
25	3.3	B/3528-21	T494B335(1)025A(2)	0.8	6.0	2.0	206	185	82	125	1
25	3.3	A/3216-18	T494A335(1)025A(2)	0.8	6.0	3.0	158	142	63	125	1
25	4.7	C/6032-28	T494C475(1)025A(2)	1.2	6.0	0.6	428	385	171	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-Plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
25	4.7	B/3528-21	T494B475(1)025A(2)	1.2	6.0	1.0	292	263	117	125	1
25	4.7	A/3216-18	T494A475(M)025A(2)	1.2	8.0	3.0	158	142	63	125	1
25	6.8	C/6032-28	T494C685(1)025A(2)	1.7	6.0	0.6	428	385	171	125	1
25	6.8	B/3528-21	T494B685(1)025A(2)	1.7	8.0	2.0	206	185	82	125	1
25	10	D/7343-31	T494D106(1)025A(2)	2.5	6.0	0.4	612	551	245	125	1
25	10	C/6032-28	T494C106(1)025A(2)	2.5	6.0	0.6	428	385	171	125	1
25	10	B/3528-21	T494B106(1)025A(2)	2.5	8.0	3.0	168	151	67	125	1
25	15	D/7343-31	T494D156(1)025A(2)	3.8	6.0	0.35	655	590	262	125	1
25	15	C/6032-28	T494C156(1)025A(2)	3.8	6.0	0.90	350	315	140	125	1
25	15	B/3528-21	T494B156(1)025A(2)	3.8	8.0	3.00	168	151	67	125	1
25	22	D/7343-31	T494D226(1)025A(2)	5.5	6.0	0.3	707	636	283	125	1
25	22	C/6032-28	T494C226(1)025A(2)	5.5	6.0	1.0	332	299	133	125	1
25	22	V/7343-20	T494V226(1)025A(2)	5.5	6.0	0.5	500	450	200	125	1
25	33	X/7343-43	T494X336(1)025A(2)	8.3	6.0	0.3	742	668	297	125	1
25	33	D/7343-31	T494D336(1)025A(2)	8.3	6.0	0.4	612	551	245	125	1
25	33	C/6032-28	T494C336(1)025A(2)	8.3	10.0	1.0	332	299	133	125	1
25	47	X/7343-43	T494X476(1)025A(2)	11.8	6.0	0.3	742	668	297	125	1
25	47	D/7343-31	T494D476(1)025A(2)	11.8	10.0	0.2	866	779	346	125	1
25	68	X/7343-43	T494X686(M)025A(2)	17.0	8.0	0.3	742	668	297	125	1
25	68	D/7343-31	T494D686(M)025A(2)	17.0	10.0	0.5	548	493	219	125	1
25	100	X/7343-43	T494X107(1)025A(2)	25.0	8.0	0.25	812	731	325	125	1
35	0.1	A/3216-18	T494A104(1)035A(2)	0.5	4.0	10.0	87	78	35	125	1
35	0.15	A/3216-18	T494A154(1)035A(2)	0.5	4.0	6.0	112	101	45	125	1
35	0.22	A/3216-18	T494A224(1)035A(2)	0.5	4.0	6.0	112	101	45	125	1
35	0.33	A/3216-18	T494A334(1)035A(2)	0.5	4.0	6.0	112	101	45	125	1
35	0.47	B/3528-21	T494B474(1)035A(2)	0.5	4.0	2.5	184	166	74	125	1
35	0.47	A/3216-18	T494A474(1)035A(2)	0.5	4.0	4.0	137	123	55	125	1
35	0.68	B/3528-21	T494B684(1)035A(2)	0.5	4.0	2.5	184	166	74	125	1
35	0.68	A/3216-18	T494A684(1)035A(2)	0.5	4.0	6.0	112	101	45	125	1
35	1	B/3528-21	T494B105(1)035A(2)	0.5	4.0	2.0	206	185	82	125	1
35	1	A/3216-18	T494A105(1)035A(2)	0.5	4.0	6.0	112	101	45	125	1
35	1.5	A/3216-18	T494A155(1)035A(2)	0.5	6.0	4.0	137	123	55	125	1
35	1.5	C/6032-28	T494C155(1)035A(2)	0.5	6.0	2.5	210	189	84	125	1
35	1.5	B/3528-21	T494B155(1)035A(2)	0.5	6.0	3.0	168	151	67	125	1
35	2.2	A/3216-18	T494A225(1)035A(2)	0.8	6.0	3.0	158	142	63	125	1
35	2.2	C/6032-28	T494C225(1)035A(2)	0.8	6.0	1.5	271	244	108	125	1
35	2.2	B/3528-21	T494B225(1)035A(2)	0.8	6.0	2.5	184	166	74	125	1
35	3.3	C/6032-28	T494C335(1)035A(2)	1.2	6.0	0.8	371	334	148	125	1
35	3.3	B/3528-21	T494B335(1)035A(2)	1.2	6.0	1.3	256	230	102	125	1
35	4.7	B/3528-21	T494B475(1)035A(2)	1.6	6.0	1.5	238	214	95	125	1
35	4.7	D/7343-31	T494D475(1)035A(2)	1.6	6.0	0.7	463	417	185	125	1
35	4.7	C/6032-28	T494C475(1)035A(2)	1.6	6.0	0.7	396	356	158	125	1
35	6.8	D/7343-31	T494D685(1)035A(2)	2.4	6.0	0.5	548	493	219	125	1
35	6.8	C/6032-28	T494C685(1)035A(2)	2.4	6.0	0.9	350	315	140	125	1
35	10	D/7343-31	T494D106(1)035A(2)	3.5	6.0	0.4	612	551	245	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-Plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

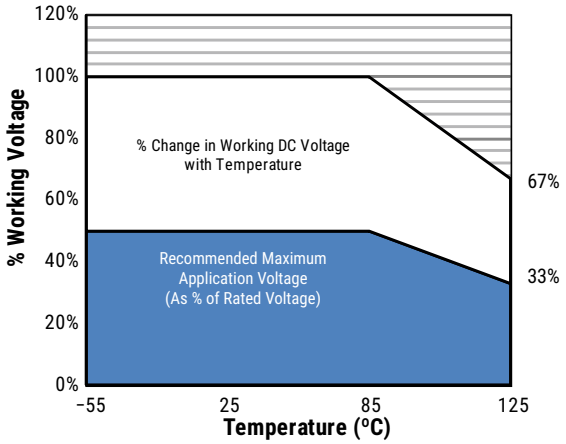
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
35	10	C/6032-28	T494C106(1)035A(2)	3.5	6.0	1.2	303	273	121	125	1
35	10	V/7343-20	T494V106(1)035A(2)	3.5	6.0	0.8	395	356	158	125	1
35	15	X/7343-43	T494X156(1)035A(2)	5.3	6.0	0.30	742	668	297	125	1
35	15	D/7343-31	T494D156(1)035A(2)	5.3	6.0	0.35	655	590	262	125	1
35	22	X/7343-43	T494X226(1)035A(2)	7.7	6.0	0.3	742	668	297	125	1
35	22	D/7343-31	T494D226(1)035A(2)	7.7	6.0	0.4	612	551	245	125	1
35	33	D/7343-31	T494D336(1)035A(2)	11.6	6.0	0.6	500	450	200	125	1
35	33	X/7343-43	T494X336(1)035A(2)	11.6	6.0	0.3	524	472	210	125	1
35	47	X/7343-43	T494X476(1)035A(2)	16.5	8.0	0.5	574	517	230	125	1
35	47	E/7360-38	T494E476(1)035A(2)	16.5	10.0	0.3	816	734	326	125	1
50	0.1	A/3216-18	T494A104(1)050A(2)	0.5	4.0	10.0	87	78	35	125	1
50	0.15	A/3216-18	T494A154(1)050A(2)	0.5	4.0	10.0	87	78	35	125	1
50	0.22	A/3216-18	T494A224(1)050A(2)	0.5	4.0	12.0	79	71	32	125	1
50	0.22	B/3528-21	T494B224(1)050A(2)	0.5	4.0	10.0	92	83	37	125	1
50	0.33	A/3216-18	T494A334(1)050A(2)	0.5	4.0	9.0	91	82	36	125	1
50	0.33	B/3528-21	T494B334(1)050A(2)	0.5	4.0	2.5	184	166	74	125	1
50	0.47	A/3216-18	T494A474(1)050A(2)	0.5	4.0	6.0	112	101	45	125	1
50	0.47	C/6032-28	T494C474(1)050A(2)	0.5	4.0	1.8	247	222	99	125	1
50	0.47	B/3528-21	T494B474(1)050A(2)	0.5	4.0	2.0	206	185	82	125	1
50	0.68	A/3216-18	T494A684(1)050A(2)	0.5	4.0	5.0	122	110	49	125	1
50	0.68	C/6032-28	T494C684(1)050A(2)	0.5	4.0	1.6	262	236	105	125	1
50	0.68	B/3528-21	T494B684(1)050A(2)	0.5	4.0	3.0	168	151	67	125	1
50	1	A/3216-18	T494A105(1)050A(2)	0.5	4.0	5.0	122	110	49	125	1
50	1	C/6032-28	T494C105(1)050A(2)	0.5	4.0	1.6	262	236	105	125	1
50	1	B/3528-21	T494B105(1)050A(2)	0.5	6.0	4.0	146	131	58	125	1
50	1	V/7343-20	T494V105(M)050A(2)	0.5	4.0	4.0	177	159	71	125	1
50	1.5	D/7343-31	T494D155(1)050A(2)	0.8	6.0	1.0	387	348	155	125	1
50	1.5	C/6032-28	T494C155(1)050A(2)	0.8	6.0	1.5	271	244	108	125	1
50	2.2	D/7343-31	T494D225(1)050A(2)	1.1	6.0	0.8	433	390	173	125	1
50	2.2	C/6032-28	T494C225(1)050A(2)	1.1	6.0	1.5	271	244	108	125	1
50	3.3	D/7343-31	T494D335(1)050A(2)	1.7	6.0	0.8	433	390	173	125	1
50	4.7	D/7343-31	T494D475(1)050A(2)	2.4	6.0	0.6	500	450	200	125	1
50	6.8	X/7343-43	T494X685(1)050A(2)	3.4	6.0	0.5	574	517	230	125	1
50	6.8	D/7343-31	T494D685(1)050A(2)	3.4	6.0	0.7	463	417	185	125	1
50	10	X/7343-43	T494X106(1)050A(2)	5.0	6.0	0.4	642	578	257	125	1
50	10	D/7343-31	T494D106(1)050A(2)	5.0	6.0	0.7	463	417	185	125	1
50	15	X/7343-43	T494X156(1)050A(2)	7.5	6.0	0.4	642	578	257	125	1
50	22	X/7343-43	T494X226(1)050A(2)	11.0	10.0	0.5	574	517	230	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	mA at 85°C 100 kHz	mA at 125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-Plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	67% of V_R
Recommended maximum application voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C w/+20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

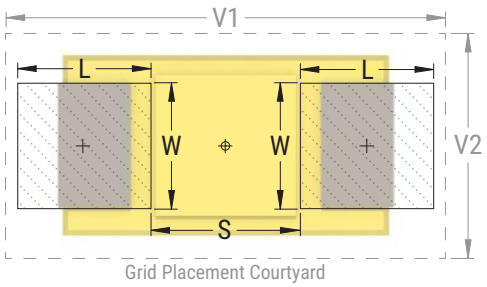
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
S[2]	3216–12	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
T	3528–12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
U	6032–15	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
V	7343–21	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] Height of these chips may create problems in wave soldering.



Grid Placement Courtyard

Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

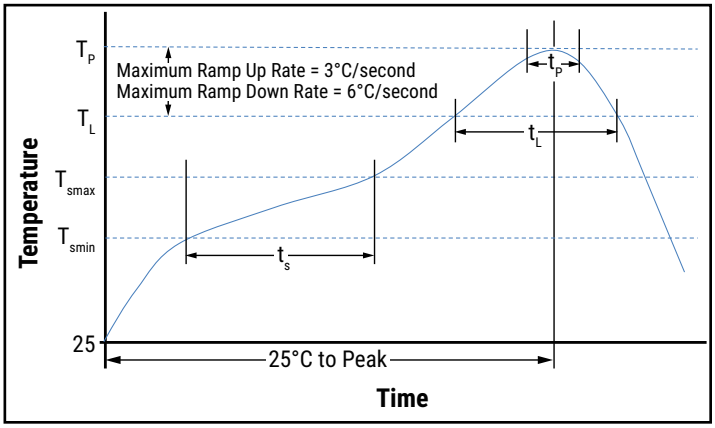
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

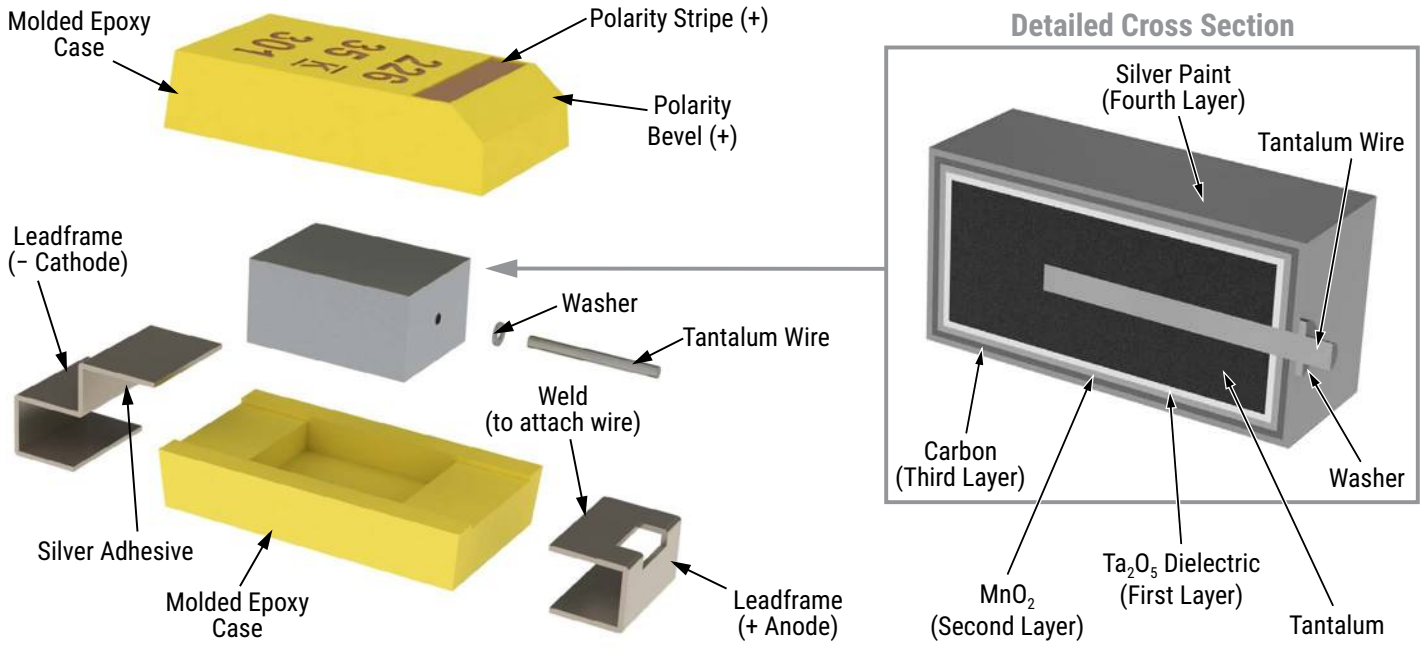
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



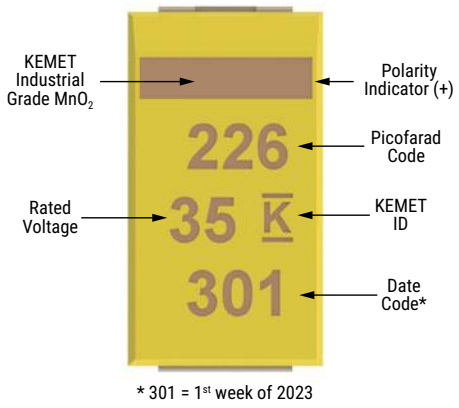
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = last number of year	8 = 2018 9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

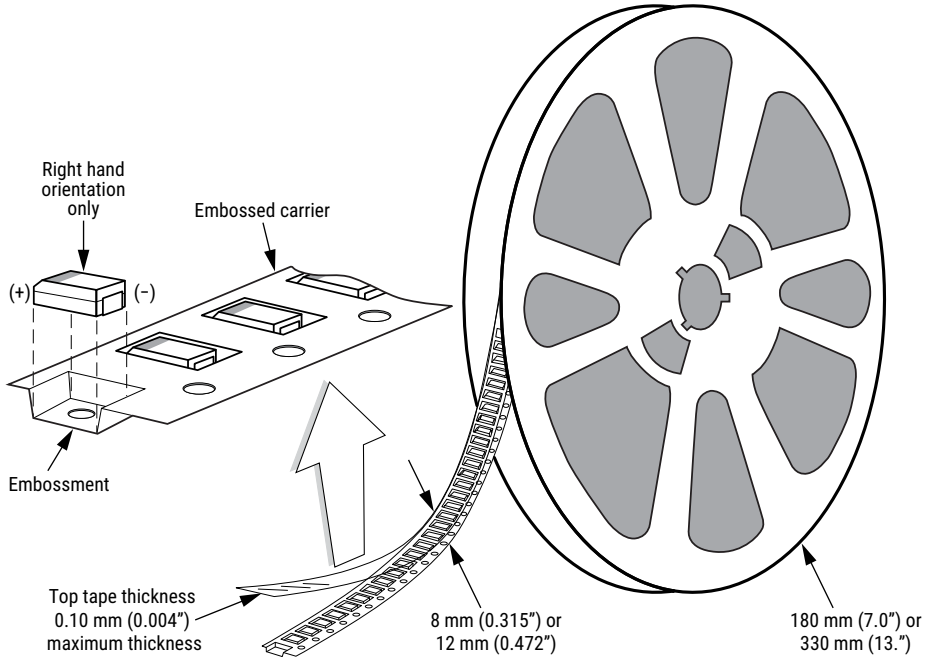


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

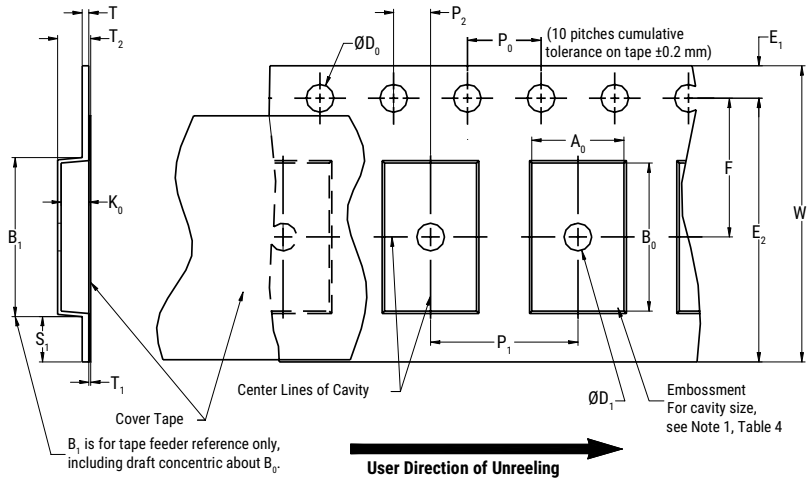


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

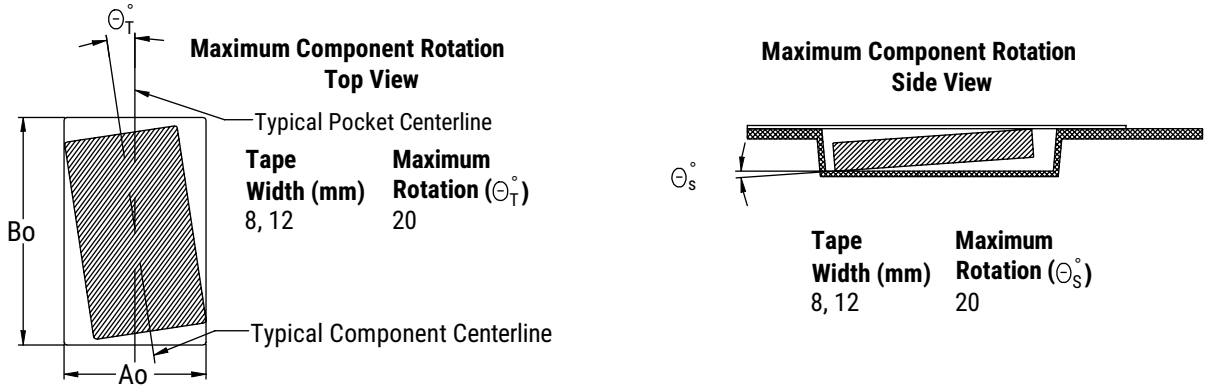


Figure 3 – Maximum Lateral Movement

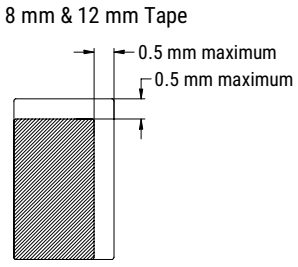


Figure 4 – Bending Radius

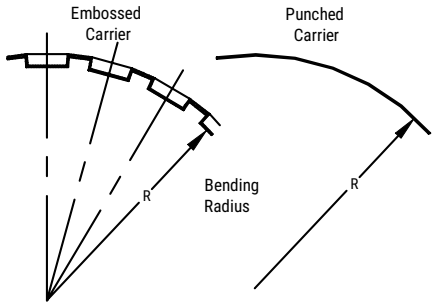
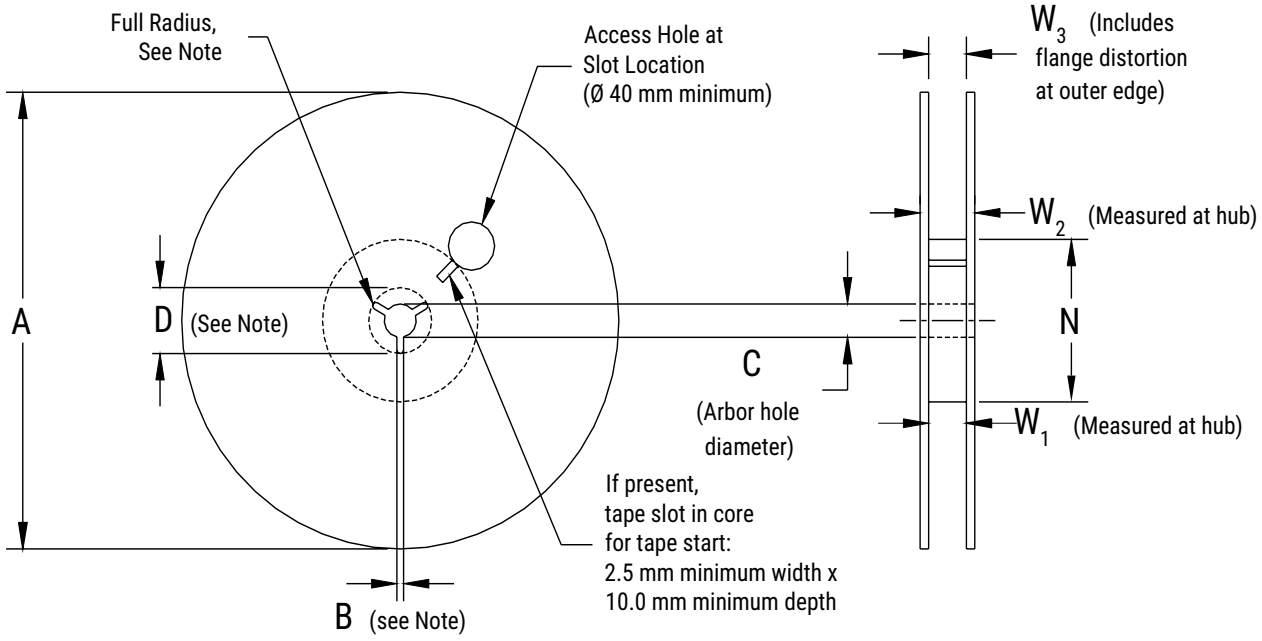


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

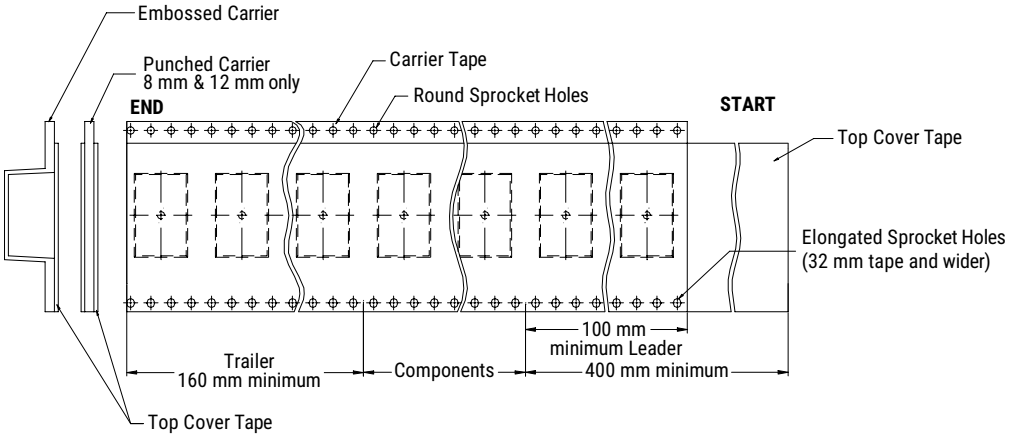
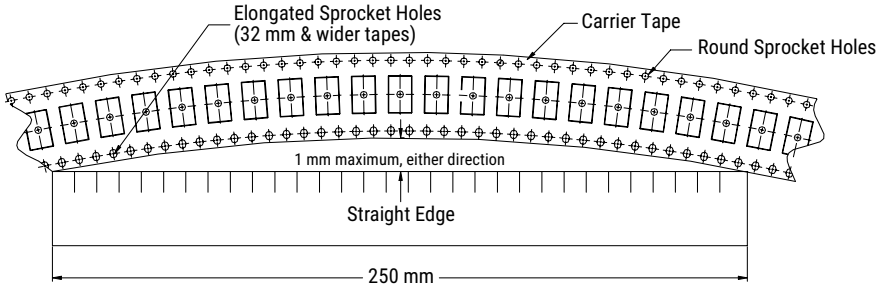


Figure 7 – Maximum Camber



T495 Surge Robust MnO_2

Overview

The low ESR, surge-robust T495 is designed for demanding applications that require high surge current and high ripple current capability. The T495 builds upon the proven capabilities of our industrial grade tantalum chip capacitors to offer several advantages such as low ESR, high ripple current capability, excellent capacitance stability, and improved resistance to high in-rush currents.

These benefits are achieved through a combination of proprietary design, materials, and process parameters, as well as high-stress, low impedance electrical conditioning performed prior to screening.The T495 is classified as moisture sensitivity level (MSL) 1 under J STD 020, with unlimited floorlife time at ≤ 30°C/85% RH.

Benefits

- Meets or exceeds EIA Standard 535BAAC
- Tape & Reel standard packaging per EIA 481
- High surge current capability
- Optional gold-plated terminations
- High ripple current capability
- 100% surge current test on B, C, D, E, U, V, and X sizes
- 100% steady-state accelerated aging

Applications

Typical applications include decoupling and filtering in many end applications, such as DC/DC converters, portable electronics, telecommunications, and control units requiring high ripple current capability.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder, Gold-plated or Non-magnetic 100% Sn solder.

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	495	X	107	M	010	A	T	E045	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	ESR	Packaging (C-Spec)
T = Tantalum	Surge Robust Low ESR	A, B, C, D, E, M, T, U, V, W, X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	2R5 = 2.5 004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte tin (Sn)-plated H = Standard solder coated (SnPb 5% Pb minimum) G = Gold-plated (A, B, C, D, X only) N = Non-magnetic 100% tin (Sn) M = Non-magnetic (SnPb)	E = ESR last three digits specify ESR in mΩ (45 = 45 mΩ)	Blank = 7" reel 7280 = 13" reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.47 – 1,000 µF at 120 Hz/25°C
Capacitance Tolerance	K tolerance (10%), M tolerance (20%)
Rated Voltage Range	2.5 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

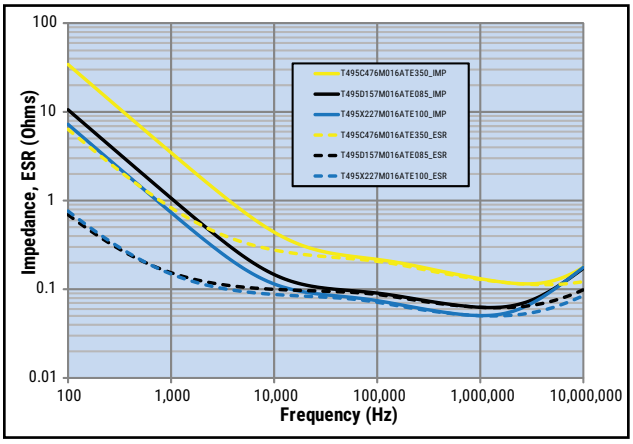
Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55C° to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C.			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

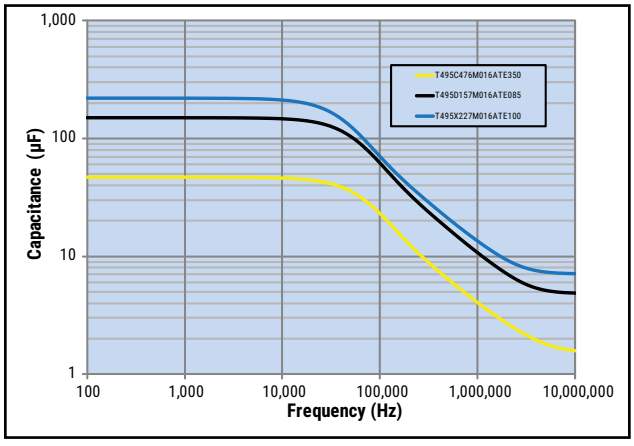
**IL = Initial limit*

Electrical Characteristics

ESR vs. Frequency

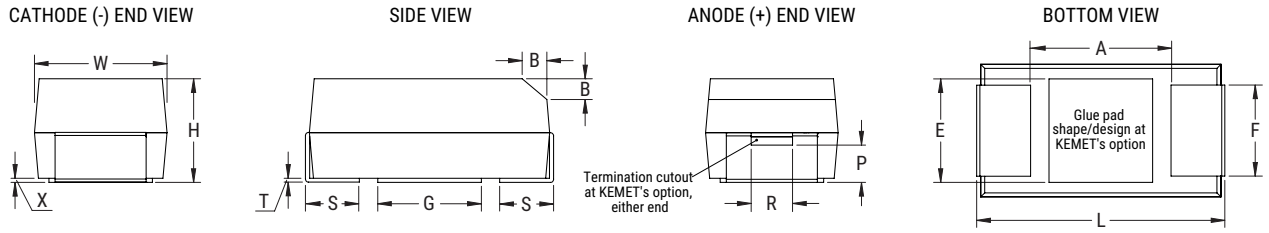


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component													Typical Weight
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)	(mg)
A	3216–18	3.2 ±0.2 (0.126 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.2 (0.047)	0.80 (0.032) +0.2 (0.008) /−0.3(0.011)	0.4 (0.016)	0.10 ±0.10 (0.004 ±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)	58.60
B	3528–21	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.9 ±0.2 (0.075 ±0.008)	2.2 (0.087)	0.80 (0.032) +0.1 (0.004) /−0.3(0.011)	0.4 (0.016)	0.10 ±0.10 (0.004 ±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)	107.45
M	3528-15	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.4 ±0.1 (0.055 ±0.004)	2.2 (0.087)	0.8 (0.031) ±0.3 (0.012)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)	97.99
C	6032–28	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.3 (0.126 ±0.012)	2.5 ±0.3 (0.098 ±0.012)	2.2 (0.087)	1.3 (0.051) ±0.3 (0.012)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.9 (0.114)	2.8 (0.110)	2.4 (0.094)	224.48
U	6032-15	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.2 (0.110 ±0.008)	1.4 ±0.1 (0.055 ±0.004)	2.2 (0.087)	1.3 (0.051) ±0.3 (0.012)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	2.9 (0.114)	2.8 (0.110)	2.4 (0.094)	70.00
D	7343–31	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	2.8 ±0.3 (0.110 ±0.012)	2.4 (0.094)	1.3 (0.051) ±0.3 (0.012)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)	446.84
W	7343-15	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	1.4 ±0.1 (0.055 ±0.004)	2.4 (0.094)	1.3 (0.051) ±0.3 (0.012)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)	248.27
X	7343-43	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (0.094)	1.3 (0.051) ±0.3 (0.012)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)	652.04
E	7360-38	7.3 ±0.3 (0.287 ±0.012)	6.0 ±0.3 (0.236 ±0.012)	3.6 ±0.2 (0.142 ±0.008)	4.1 (0.161)	1.3 (0.051) ±0.3 (0.012)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)	803.76
T	3528-12	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.1 ±0.1 (0.043 ±0.004)	2.2 (0.087)	0.80 (0.032) +0.1 (0.004) /−0.3(0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)	63.89
V	7343-20	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	1.8 ±0.2 (0.071 ± 0.008)	2.4 (0.094)	1.3 (0.051) ±0.3 (0.012)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)	286.40

Notes: (Ref) – Dimensions provided for reference only. For low profile cases, no dimensions are provided for B, P, or R because these cases do not have a bevel or a notch. These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
2.5	220	D/7343-31	T495D227(1)2R5A(2)E045	5.5	8.0	45	1826	1643	730	125	1
2.5	470	D/7343-31	T495D477(1)2R5A(2)E035	11.8	8.0	35	2070	1863	828	125	1
2.5	1000	X/7343-43	T495X108(1)2R5A(2)E030	25.0	15.0	30	2345	2111	938	125	1
2.5	1000	X/7343-43	T495X108(1)2R5A(2)E040	25.0	15.0	40	2031	1828	812	125	1
4	6.8	A/3216-18	T495A685(1)004A(2)E2K0	0.5	6.0	2,000	194	175	78	125	1
4	22	C/6032-28	T495C226(1)004A(2)E2K4	0.9	6.0	2,400	214	193	86	125	1
4	22	C/6032-28	T495C226(1)004A(2)E380	0.9	6.0	380	538	484	215	125	1
4	33	T/3528-12	T495T336(1)004A(2)E1K2	1.3	8.0	1,200	242	218	97	125	1
4	68	T/3528-12	T495T686(1)004A(2)E1K5	2.7	20.0	1,500	216	194	86	125	1
4	68	V/7343-20	T495V686(1)004A(2)E150	2.7	6.0	150	913	822	365	125	1
4	100	B/3528-21	T495B107(1)004A(2)E500	4.0	8.0	500	412	371	165	125	1
4	100	D/7343-31	T495D107(1)004A(2)E800	4.0	6.0	800	433	390	173	125	1
4	150	B/3528-21	T495B157(M)004A(2)E900	6.0	12.0	900	307	276	123	125	1
4	150	C/6032-28	T495C157(1)004A(2)E070	6.0	12.0	70	1254	1129	502	125	1
4	150	C/6032-28	T495C157(1)004A(2)E250	6.0	8.0	250	663	597	265	125	1
4	150	U/6032-15	T495U157(1)004A(2)E200	6.0	8.0	200	671	604	268	125	1
4	220	D/7343-31	T495D227(1)004A(2)E040	8.8	8.0	40	1936	1742	774	125	1
4	220	D/7343-31	T495D227(1)004A(2)E050	8.8	8.0	50	1732	1559	693	125	1
4	220	D/7343-31	T495D227(1)004A(2)E100	8.8	8.0	100	1225	1103	490	125	1
4	330	C/6032-28	T495C337(1)004A(2)E300	13.2	10.0	300	606	545	242	125	1
4	330	C/6032-28	T495C337(1)004A(2)E700	13.2	12.0	700	396	356	158	125	1
4	330	D/7343-31	T495D337(1)004A(2)E030	13.2	8.0	30	2236	2012	894	125	1
4	330	D/7343-31	T495D337(1)004A(2)E045	13.2	8.0	45	1826	1643	730	125	1
4	330	D/7343-31	T495D337(1)004A(2)E100	13.2	8.0	100	1225	1103	490	125	1
4	470	D/7343-31	T495D477(1)004A(2)E045	18.8	12.0	45	1826	1643	730	125	1
4	470	D/7343-31	T495D477(1)004A(2)E100	18.8	12.0	100	1225	1103	490	125	1
4	470	X/7343-43	T495X477(1)004A(2)E030	18.8	8.0	30	2345	2111	938	125	1
4	470	X/7343-43	T495X477(1)004A(2)E045	18.8	8.0	45	1915	1724	766	125	1
4	470	X/7343-43	T495X477(1)004A(2)E060	18.8	10.0	60	1658	1492	663	125	1
4	470	X/7343-43	T495X477(1)004A(2)E100	18.8	8.0	100	1285	1157	514	125	1
4	680	X/7343-43	T495X687(1)004A(2)E040	27.2	10.0	40	2031	1828	812	125	1
4	680	X/7343-43	T495X687(1)004A(2)E060	27.2	10.0	60	1658	1492	663	125	1
4	680	X/7343-43	T495X687(1)004A(2)E100	27.2	10.0	100	1285	1157	514	125	1
4	1000	X/7343-43	T495X108(1)004A(2)E030	40.0	10.0	30	2345	2111	938	125	1
4	1000	X/7343-43	T495X108(1)004A(2)E040	40.0	10.0	40	2031	1828	812	125	1
4	1000	X/7343-43	T495X108(1)004A(2)E060	40.0	10.0	60	1658	1492	663	125	1
4	1000	X/7343-43	T495X108(1)004A(2)E070	40.0	10.0	70	1535	1382	614	125	1
4	1000	X/7343-43	T495X108(1)004A(2)E090	40.0	10.0	90	1354	1219	542	125	1
4	1000	X/7343-43	T495X108(1)004A(2)E100	40.0	10.0	100	1285	1157	514	125	1
4	1000	E/7360-38	T495E108(1)004A(2)E035	40.0	15.0	35	2390	2151	956	125	1
4	1000	E/7360-38	T495E108(1)004A(2)E050	40.0	15.0	50	2000	1800	800	125	1
6.3	2.2	A/3216-18	T495A225(1)006ATE5K0	0.5	6.0	5,000	122	110	49	125	1
6.3	3.3	A/3216-18	T495A335(1)006ATE3K0	0.5	6.0	3,000	158	142	63	125	1
6.3	6.8	A/3216-18	T495A685(1)006ATE1K8	0.5	6.0	1,800	204	184	82	125	1
6.3	6.8	A/3216-18	T495A685(1)006ATE2K0	0.5	6.0	2,000	194	175	78	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
6.3	6.8	A/3216-18	T495A685(1)006A(2)E4K5	0.5	6.0	4,500	129	116	52	125	1
6.3	6.8	C/6032-28	T495C685(1)006A(2)E480	0.5	6.0	480	479	431	192	125	1
6.3	10	A/3216-18	T495A106(1)006A(2)E800	0.6	6.0	800	306	275	122	125	1
6.3	10	A/3216-18	T495A106(1)006A(2)E1K0	0.6	6.0	1,000	274	247	110	125	1
6.3	10	A/3216-18	T495A106(1)006A(2)E1K5	0.6	6.0	1,500	224	202	90	125	1
6.3	10	A/3216-18	T495A106(1)006A(2)E2K0	0.6	6.0	2,000	194	175	78	125	1
6.3	10	B/3528-21	T495B106(1)006A(2)E1K0	0.6	6.0	1,000	292	263	117	125	1
6.3	10	T/3528-12	T495T106(1)006A(2)E1K2	0.6	6.0	1,200	242	218	97	125	1
6.3	15	A/3216-18	T495A156(1)006A(2)E2K0	0.9	6.0	2,000	194	175	78	125	1
6.3	15	T/3528-12	T495T156(1)006A(2)E1K0	0.9	6.0	1,000	265	239	106	125	1
6.3	22	A/3216-18	T495A226(1)006A(2)E500	1.4	6.0	500	387	348	155	125	1
6.3	22	A/3216-18	T495A226(1)006A(2)E900	1.4	8.0	900	289	260	116	125	1
6.3	22	A/3216-18	T495A226(1)006A(2)E1K5	1.4	8.0	1,500	224	202	90	125	1
6.3	22	B/3528-21	T495B226(1)006A(2)E500	1.4	6.0	500	412	371	165	125	1
6.3	22	C/6032-28	T495C226(1)006A(2)E380	1.4	6.0	380	538	484	215	125	1
6.3	33	A/3216-18	T495A336(1)006A(2)E600	2.1	12.0	600	354	319	142	125	1
6.3	33	B/3528-21	T495B336(1)006A(2)E600	2.1	6.0	600	376	338	150	125	1
6.3	33	T/3528-12	T495T336(1)006A(2)E800	2.1	6.0	800	296	266	118	125	1
6.3	33	C/6032-28	T495C336(1)006A(2)E350	2.1	6.0	350	561	505	224	125	1
6.3	47	B/3528-21	T495B476(1)006A(2)E250	3.0	6.0	250	583	525	233	125	1
6.3	47	B/3528-21	T495B476(1)006A(2)E400	3.0	6.0	400	461	415	184	125	1
6.3	47	B/3528-21	T495B476(1)006A(2)E450	3.0	6.0	450	435	392	174	125	1
6.3	47	B/3528-21	T495B476(1)006A(2)E500	3.0	6.0	500	583	525	233	125	1
6.3	47	C/6032-28	T495C476(1)006A(2)E250	3.0	6.0	250	663	597	265	125	1
6.3	47	C/6032-28	T495C476(1)006A(2)E300	3.0	6.0	300	606	545	242	125	1
6.3	47	C/6032-28	T495C476(1)006A(2)E330	3.0	6.0	330	577	519	231	125	1
6.3	47	V/7343-20	T495V476(1)006A(2)E150	3.0	6.0	150	913	822	365	125	1
6.3	68	B/3528-21	T495B686(1)006A(2)E500	4.3	8.0	500	412	371	165	125	1
6.3	68	C/6032-28	T495C686(1)006A(2)E400	4.3	6.0	400	524	472	210	125	1
6.3	68	U/6032-15	T495U686(1)006A(2)E400	4.3	6.0	400	474	427	190	125	1
6.3	68	D/7343-31	T495D686(1)006A(2)E175	4.3	4.0	175	926	833	370	125	1
6.3	68	D/7343-31	T495D686(1)006A(2)E180	4.3	4.0	180	913	822	365	125	1
6.3	100	B/3528-21	T495B107(1)006A(2)E400	6.3	15.0	400	461	415	184	125	1
6.3	100	B/3528-21	T495B107(M)006A(2)E700	6.3	15.0	700	348	313	139	125	1
6.3	100	M/3528-15	T495M107(1)006A(2)E500	6.3	20.0	500	490	441	196	125	1
6.3	100	M/3528-15	T495M107(1)006A(2)E1K0	6.3	20.0	1,000	346	311	138	125	1
6.3	100	C/6032-28	T495C107(1)006A(2)E075	6.3	8.0	75	1211	1090	484	125	1
6.3	100	C/6032-28	T495C107(1)006A(2)E150	6.3	8.0	150	856	770	342	125	1
6.3	100	D/7343-31	T495D107(1)006A(2)E050	6.3	6.0	50	1732	1559	693	125	1
6.3	100	D/7343-31	T495D107(1)006A(2)E130	6.3	6.0	130	1074	967	430	125	1
6.3	100	D/7343-31	T495D107(1)006A(2)E150	6.3	8.0	150	1000	900	400	125	1
6.3	100	D/7343-31	T495D107(1)006A(2)E800	6.3	6.0	800	433	390	173	125	1
6.3	100	V/7343-20	T495V107(1)006A(2)E090	6.3	8.0	90	1179	1061	472	125	1
6.3	100	V/7343-20	T495V107(1)006A(2)E150	6.3	8.0	150	913	822	365	125	1
6.3	150	B/3528-21	T495B157(1)006A(2)E800	9.5	6.0	800	326	293	130	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
6.3	150	C/6032-28	T495C157(1)006A(2)E050	9.5	8.0	50	1483	1335	593	125	1
6.3	150	C/6032-28	T495C157(M)006A(2)E200	9.5	8.0	200	742	668	297	125	1
6.3	150	U/6032-15	T495U157(1)006A(2)E200	9.5	8.0	200	671	604	268	125	1
6.3	150	V/7343-20	T495V157(1)006A(2)E040	9.5	8.0	40	1768	1591	707	125	1
6.3	150	V/7343-20	T495V157(1)006A(2)E070	9.5	8.0	70	1336	1202	534	125	1
6.3	150	V/7343-20	T495V157(1)006A(2)E150	9.5	8.0	150	913	822	365	125	1
6.3	150	D/7343-31	T495D157(1)006A(2)E050	9.5	6.0	50	1732	1559	693	125	1
6.3	150	D/7343-31	T495D157(1)006A(2)E065	9.5	6.0	65	1519	1367	608	125	1
6.3	150	D/7343-31	T495D157(1)006A(2)E080	9.5	6.0	80	1369	1232	548	125	1
6.3	150	D/7343-31	T495D157(1)006A(2)E100	9.5	6.0	100	1225	1103	490	125	1
6.3	150	D/7343-31	T495D157(1)006A(2)E125	9.5	6.0	125	1095	986	438	125	1
6.3	150	X/7343-43	T495X157(1)006A(2)E100	9.5	6.0	100	1285	1157	514	125	1
6.3	220	C/6032-28	T495C227(1)006A(2)E225	13.9	10.0	225	699	629	280	125	1
6.3	220	C/6032-28	T495C227(1)006A(2)E200	13.9	10.0	200	742	668	297	125	1
6.3	220	C/6032-28	T495C227(1)006A(2)E100	13.9	10.0	100	1049	944	420	125	1
6.3	220	D/7343-31	T495D227(1)006A(2)E045	13.9	8.0	45	1826	1643	730	125	1
6.3	220	D/7343-31	T495D227(1)006A(2)E050	13.9	8.0	50	1732	1559	693	125	1
6.3	220	D/7343-31	T495D227(1)006A(2)E100	13.9	8.0	100	1225	1103	490	125	1
6.3	220	W/7343-15	T495W227(1)006A(2)E250	13.9	8.0	250	849	764	340	125	1
6.3	220	X/7343-43	T495X227(1)006A(2)E070	13.9	8.0	70	1535	1382	614	125	1
6.3	220	X/7343-43	T495X227(1)006A(2)E080	13.9	8.0	80	1436	1292	574	125	1
6.3	220	X/7343-43	T495X227(1)006A(2)E100	13.9	8.0	100	1285	1157	514	125	1
6.3	220	V/7343-20	T495V227(1)006ATE150	13.9	8.0	150	913	822	365	125	1
6.3	330	C/6032-28	T495C337(1)006A(2)E200	20.8	18.0	200	742	668	297	125	1
6.3	330	D/7343-31	T495D337(1)006A(2)E040	20.8	8.0	40	1936	1742	774	125	1
6.3	330	D/7343-31	T495D337(1)006A(2)E045	20.8	8.0	45	1826	1643	730	125	1
6.3	330	D/7343-31	T495D337(1)006A(2)E050	20.8	8.0	50	1732	1559	693	125	1
6.3	330	D/7343-31	T495D337(1)006A(2)E070	20.8	8.0	70	1464	1318	586	125	1
6.3	330	D/7343-31	T495D337(1)006A(2)E100	20.8	8.0	100	1225	1103	490	125	1
6.3	330	V/7343-20	T495V337(1)006A(2)E150	20.8	8.0	150	913	822	365	125	1
6.3	330	X/7343-43	T495X337(1)006A(2)E045	20.8	8.0	45	1915	1724	766	125	1
6.3	330	X/7343-43	T495X337(1)006A(2)E050	20.8	8.0	50	1817	1635	727	125	1
6.3	330	X/7343-43	T495X337(1)006A(2)E065	20.8	8.0	65	1593	1434	637	125	1
6.3	330	X/7343-43	T495X337(1)006A(2)E080	20.8	8.0	80	1436	1292	574	125	1
6.3	330	X/7343-43	T495X337(1)006A(2)E100	20.8	8.0	100	1285	1157	514	125	1
6.3	330	E/7360-38	T495E337(1)006A(2)E060	20.8	8.0	60	1826	1643	730	125	1
6.3	330	E/7360-38	T495E337(1)006A(2)E100	20.8	8.0	100	1414	1273	566	125	1
6.3	470	D/7343-31	T495D477(1)006A(2)E045	29.6	12.0	45	1826	1643	730	125	1
6.3	470	D/7343-31	T495D477(1)006A(2)E100	29.6	12.0	100	1225	1103	490	125	1
6.3	470	D/7343-31	T495D477(1)006A(2)E125	29.6	12.0	125	1095	986	438	125	1
6.3	470	D/7343-31	T495D477(1)006A(2)E150	29.6	12.0	150	1000	900	400	125	1
6.3	470	V/7343-20	T495V477(1)006A(2)E150	29.6	15.0	150	913	822	365	125	1
6.3	470	X/7343-43	T495X477(1)006A(2)E030	29.6	10.0	30	2345	2111	938	125	1
6.3	470	X/7343-43	T495X477(1)006A(2)E045	29.6	10.0	45	1915	1724	766	125	1
6.3	470	X/7343-43	T495X477(1)006A(2)E050	29.6	10.0	50	1817	1635	727	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
6.3	470	X/7343-43	T495X477(1)006A(2)E060	29.6	10.0	60	1658	1492	663	125	1
6.3	470	X/7343-43	T495X477(1)006A(2)E065	29.6	10.0	65	1593	1434	637	125	1
6.3	470	X/7343-43	T495X477(1)006A(2)E100	29.6	10.0	100	1285	1157	514	125	1
6.3	470	X/7343-43	T495X477(1)006A(2)E125	29.6	10.0	125	1149	1034	460	125	1
6.3	470	E/7360-38	T495E477(1)006A(2)E040	29.6	12.0	40	2236	2012	894	125	1
6.3	470	E/7360-38	T495E477(1)006A(2)E055	29.6	10.0	55	1907	1716	763	125	1
6.3	470	E/7360-38	T495E477(1)006A(2)E100	29.6	10.0	100	1414	1273	566	125	1
6.3	680	X/7343-43	T495X687(1)006A(2)E100	42.8	12.0	100	1285	1157	514	125	1
6.3	680	X/7343-43	T495X687(1)006A(2)E060	42.8	12.0	60	1658	1492	663	125	1
6.3	680	X/7343-43	T495X687(1)006A(2)E045	42.8	12.0	45	1915	1724	766	125	1
6.3	1,000	X/7343-43	T495X108(1)006A(2)E100	63.0	20.0	100	1285	1157	514	125	1
6.3	1,000	E/7360-38	T495E108(1)006A(2)E050	63.0	15.0	50	2000	1800	800	125	1
6.3	1,000	E/7360-38	T495E108(1)006A(2)E040	63.0	15.0	40	2236	2012	894	125	1
10	2.2	A/3216-18	T495A225(1)010A(2)E1K8	0.5	6.0	1,800	204	184	82	125	1
10	2.2	A/3216-18	T495A225(1)010A(2)E7K0	0.5	6.0	7,000	104	94	42	125	1
10	3.3	A/3216-18	T495A335(1)010A(2)E2K0	0.5	6.0	2,000	194	175	78	125	1
10	4.7	A/3216-18	T495A475(1)010A(2)E1K2	0.5	6.0	1,200	250	225	100	125	1
10	4.7	A/3216-18	T495A475(1)010A(2)E1K3	0.5	6.0	1,300	240	216	96	125	1
10	4.7	A/3216-18	T495A475(1)010A(2)E1K4	0.5	6.0	1,400	231	208	92	125	1
10	4.7	A/3216-18	T495A475(1)010A(2)E1K8	0.5	6.0	1,800	204	184	82	125	1
10	4.7	A/3216-18	T495A475(1)010A(2)E2K0	0.5	6.0	2,000	194	175	78	125	1
10	4.7	B/3528-21	T495B475(1)010A(2)E1K3	0.5	15.0	1,300	256	230	102	125	1
10	4.7	B/3528-21	T495B475(1)010A(2)E1K5	0.5	6.0	1,500	238	214	95	125	1
10	6.8	A/3216-18	T495A685(1)010A(2)E1K8	0.7	6.0	1,800	204	184	82	125	1
10	6.8	B/3528-21	T495B685(1)010A(2)E900	0.7	6.0	900	307	276	123	125	1
10	6.8	B/3528-21	T495B685(1)010A(2)E1K1	0.7	6.0	1,100	278	250	111	125	1
10	6.8	B/3528-21	T495B685(1)010A(2)E1K2	0.7	6.0	1,200	266	239	106	125	1
10	10	A/3216-18	T495A106(1)010A(2)E1K8	1.0	6.0	1,800	204	184	82	125	1
10	10	A/3216-18	T495A106(1)010A(2) E2K0	1.0	6.0	2,000	194	175	78	125	1
10	10	A/3216-18	T495A106(1)010A(2) E2K5	1.0	6.0	2,500	173	156	69	125	1
10	10	A/3216-18	T495A106(1)010A(2) E3K8	1.0	6.0	3,800	140	126	56	125	1
10	10	B/3528-21	T495B106(1)010A(2) E600	1.0	6.0	600	376	338	150	125	1
10	10	B/3528-21	T495B106(1)010A(2)E750	1.0	6.0	750	337	303	135	125	1
10	10	B/3528-21	T495B106(1)010A(2) E1K2	1.0	6.0	1,200	266	239	106	125	1
10	10	B/3528-21	T495B106(1)010A(2)E3K0	1.0	6.0	3,000	168	151	67	125	1
10	10	C/6032-28	T495C106(1)010AT E400	1.0	6.0	400	524	472	210	125	1
10	10	T/3528-12	T495T106(1)010AT E1K5	1.0	6.0	1,500	216	194	86	125	1
10	15	A/3216-18	T495A156(1)010AT E1K0	1.5	6.0	1,000	274	247	110	125	1
10	15	A/3216-18	T495A156(1)010AT E1K8	1.5	6.0	1,800	204	184	82	125	1
10	15	B/3528-21	T495B156(1)010AT E600	1.5	6.0	600	376	338	150	125	1
10	15	B/3528-21	T495B156(1)010AT E900	1.5	6.0	900	307	276	123	125	1
10	15	T/3528-12	T495T156(1)010AT E1K2	1.5	6.0	1,200	242	218	97	125	1
10	15	B/3528-21	T495B156(1)010A(2)E500	1.5	6.0	500	412	371	165	125	1
10	15	C/6032-28	T495C156(1)010A(2)E375	1.5	6.0	375	542	488	217	125	1
10	15	C/6032-28	T495C156(1)010A(2)E400	1.5	6.0	400	524	472	210	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	15	C/6032-28	T495C156(1)010A(2)E475	1.5	6.0	475	481	433	192	125	1
10	22	A/3216-18	T495A226(1)010AT E1K2	2.2	8.0	1,200	250	225	100	125	1
10	22	A/3216-18	T495A226(1)010AT E1K5	2.2	8.0	1,500	224	202	90	125	1
10	22	B/3528-21	T495B226(1)010AT E400	2.2	6.0	400	461	415	184	125	1
10	22	B/3528-21	T495B226(1)010AT E500	2.2	6.0	500	412	371	165	125	1
10	22	B/3528-21	T495B226(1)010AT E700	2.2	6.0	700	348	313	139	125	1
10	22	B/3528-21	T495B226(1)010AT E800	2.2	6.0	800	326	293	130	125	1
10	22	B/3528-21	T495B226(1)010A(2)E2K3	2.2	6.0	2,300	192	173	77	125	1
10	22	C/6032-28	T495C226(1)010A(2)E200	2.2	6.0	200	742	668	297	125	1
10	22	C/6032-28	T495C226(1)010A(2)E245	2.2	6.0	245	670	603	268	125	1
10	22	C/6032-28	T495C226(1)010A(2)E290	2.2	6.0	290	616	554	246	125	1
10	22	C/6032-28	T495C226(1)010A(2)E300	2.2	6.0	300	606	545	242	125	1
10	22	C/6032-28	T495C226(1)010A(2)E345	2.2	6.0	345	565	509	226	125	1
10	22	C/6032-28	T495C226(1)010A(2)E350	2.2	6.0	350	561	505	224	125	1
10	22	C/6032-28	T495C226(1)010A(2)E380	2.2	6.0	380	538	484	215	125	1
10	33	B/3528-21	T495B336(1)010A(2)E450	3.3	6.0	450	435	392	174	125	1
10	33	B/3528-21	T495B336(1)010A(2)E550	3.3	6.0	550	393	354	157	125	1
10	33	B/3528-21	T495B336(1)010A(2)E650	3.3	6.0	650	362	326	145	125	1
10	33	V/7343-20	T495V336(1)010A(2)E100	3.3	6.0	100	1118	1006	447	125	1
10	33	V/7343-20	T495V336(1)010A(2)E150	3.3	6.0	150	913	822	365	125	1
10	47	B/3528-21	T495B476(1)010A(2)E500	4.7	6.0	500	412	371	165	125	1
10	47	B/3528-21	T495B476(1)010A(2)E650	4.7	6.0	650	362	326	145	125	1
10	47	C/6032-28	T495C476(1)010A(2)E300	4.7	6.0	300	606	545	242	125	1
10	47	U/6032-15	T495U476(1)010A(2)E400	4.7	6.0	400	474	427	190	125	1
10	47	D/7343-31	T495D476(1)010A(2)E080	4.7	4.0	80	1369	1232	548	125	1
10	47	D/7343-31	T495D476(1)010A(2)E090	4.7	6.0	90	1291	1162	516	125	1
10	47	D/7343-31	T495D476(1)010A(2)E100	4.7	6.0	100	1225	1103	490	125	1
10	47	D/7343-31	T495D476(1)010A(2)E200	4.7	4.0	200	866	779	346	125	1
10	47	V/7343-20	T495V476(1)010A(2)E200	4.7	6.0	200	791	712	316	125	1
10	68	B/3528-21	T495B686(1)010A(2)E600	6.8	8.0	600	376	338	150	125	1
10	68	B/3528-21	T495B686(1)010A(2)E750	6.8	8.0	750	337	303	135	125	1
10	68	B/3528-21	T495B686(M)010A(2)E900	6.8	8.0	900	307	276	123	125	1
10	68	C/6032-28	T495C686(1)010A(2)E080	6.8	6.0	80	1173	1056	469	125	1
10	68	C/6032-28	T495C686(1)010A(2)E200	6.8	6.0	200	742	668	297	125	1
10	68	C/6032-28	T495C686(1)010A(2)E225	6.8	6.0	225	699	629	280	125	1
10	68	C/6032-28	T495C686(1)010A(2)E250	6.8	6.0	250	663	597	265	125	1
10	68	V/7343-20	T495V686(1)010A(2)E070	6.8	6.0	70	1336	1202	534	125	1
10	68	V/7343-20	T495V686(1)010A(2)E100	6.8	6.0	100	1118	1006	447	125	1
10	68	V/7343-20	T495V686(1)010A(2)E140	6.8	6.0	140	945	851	378	125	1
10	68	V/7343-20	T495V686(1)010A(2)E200	6.8	6.0	200	791	712	316	125	1
10	68	D/7343-31	T495D686(1)010A(2)E070	6.8	6.0	70	1464	1318	586	125	1
10	68	D/7343-31	T495D686(1)010A(2)E090	6.8	6.0	90	1291	1162	516	125	1
10	68	D/7343-31	T495D686(1)010A(2)E100	6.8	6.0	100	1225	1103	490	125	1
10	68	D/7343-31	T495D686(1)010A(2)E150	6.8	6.0	150	1000	900	400	125	1
10	68	X/7343-43	T495X686(1)010A(2)E150	6.8	4.0	150	1049	944	420	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	100	B/3528-21	T495B107(M)010A(2)E350	10.0	12.0	350	493	444	197	125	1
10	100	B/3528-21	T495B107(M)010A(2)E500	10.0	30.0	500	412	371	165	125	1
10	100	B/3528-21	T495B107(M)010A(2)E700	10.0	30.0	700	348	313	139	125	1
10	100	C/6032-28	T495C107(1)010A(2)E100	10.0	8.0	100	1050	945	420	125	1
10	100	C/6032-28	T495C107(1)010A(2)E150	10.0	8.0	150	856	812	542	125	1
10	100	C/6032-28	T495C107(1)010A(2)E180	10.0	8.0	180	782	704	313	125	1
10	100	C/6032-28	T495C107(1)010A(2)E200	10.0	8.0	200	742	668	297	125	1
10	100	C/6032-28	T495C107(1)010A(2)E250	10.0	8.0	250	663	597	265	125	1
10	100	U/6032-15	T495U107(1)010A(2)E150	10.0	8.0	150	775	698	310	125	1
10	100	W/7343-15	T495W107(1)010A(2)E200	10.0	8.0	200	949	854	380	125	1
10	100	V/7343-20	T495V107(1)010A(2)E100	10.0	8.0	100	1118	1006	447	125	1
10	100	V/7343-20	T495V107(1)010A(2)E150	10.0	8.0	150	913	822	365	125	1
10	100	V/7343-20	T495V107(1)010A(2)E200	10.0	8.0	200	791	712	316	125	1
10	100	D/7343-31	T495D107(1)010A(2)E050	10.0	8.0	50	1732	1559	693	125	1
10	100	D/7343-31	T495D107(1)010A(2)E065	10.0	8.0	65	1519	1367	608	125	1
10	100	D/7343-31	T495D107(1)010A(2)E080	10.0	8.0	80	1369	1232	548	125	1
10	100	D/7343-31	T495D107(1)010A(2)E100	10.0	8.0	100	1225	1103	490	125	1
10	100	D/7343-31	T495D107(1)010A(2)E120	10.0	8.0	120	1118	1006	447	125	1
10	100	D/7343-31	T495D107(1)010A(2)E125	10.0	8.0	125	1095	986	438	125	1
10	100	X/7343-43	T495X107(1)010A(2)E100	10.0	6.0	100	1285	1157	514	125	1
10	150	C/6032-28	T495C157(1)010A(2)E200	15.0	10.0	200	742	668	297	125	1
10	150	V/7343-20	T495V157(1)010A(2)E100	15.0	8.0	100	1118	1006	447	125	1
10	150	V/7343-20	T495V157(1)010A(2)E150	15.0	8.0	150	913	822	365	125	1
10	150	V/7343-20	T495V157(1)010A(2)E200	15.0	8.0	200	791	712	316	125	1
10	150	D/7343-31	T495D157(1)010A(2)E050	15.0	8.0	50	1732	1559	693	125	1
10	150	D/7343-31	T495D157(1)010A(2)E060	15.0	8.0	60	1581	1423	632	125	1
10	150	D/7343-31	T495D157(1)010A(2)E080	15.0	8.0	80	1369	1232	548	125	1
10	150	D/7343-31	T495D157(1)010A(2)E100	15.0	8.0	100	1225	1103	490	125	1
10	150	X/7343-43	T495X157(1)010A(2)E070	15.0	8.0	70	1535	1382	614	125	1
10	150	X/7343-43	T495X157(1)010A(2)E080	15.0	8.0	80	1436	1292	574	125	1
10	150	X/7343-43	T495X157(1)010A(2)E085	15.0	8.0	85	1393	1254	557	125	1
10	150	X/7343-43	T495X157(1)010A(2)E100	15.0	8.0	100	1285	1157	514	125	1
10	220	D/7343-31	T495D227(1)010A(2)E045	22.0	8.0	45	1826	1643	730	125	1
10	220	D/7343-31	T495D227(1)010A(2)E050	22.0	9.0	50	1732	1559	693	125	1
10	220	D/7343-31	T495D227(1)010A(2)E075	22.0	8.0	75	1414	1273	566	125	1
10	220	D/7343-31	T495D227(1)010A(2)E100	22.0	8.0	100	1225	1103	490	125	1
10	220	D/7343-31	T495D227(1)010A(2)E125	22.0	8.0	125	1095	986	438	125	1
10	220	V/7343-20	T495V227(1)010A(2)E150	22.0	10.0	150	913	822	365	125	1
10	220	V/7343-20	T495V227(1)010A(2)E200	22.0	10.0	200	791	712	316	125	1
10	220	X/7343-43	T495X227(1)010A(2)E045	22.0	8.0	45	1915	1724	766	125	1
10	220	X/7343-43	T495X227(1)010A(2)E050	22.0	8.0	50	1817	1635	727	125	1
10	220	X/7343-43	T495X227(1)010A(2)E060	22.0	8.0	60	1658	1492	663	125	1
10	220	X/7343-43	T495X227(1)010A(2)E070	22.0	8.0	70	1535	1382	614	125	1
10	220	X/7343-43	T495X227(1)010A(2)E080	22.0	8.0	80	1436	1292	574	125	1
10	220	X/7343-43	T495X227(1)010A(2)E100	22.0	8.0	100	1285	1157	514	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	330	D/7343-31	T495D337(1)010A(2)E100	33.0	8.0	100	1225	1103	490	125	1
10	330	D/7343-31	T495D337(1)010A(2)E125	33.0	10.0	125	1095	986	438	125	1
10	330	D/7343-31	T495D337(1)010A(2)E150	33.0	10.0	150	1000	900	400	125	1
10	330	X/7343-43	T495X337(1)010A(2)E035	33.0	10.0	35	2171	1954	868	125	1
10	330	X/7343-43	T495X337(1)010A(2)E040	33.0	10.0	40	2031	1828	812	125	1
10	330	X/7343-43	T495X337(1)010A(2)E050	33.0	10.0	50	1817	1635	727	125	1
10	330	X/7343-43	T495X337(1)010A(2)E060	33.0	10.0	60	1658	1492	663	125	1
10	330	X/7343-43	T495X337(1)010A(2)E080	33.0	10.0	80	1436	1292	574	125	1
10	330	X/7343-43	T495X337(1)010A(2)E100	33.0	10.0	100	1285	1157	514	125	1
10	330	E/7360-38	T495E337(1)010A(2)E040	33.0	8.0	40	2236	2012	894	125	1
10	330	E/7360-38	T495E337(1)010A(2)E060	33.0	10.0	60	1826	1643	730	125	1
10	330	E/7360-38	T495E337(1)010A(2)E100	33.0	10.0	100	1414	1273	566	125	1
10	470	X/7343-43	T495X477(1)010A(2)E045	47.0	10.0	45	1915	1724	766	125	1
10	470	X/7343-43	T495X477(1)010A(2)E050	47.0	10.0	50	1817	1635	727	125	1
10	470	X/7343-43	T495X477(1)010A(2)E060	47.0	10.0	60	1658	1492	663	125	1
10	470	X/7343-43	T495X477(1)010A(2)E080	47.0	10.0	80	1436	1292	574	125	1
10	470	X/7343-43	T495X477(1)010A(2)E100	47.0	10.0	100	1285	1157	514	125	1
10	470	X/7343-43	T495X477(1)010A(2)E200	47.0	10.0	200	908	817	363	125	1
10	470	E/7360-38	T495E477(1)010A(2)E040	47.0	10.0	40	2236	2012	894	125	1
10	470	E/7360-38	T495E477(1)010A(2)E060	47.0	10.0	60	1826	1643	730	125	1
10	470	E/7360-38	T495E477(1)010A(2)E100	47.0	10.0	100	1414	1273	566	125	1
16	1.0	A/3216-18	T495A105(1)016A(2)E5K0	0.5	6.0	5,000	122	110	49	125	1
16	1.5	A/3216-18	T495A155(1)016A(2)E5K0	0.5	6.0	5,000	122	110	49	125	1
16	2.2	A/3216-18	T495A225(1)016A(2)E2K5	0.5	6.0	2,500	173	156	69	125	1
16	2.2	A/3216-18	T495A225(1)016A(2)E1K8	0.5	6.0	1,800	204	184	82	125	1
16	3.3	A/3216-18	T495A335(1)016A(2)E3K0	0.5	6.0	3,000	158	142	63	125	1
16	3.3	B/3528-21	T495B335(1)016A(2)E2K0	0.5	6.0	2,000	206	185	82	125	1
16	4.7	A/3216-18	T495A475(1)016A(2)E2K0	0.8	6.0	2,000	194	175	78	125	1
16	4.7	B/3528-21	T495B475(1)016A(2)E700	0.8	6.0	700	348	313	139	125	1
16	4.7	B/3528-21	T495B475(1)016A(2)E800	0.8	6.0	800	326	293	130	125	1
16	4.7	B/3528-21	T495B475(1)016A(2)E1K0	0.8	6.0	1,000	292	263	117	125	1
16	4.7	B/3528-21	T495B475(1)016A(2)E1K5	0.8	6.0	1,500	238	214	95	125	1
16	6.8	B/3528-21	T495B685(1)016A(2)E1K2	1.1	6.0	1,200	266	239	106	125	1
16	6.8	C/6032-28	T495C685(1)016A(2)E750	1.1	6.0	750	383	345	153	125	1
16	10	A/3216-18	T495A106(1)016A(2)E1K7	1.6	6.0	1,700	210	189	84	125	1
16	10	B/3528-21	T495B106(1)016A(2)E500	1.6	6.0	500	412	371	165	125	1
16	10	B/3528-21	T495B106(1)016A(2)E650	1.6	6.0	650	362	326	145	125	1
16	10	B/3528-21	T495B106(1)016A(2)E800	1.6	6.0	800	326	293	130	125	1
16	10	B/3528-21	T495B106(1)016A(2)E2K5	1.6	6.0	2,500	184	166	74	125	1
16	10	T/3528-12	T495T106(M)016A(2)E4K0	1.6	8.0	4,000	132	119	53	125	1
16	15	A/3216-18	T495A156(1)016A(2)E2K5	2.4	8.0	2,500	173	156	69	125	1
16	15	B/3528-21	T495B156(1)016A(2)E500	2.4	6.0	500	412	371	165	125	1
16	15	B/3528-21	T495B156(1)016A(2)E650	2.4	6.0	650	362	326	145	125	1
16	15	B/3528-21	T495B156(1)016A(2)E800	2.4	6.0	800	326	293	130	125	1
16	15	C/6032-28	T495C156(1)016A(2)E400	2.4	6.0	400	524	472	210	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
16	22	B/3528-21	T495B226(1)016A(2)E600	3.5	6.0	600	376	338	150	125	1
16	22	B/3528-21	T495B226(1)016A(2)E700	3.5	6.0	700	348	313	139	125	1
16	22	C/6032-28	T495C226(1)016A(2)E300	3.5	6.0	300	606	545	242	125	1
16	22	C/6032-28	T495C226(1)016A(2)E350	3.5	6.0	350	561	505	224	125	1
16	22	C/6032-28	T495C226(1)016A(2)E500	3.5	6.0	500	469	422	188	125	1
16	33	C/6032-28	T495C336(1)016A(2)E200	5.3	6.0	200	742	668	297	125	1
16	33	C/6032-28	T495C336(1)016A(2)E225	5.3	6.0	225	699	629	280	125	1
16	33	C/6032-28	T495C336(1)016A(2)E230	5.3	6.0	230	692	623	277	125	1
16	33	C/6032-28	T495C336(1)016A(2)E275	5.3	6.0	275	632	569	253	125	1
16	33	C/6032-28	T495C336(1)016A(2)E300	5.3	6.0	300	606	545	242	125	1
16	33	U/6032-15	T495U336(1)016A(2)E200	5.3	6.0	200	671	604	268	125	1
16	33	U/6032-15	T495U336(1)016A(2)E400	5.3	6.0	400	474	427	190	125	1
16	33	B/3528-21	T495B336(1)016A(2)E350	5.3	6.0	350	493	444	197	125	1
16	33	D/7343-31	T495D336(1)016A(2)E150	5.3	6.0	150	1000	900	400	125	1
16	33	D/7343-31	T495D336(1)016A(2)E175	5.3	6.0	175	926	833	370	125	1
16	33	D/7343-31	T495D336(1)016A(2)E200	5.3	6.0	200	866	779	346	125	1
16	33	D/7343-31	T495D336(1)016A(2)E225	5.3	4.0	225	816	734	326	125	1
16	33	D/7343-31	T495D336(1)016A(2)E250	5.3	6.0	250	775	698	310	125	1
16	47	C/6032-28	T495C476(1)016A(2)E300	7.5	6.0	300	606	545	242	125	1
16	47	C/6032-28	T495C476(1)016A(2)E350	7.5	6.0	350	561	505	224	125	1
16	47	D/7343-31	T495D476(1)016A(2)E080	7.5	6.0	80	1369	1232	548	125	1
16	47	D/7343-31	T495D476(1)016A(2)E100	7.5	6.0	100	1225	1103	490	125	1
16	47	D/7343-31	T495D476(1)016A(2)E150	7.5	6.0	150	1000	900	400	125	1
16	47	D/7343-31	T495D476(1)016A(2)E180	7.5	6.0	180	913	822	365	125	1
16	47	D/7343-31	T495D476(1)016A(2)E800	7.5	6.0	800	433	390	173	125	1
16	68	C/6032-28	T495C686(1)016A(2)E250	10.9	6.0	250	663	597	265	125	1
16	68	C/6032-28	T495C686(1)016A(2)E200	10.9	6.0	200	742	668	297	125	1
16	68	C/6032-28	T495C686(1)016A(2)E180	10.9	6.0	180	782	704	313	125	1
16	68	V/7343-20	T495V686(1)016A(2)E180	10.9	6.0	180	833	750	333	125	1
16	68	V/7343-20	T495V686(1)016A(2)E250	10.9	6.0	250	707	636	283	125	1
16	68	V/7343-20	T495V686(1)016A(2)E300	10.9	6.0	300	645	581	258	125	1
16	68	D/7343-31	T495D686(1)016A(2)E070	10.9	6.0	70	1464	1318	586	125	1
16	68	D/7343-31	T495D686(1)016A(2)E100	10.9	6.0	100	1225	1103	490	125	1
16	68	D/7343-31	T495D686(1)016A(2)E150	10.9	6.0	150	1000	900	400	125	1
16	68	X/7343-43	T495X686(1)016A(2)E150	10.9	5.0	150	1049	944	420	125	1
16	100	C/6032-28	T495C107(1)016A(2)E200	16.0	10.0	200	742	668	297	125	1
16	100	D/7343-31	T495D107(1)016A(2)E060	16.0	8.0	60	1581	1423	632	125	1
16	100	D/7343-31	T495D107(1)016A(2)E100	16.0	8.0	100	1225	1103	490	125	1
16	100	D/7343-31	T495D107(1)016A(2)E125	16.0	8.0	125	1095	986	438	125	1
16	100	D/7343-31	T495D107(1)016A(2)E130	16.0	8.0	130	1074	967	430	125	1
16	100	D/7343-31	T495D107(1)016A(2)E150	16.0	8.0	150	1000	900	400	125	1
16	100	D/7343-31	T495D107(1)016A(2)E800	16.0	8.0	800	433	390	173	125	1
16	100	X/7343-43	T495X107(1)016A(2)E080	16.0	8.0	80	1436	1292	574	125	1
16	100	X/7343-43	T495X107(1)016A(2)E100	16.0	8.0	100	1285	1157	514	125	1
16	150	D/7343-31	T495D157(M)016A(2)E060	24.0	12.0	60	1581	1423	632	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
16	150	D/7343-31	T495D157(1)016A(2)E085	24.0	8.0	85	1328	1195	531	125	1
16	150	D/7343-31	T495D157(1)016A(2)E100	24.0	8.0	100	1225	1103	490	125	1
16	150	D/7343-31	T495D157(1)016A(2)E125	24.0	8.0	125	1095	986	438	125	1
16	150	D/7343-31	T495D157(1)016A(2)E130	24.0	8.0	130	1074	967	430	125	1
16	150	D/7343-31	T495D157(1)016A(2)E150	24.0	8.0	150	1000	900	400	125	1
16	150	X/7343-43	T495X157(1)016A(2)E075	24.0	8.0	75	1483	1335	593	125	1
16	150	X/7343-43	T495X157(1)016A(2)E100	24.0	8.0	100	1285	1157	514	125	1
16	220	D/7343-31	T495D227(1)016A(2)E150	35.2	12.0	150	1000	900	400	125	1
16	220	D/7343-31	T495D227(1)016A(2)E200	35.2	12.0	200	866	779	346	125	1
16	220	D/7343-31	T495D227(1)016A(2)E220	35.2	12.0	220	826	743	330	125	1
16	220	X/7343-43	T495X227(1)016A(2)E100	35.2	8.0	100	1285	1157	514	125	1
16	220	E/7360-38	T495E227(1)016A(2)E050	35.2	12.0	50	2000	1800	800	125	1
16	220	E/7360-38	T495E227(1)016A(2)E075	35.2	8.0	75	1633	1470	653	125	1
16	220	E/7360-38	T495E227(1)016A(2)E100	35.2	7.2	100	1414	1273	566	125	1
16	220	E/7360-38	T495E227(1)016A(2)E150	35.2	7.2	150	1155	1040	462	125	1
20	1.0	A/3216-18	T495A105(1)020A(2)E3K0	0.5	4.0	3,000	158	142	63	125	1
20	1.0	A/3216-18	T495A105(1)020A(2)E5K0	0.5	4.0	5,000	122	110	49	125	1
20	2.2	A/3216-18	T495A225(1)020A(2)E3K0	0.5	6.0	3,000	158	142	63	125	1
20	4.7	A/3216-18	T495A475(1)020A(2)E1K8	0.9	6.0	1,800	204	184	82	125	1
20	4.7	A/3216-18	T495A475(1)020A(2)E2K0	0.9	6.0	2,000	194	175	78	125	1
20	4.7	B/3528-21	T495B475(1)020A(2)E750	0.9	6.0	750	337	303	135	125	1
20	4.7	B/3528-21	T495B475(1)020A(2)E1K0	0.9	6.0	1,000	292	263	117	125	1
20	6.8	C/6032-28	T495C685(1)020A(2)E480	1.4	6.0	480	479	431	192	125	1
20	10	B/3528-21	T495B106(1)020A(2)E1K0	2.0	6.0	1,000	292	263	117	125	1
20	10	B/3528-21	T495B106(1)020A(2)E800	2.0	6.0	800	326	293	130	125	1
20	10	C/6032-28	T495C106(1)020A(2)E300	2.0	6.0	300	606	545	242	125	1
20	10	C/6032-28	T495C106(1)020A(2)E350	2.0	6.0	350	561	505	224	125	1
20	10	C/6032-28	T495C106(1)020A(2)E400	2.0	6.0	400	524	472	210	125	1
20	10	C/6032-28	T495C106(1)020A(2)E450	2.0	6.0	450	494	445	198	125	1
20	10	C/6032-28	T495C106(1)020A(2)E475	2.0	6.0	475	481	433	192	125	1
20	15	C/6032-28	T495C156(1)020A(2)E375	3.0	6.0	375	542	488	217	125	1
20	15	C/6032-28	T495C156(1)020A(2)E400	3.0	6.0	400	524	472	210	125	1
20	15	D/7343-31	T495D156(1)020A(2)E275	3.0	4.0	275	739	665	296	125	1
20	15	D/7343-31	T495D156(1)020A(2)E1K2	3.0	4.0	1,200	354	319	142	125	1
20	22	D/7343-31	T495D226(1)020A(2)E180	4.4	4.0	180	913	822	365	125	1
20	22	D/7343-31	T495D226(1)020A(2)E200	4.4	4.0	200	866	779	346	125	1
20	22	D/7343-31	T495D226(1)020A(2)E225	4.4	4.0	225	816	734	326	125	1
20	22	V/7343-20	T495V226(1)020A(2)E400	4.4	6.0	400	559	503	224	125	1
20	33	C/6032-28	T495C336(1)020A(2)E200	6.6	6.0	200	742	668	297	125	1
20	33	D/7343-31	T495D336(1)020A(2)E100	6.6	6.0	100	1225	1103	490	125	1
20	33	D/7343-31	T495D336(1)020A(2)E150	6.6	6.0	150	1000	900	400	125	1
20	33	D/7343-31	T495D336(1)020A(2)E200	6.6	6.0	200	866	779	346	125	1
20	33	X/7343-43	T495X336(1)020A(2)E200	6.6	6.0	200	908	817	363	125	1
20	47	D/7343-31	T495D476(1)020A(2)E075	9.4	6.0	75	1414	1273	566	125	1
20	47	D/7343-31	T495D476(1)020A(2)E100	9.4	6.0	100	1225	1103	490	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
20	47	D/7343-31	T495D476(1)020A(2)E150	9.4	6.0	150	1000	900	400	125	1
20	47	D/7343-31	T495D476(1)020A(2)E175	9.4	6.0	175	926	833	370	125	1
20	47	D/7343-31	T495D476(1)020A(2)E200	9.4	6.0	200	866	779	346	125	1
20	47	D/7343-31	T495D476(1)020A(2)E250	9.4	6.0	250	775	698	310	125	1
20	47	X/7343-43	T495X476(1)020A(2)E065	9.4	8.0	65	1593	1434	637	125	1
20	47	X/7343-43	T495X476(1)020A(2)E070	9.4	6.0	70	1535	1382	614	125	1
20	47	X/7343-43	T495X476(1)020A(2)E100	9.4	6.0	100	1285	1157	514	125	1
20	47	X/7343-43	T495X476(1)020A(2)E125	9.4	6.0	125	1149	1034	460	125	1
20	47	X/7343-43	T495X476(1)020A(2)E130	9.4	6.0	130	1127	1014	451	125	1
20	47	X/7343-43	T495X476(1)020A(2)E150	9.4	4.0	150	1049	944	420	125	1
20	68	C/6032-28	T495C686(1)020A(2)E250	13.6	8.0	250	663	597	265	125	1
20	68	D/7343-31	T495D686(1)020A(2)E070	13.6	6.0	70	1464	1318	586	125	1
20	68	D/7343-31	T495D686(1)020A(2)E100	13.6	6.0	100	1225	1103	490	125	1
20	68	D/7343-31	T495D686(1)020A(2)E150	13.6	6.0	150	1000	900	400	125	1
20	68	D/7343-31	T495D686(1)020A(2)E200	13.6	6.0	200	866	779	346	125	1
20	68	D/7343-31	T495D686(1)020A(2)E300	13.6	6.0	300	707	636	283	125	1
20	68	X/7343-43	T495X686(1)020A(2)E120	13.6	6.0	120	1173	1056	469	125	1
20	68	X/7343-43	T495X686(1)020A(2)E130	13.6	6.0	130	1127	1014	451	125	1
20	68	X/7343-43	T495X686(1)020A(2)E150	13.6	6.0	150	1049	944	420	125	1
20	68	X/7343-43	T495X686(1)020A(2)E200	13.6	6.0	200	908	817	363	125	1
20	100	D/7343-31	T495D107(1)020A(2)E200	20.0	6.0	200	866	779	346	125	1
20	100	X/7343-43	T495X107(1)020A(2)E100	20.0	6.0	100	1285	1157	514	125	1
20	100	X/7343-43	T495X107(1)020A(2)E150	20.0	8.0	150	1049	944	420	125	1
20	100	E/7360-38	T495E107(1)020A(2)E060	20.0	8.0	60	1826	1643	730	125	1
20	100	E/7360-38	T495E107(1)020A(2)E085	20.0	8.0	85	1534	1381	614	125	1
20	100	E/7360-38	T495E107(1)020A(2)E100	20.0	8.0	100	1414	1273	566	125	1
20	100	E/7360-38	T495E107(1)020A(2)E200	20.0	8.0	200	1000	900	400	125	1
20	150	E/7360-38	T495E157(1)020A(2)E080	30.0	8.0	80	1581	1423	632	125	1
25	0.47	A/3216-18	T495A474(1)025A(2)E4K5	0.5	4.0	4,500	129	116	52	125	1
25	0.47	A/3216-18	T495A474(1)025A(2)E7K0	0.5	4.0	7,000	104	94	42	125	1
25	1.0	A/3216-18	T495A105(1)025A(2)E2K5	0.5	4.0	2,500	173	156	69	125	1
25	1.0	A/3216-18	T495A105(1)025A(2)E3K0	0.5	4.0	3,000	158	142	63	125	1
25	1.0	A/3216-18	T495A105(1)025A(2)E4K0	0.5	4.0	4,000	137	123	55	125	1
25	1.0	A/3216-18	T495A105(1)025A(2)E5K0	0.5	4.0	5,000	122	110	49	125	1
25	1.5	A/3216-18	T495A155(1)025A(2)E3K0	0.5	6.0	3,000	158	142	63	125	1
25	2.2	B/3528-21	T495B225(1)025A(2)E1K2	0.6	4.0	1,200	266	239	106	125	1
25	2.2	C/6032-28	T495C225(1)025A(2)E1K3	0.6	6.0	1,300	291	262	116	125	1
25	3.3	B/3528-21	T495B335(1)025A(2)E1K2	0.8	6.0	1,200	266	239	106	125	1
25	3.3	C/6032-28	T495C335(1)025A(2)E750	0.8	6.0	750	383	345	153	125	1
25	4.7	C/6032-28	T495C475(1)025A(2)E530	1.2	6.0	530	456	410	182	125	1
25	4.7	C/6032-28	T495C475(1)025A(2)E575	1.2	6.0	575	437	393	175	125	1
25	4.7	B/3528-21	T495B475(1)025A(2)E700	1.2	6.0	700	348	313	139	125	1
25	4.7	B/3528-21	T495B475(1)025A(2)E750	1.2	6.0	750	337	303	135	125	1
25	4.7	B/3528-21	T495B475(1)025A(2)E800	1.2	6.0	800	326	293	130	125	1
25	4.7	B/3528-21	T495B475(1)025A(2)E900	1.2	6.0	900	307	276	123	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
25	4.7	B/3528-21	T495B475(1)025A(2)E1K0	1.2	6.0	1,000	292	263	117	125	1
25	6.8	B/3528-21	T495B685(1)025A(2)E1K0	1.7	6.0	1,000	292	263	117	125	1
25	6.8	B/3528-21	T495B685(1)025A(2)E1K5	1.7	6.0	1,500	238	214	95	125	1
25	6.8	C/6032-28	T495C685(1)025A(2)E400	1.7	6.0	400	524	472	210	125	1
25	6.8	C/6032-28	T495C685(1)025A(2)E490	1.7	6.0	490	474	427	190	125	1
25	6.8	C/6032-28	T495C685(1)025A(2)E500	1.7	6.0	500	469	422	188	125	1
25	10	B/3528-21	T495B106(1)025A(2)E750	2.5	6.0	750	337	303	135	125	1
25	10	C/6032-28	T495C106(1)025A(2)E275	2.5	6.0	275	632	569	253	125	1
25	10	C/6032-28	T495C106(1)025A(2)E300	2.5	6.0	300	606	545	242	125	1
25	10	C/6032-28	T495C106(1)025A(2)E450	2.5	6.0	450	494	445	198	125	1
25	10	D/7343-31	T495D106(1)025A(2)E1K2	2.5	6.0	1,200	354	319	142	125	1
25	15	C/6032-28	T495C156(1)025A(2)E300	3.8	6.0	300	606	545	242	125	1
25	15	D/7343-31	T495D156(1)025A(2)E100	3.8	6.0	100	1225	1103	490	125	1
25	15	D/7343-31	T495D156(1)025A(2)E230	3.8	4.0	230	808	727	323	125	1
25	15	D/7343-31	T495D156(1)025A(2)E275	3.8	6.0	275	739	665	296	125	1
25	15	V/7343-20	T495V156(1)025A(2)E500	3.8	6.0	500	500	450	200	125	1
25	15	X/7343-43	T495X156(1)025A(2)E200	3.8	4.0	200	908	817	363	125	1
25	22	C/6032-28	T495C226(1)025A(2)E275	5.5	6.0	275	632	569	253	125	1
25	22	C/6032-28	T495C226(1)025A(2)E280	5.5	6.0	280	627	564	251	125	1
25	22	C/6032-28	T495C226(1)025A(2)E300	5.5	8.0	300	606	545	242	125	1
25	22	C/6032-28	T495C226(1)025A(2)E900	5.5	6.0	900	350	315	140	125	1
25	22	D/7343-31	T495D226(1)025A(2)E200	5.5	6.0	200	866	779	346	125	1
25	22	D/7343-31	T495D226(1)025A(2)E230	5.5	6.0	230	808	727	323	125	1
25	22	X/7343-43	T495X226(1)025A(2)E225	5.5	4.0	225	856	770	342	125	1
25	33	D/7343-31	T495D336(1)025A(2)E090	8.3	6.0	90	1291	1162	516	125	1
25	33	D/7343-31	T495D336(1)025A(2)E100	8.3	6.0	100	1225	1103	490	125	1
25	33	D/7343-31	T495D336(1)025A(2)E150	8.3	6.0	150	1000	900	400	125	1
25	33	D/7343-31	T495D336(1)025A(2)E200	8.3	6.0	200	866	779	346	125	1
25	33	D/7343-31	T495D336(1)025A(2)E225	8.3	6.0	225	816	734	326	125	1
25	33	D/7343-31	T495D336(1)025A(2)E230	8.3	6.0	230	808	727	323	125	1
25	33	D/7343-31	T495D336(1)025A(2)E300	8.3	6.0	300	707	636	283	125	1
25	33	X/7343-43	T495X336(1)025A(2)E100	8.3	4.0	100	1285	1157	514	125	1
25	33	X/7343-43	T495X336(1)025A(2)E175	8.3	4.0	175	971	874	388	125	1
25	33	X/7343-43	T495X336(1)025A(2)E180	8.3	4.0	180	957	861	383	125	1
25	33	X/7343-43	T495X336(1)025A(2)E200	8.3	4.0	200	908	817	363	125	1
25	47	X/7343-43	T495X476(1)025A(2)E080	11.8	6.0	80	1436	1292	574	125	1
25	47	X/7343-43	T495X476(1)025A(2)E100	11.8	6.0	100	1285	1157	514	125	1
25	47	X/7343-43	T495X476(1)025A(2)E120	11.8	6.0	120	1173	1056	469	125	1
25	47	X/7343-43	T495X476(1)025A(2)E150	11.8	6.0	150	1049	944	420	125	1
25	47	X/7343-43	T495X476(1)025A(2)E185	11.8	6.0	185	944	850	378	125	1
25	47	X/7343-43	T495X476(1)025A(2)E200	11.8	6.0	200	908	817	363	125	1
25	47	D/7343-31	T495D476(1)025A(2)E100	11.8	6.0	100	1225	1103	490	125	1
25	47	D/7343-31	T495D476(1)025A(2)E120	11.8	6.0	120	1118	1006	447	125	1
25	47	D/7343-31	T495D476(1)025A(2)E130	11.8	6.0	130	1074	967	430	125	1
25	47	D/7343-31	T495D476(1)025A(2)E150	11.8	6.0	150	1000	900	400	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
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Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
25	47	D/7343-31	T495D476(1)025A(2)E250	11.8	6.0	250	775	698	310	125	1
25	68	D/7343-31	T495D686(1)025A(2)E150	17.0	10.0	150	1000	900	400	125	1
25	68	D/7343-31	T495D686(1)025A(2)E200	17.0	10.0	200	866	779	346	125	1
25	68	X/7343-43	T495X686(1)025A(2)E125	17.0	6.0	125	1149	1034	460	125	1
25	68	X/7343-43	T495X686(1)025A(2)E130	17.0	6.0	130	1127	1014	451	125	1
25	68	X/7343-43	T495X686(1)025A(2)E150	17.0	6.0	150	1049	944	420	125	1
25	68	X/7343-43	T495X686(1)025A(2)E200	17.0	6.0	200	908	817	363	125	1
25	100	X/7343-43	T495X107(1)025A(2)E150	25.0	10.0	150	1049	944	420	125	1
25	100	E/7360-38	T495E107(1)025A(2)E100	25.0	8.0	100	1414	1273	566	125	1
35	0.33	A/3216-18	T495A334(1)035A(2)E6K0	0.5	4.0	6,000	112	101	45	125	1
35	0.47	A/3216-18	T495A474(1)035A(2)E4K0	0.5	4.0	4,000	137	123	55	125	1
35	0.47	B/3528-21	T495B474(1)035A(2)E1K5	0.5	4.0	1,500	238	214	95	125	1
35	0.47	B/3528-21	T495B474(1)035A(2)E2K2	0.5	4.0	2,200	197	177	79	125	1
35	0.47	B/3528-21	T495B474(1)035A(2)E2K5	0.5	4.0	2,500	184	166	74	125	1
35	0.47	B/3528-21	T495B474(1)035A(2)E11K	0.5	4.0	11,000	88	79	35	125	1
35	1.0	A/3216-18	T495A105(1)035A(2)E3K0	0.5	4.0	3,000	158	142	63	125	1
35	1.0	B/3528-21	T495B105(1)035A(2)E1K5	0.5	4.0	1,500	238	214	95	125	1
35	1.0	B/3528-21	T495B105(1)035A(2)E1K7	0.5	4.0	1,700	224	202	90	125	1
35	1.0	B/3528-21	T495B105(1)035A(2)E2K0	0.5	4.0	2,000	206	185	82	125	1
35	1.0	B/3528-21	T495B105(1)035A(2)E7K0	0.5	4.0	7,000	110	99	44	125	1
35	2.2	B/3528-21	T495B225(1)035A(2)E1K5	0.8	6.0	1,500	238	214	95	125	1
35	2.2	B/3528-21	T495B225(1)035A(2)E2K0	0.8	6.0	2,000	206	185	82	125	1
35	2.2	B/3528-21	T495B225(1)035A(2)E4K0	0.8	6.0	4,000	146	131	58	125	1
35	2.2	C/6032-28	T495C225(1)035A(2)E750	0.8	6.0	750	383	345	153	125	1
35	3.3	B/3528-21	T495B335(1)035A(2)E1K0	1.2	6.0	1,000	292	263	117	125	1
35	3.3	B/3528-21	T495B335(1)035A(2)E900	1.2	6.0	900	307	276	123	125	1
35	3.3	C/6032-28	T495C335(1)035A(2)E525	1.2	6.0	525	458	412	183	125	1
35	3.3	C/6032-28	T495C335(1)035A(2)E550	1.2	6.0	550	447	402	179	125	1
35	3.3	C/6032-28	T495C335(1)035A(2)E600	1.2	6.0	600	428	385	171	125	1
35	4.7	B/3528-21	T495B475(1)035A(2)E850	1.6	6.0	850	316	284	126	125	1
35	4.7	B/3528-21	T495B475(1)035A(2)E1K0	1.6	6.0	1,000	292	263	117	125	1
35	4.7	C/6032-28	T495C475(1)035A(2)E450	1.6	6.0	450	494	445	198	125	1
35	4.7	C/6032-28	T495C475(1)035A(2)E500	1.6	6.0	500	469	422	188	125	1
35	4.7	C/6032-28	T495C475(1)035A(2)E600	1.6	6.0	600	428	385	171	125	1
35	4.7	D/7343-31	T495D475(1)035A(2)E300	1.6	6.0	300	707	636	283	125	1
35	6.8	C/6032-28	T495C685(1)035A(2)E1K8	2.4	6.0	1,800	247	222	99	125	1
35	6.8	D/7343-31	T495D685(1)035A(2)E150	2.4	6.0	150	1000	900	400	125	1
35	6.8	D/7343-31	T495D685(1)035A(2)E300	2.4	6.0	300	707	636	283	125	1
35	6.8	D/7343-31	T495D685(1)035A(2)E400	2.4	6.0	400	612	551	245	125	1
35	6.8	V/7343-20	T495V685(1)035A(2)E600	2.4	6.0	600	456	410	182	125	1
35	6.8	X/7343-43	T495X685(1)035A(2)E300	2.4	4.0	300	742	668	297	125	1
35	10	C/6032-28	T495C106(1)035A(2)E400	3.5	6.0	400	524	472	210	125	1
35	10	D/7343-31	T495D106(1)035A(2)E120	3.5	4.0	120	1118	1006	447	125	1
35	10	D/7343-31	T495D106(1)035A(2)E125	3.5	6.0	125	1095	986	438	125	1
35	10	D/7343-31	T495D106(1)035A(2)E130	3.5	6.0	130	1074	967	430	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
35	10	D/7343-31	T495D106(1)035A(2)E250	3.5	6.0	250	775	698	310	125	1
35	10	D/7343-31	T495D106(1)035A(2)E260	3.5	6.0	260	760	684	304	125	1
35	10	D/7343-31	T495D106(1)035A(2)E300	3.5	6.0	300	707	636	283	125	1
35	10	D/7343-31	T495D106(1)035A(2)E1K0	3.5	6.0	1,000	387	348	155	125	1
35	10	V/7343-20	T495V106(1)035A(2)E600	3.5	6.0	600	456	410	182	125	1
35	10	X/7343-43	T495X106(1)035A(2)E175	3.5	6.0	175	971	874	388	125	1
35	10	X/7343-43	T495X106(1)035A(2)E200	3.5	6.0	200	908	817	363	125	1
35	10	X/7343-43	T495X106(1)035A(2)E250	3.5	4.0	250	812	731	325	125	1
35	10	X/7343-43	T495X106(1)035A(2)E260	3.5	4.0	260	797	717	319	125	1
35	15	C/6032-28	T495C156(1)035A(2)E350	5.3	6.0	350	561	505	224	125	1
35	15	D/7343-31	T495D156(1)035A(2)E225	5.3	6.0	225	816	734	326	125	1
35	15	D/7343-31	T495D156(1)035A(2)E260	5.3	6.0	260	760	684	304	125	1
35	15	D/7343-31	T495D156(1)035A(2)E300	5.3	6.0	300	707	636	283	125	1
35	15	X/7343-43	T495X156(1)035A(2)E200	5.3	6.0	200	908	817	363	125	1
35	15	X/7343-43	T495X156(1)035A(2)E225	5.3	6.0	225	856	770	342	125	1
35	15	X/7343-43	T495X156(1)035A(2)E250	5.3	6.0	250	812	731	325	125	1
35	15	X/7343-43	T495X156(1)035A(2)E260	5.3	6.0	260	797	717	319	125	1
35	22	D/7343-31	T495D226(1)035A(2)E125	7.7	6.0	125	1095	986	438	125	1
35	22	D/7343-31	T495D226(1)035A(2)E200	7.7	6.0	200	866	779	346	125	1
35	22	D/7343-31	T495D226(1)035A(2)E250	7.7	6.0	250	775	698	310	125	1
35	22	D/7343-31	T495D226(1)035A(2)E260	7.7	6.0	260	760	684	304	125	1
35	22	D/7343-31	T495D226(1)035A(2)E300	7.7	6.0	300	707	636	283	125	1
35	22	X/7343-43	T495X226(1)035A(2)E125	7.7	6.0	125	1149	1034	460	125	1
35	22	X/7343-43	T495X226(1)035A(2)E130	7.7	6.0	130	1127	1014	451	125	1
35	22	X/7343-43	T495X226(1)035A(2)E180	7.7	6.0	180	957	861	383	125	1
35	22	X/7343-43	T495X226(1)035A(2)E200	7.7	6.0	200	908	817	363	125	1
35	22	X/7343-43	T495X226(1)035A(2)E260	7.7	6.0	260	797	717	319	125	1
35	22	X/7343-43	T495X226(1)035A(2)E275	7.7	6.0	275	775	698	310	125	1
35	22	X/7343-43	T495X226(1)035A(2)E300	7.7	6.0	300	742	668	297	125	1
35	33	D/7343-31	T495D336(1)035A(2)E200	11.6	6.0	200	866	779	346	125	1
35	33	D/7343-31	T495D336(1)035A(2)E300	11.6	6.0	300	707	636	283	125	1
35	33	X/7343-43	T495X336(1)035A(2)E100	11.6	6.0	100	1285	1157	514	125	1
35	33	X/7343-43	T495X336(1)035A(2)E175	11.6	6.0	175	971	874	388	125	1
35	33	X/7343-43	T495X336(1)035A(2)E250	11.6	6.0	250	812	731	325	125	1
35	33	X/7343-43	T495X336(1)035A(2)E260	11.6	6.0	260	797	717	319	125	1
35	33	E/7360-38	T495E336(1)035A(2)E200	11.6	6.0	200	1000	900	400	125	1
35	47	X/7343-43	T495X476(1)035A(2)E185	16.5	8.0	185	944	850	378	125	1
35	47	X/7343-43	T495X476(1)035A(2)E200	16.5	8.0	200	908	817	363	125	1
35	47	X/7343-43	T495X476(1)035A(2)E230	16.5	8.0	230	847	762	339	125	1
35	47	X/7343-43	T495X476(1)035A(2)E300	16.5	8.0	300	742	668	297	125	1
50	1.0	C/6032-28	T495C105(1)050A(2)E1K3	0.5	4.0	1,300	291	262	116	125	1
50	1.0	C/6032-28	T495C105(1)050A(2)E1K6	0.5	4.0	1,600	262	236	105	125	1
50	2.2	D/7343-31	T495D225(1)050A(2)E600	1.1	6.0	600	500	450	200	125	1
50	3.3	D/7343-31	T495D335(1)050A(2)E700	1.7	6.0	700	463	417	185	125	1
50	4.7	D/7343-31	T495D475(1)050A(2)E275	2.4	6.0	275	739	665	296	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

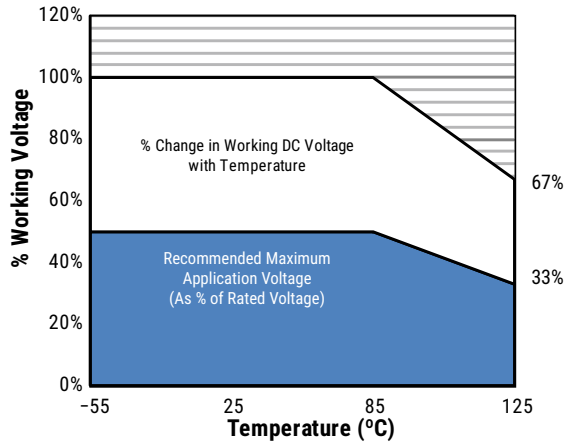
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
50	4.7	D/7343-31	T495D475(1)050A(2)E300	2.4	6.0	300	707	636	283	125	1
50	4.7	X/7343-43	T495X475(1)050A(2)E300	2.4	4.0	300	742	668	297	125	1
50	6.8	D/7343-31	T495D685(1)050A(2)E190	3.4	6.0	190	889	800	356	125	1
50	6.8	D/7343-31	T495D685(1)050A(2)E200	3.4	6.0	200	866	779	346	125	1
50	6.8	D/7343-31	T495D685(1)050A(2)E275	3.4	6.0	275	739	665	296	125	1
50	6.8	D/7343-31	T495D685(1)050A(2)E300	3.4	6.0	300	707	636	283	125	1
50	6.8	D/7343-31	T495D685(1)050A(2)E400	3.4	6.0	400	612	551	245	125	1
50	6.8	X/7343-43	T495X685(1)050A(2)E300	3.4	6.0	300	742	668	297	125	1
50	10	X/7343-43	T495X106(1)050A(2)E250	5.0	8.0	250	812	731	325	125	1
50	10	X/7343-43	T495X106(1)050A(2)E260	5.0	6.0	260	797	717	319	125	1
50	10	X/7343-43	T495X106(1)050A(2)E300	5.0	6.0	300	742	668	297	125	1
50	15	X/7343-43	T495X156(1)050A(2)E200	7.5	6.0	200	908	817	363	125	1
50	15	X/7343-43	T495X156(1)050A(2)E250	7.5	6.0	250	812	731	325	125	1
50	15	X/7343-43	T495X156(1)050A(2)E300	7.5	6.0	300	742	668	297	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	–55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	67% of V_R
Recommended maximum application voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C w/+20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

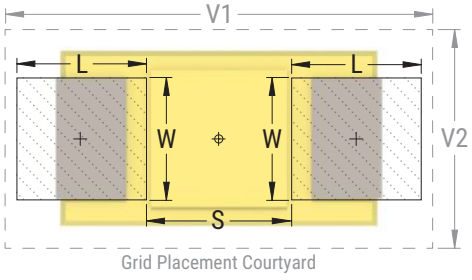
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
M	3528-15	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
U	6032–15	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
E[1]	7360–38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
T	3528–12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
V	7343–21	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] Height of these chips may create problems in wave soldering.
[2] Land pattern geometry is too small for silkscreen outline.



Grid Placement Courtyard

Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

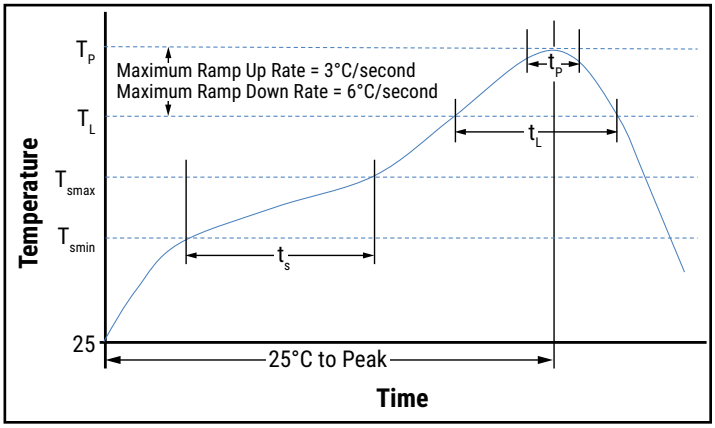
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

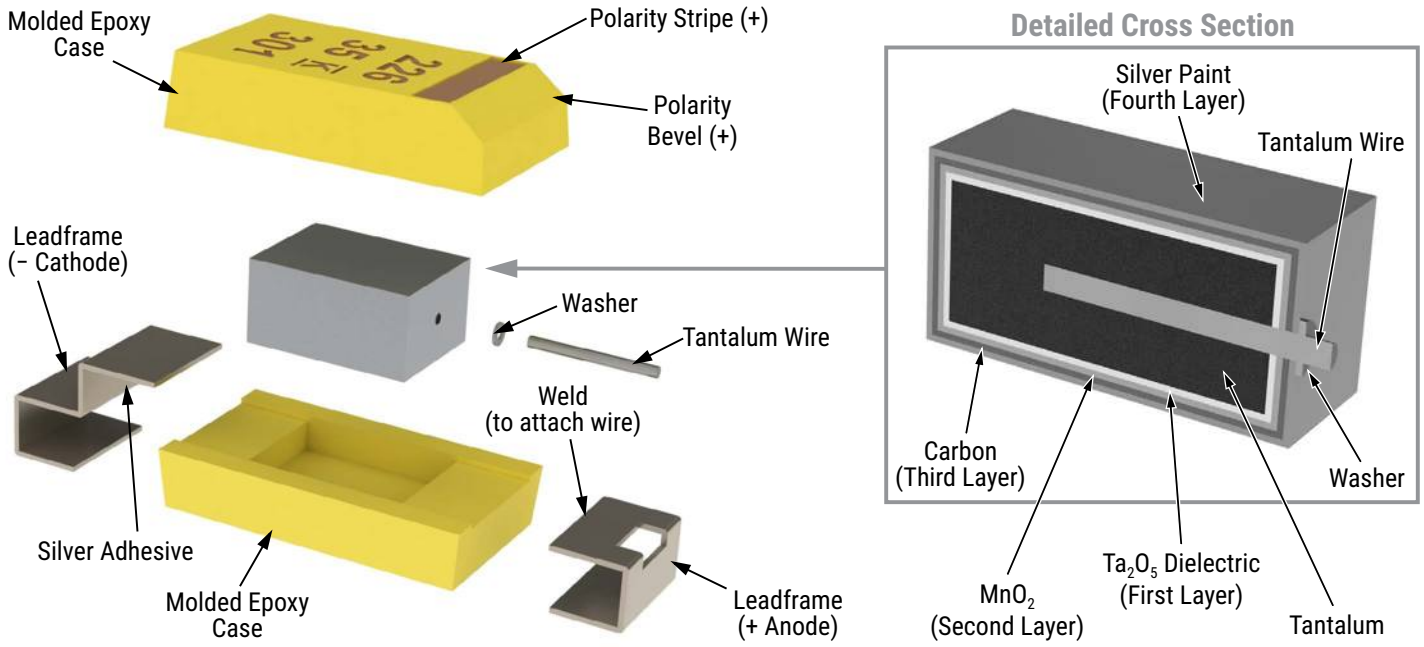
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



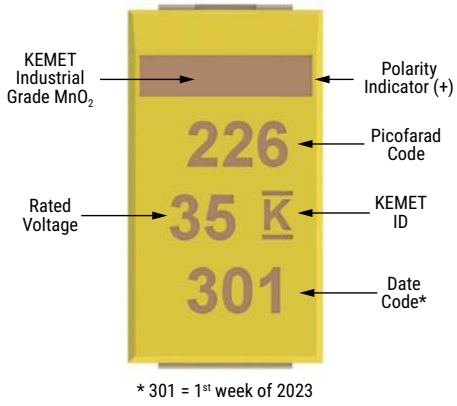
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = last number of year	8 = 2018 9 = 2019 0 = 2020 1 = 2021 2 = 2022
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

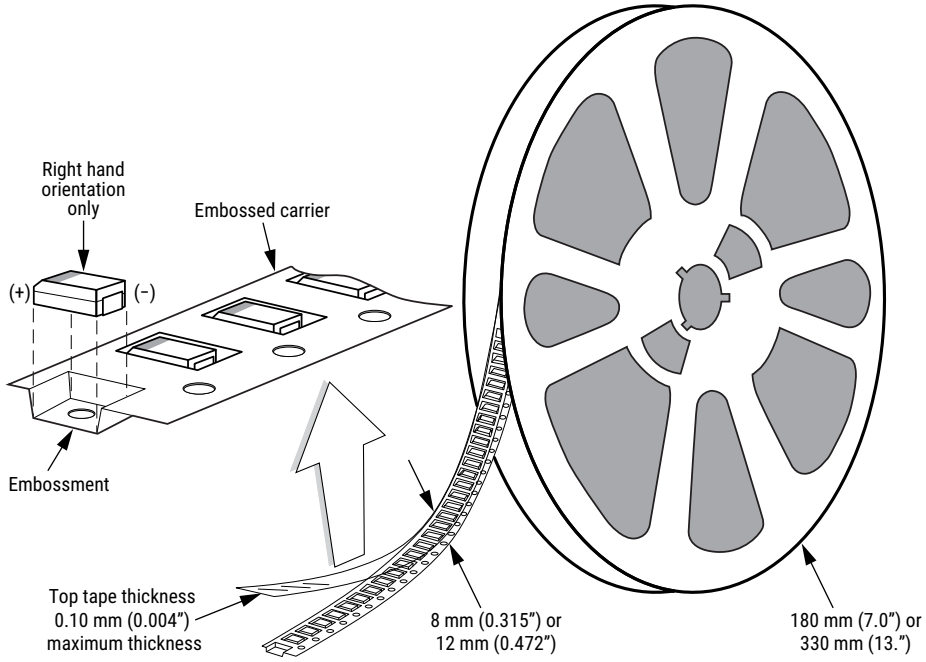


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

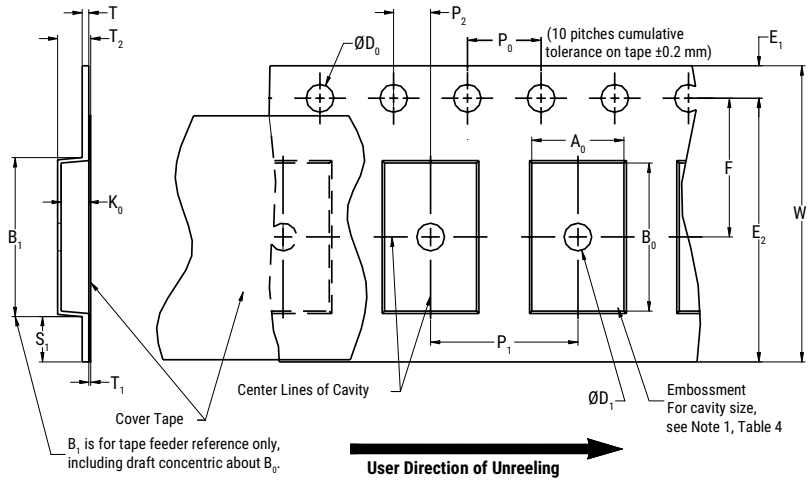


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

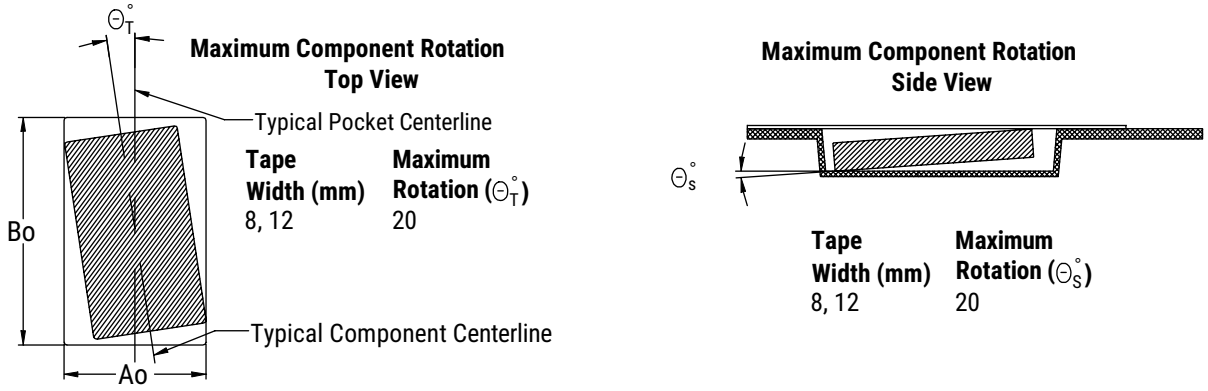


Figure 3 – Maximum Lateral Movement

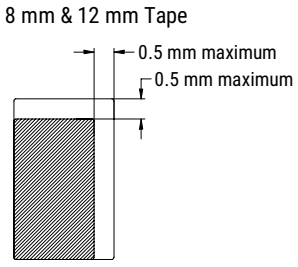


Figure 4 – Bending Radius

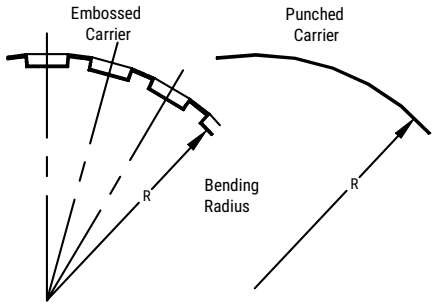
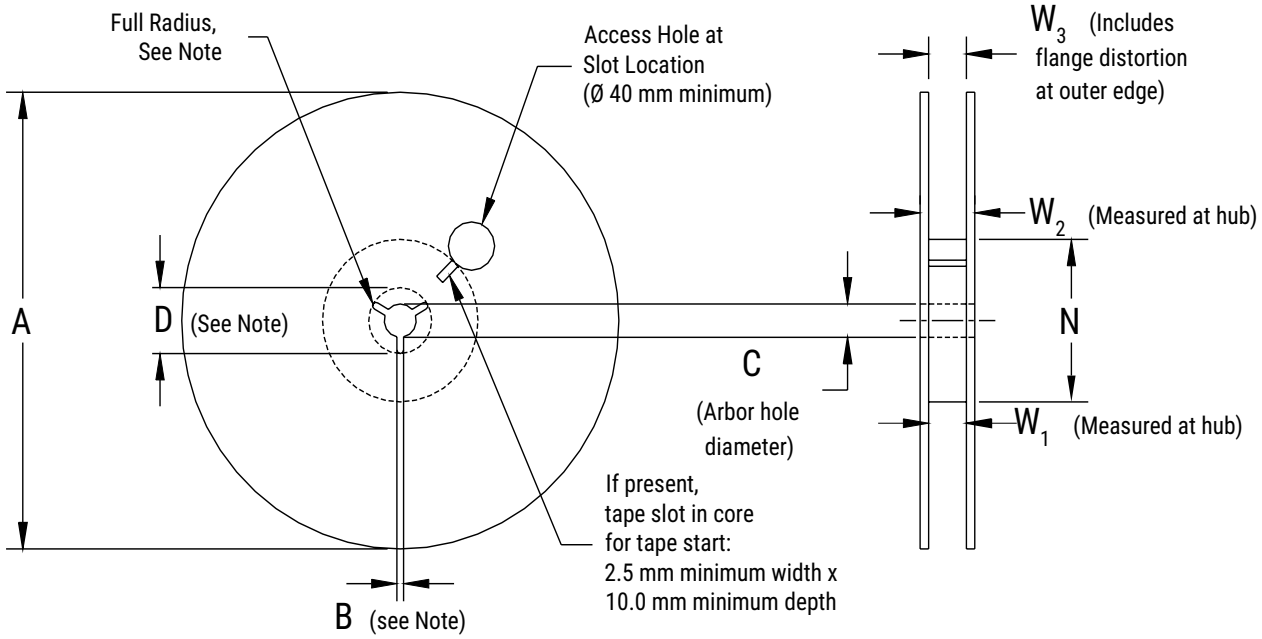


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

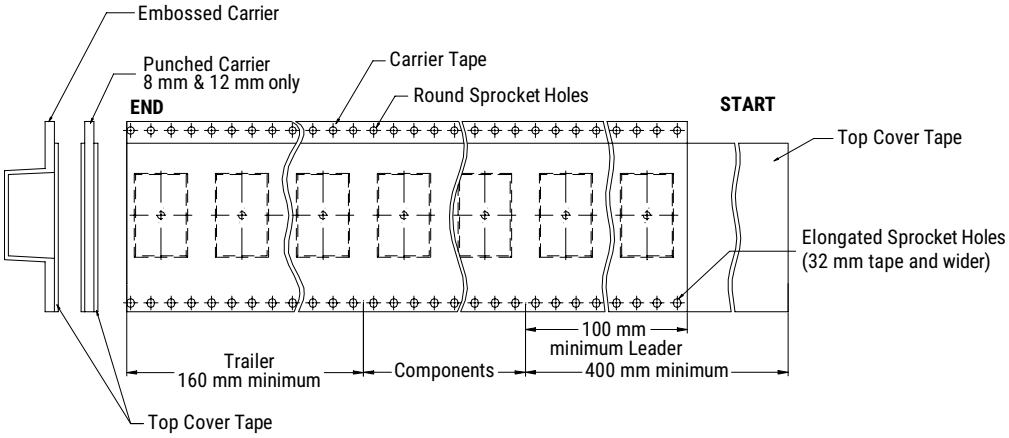
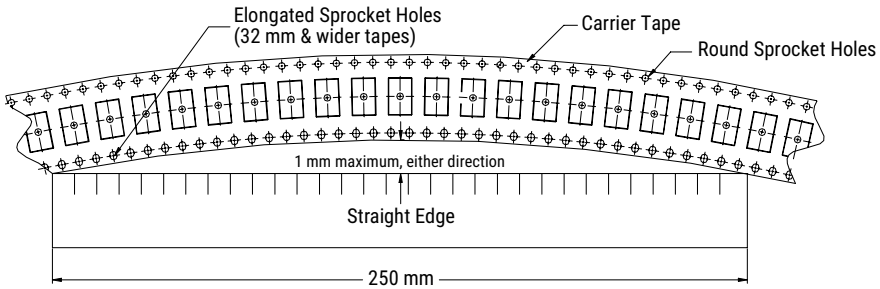


Figure 7 – Maximum Camber

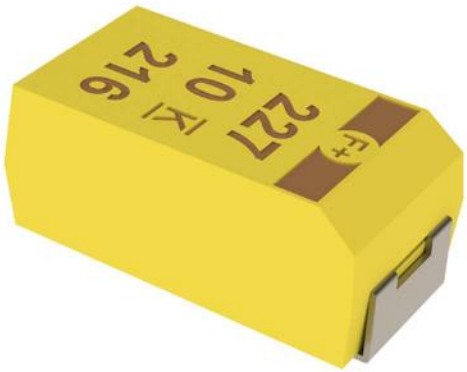


T496 Fused MnO_2

Overview

The T496 tantalum chip capacitors offer a "fail safe" design. The built-in fuse element offers excellent protection from damaging short circuit conditions in applications where damaging high fault currents exist. Protection from costly circuit damage due to reversed installation is offered with this device. This series is classified as MSL (Moisture Sensitivity Level) 1 under J STD 020: unlimited floor life time at ≤ 30°C/85% RH.

Benefits



- Meets or exceeds EIA Standard 535BAAC
- Patented fuse assembly
- Optional gold-plated terminations
- Built-in fuse protects against short circuit mode
- 100% surge current test on C, D, and X sizes
- Halogen-free epoxy
- Capacitance values of 0.15 to 330 µF
- Tolerances of ±10% and ±20%
- Voltage rating of 4 – 50 VDC
- Fuse activation, 25°C: within 1 second at fault currents of 4 amps and higher
- Continuous current capability: 0.75 amps
- Post actuation resistance, 25°C: 10 MΩ, minimum
- Test tabs on side of case bypass the capacitor element to allow direct testing of the fuse assembly
- RoHS compliant and lead-free terminations
- Operating temperature range of −55°C to +125°C

Applications

Typical applications include decoupling and filtering in computing and telecommunications end applications, such as high-end servers requiring built-in fuse capability.

Environmental Compliance

RoHS compliant when ordered with 100% Sn solder.

- Halogen-free
- Epoxy compliant with UL94 V–0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	496	X	227	M	010	A	T	E500	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	ESR	Packaging (C-Spec)
T = Tantalum	Fail Safe	B C D X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte tin (Sn)-plated H = Standard solder coated (SnPb 5% Pb minimum)	E = ESR Last three digits specify ESR in mΩ (500 = 500 mΩ)	Blank = 7" reel 7280 = 13" reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.15 – 477 µF at 120 Hz/25°C
Capacitance Tolerance	K tolerance (10%), M tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G Peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

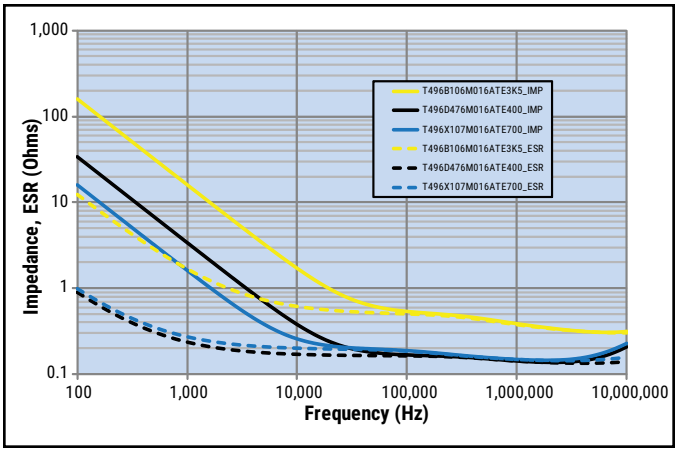
**IL = Initial limit*

Certification

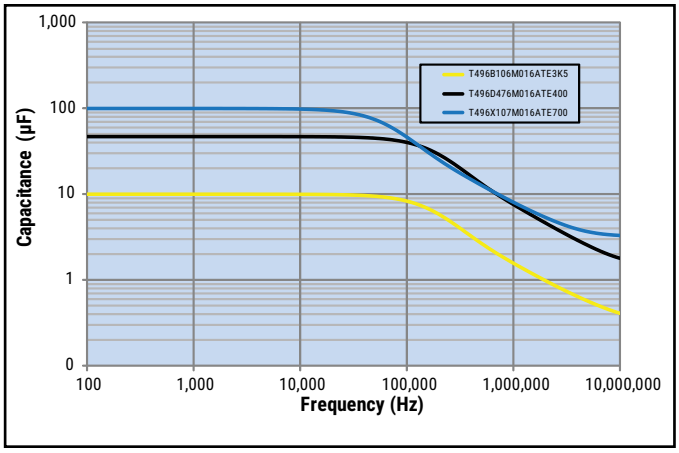
DLA Drawing 04053

Electrical Characteristics

ESR vs. Frequency

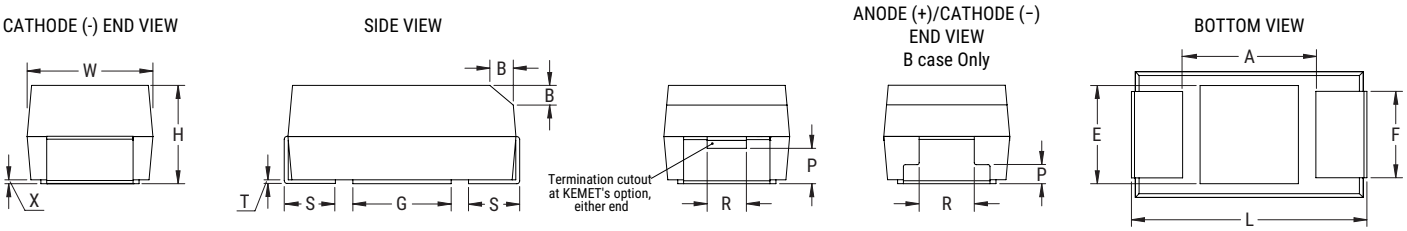


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component													Typical Weight
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S ±0.3 ±(0.012)	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)	(mg)
B	3528–21	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.9 ±0.2 (0.075 ±0.008)	2.2 (0.087)	0.8 (0.031)	0.4 (0.016)	0.10 ±0.10 (0.004 ±0.004)	0.4 (0.016)	1.5 (0.059)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)	107.45
C	6032–28	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.3 (0.126 ±0.012)	2.5 ±0.3 (0.098 ±0.012)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.1 (0.122)	2.8 (0.110)	2.4 (0.094)	224.48
D	7343–31	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	2.8 ±0.3 (0.110 ±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	446.84
X	7343–43	7.3±0.3 (0.287±0.012)	4.0±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	652.04

Notes: (Ref) – Dimensions provided for reference only.
These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz % Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	68	C/6032-28	T496C686(1)004A(2)E1K6	2.7	6.0	1600	262	236	105	125	1
4	68	C/6032-28	T496C686(1)004A(2)E400	2.7	6.0	400	524	472	210	125	1
4	100	C/6032-28	T496C107(1)004A(2)E1K2	4.0	8.0	1200	303	273	121	125	1
4	150	D/7343-31	T496D157(1)004A(2)E800	6.0	8.0	800	433	390	173	125	1
4	150	C/6032-28	T496C157(1)004A(2)E1K2	6.0	8.0	1200	303	273	121	125	1
4	220	D/7343-31	T496D227(1)004A(2)E700	8.8	8.0	700	463	417	185	125	1
4	220	D/7343-31	T496D227(1)004A(2)E400	8.8	8.0	400	612	551	245	125	1
4	330	D/7343-31	T496D337(1)004A(2)E700	13.2	8.0	700	463	417	185	125	1
4	330	D/7343-31	T496D337(1)004A(2)E400	13.2	8.0	400	612	551	245	125	1
4	330	X/7343-43	T496X337(1)004A(2)E700	13.2	8.0	700	486	437	194	125	1
4	470	X/7343-43	T496X477(1)004A(2)E500	18.8	8.0	500	574	517	230	125	1
6.3	4.7	B/3528-21	T496B475(1)006A(2)E3K5	0.3	6.0	3500	156	140	62	125	1
6.3	6.8	B/3528-21	T496B685(1)006A(2)E3K5	0.4	6.0	3500	156	140	62	125	1
6.3	10	B/3528-21	T496B106(1)006A(2)E3K5	0.6	6.0	3500	156	140	62	125	1
6.3	15	C/6032-28	T496C156(1)006A(2)E2K0	0.9	6.0	2000	235	212	94	125	1
6.3	22	B/3528-21	T496B226(1)006A(2)E3K5	1.4	6.0	3500	156	140	62	125	1
6.3	22	B/3528-21	T496B226(1)006A(2)E1K5	1.4	6.0	1500	238	214	95	125	1
6.3	22	C/6032-28	T496C226(1)006A(2)E2K0	1.4	6.0	2000	235	212	94	125	1
6.3	33	C/6032-28	T496C336(1)006A(2)E2K0	2.1	6.0	2000	235	212	94	125	1
6.3	33	C/6032-28	T496C336(1)006A(2)E600	2.1	6.0	600	428	385	171	125	1
6.3	47	C/6032-28	T496C476(1)006A(2)E1K6	3.0	6.0	1600	262	236	105	125	1
6.3	47	C/6032-28	T496C476(1)006A(2)E600	3.0	6.0	600	428	385	171	125	1
6.3	47	D/7343-31	T496D476(1)006A(2)E1K0	3.0	6.0	1000	387	348	155	125	1
6.3	68	C/6032-28	T496C686(1)006A(2)E1K2	4.3	6.0	1200	303	273	121	125	1
6.3	68	D/7343-31	T496D686(1)006A(2)E1K0	4.3	6.0	1000	387	348	155	125	1
6.3	100	X/7343-43	T496X107(1)006A(2)E900	6.3	8.0	900	428	385	171	125	1
6.3	100	X/7343-43	T496X107(1)006A(2)E300	6.3	8.0	300	742	668	297	125	1
6.3	100	D/7343-31	T496D107(1)006A(2)E800	6.3	8.0	800	433	390	173	125	1
6.3	100	D/7343-31	T496D107(1)006A(2)E400	6.3	8.0	400	612	551	245	125	1
6.3	100	C/6032-28	T496C107(1)006A(2)E400	6.3	8.0	400	524	472	210	125	1
6.3	150	X/7343-43	T496X157(1)006A(2)E300	9.5	8.0	300	742	668	297	125	1
6.3	150	D/7343-31	T496D157(1)006A(2)E700	9.5	8.0	700	463	417	185	125	1
6.3	150	D/7343-31	T496D157(1)006A(2)E300	9.5	8.0	300	707	636	283	125	1
6.3	220	X/7343-43	T496X227(1)006A(2)E700	13.9	8.0	700	486	437	194	125	1
6.3	220	X/7343-43	T496X227(1)006A(2)E300	13.9	8.0	300	742	668	297	125	1
6.3	220	D/7343-31	T496D227(1)006A(2)E700	13.9	8.0	700	463	417	185	125	1
6.3	220	D/7343-31	T496D227(1)006A(2)E300	13.9	8.0	300	707	636	283	125	1
6.3	330	X/7343-43	T496X337(1)006A(2)E500	20.8	8.0	500	574	517	230	125	1
6.3	330	X/7343-43	T496X337(1)006A(2)E300	20.8	8.0	300	742	668	297	125	1
10	3.3	B/3528-21	T496B335(1)010A(2)E3K5	0.3	6.0	3500	156	140	62	125	1
10	4.7	B/3528-21	T496B475(1)010A(2)E3K5	0.5	6.0	3500	156	140	62	125	1
10	6.8	B/3528-21	T496B685(1)010A(2)E3K5	0.7	6.0	3500	156	140	62	125	1
10	10	C/6032-28	T496C106(1)010A(2)E2K0	1.0	6.0	2000	235	212	94	125	1
10	15	B/3528-21	T496B156(1)010A(2)E3K5	1.5	6.0	3500	156	140	62	125	1
10	15	C/6032-28	T496C156(1)010A(2)E2K0	1.5	6.0	2000	235	212	94	125	1
10	15	C/6032-28	T496C156(1)010A(2)E600	1.5	6.0	600	428	385	171	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz % Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

1) To complete KEMET part number, insert M for ± 20% or K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz % Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	22	C/6032-28	T496C226(1)010A(2)E2K0	2.2	6.0	2000	235	212	94	125	1
10	22	C/6032-28	T496C226(1)010A(2)E500	2.2	6.0	500	469	422	188	125	1
10	33	D/7343-31	T496D336(1)010A(2)E1K0	3.3	6.0	1000	387	348	155	125	1
10	33	D/7343-31	T496D336(1)010A(2)E400	3.3	6.0	400	612	551	245	125	1
10	33	C/6032-28	T496C336(1)010A(2)E1K6	3.3	6.0	1600	262	236	105	125	1
10	33	C/6032-28	T496C336(1)010A(2)E400	3.3	6.0	400	524	472	210	125	1
10	47	D/7343-31	T496D476(1)010A(2)E1K0	4.7	6.0	1000	387	348	155	125	1
10	47	D/7343-31	T496D476(1)010A(2)E400	4.7	6.0	400	612	551	245	125	1
10	47	C/6032-28	T496C476(1)010A(2)E1K2	4.7	6.0	1200	303	273	121	125	1
10	47	C/6032-28	T496C476(1)010A(2)E400	4.7	6.0	400	524	472	210	125	1
10	68	X/7343-43	T496X686(1)010A(2)E900	6.8	6.0	900	428	385	171	125	1
10	68	D/7343-31	T496D686(1)010A(2)E800	6.8	6.0	800	433	390	173	125	1
10	68	D/7343-31	T496D686(1)010A(2)E400	6.8	6.0	400	612	551	245	125	1
10	100	X/7343-43	T496X107(1)010A(2)E400	10.0	8.0	400	642	578	257	125	1
10	100	D/7343-31	T496D107(1)010A(2)E700	10.0	8.0	700	463	417	185	125	1
10	100	D/7343-31	T496D107(1)010A(2)E400	10.0	8.0	400	612	551	245	125	1
10	150	X/7343-43	T496X157(1)010A(2)E700	15.0	8.0	700	486	437	194	125	1
10	150	X/7343-43	T496X157(1)010A(2)E400	15.0	8.0	400	642	578	257	125	1
10	150	D/7343-31	T496D157(1)010A(2)E700	15.0	8.0	700	463	417	185	125	1
10	150	D/7343-31	T496D157(1)010A(2)E400	15.0	8.0	400	612	551	245	125	1
10	220	X/7343-43	T496X227(1)010A(2)E500	22.0	8.0	500	574	517	230	125	1
10	220	X/7343-43	T496X227(1)010A(2)E300	22.0	8.0	300	742	668	297	125	1
10	220	D/7343-31	T496D227(1)010A(2)E300	22.0	8.0	300	707	636	283	125	1
16	2.2	B/3528-21	T496B225(1)016A(2)E3K5	0.4	6.0	3500	156	140	62	125	1
16	3.3	B/3528-21	T496B335(1)016A(2)E3K5	0.5	6.0	3500	156	140	62	125	1
16	3.3	B/3528-21	T496B335(1)016A(2)E2K1	0.5	6.0	2100	201	181	80	125	1
16	4.7	B/3528-21	T496B475(1)016A(2)E3K5	0.8	6.0	3500	156	140	62	125	1
16	4.7	B/3528-21	T496B475(1)016A(2)E1K6	0.8	6.0	1600	230	207	92	125	1
16	6.8	C/6032-28	T496C685(1)016A(2)E2K0	1.1	6.0	2000	235	212	94	125	1
16	6.8	C/6032-28	T496C685(1)016A(2)E600	1.1	6.0	600	428	385	171	125	1
16	10	B/3528-21	T496B106(1)016A(2)E3K5	1.6	6.0	3500	156	140	62	125	1
16	10	C/6032-28	T496C106(1)016A(2)E2K0	1.6	6.0	2000	235	212	94	125	1
16	10	C/6032-28	T496C106(1)016A(2)E700	1.6	6.0	700	396	356	158	125	1
16	15	C/6032-28	T496C156(1)016A(2)E2K0	2.4	6.0	2000	235	212	94	125	1
16	15	C/6032-28	T496C156(1)016A(2)E600	2.4	6.0	600	428	385	171	125	1
16	22	D/7343-31	T496D226(1)016A(2)E1K0	3.5	6.0	1000	387	348	155	125	1
16	22	D/7343-31	T496D226(1)016A(2 E500	3.5	6.0	500	548	493	219	125	1
16	22	C/6032-28	T496C226(1)016A(2)E1K6	3.5	6.0	1600	262	236	105	125	1
16	22	C/6032-28	T496C226(1)016A(2)E1K0	3.5	6.0	1000	332	299	133	125	1
16	33	D/7343-31	T496D336(1)016A(2)E1K0	5.3	6.0	1000	387	348	155	125	1
16	33	D/7343-31	T496D336(1)016A(2)E400	5.3	6.0	400	612	551	245	125	1
16	47	X/7343-43	T496X476(1)016A(2)E900	7.5	6.0	900	428	385	171	125	1
16	47	X/7343-43	T496X476(1)016A(2)E400	7.5	6.0	400	642	578	257	125	1
16	47	D/7343-31	T496D476(1)016A(2)E800	7.5	6.0	800	433	390	173	125	1
16	47	D/7343-31	T496D476(1)016A(2)E400	7.5	6.0	400	612	551	245	125	1
16	68	D/7343-31	T496D686(1)016A(2)E400	10.9	8.0	400	612	551	245	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz % Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

1) To complete KEMET part number, insert M for ± 20% or K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz % Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
16	100	X/7343-43	T496X107(1)016A(2)E700	16.0	8.0	700	486	437	194	125	1
20	1.5	B/3528-21	T496B155(1)020A(2)E5K0	0.3	6.0	5000	130	117	52	125	1
20	2.2	B/3528-21	T496B225(1)020A(2)E3K5	0.4	6.0	3500	156	140	62	125	1
20	2.2	B/3528-21	T496B225(1)020A(2)E1K6	0.4	6.0	1600	230	207	92	125	1
20	3.3	B/3528-21	T496B335(1)020A(2)E3K5	0.7	6.0	3500	156	140	62	125	1
20	4.7	C/6032-28	T496C475(1)020A(2)E2K0	0.9	6.0	2000	235	212	94	125	1
20	6.8	C/6032-28	T496C685(1)020A(2)E2K0	1.4	6.0	2000	235	212	94	125	1
20	6.8	C/6032-28	T496C685(1)020A(2)E600	1.4	6.0	600	428	385	171	125	1
20	10	C/6032-28	T496C106(1)020A(2)E2K0	2.0	6.0	2000	235	212	94	125	1
20	10	C/6032-28	T496C106(1)020A(2)E800	2.0	6.0	800	371	334	148	125	1
20	15	D/7343-31	T496D156(1)020A(2)E1K0	3.0	6.0	1000	387	348	155	125	1
20	15	D/7343-31	T496D156(1)020A(2)E500	3.0	6.0	500	548	493	219	125	1
20	15	C/6032-28	T496C156(1)020A(2)E500	3.0	6.0	500	469	422	188	125	1
20	22	D/7343-31	T496D226(1)020A(2)E1K0	4.4	6.0	1000	387	348	155	125	1
20	22	D/7343-31	T496D226(1)020A(2)E500	4.4	6.0	500	548	493	219	125	1
20	33	X/7343-43	T496X336(1)020A(2)E900	6.6	6.0	900	428	385	171	125	1
20	33	X/7343-43	T496X336(1)020A(2)E400	6.6	6.0	400	642	578	257	125	1
20	33	D/7343-31	T496D336(1)020A(2)E400	6.6	6.0	400	612	551	245	125	1
20	47	X/7343-43	T496X476(1)020A(2)E300	9.4	6.0	300	742	668	297	125	1
20	47	D/7343-31	T496D476(1)020A(2)E300	9.4	6.0	300	707	636	283	125	1
25	0.68	B/3528-21	T496B684(1)025A(2)E6K5	0.2	4.0	6500	114	103	46	125	1
25	1	B/3528-21	T496B105(1)025A(2)E5K0	0.3	4.0	5000	130	117	52	125	1
25	1	B/3528-21	T496B105(1)025A(2)E3K5	0.3	4.0	3500	156	140	62	125	1
25	1.5	B/3528-21	T496B155(1)025A(2)E5K0	0.4	6.0	5000	130	117	52	125	1
25	1.5	B/3528-21	T496B155(1)025A(2)E1K6	0.4	6.0	1600	230	207	92	125	1
25	2.2	C/6032-28	T496C225(1)025A(2)E3K5	0.6	6.0	3500	177	159	71	125	1
25	3.3	C/6032-28	T496C335(1)025A(2)E2K5	0.8	6.0	2500	210	189	84	125	1
25	3.3	C/6032-28	T496C335(1)025A(2)E2K1	0.8	6.0	2100	229	206	92	125	1
25	4.7	B/3528-21	T496B475(1)025A(2)E4K0	1.2	6.0	4000	146	131	58	125	1
25	4.7	C/6032-28	T496C475(1)025A(2)E2K5	1.2	6.0	2500	210	189	84	125	1
25	4.7	C/6032-28	T496C475(1)025A(2)E1K3	1.2	6.0	1300	291	262	116	125	1
25	6.8	C/6032-28	T496C685(1)025A(2)E2K0	1.7	6.0	2000	235	212	94	125	1
25	6.8	C/6032-28	T496C685(1)025A(2)E600	1.7	6.0	600	428	385	171	125	1
25	10	C/6032-28	T496C106(1)025A(2)E600	2.5	6.0	600	428	385	171	125	1
25	10	D/7343-31	T496D106(1)025A(2)E1K2	2.5	6.0	1200	354	319	142	125	1
25	10	D/7343-31	T496D106(1)025A(2)E600	2.5	6.0	600	500	450	200	125	1
25	15	C/6032-28	T496C156(1)025A(2)E750	3.8	6.0	750	383	345	153	125	1
25	15	D/7343-31	T496D156(1)025A(2)E1K0	3.8	6.0	1000	387	348	155	125	1
25	15	D/7343-31	T496D156(1)025A(2)E500	3.8	6.0	500	548	493	219	125	1
25	22	X/7343-43	T496X226(1)025A(2)E900	5.5	6.0	900	428	385	171	125	1
25	22	X/7343-43	T496X226(1)025A(2)E400	5.5	6.0	400	642	578	257	125	1
25	22	D/7343-31	T496D226(1)025A(2)E800	5.5	6.0	800	433	390	173	125	1
25	22	D/7343-31	T496D226(1)025A(2)E400	5.5	6.0	400	612	551	245	125	1
35	0.47	B/3528-21	T496B474(1)035A(2)E8K0	0.2	4.0	8000	103	93	41	125	1
35	0.47	B/3528-21	T496B474(1)035A(2)E2K6	0.2	4.0	2600	181	163	72	125	1
35	0.68	B/3528-21	T496B684(1)035A(2)E6K5	0.2	4.0	6500	114	103	46	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz % Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

1) To complete KEMET part number, insert M for ± 20% or K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz % Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
35	1	B/3528-21	T496B105(1)035A(2)E5K0	0.4	4.0	5000	130	117	52	125	1
35	1	B/3528-21	T496B105(1)035A(2)E3K1	0.4	4.0	3100	166	149	66	125	1
35	1.5	C/6032-28	T496C155(1)035A(2)E4K5	0.5	6.0	4500	156	140	62	125	1
35	1.5	C/6032-28	T496C155(1)035A(2)E2K6	0.5	6.0	2600	206	185	82	125	1
35	2.2	C/6032-28	T496C225(1)035A(2)E3K5	0.8	6.0	3500	177	159	71	125	1
35	2.2	C/6032-28	T496C225(1)035A(2)E1K6	0.8	6.0	1600	262	236	105	125	1
35	3.3	C/6032-28	T496C335(1)035A(2)E2K5	1.2	6.0	2500	210	189	84	125	1
35	3.3	C/6032-28	T496C335(1)035A(2)E900	1.2	6.0	900	350	315	140	125	1
35	4.7	D/7343-31	T496D475(1)035A(2)E1K5	1.6	6.0	1500	316	284	126	125	1
35	4.7	D/7343-31	T496D475(1)035A(2)E700	1.6	6.0	700	463	417	185	125	1
35	6.8	D/7343-31	T496D685(1)035A(2)E1K3	2.4	6.0	1300	340	306	136	125	1
35	6.8	D/7343-31	T496D685(1)035A(2)E750	2.4	6.0	750	447	402	179	125	1
35	10	X/7343-43	T496X106(1)035A(2)E1K0	3.5	6.0	1000	406	365	162	125	1
35	10	X/7343-43	T496X106(1)035A(2)E500	3.5	6.0	500	574	517	230	125	1
35	10	D/7343-31	T496D106(1)035A(2)E400	3.5	6.0	400	612	551	245	125	1
35	15	X/7343-43	T496X156(1)035A(2)E900	5.3	6.0	900	428	385	171	125	1
35	15	X/7343-43	T496X156(1)035A(2)E500	5.3	6.0	500	574	517	230	125	1
35	15	D/7343-31	T496D156(1)035A(2)E500	5.3	6.0	500	548	493	219	125	1
35	22	X/7343-43	T496X226(1)035A(2)E300	7.7	6.0	300	742	668	297	125	1
50	0.15	B/3528-21	T496B154(1)050A(2)E16K	0.1	4.0	16000	73	66	29	125	1
50	0.22	B/3528-21	T496B224(1)050A(2)E14K	0.1	4.0	14000	78	70	31	125	1
50	0.22	B/3528-21	T496B224(1)050A(2)E10K	0.1	4.0	10000	92	83	37	125	1
50	0.33	B/3528-21	T496B334(1)050A(2)E10K	0.2	4.0	10000	92	83	37	125	1
50	0.33	B/3528-21	T496B334(1)050A(2)E2K6	0.2	4.0	2600	181	163	72	125	1
50	0.47	C/6032-28	T496C474(1)050A(2)E8K0	0.2	4.0	8000	117	105	47	125	1
50	0.47	C/6032-28	T496C474(1)050A(2)E1K9	0.2	4.0	1900	241	217	96	125	1
50	0.68	C/6032-28	T496C684(1)050A(2)E7K0	0.3	4.0	7000	125	113	50	125	1
50	0.68	C/6032-28	T496C684(1)050A(2)E1K7	0.3	4.0	1700	254	229	102	125	1
50	1	C/6032-28	T496C105(1)050A(2)E5K5	0.5	4.0	5500	141	127	56	125	1
50	1	C/6032-28	T496C105(1)050A(2)E2K7	0.5	4.0	2700	202	182	81	125	1
50	1.5	C/6032-28	T496C155(1)050A(2)E5K0	0.8	6.0	5000	148	133	59	125	1
50	1.5	C/6032-28	T496C155(1)050A(2)E2K0	0.8	6.0	2000	235	212	94	125	1
50	2.2	D/7343-31	T496D225(1)050A(2)E2K5	1.1	6.0	2500	245	221	98	125	1
50	2.2	D/7343-31	T496D225(1)050A(2)E900	1.1	6.0	900	408	367	163	125	1
50	3.3	D/7343-31	T496D335(1)050A(2)E2K0	1.7	6.0	2000	274	247	110	125	1
50	3.3	D/7343-31	T496D335(1)050A(2)E1K0	1.7	6.0	1000	387	348	155	125	1
50	4.7	X/7343-43	T496X475(1)050A(2)E1K5	2.4	6.0	1500	332	299	133	125	1
50	4.7	X/7343-43	T496X475(1)050A(2)E400	2.4	6.0	400	642	578	257	125	1
50	4.7	D/7343-31	T496D475(1)050A(2)E400	2.4	6.0	400	612	551	245	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz % Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

1) To complete KEMET part number, insert M for ± 20% or K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
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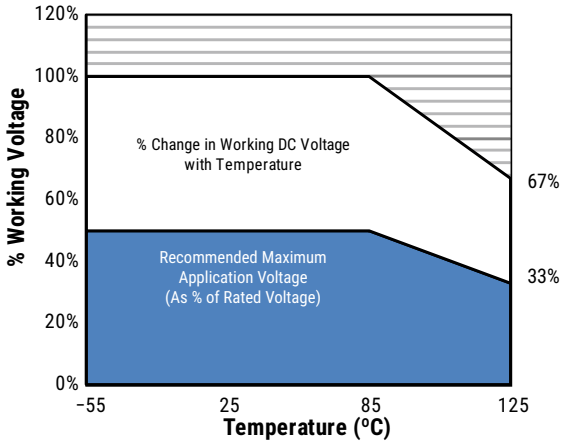
Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	67% of V_R
Recommended maximum application voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C w/+20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multip

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

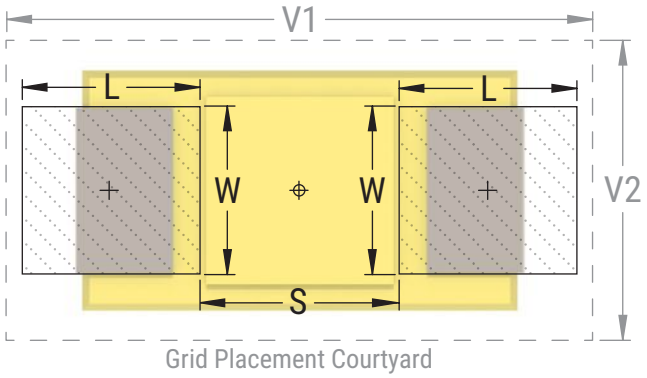
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*
[2] *Land pattern geometry is too small for silkscreen outline.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

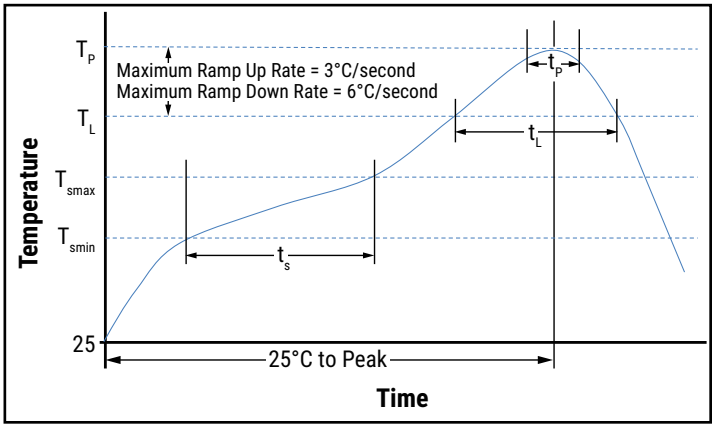
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

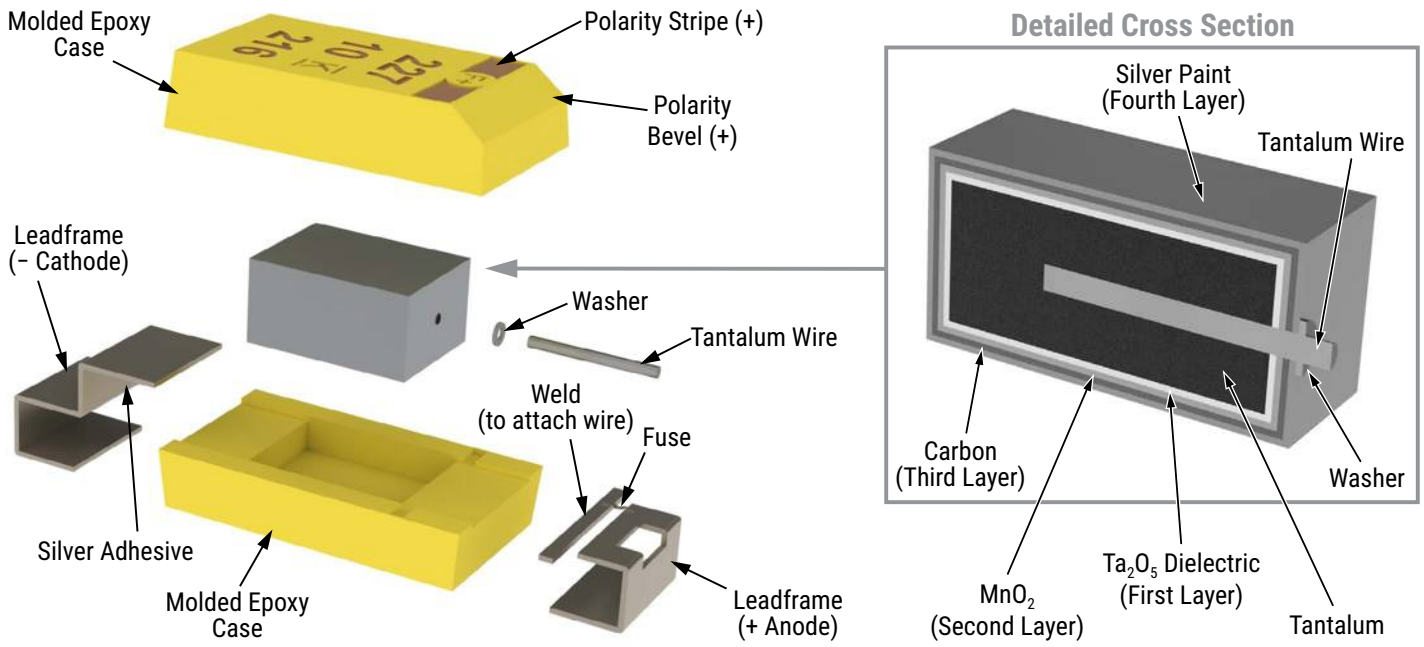
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



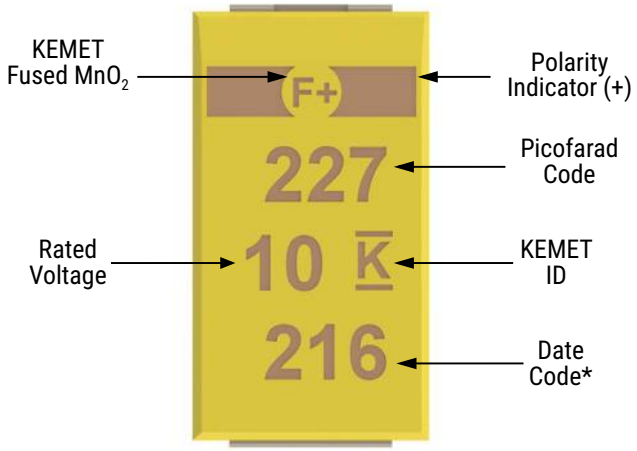
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 216 = 16th week of 2022

Date Code *	
1st digit = last number of year	0 = 2020 1 = 2021 2 = 2022 3 = 2023 4 = 2024
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

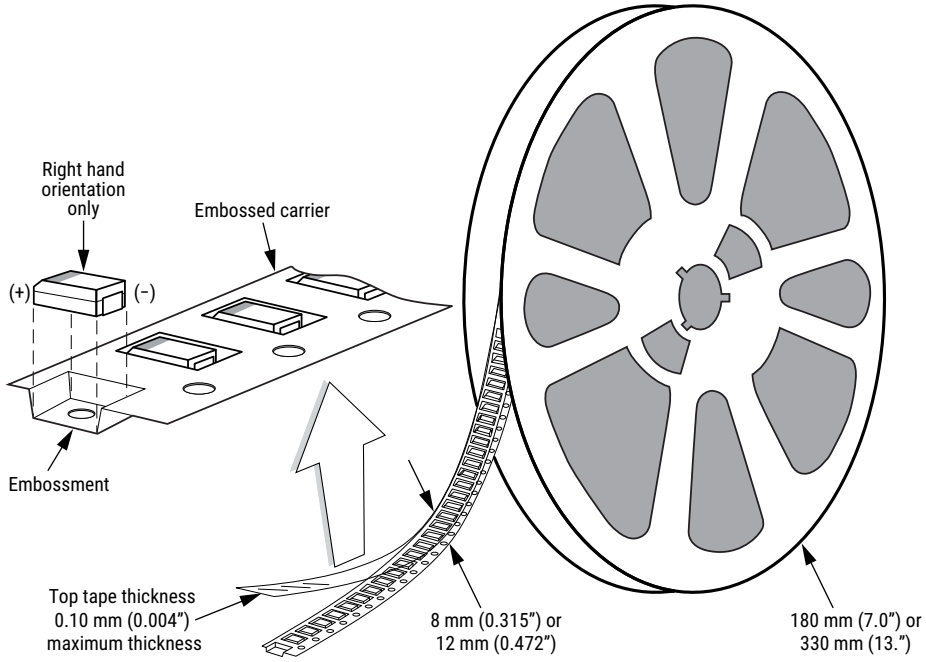


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

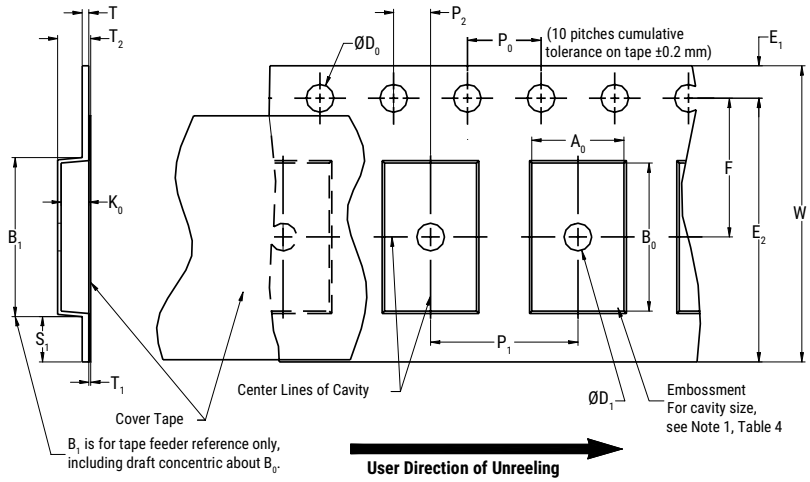


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

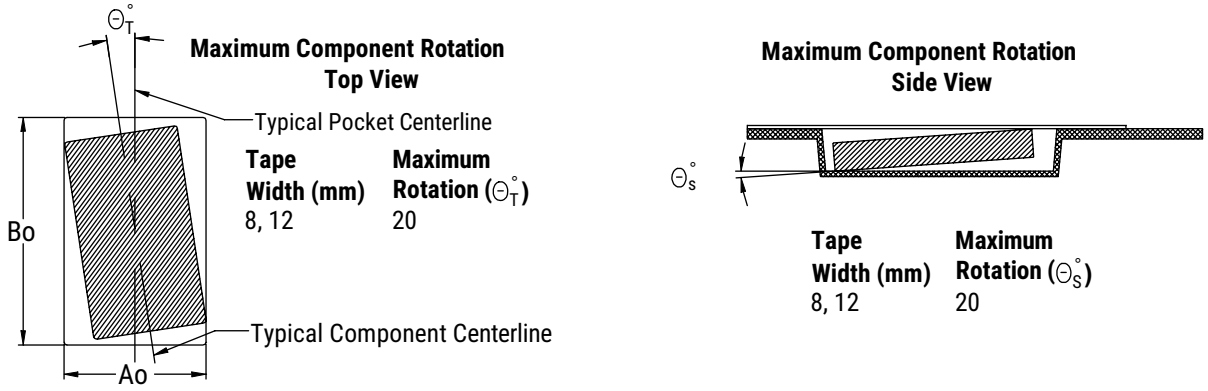


Figure 3 – Maximum Lateral Movement

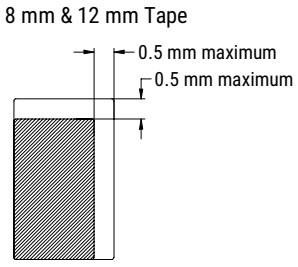


Figure 4 – Bending Radius

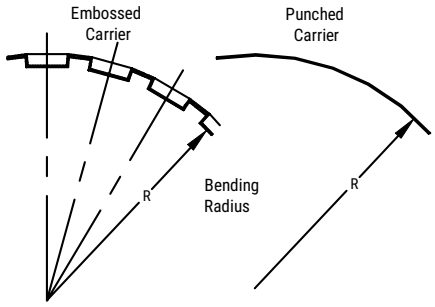
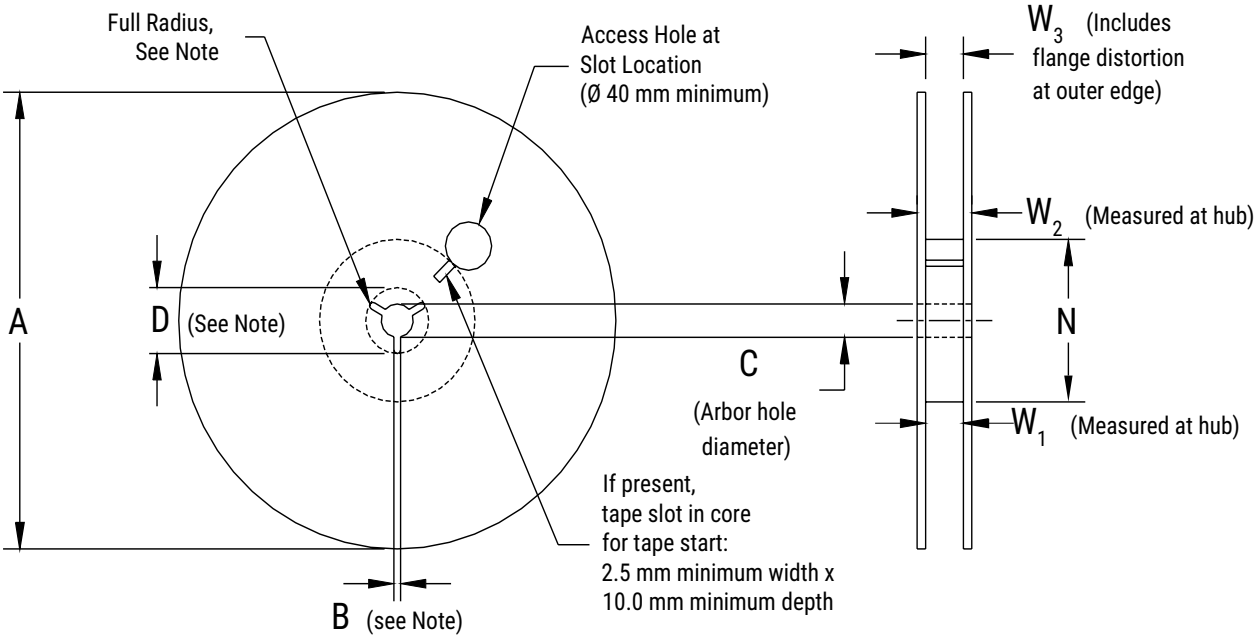


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

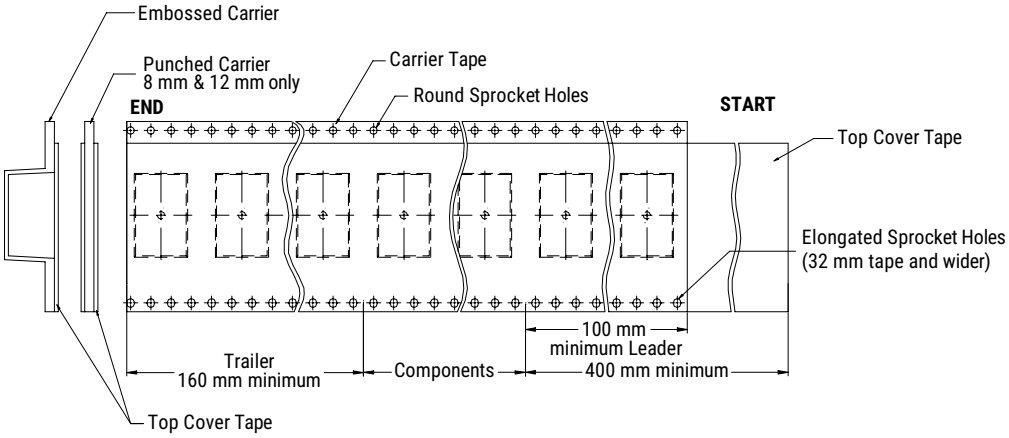
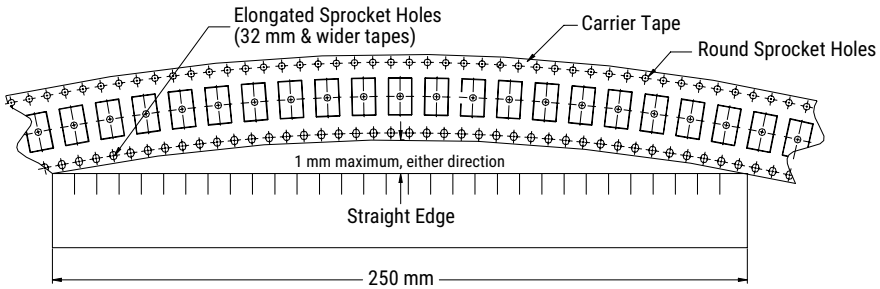


Figure 7 – Maximum Camber



T497 High Reliability Series (HRA) MnO_2 (CWR09/19/29 Style)

Overview

The KEMET T497 is designed for the High Reliability Series (HRA) requirements of military, medical, and aerospace applications. This product is a HRA version of CWR09,19, and 29 products. The T497 Series is a surface mount product offering various lead-frame plating options, Weibull grading options, X-ray inspection, surge current testing, F-Tech (an improved anode manufacturing process) and Simulated Breakdown Voltage (SBDV) screening options to improve long term reliability.

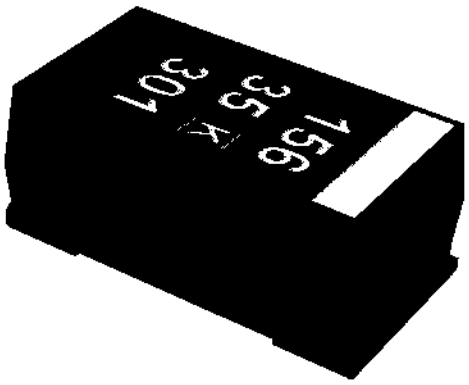
KEMET's F-Tech eliminates hidden defects in the dielectric, which continue to grow in the field, causing capacitor failures. Based on the fundamental understanding of degradation mechanisms in tantalum and niobium capacitors, F-Tech incorporates multiple process methodologies. Some minimize the oxygen and carbon content in the anodes, which become contaminants and can lead to the crystallization of the anodic oxide dielectric. This process methodology reduces the contaminants, improving quality of the dielectric. An additional technology provides a stronger mechanical connection point between the tantalum lead wire and tantalum anode, enhancing robustness and product reliability. The benefit of F-Tech is illustrated by a 2,000 hour, 85°C, 1.32 X rated voltage accelerated life test. The F-Tech parts see no degradation while standard tantalums have 1.5 orders of magnitude degradation in leakage current. F-Tech is currently available for T493 (select D and X case capacitance values in 25 V and higher rated voltage), and T497 (select H case capacitance values in 25 V and higher rated voltage). Please contact KEMET for details on ordering other part types with these capabilities.

KEMET's patented Simulated Breakdown Screening (SBDS) is a nondestructive testing technique that simulates the breakdown voltage (BDV) of a capacitor without damage to its dielectric or to the general population of capacitors. This screening identifies hidden defects in the dielectric, providing the highest level of dielectric testing. SBDS is based on the simulation of breakdown voltage (BDV), the ultimate test of the dielectric in a capacitor.

Low BDV indicates defects in the dielectric, and therefore, a higher probability of failure in the field. High BDV indicates a stronger dielectric and high-reliability performance in the field. This new screening method allows KEMET to identify the breakdown voltage of each individual capacitor and provides only the strongest capacitors from each lot.

SBDS is currently available on select part types in the T493 and T497 series. Please contact KEMET for details on ordering other part types with these capabilities.

KEMET offers these technologies per the following options:
- F-Tech only
- SBDS only
- Combination of both F-Tech and SBDS for the ultimate protection



Benefits

- F-Tech and Simulated Breakdown Voltage (SBDS) screening options available
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Termination options B, H, and T
- Weibull failure options B and C
- 100% thermal shock

Applications

Typical applications include decoupling and filtering in military, medical, and aerospace applications.

Environmental Compliance

RoHS compliant when ordered with 100% Sn solder.
- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	497	G	226	K	020	A	H	61	10	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Surge	X-ray	Packaging (C-Spec)
T = Tantalum	High Grade	A B C D E F G H X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A B = 0.1%/ 1,000 hours C = 0.01%/ 1,000 hours	T = 100% Matte Tin (Sn)-plated H = Standard solder-coated (SnPb 5% Pb minimum) B = Gold-plated C = Hot solder dipped K = Solder fused	61 = Standard (in-process) 62 = 10 Cycles after Weibull, 25°C 63 = 10 Cycles after Weibull, −55° and 85°C 64 = 10 Cycles before Weibull, −55° and 85°C	10 = None 15 = 100%	Blank = 7" Reel 7280 = 13" Reel 7610 = Bulk bag 7640 = Bulk plastic box WAFL = Waffle pack

Ordering Information – F-Tech & Simulated Breakdown Screening (SBDS)

T	497	H	226	K	020	A	H	61	10
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Surge	Design/Screening
T = Tantalum	High Grade	H	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	025 = 25 035 = 35 050 = 50	A = N/A B= 0.1%/ 1,000 hours C= 0.01%/ 1,000 hours	T = 100% Matte Tin (Sn)-plated H = Standard solder-coated (SnPb 5% Pb minimum) B = Gold-plated C = Hot solder dipped K = Solder fused	61 = Standard (in-process) 62 = 10 Cycles after Weibull, 25°C 63 = 10 Cycles after Weibull, −55° and 85°C 64 = 10 Cycles before Weibull, −55° and 85°C	10 = Standard 11 = F-Tech & SBDS 12 = SBDS 13 = F-Tech 15 = 100% X-ray 16 = F-Tech & SBDS & 100% X-ray 17 = SBDS & 100% X-ray 18 = F-Tech & 100% X-ray

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 150 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

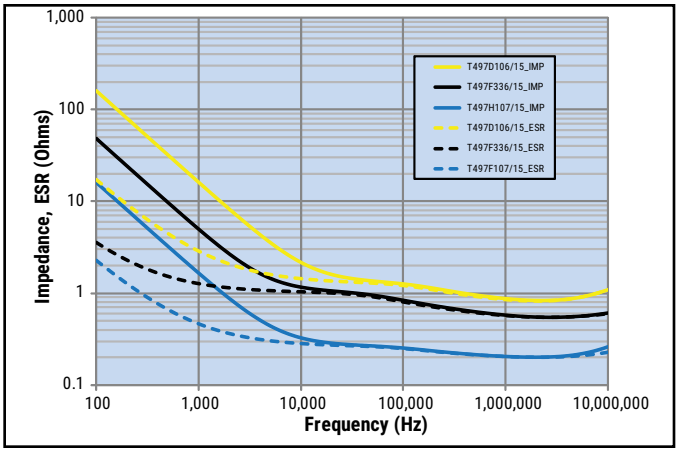
Qualification

Test	Condition		Characteristics			
Endurance	105°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within −20%/+10% of initial value		
			DF	≤ Initial Limit		
			DCL	2 x IL at 125°C		
			ESR	2 x Initial Limit		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within −20%/+10% of initial value		
			DF	Within initial limits		
			DCL	Within 2.0 x initial limit		
			ESR	Within 2.0 x initial limit		
Humidity	85°C, 85% RH, 1,000 hours No Load		Δ C/C	Within −5%/+35% of initial value		
			DF	≤ Initial Limit		
			DCL	Within 3.0 x initial limit		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +125°C, +25°C		+25°C	−55°C	+85°C	+125°C
		Δ C/C	IL*	±20%	±20%	±30%
		DF	IL	IL	1.2 x IL	1.5 x IL
		DCL	IL	n/a	10 x IL	10 x IL
Surge Voltage	105°C, 1.32 x rated voltage 1,000 cycles		Δ C/C	Within −20%/+10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

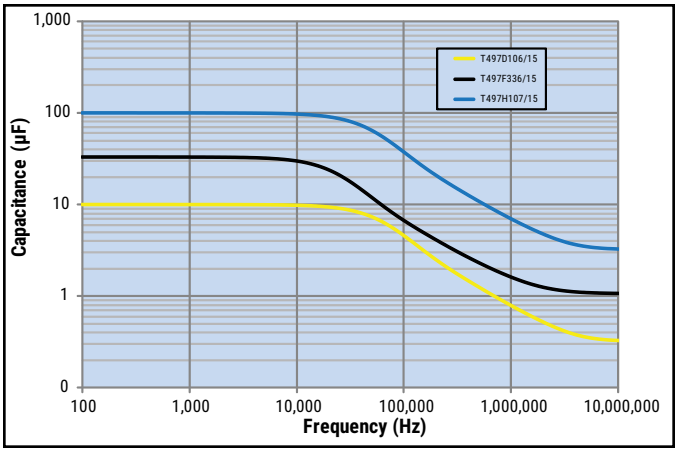
**IL = Initial limit*

Electrical Characteristics

ESR vs. Frequency



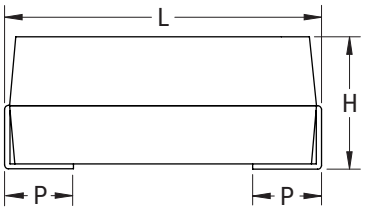
Capacitance vs. Frequency



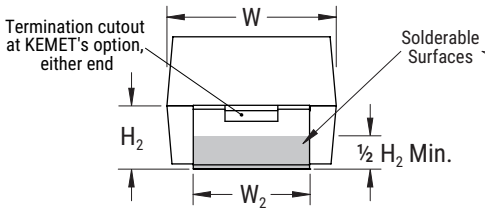
Dimensions – Millimeters (Inches)

Metric will govern

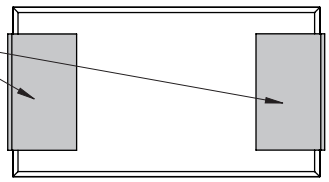
SIDE VIEW



END VIEW



BOTTOM VIEW



Case Size	Component						Typical Weight
KEMET	L ±0.38 (0.015)	W ±0.38 (0.015)	H ±0.38 (0.015)	P +0.25 (0.010), −0.13 (0.005)	W_2	H_2 Minimum	(mg)
A	2.54 (0.100)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	39.91
B	3.81 (0.150)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	68.73
C	5.08 (0.200)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	146.5
D	3.81 (0.150)	2.54 (0.100)	1.27 (0.050)	0.76 (0.030)	2.41+0.13,−0.25 (0.095+0.005,−0.010)	0.76 (0.030)	264.12
E	5.08 (0.200)	2.54 (0.100)	1.27 (0.050)	0.76 (0.030)	2.41+0.13,−0.25 (0.095+0.005,−0.010)	0.76 (0.030)	421.63
F	5.59 (0.220)	3.43 (0.135)	1.78 (0.070)	0.76 (0.030)	3.30±0.13 (0.130±0.005)	1.02 (0.040)	173.63
G	6.73 (0.265)	2.79 (0.110)	2.79 (0.110)	1.27 (0.050)	2.67±0.13 (0.105±0.005)	1.52 (0.060)	266.42
H	7.24 (0.285)	3.81 (0.150)	2.79 (0.110)	1.27 (0.050)	3.68+0.013,−0.51 (0.145+0.005,−0.020)	1.52 (0.060)	349.01
X	6.93 (0.273)	5.41 (0.213)	2.74 (0.108)	1.19 (0.047)	3.05±0.13 (0.120±0.005)	1.22 (0.048)	590.44

Note: When solder coated terminations are required, add an additional 0.38 mm (0.015 inch) to the above tolerances for "L", "W", "H", "P" ,"W_2" and "H_2"
These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/5 Min.	% at 25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	100kHz, 25 °C	°C	Reflow Temp. ≤ 260°C
4	4.7	A/1005	T497A475(1)004(2)(3)(4)(5)	0.2	6.0	12.0	65	125	1.0
4	4.7	B/1505	T497B475(1)004(2)(3)(4)(5)	0.2	6.0	8.0	94	125	1.0
4	15	B/1505	T497B156(1)004(2)(3)(4)(5)	0.6	8.0	8.0	94	125	1.0
4	33	D/1510	T497D336(1)004(2)(3)(4)(5)	1.3	8.0	4.0	141	125	1.0
4	33	F/2214	T497F336(1)004(2)(3)(4)(5)	1.3	8.0	2.2	213	125	1.0
4	68	E/2010	T497E686(1)004(2)(3)(4)(5)	2.7	8.0	3.0	173	125	1.0
4	68	F/2214	T497F686(1)004(2)(3)(4)(5)	2.7	6.0	2.0	224	125	1.0
4	68	G/2711	T497G686(1)004(2)(3)(4)(5)	2.7	10.0	1.1	337	125	1.0
4	100	H/2915	T497H107(1)004(2)(3)(4)(5)	4.0	10.0	0.9	408	125	1.0
6.3	1.5	A/1005	T497A155(1)006(2)(3)(4)(5)	0.1	6.0	8.0	79	125	1.0
6.3	2.2	A/1005	T497A225(1)006(2)(3)(4)(5)	0.1	6.0	10.0	71	125	1.0
6.3	3.3	A/1005	T497A335(1)006(2)(3)(4)(5)	0.2	6.0	12.0	65	125	1.0
6.3	3.3	B/1505	T497B335(1)006(2)(3)(4)(5)	0.2	6.0	8.0	94	125	1.0
6.3	4.7	A/1005	T497A475(1)006(2)(3)(4)(5)	0.3	6.0	12.0	65	125	1.0
6.3	4.7	D/1510	T497D475(1)006(2)(3)(4)(5)	0.3	6.0	5.5	121	125	1.0
6.3	6.8	B/1505	T497B685(1)006(2)(3)(4)(5)	0.4	6.0	8.0	94	125	1.0
6.3	6.8	D/1510	T497D685(1)006(2)(3)(4)(5)	0.4	6.0	4.5	133	125	1.0
6.3	10	B/1505	T497B106(1)006(2)(3)(4)(5)	0.6	6.0	8.0	94	125	1.0
6.3	10	E/2010	T497E106(1)006(2)(3)(4)(5)	0.6	8.0	3.5	160	125	1.0
6.3	15	B/1505	T497B156(1)006(2)(3)(4)(5)	0.9	8.0	8.0	94	125	1.0
6.3	15	D/1510	T497D156(1)006(2)(3)(4)(5)	0.9	8.0	5.0	126	125	1.0
6.3	22	D/1510	T497D226(1)006(2)(3)(4)(5)	1.4	6.0	5.0	126	125	1.0
6.3	22	E/2010	T497E226(1)006(2)(3)(4)(5)	1.4	8.0	3.5	160	125	1.0
6.3	22	F/2214	T497F226(1)006(2)(3)(4)(5)	1.4	8.0	2.2	213	125	1.0
6.3	33	E/2010	T497E336(1)006(2)(3)(4)(5)	2.1	6.0	3.5	160	125	1.0
6.3	47	F/2214	T497F476(1)006(2)(3)(4)(5)	3.0	8.0	3.5	169	125	1.0
6.3	47	G/2711	T497G476(1)006(2)(3)(4)(5)	3.0	10.0	1.1	337	125	1.0
6.3	68	F/2214	T497F686(1)006(2)(3)(4)(5)	4.3	10.0	1.5	258	125	1.0
6.3	68	H/2915	T497H686(1)006(2)(3)(4)(5)	4.3	10.0	0.9	408	125	1.0
6.3	100	G/2711	T497G107(1)006(2)(3)(4)(5)	6.3	10.0	1.1	337	125	1.0
6.3	150	G/2711	T497G157(1)006(2)(3)(4)(5)	9.5	10.0	1.1	337	125	1.0
6.3	150	H/2915	T497H157(1)006(2)(3)(4)(5)	9.5	10.0	0.9	408	125	1.0
10	0.47	A/1005	T497A474(1)010(2)(3)(4)(5)	0.0	6.0	10.0	71	125	1.0
10	1	A/1005	T497A105(1)010(2)(3)(4)(5)	0.1	6.0	10.0	71	125	1.0
10	1.5	A/1005	T497A155(1)010(2)(3)(4)(5)	0.2	6.0	10.0	71	125	1.0
10	2.2	A/1005	T497A225(1)010(2)(3)(4)(5)	0.2	6.0	12.0	65	125	1.0
10	2.2	B/1505	T497B225(1)010(2)(3)(4)(5)	0.2	6.0	8.0	94	125	1.0
10	3.3	A/1005	T497A335(1)010(2)(3)(4)(5)	0.3	6.0	12.0	65	125	1.0
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/5 Min.	% at 25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	100kHz, 25 °C	°C	Reflow Temp. ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, B = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), C = Hot Solder Dipped, K = Solder Fused. Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = Standard (in-process), 62 = 10 Cycles after Weibull, +25°C, 63 = 10 Cycles after Weibull, −55° and +85°C or 64 = 10 cycles before Weibull, −55°C and +85°C.
(5) To complete KEMET part number, insert 10 = None or 15 = 100%. Designates X-ray inspection.
(6) To complete KEMET part number, insert 10 = Standard, 11 = F-Tech & SBDS, 12 = SBDS, 13 = F-Tech, 15 = 100% X-ray, 16 = F-Tech & SBDS, & 100% X-ray, 17 = SBDS & 100%, X-ray, 18 = F-Tech & 100%X-ray. Designates screening.
Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/5 Min.	% at 25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	100kHz, 25 °C	°C	Reflow Temp. ≤ 260°C
10	3.3	B/1505	T497B335(1)010(2)(3)(4)(5)	0.3	6.0	10.0	71	125	1.0
10	4.7	B/1505	T497B475(1)010(2)(3)(4)(5)	0.5	6.0	8.0	94	125	1.0
10	4.7	D/1510	T497D475(1)010(2)(3)(4)(5)	0.5	6.0	4.5	133	125	1.0
10	6.8	B/1505	T497B685(1)010(2)(3)(4)(5)	0.7	6.0	8.0	94	125	1.0
10	6.8	F/2214	T497F685(1)010(2)(3)(4)(5)	0.7	6.0	5.0	141	125	1.0
10	6.8	E/2010	T497E685(1)010(2)(3)(4)(5)	0.7	6.0	3.5	160	125	1.0
10	10	B/1505	T497B106(1)010(2)(3)(4)(5)	1.0	8.0	8.0	94	125	1.0
10	10	D/1510	T497D106(1)010(2)(3)(4)(5)	1.0	6.0	4.0	141	125	1.0
10	10	E/2010	T497E106(1)010(2)(3)(4)(5)	1.0	6.0	3.5	160	125	1.0
10	15	D/1510	T497D156(1)010(2)(3)(4)(5)	1.5	6.0	5.0	126	125	1.0
10	15	E/2010	T497E156(1)010(2)(3)(4)(5)	1.5	8.0	3.0	173	125	1.0
10	15	F/2214	T497F156(1)010(2)(3)(4)(5)	1.5	8.0	2.5	200	125	1.0
10	22	D/1510	T497D226(1)010(2)(3)(4)(5)	2.2	6.0	4.0	141	125	1.0
10	22	E/2010	T497E226(1)010(2)(3)(4)(5)	2.2	8.0	2.0	212	125	1.0
10	22	F/2214	T497F226(1)010(2)(3)(4)(5)	2.2	8.0	1.5	258	125	1.0
10	22	G/2711	T497G226(1)010(2)(3)(4)(5)	2.2	8.0	1.5	289	125	1.0
10	33	F/2214	T497F336(1)010(2)(3)(4)(5)	3.3	8.0	1.5	258	125	1.0
10	33	G/2711	T497G336(1)010(2)(3)(4)(5)	3.3	10.0	1.5	289	125	1.0
10	47	F/2214	T497F476(1)010(2)(3)(4)(5)	4.7	10.0	1.5	258	125	1.0
10	47	G/2711	T497G476(1)010(2)(3)(4)(5)	4.7	10.0	1.0	354	125	1.0
10	47	H/2915	T497H476(1)010(2)(3)(4)(5)	4.7	10.0	0.9	408	125	1.0
10	68	G/2711	T497G686(1)010(2)(3)(4)(5)	6.8	10.0	1.1	337	125	1.0
10	100	G/2711	T497G107(1)010(2)(3)(4)(5)	10.0	10.0	1.1	337	125	1.0
10	100	H/2915	T497H107(1)010(2)(3)(4)(5)	10.0	10.0	0.9	408	125	1.0
10	150	H/2915	T497H157(1)010(2)(3)(4)(5)	15.0	10.0	0.9	408	125	1.0
15	0.1	A/1005	T497A104(1)015(2)(3)(4)(5)	0.0	6.0	15.0	58	125	1.0
15	0.22	A/1005	T497A224(1)015(2)(3)(4)(5)	0.0	6.0	15.0	58	125	1.0
15	0.33	A/1005	T497A334(1)015(2)(3)(4)(5)	0.0	6.0	15.0	58	125	1.0
15	0.68	A/1005	T497A684(1)015(2)(3)(4)(5)	0.1	6.0	20.0	50	125	1.0
15	1	A/1005	T497A105(1)015(2)(3)(4)(5)	0.2	6.0	15.0	58	125	1.0
15	1.5	A/1005	T497A155(1)015(2)(3)(4)(5)	0.2	6.0	15.0	58	125	1.0
15	1.5	B/1505	T497B155(1)015(2)(3)(4)(5)	0.2	6.0	8.0	94	125	1.0
15	2.2	A/1005	T497A225(1)015(2)(3)(4)(5)	0.3	6.0	15.0	58	125	1.0
15	3.3	B/1505	T497B335(1)015(2)(3)(4)(5)	0.5	6.0	9.0	75	125	1.0
15	3.3	D/1510	T497D335(1)015(2)(3)(4)(5)	0.5	6.0	5.0	126	125	1.0
15	4.7	B/1505	T497B475(1)015(2)(3)(4)(5)	0.7	6.0	5.0	100	125	1.0
15	4.7	D/1510	T497D475(1)015(2)(3)(4)(5)	0.7	6.0	6.0	115	125	1.0
15	4.7	E/2010	T497E475(1)015(2)(3)(4)(5)	0.7	6.0	4.0	150	125	1.0
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/5 Min.	% at 25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	100kHz, 25 °C	°C	Reflow Temp. ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, B = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), C = Hot Solder Dipped, K = Solder Fused. Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = Standard (in-process), 62 = 10 Cycles after Weibull, +25°C, 63 = 10 Cycles after Weibull, −55° and +85°C or 64 = 10 cycles before Weibull, −55°C and +85°C.
(5) To complete KEMET part number, insert 10 = None or 15 = 100%. Designates X-ray inspection.
(6) To complete KEMET part number, insert 10 = Standard, 11 = F-Tech & SBDS, 12 = SBDS, 13 = F-Tech, 15 = 100% X-ray, 16 = F-Tech & SBDS, & 100% X-ray, 17 = SBDS & 100%, X-ray, 18 = F-Tech & 100%X-ray. Designates screening.
Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/5 Min.	% at 25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	100kHz, 25 °C	°C	Reflow Temp. ≤ 260°C
15	6.8	D/1510	T497D685(1)015(2)(3)(4)(5)	1.0	6.0	6.0	115	125	1.0
15	10	D/1510	T497D106(1)015(2)(3)(4)(5)	1.5	6.0	6.0	115	125	1.0
15	10	E/2010	T497E106(1)015(2)(3)(4)(5)	1.5	6.0	4.0	150	125	1.0
15	10	F/2214	T497F106(1)015(2)(3)(4)(5)	1.5	6.0	2.5	200	125	1.0
15	15	E/2010	T497E156(1)015(2)(3)(4)(5)	2.3	6.0	4.0	150	125	1.0
15	15	F/2214	T497F156(1)015(2)(3)(4)(5)	2.3	6.0	2.5	200	125	1.0
15	22	F/2214	T497F226(1)015(2)(3)(4)(5)	3.3	8.0	3.0	183	125	1.0
15	22	G/2711	T497G226(1)015(2)(3)(4)(5)	3.3	6.0	1.1	337	125	1.0
15	33	F/2214	T497F336(1)015(2)(3)(4)(5)	5.0	6.0	3.0	183	125	1.0
15	33	H/2915	T497H336(1)015(2)(3)(4)(5)	5.0	8.0	0.9	408	125	1.0
15	47	G/2711	T497G476(1)015(2)(3)(4)(5)	7.1	8.0	1.1	337	125	1.0
15	68	H/2915	T497H686(1)015(2)(3)(4)(5)	10.2	8.0	0.9	408	125	1.0
15	100	H/2915	T497H107(1)015(2)(3)(4)(5)	15.0	10.0	0.9	408	125	1.0
20	0.15	A/1005	T497A154(1)020(2)(3)(4)(5)	0.0	8.0	15.0	58	125	1.0
20	0.47	A/1005	T497A474(1)020(2)(3)(4)(5)	0.1	8.0	14.0	60	125	1.0
20	0.68	A/1005	T497A684(1)020(2)(3)(4)(5)	0.1	6.0	15.0	58	125	1.0
20	0.68	B/1505	T497B684(1)020(2)(3)(4)(5)	0.1	6.0	10.0	71	125	1.0
20	1	A/1005	T497A105(1)020(2)(3)(4)(5)	0.2	6.0	15.0	58	125	1.0
20	1	B/1505	T497B105(1)020(2)(3)(4)(5)	0.2	6.0	12.0	65	125	1.0
20	1.5	B/1505	T497B155(1)020(2)(3)(4)(5)	0.3	6.0	9.0	75	125	1.0
20	2.2	B/1505	T497B225(1)020(2)(3)(4)(5)	0.4	6.0	9.0	75	125	1.0
20	2.2	D/1510	T497D225(1)020(2)(3)(4)(5)	0.4	6.0	5.0	126	125	1.0
20	3.3	D/1510	T497D335(1)020(2)(3)(4)(5)	0.7	6.0	6.0	115	125	1.0
20	3.3	E/2010	T497E335(1)020(2)(3)(4)(5)	0.7	6.0	4.0	150	125	1.0
20	4.7	E/2010	T497E475(1)020(2)(3)(4)(5)	0.9	6.0	6.0	122	125	1.0
20	4.7	F/2214	T497F475(1)020(2)(3)(4)(5)	0.9	6.0	4.0	158	125	1.0
20	6.8	D/1510	T497D685(1)020(2)(3)(4)(5)	1.4	6.0	5.0	126	125	1.0
20	6.8	E/2010	T497E685(1)020(2)(3)(4)(5)	1.4	6.0	5.0	134	125	1.0
20	6.8	F/2214	T497F685(1)020(2)(3)(4)(5)	1.4	6.0	2.4	204	125	1.0
20	10	F/2214	T497F106(1)020(2)(3)(4)(5)	2.0	6.0	3.0	183	125	1.0
20	15	F/2214	T497F156(1)020(2)(3)(4)(5)	3.0	6.0	3.0	183	125	1.0
20	15	G/2711	T497G156(1)020(2)(3)(4)(5)	3.0	6.0	1.1	337	125	1.0
20	22	G/2711	T497G226(1)020(2)(3)(4)(5)	4.4	6.0	2.5	224	125	1.0
20	22	H/2915	T497H226(1)020(2)(3)(4)(5)	4.4	6.0	0.9	408	125	1.0
20	33	H/2915	T497H336(1)020(2)(3)(4)(5)	6.6	8.0	0.9	408	125	1.0
20	47	H/2915	T497H476(1)020(2)(3)(4)(5)	9.4	8.0	0.9	408	125	1.0
25	0.33	A/1005	T497A334(1)025(2)(3)(4)(5)	0.1	6.0	15.0	58	125	1.0
25	0.47	A/1005	T497A474(1)025(2)(3)(4)(5)	0.1	6.0	15.0	58	125	1.0
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/5 Min.	% at 25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	100kHz, 25 °C	°C	Reflow Temp. ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, B = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), C = Hot Solder Dipped, K = Solder Fused. Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = Standard (in-process), 62 = 10 Cycles after Weibull, +25°C, 63 = 10 Cycles after Weibull, −55° and +85°C or 64 = 10 cycles before Weibull, −55°C and +85°C.
(5) To complete KEMET part number, insert 10 = None or 15 = 100%. Designates X-ray inspection.
(6) To complete KEMET part number, insert 10 = Standard, 11 = F-Tech & SBDS, 12 = SBDS, 13 = F-Tech, 15 = 100% X-ray, 16 = F-Tech & SBDS, & 100% X-ray, 17 = SBDS & 100%, X-ray, 18 = F-Tech & 100%X-ray. Designates screening.
Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/5 Min.	% at 25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	100kHz, 25 °C	°C	Reflow Temp. ≤ 260°C
25	0.68	B/1505	T497B684(1)025(2)(3)(4)(5)	0.2	6.0	7.5	82	125	1.0
25	1	B/1505	T497B105(1)025(2)(3)(4)(5)	0.3	6.0	10.0	71	125	1.0
25	1	C/2005	T497C105(1)025(2)(3)(4)(5)	0.3	6.0	6.5	42	125	1.0
25	1.5	D/1510	T497D155(1)025(2)(3)(4)(5)	0.4	6.0	6.5	119	125	1.0
25	2.2	D/1510	T497D225(1)025(2)(3)(4)(5)	0.6	6.0	6.0	115	125	1.0
25	2.2	E/2010	T497E225(1)025(2)(3)(4)(5)	0.6	6.0	3.5	160	125	1.0
25	3.3	E/2010	T497E335(1)025(2)(3)(4)(5)	0.8	6.0	4.0	150	125	1.0
25	4.7	F/2214	T497F475(1)025(2)(3)(4)(5)	1.2	6.0	2.5	200	125	1.0
25	6.8	F/2214	T497F685(1)025(2)(3)(4)(5)	1.7	6.0	3.0	183	125	1.0
25	6.8	G/2711	T497G685(1)025(2)(3)(4)(5)	1.7	6.0	1.2	323	125	1.0
25	10	F/2214	T497F106(1)025(2)(3)(4)(5)	2.5	6.0	2.5	200	125	1.0
25	10	G/2711	T497G106(1)025(2)(3)(4)(5)	2.5	6.0	1.4	299	125	1.0
25	15	G/2711	T497G156(1)025(2)(3)(4)(5)	3.8	6.0	1.4	299	125	1.0
25	15	H/2915	T497H156(1)025(2)(3)(4)(6)	3.8	6.0	1.0	387	125	1.0
25	22	G/2711	T497G226(1)025(2)(3)(4)(5)	5.5	6.0	1.4	299	125	1.0
25	22	H/2915	T497H226(1)025(2)(3)(4)(6)	5.5	6.0	0.9	408	125	1.0
25	22	X/2824	T497X226(1)025(2)(3)(4)(5)	5.5	6.0	0.9	428	125	1.0
25	33	H/2915	T497H336(1)025(2)(3)(4)(6)	8.3	8.0	0.9	408	125	1.0
25	33	X/2824	T497X336(1)025(2)(3)(4)(5)	8.3	8.0	0.9	428	125	1.0
35	0.22	A/1005	T497A224(1)035(2)(3)(4)(5)	0.1	6.0	18.0	53	125	1.0
35	0.33	A/1005	T497A334(1)035(2)(3)(4)(5)	0.1	6.0	22.0	48	125	1.0
35	0.47	B/1505	T497B474(1)035(2)(3)(4)(5)	0.2	6.0	10.0	71	125	1.0
35	0.68	C/2005	T497C684(1)035(2)(3)(4)(5)	0.2	6.0	8.0	97	125	1.0
35	1	D/1510	T497D105(1)035(2)(3)(4)(5)	0.4	6.0	6.5	119	125	1.0
35	1.5	E/2010	T497E155(1)035(2)(3)(4)(5)	0.5	6.0	4.5	141	125	1.0
35	3.3	F/2214	T497F335(1)035(2)(3)(4)(5)	1.2	6.0	2.5	200	125	1.0
35	4.7	G/2711	T497G475(1)035(2)(3)(4)(5)	1.6	6.0	1.5	289	125	1.0
35	6.8	G/2711	T497G685(1)035(2)(3)(4)(5)	2.4	6.0	1.3	310	125	1.0
35	6.8	H/2915	T497H685(1)035(2)(3)(4)(6)	2.4	6.0	1.3	340	125	1.0
35	10	H/2915	T497H106(1)035(2)(3)(4)(6)	3.5	8.0	0.9	408	125	1.0
35	15	X/2824	T497X156(1)035(2)(3)(4)(5)	5.3	6.0	0.9	428	125	1.0
50	0.1	A/1005	T497A104(1)050(2)(3)(4)(5)	0.1	6.0	22.0	48	125	1.0
50	0.15	A/1005	T497A154(1)050(2)(3)(4)(5)	0.1	6.0	17.0	54	125	1.0
50	0.22	B/1505	T497B224(1)050(2)(3)(4)(5)	0.1	6.0	14.0	60	125	1.0
50	0.33	B/1505	T497B334(1)050(2)(3)(4)(5)	0.2	6.0	12.0	65	125	1.0
50	0.47	C/2005	T497C474(1)050(2)(3)(4)(5)	0.2	6.0	8.0	97	125	1.0
50	0.68	D/1510	T497D684(1)050(2)(3)(4)(5)	0.3	6.0	7.0	107	125	1.0
50	1	E/2010	T497E105(1)050(2)(3)(4)(5)	0.5	6.0	6.0	122	125	1.0
50	1.5	F/2214	T497F155(1)050(2)(3)(4)(5)	0.8	6.0	4.0	158	125	1.0
50	2.2	F/2214	T497F225(1)050(2)(3)(4)(5)	1.1	6.0	2.5	200	125	1.0
50	3.3	G/2711	T497G335(1)050(2)(3)(4)(5)	1.7	6.0	2.0	250	125	1.0
50	4.7	H/2915	T497H475(1)050(2)(3)(4)(6)	2.4	6.0	1.5	316	125	1.0
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/5 Min.	% at 25°C 120 Hz Maximum	Ω at +25°C 100 kHz Maximum	100kHz, 25 °C	°C	Reflow Temp. ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.

(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours) or A = N/A. Designates Reliability Level.

(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, B = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), C = Hot Solder Dipped, K = Solder Fused. Designates Termination Finish.

(4) To complete KEMET part number, insert 61 = Standard (in-process), 62 = 10 Cycles after Weibull, +25°C, 63 = 10 Cycles after Weibull, −55° and +85°C or 64 = 10 cycles before Weibull, −55°C and +85°C.

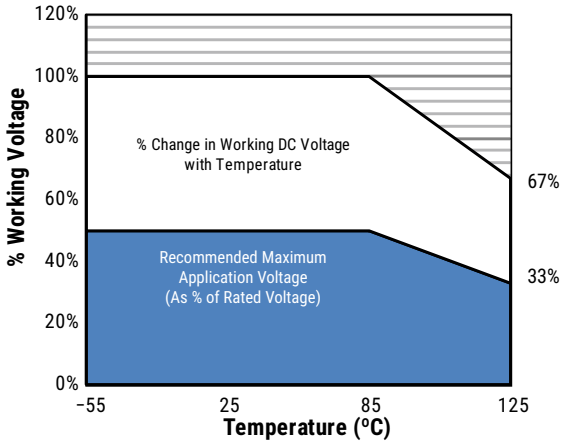
(5) To complete KEMET part number, insert 10 = None or 15 = 100%. Designates X-ray inspection.

(6) To complete KEMET part number, insert 10 = Standard, 11 = F-Tech & SBDS, 12 = SBDS, 13 = F-Tech, 15 = 100% X-ray, 16 = F-Tech & SBDS, & 100% X-ray, 17 = SBDS & 100%, X-ray, 18 = F-Tech & 100%X-ray. Designates screening. Designates Termination Finish. Refer to Ordering Information for additional detail.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
A	2513	50
B	3813	70
C	5113	75
D	3825	80
E	5125	90
F	5634	100
G	6728	125
H	7238	150
X	6954	165

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the Pmax of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
Pmax = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

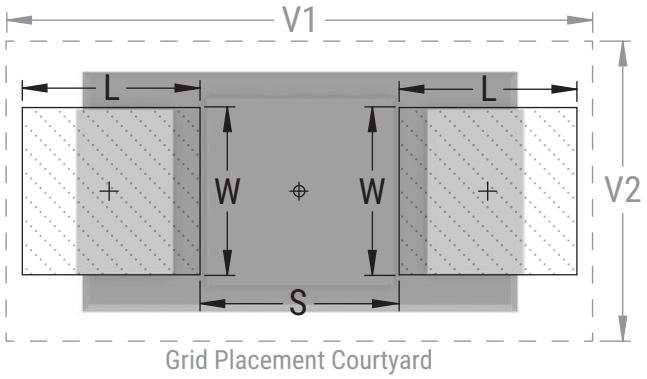
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	L	W	S	V1	V2	L	W	S	V1	V2	L	W	S	V1	V2
A[1]	1005	2.19	1.44	0.15	5.54	2.66	1.89	1.32	0.15	4.44	2.16	1.52	1.22	0.29	3.58	1.90
B	1505	2.30	1.44	1.20	6.80	2.66	1.90	1.32	1.40	5.70	2.16	1.52	1.22	1.56	4.84	1.90
C	2005	2.30	1.44	2.47	8.08	2.66	1.90	1.32	2.67	6.98	2.16	1.52	1.22	2.83	6.12	1.90
D	1510	2.30	2.58	1.20	6.80	3.92	1.90	2.46	1.40	5.70	3.42	1.52	2.36	1.56	4.84	3.16
E	2010	2.30	2.58	2.47	8.08	3.92	1.90	2.46	2.67	6.98	3.42	1.52	2.36	2.83	6.12	3.16
F	2214	2.30	3.47	2.98	8.58	4.82	1.90	3.35	3.18	7.48	4.32	1.52	3.25	3.34	6.62	4.06
G	2711	2.81	2.84	3.10	9.72	4.18	2.41	2.72	3.30	8.62	3.68	2.03	2.62	3.46	7.76	3.42
H	2915	2.81	3.84	3.61	10.24	5.20	2.41	3.72	3.81	9.14	4.70	2.03	3.62	3.97	8.28	4.44
X	2824	2.73	3.22	3.46	9.92	6.80	2.33	3.10	3.66	8.82	6.30	1.95	3.00	3.82	7.96	6.04

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component desity product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Land pattern geometry is too small for silkscreen outline.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

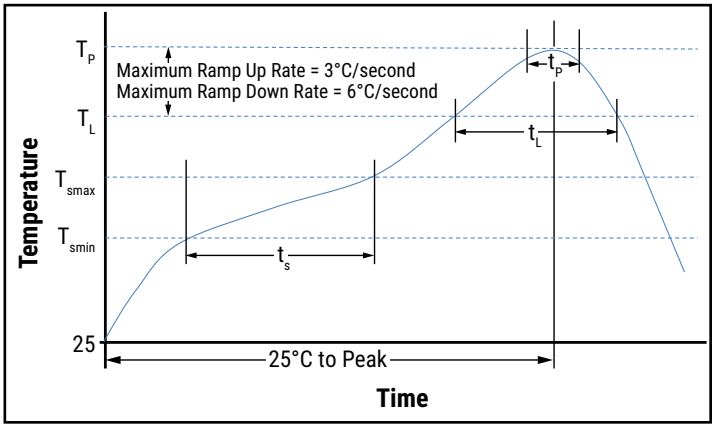
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

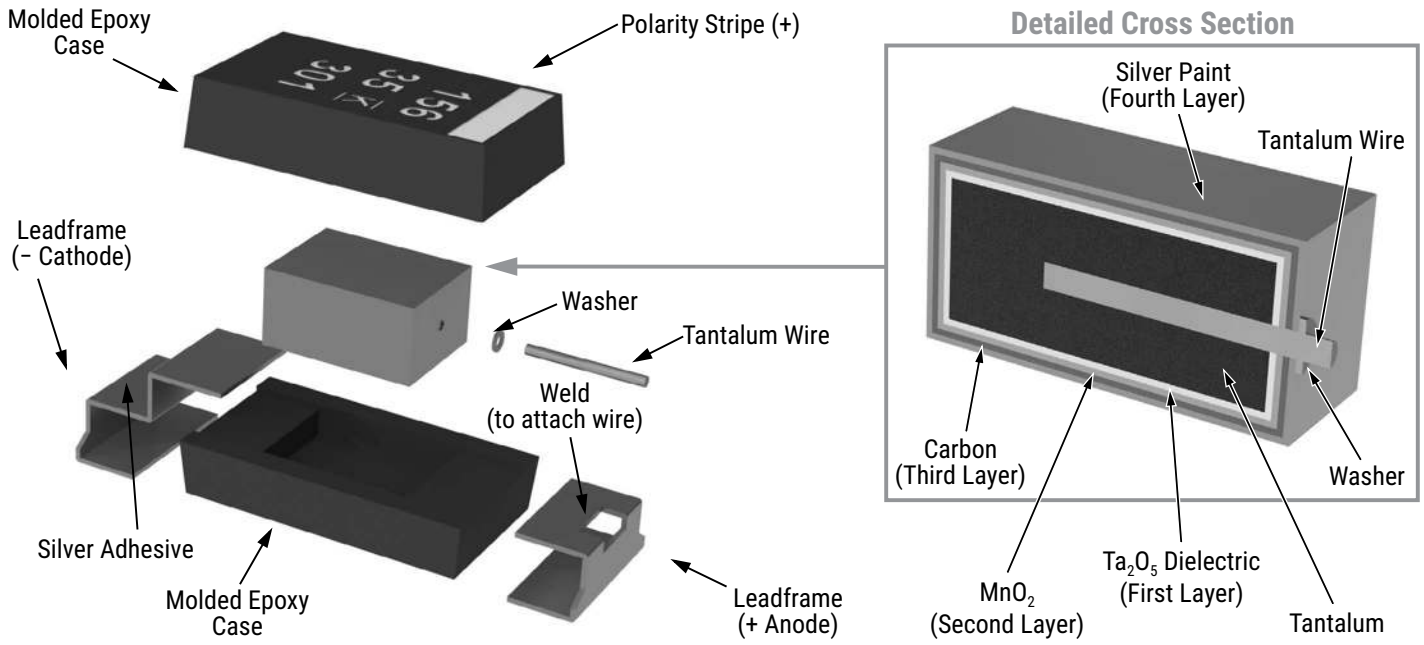
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



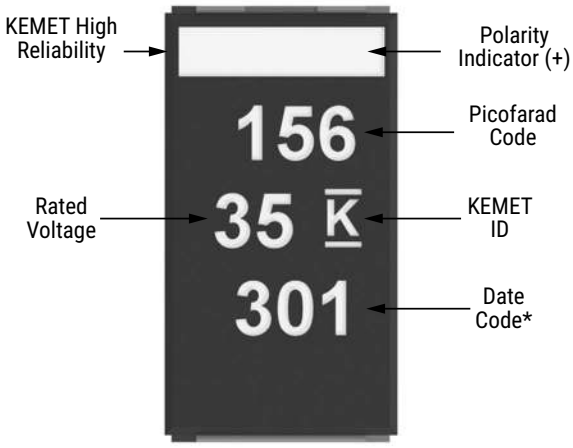
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = Last number of Year	0 = 2020 1 = 2021 2 = 2022 3 = 2023 4 = 2024
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Tape & Reel Packaging Information

KEMET's molded tantalum and aluminum chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

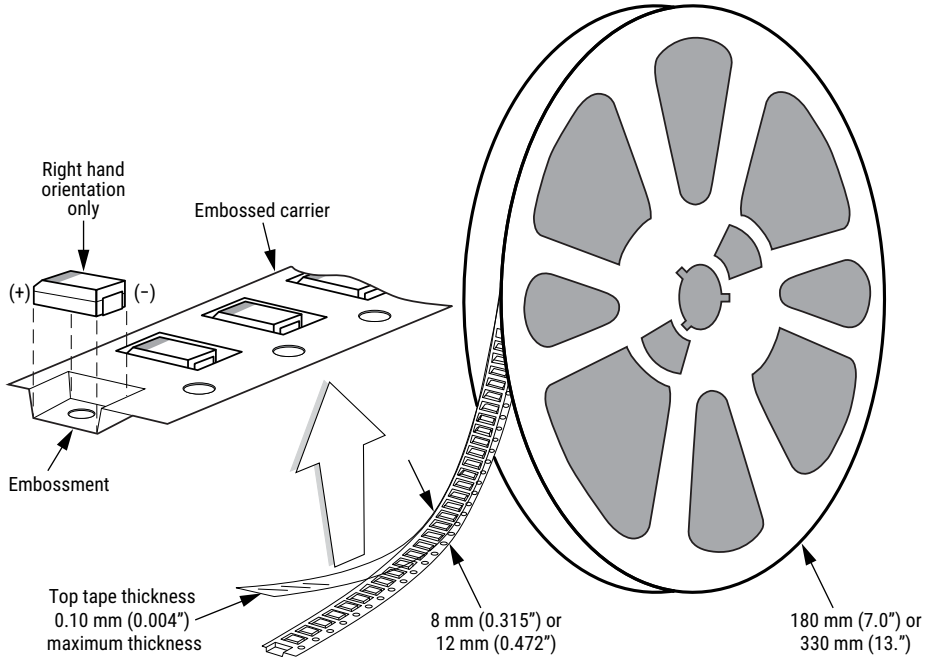


Table 3 – Packaging Quantity

KEMET Case Codes		Tape Width (mm)	Tape and Reel Dimensions	
			180 mm (7" diameter)	330 mm (13" diameter)
A	1005	8	2,500	9,500
B	1505	12	2,500	9,500
C	2005	12	2,500	9,500
D	1510	12	2,500	9,500
E	2010	12	2,500	9,500
F	2214	12	500	3,500
G	2711	12	500	2,500
H	2915	12	500	2,500
X	2824	12	500	2,500

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

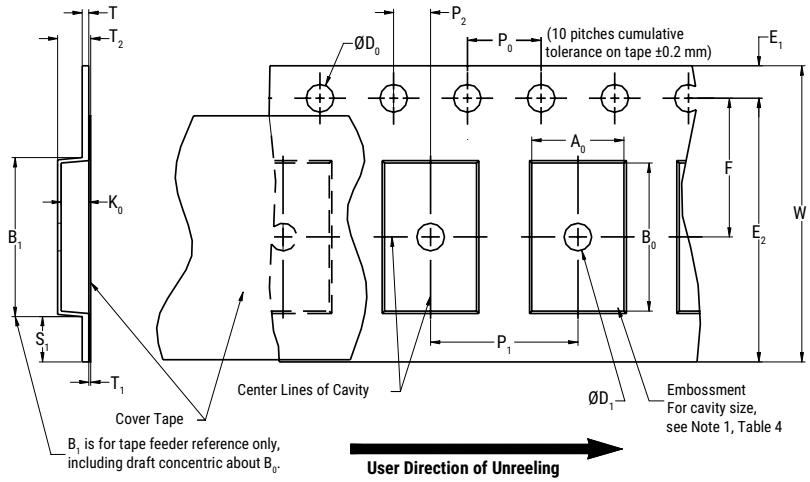


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover Tape Break Force: 1.0 kg minimum.
2. Cover Tape Peel Strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 Newton (10 to 100 gf)
12 and 16 mm	0.1 to 1.3 Newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

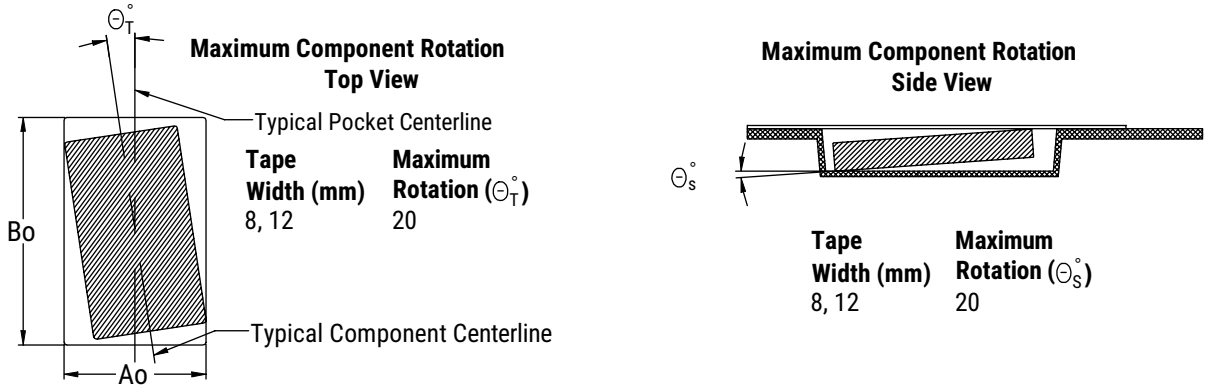


Figure 3 – Maximum Lateral Movement

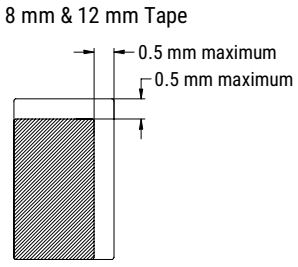


Figure 4 – Bending Radius

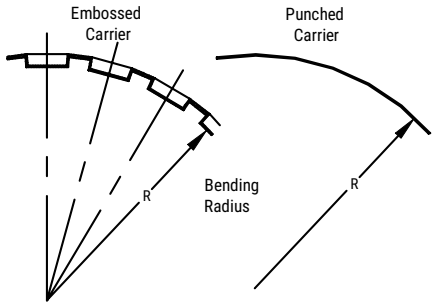
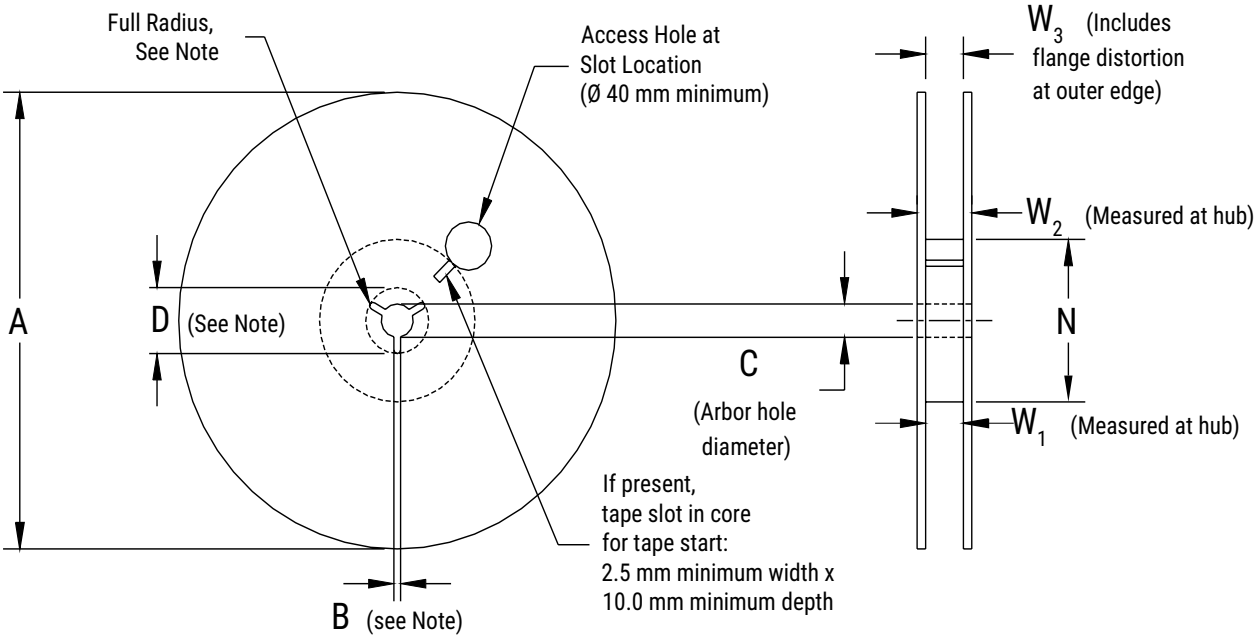


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

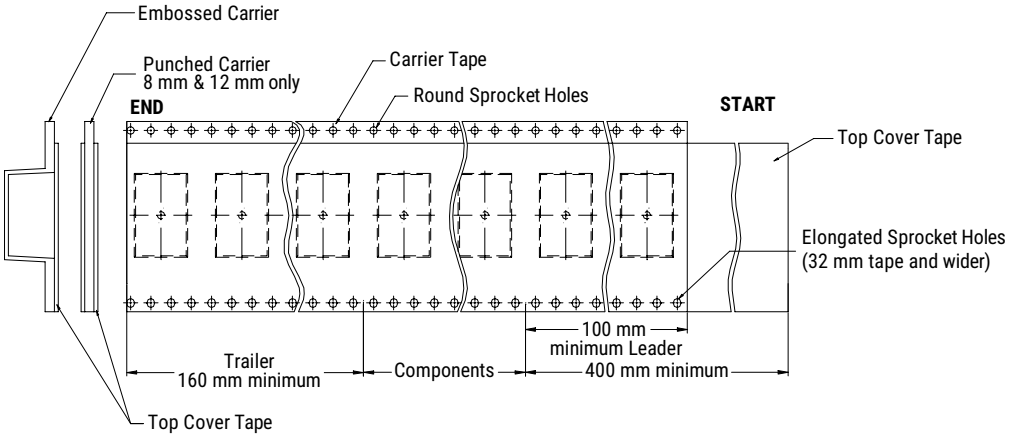
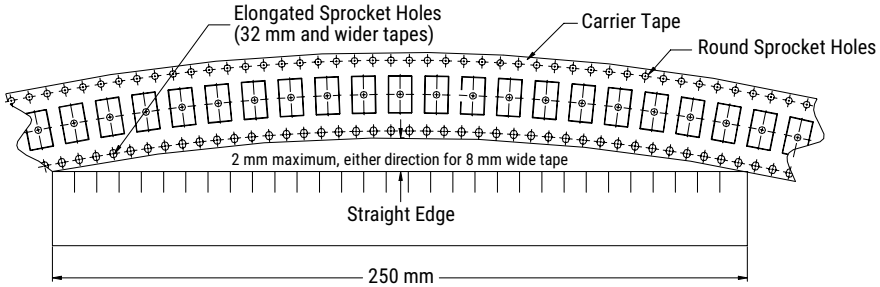


Figure 7 – Maximum Camber



T510 Multiple Anode MnO_2

Overview

The low ESR, surge-robust T510 is designed for demanding applications that require high surge current and high ripple current capability. This series builds upon the proven capabilities of our industrial grade tantalum chip capacitors to offer several advantages such as low ESR, high ripple current capability, excellent capacitance stability, and improved resistance to high in-rush currents. These benefits are achieved though the utilization of multiple anodes as well as high-stress, low impedance electrical conditioning performed prior to screening. This series is classified as MSL (Moisture Sensitivity Level) 1 under J STD 020: unlimited floor life time at ≤ 30°C/85% RH.

Benefits

- Meets or exceeds EIA Standard 535BAAC
- Taped and reeled per EIA 481
- High surge current capability
- Optional gold-plated terminations
- High ripple current capability
- 100% surge current test
- 100% steady-state accelerated aging
- Case sizes E and X
- ESR as low as 10 mΩ

Applications

Typical applications include decoupling and filtering in many end applications, such as DC/DC converters, portable electronics, telecommunications, and control units requiring high ripple current capability.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder or gold-plated.
- Halogen-free
- Epoxy compliant with UL94 V–0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	510	X	477	M	006	A	T	E800	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	ESR	Packaging (C-Spec)
T = Tantalum	Multiple Anode Low ESR	E X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A Z = N/A	T = 100% Matte Tin (Sn) Plated H = Standard Solder Coated (SnPb 5% Pb minimum) G = Gold Plated (A, B, C, D, X only)	Last three digits specify ESR in mΩ. (800 = 800 mΩ)	Blank = 7" Reel 7280 = 13" Reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	10 – 1,000 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

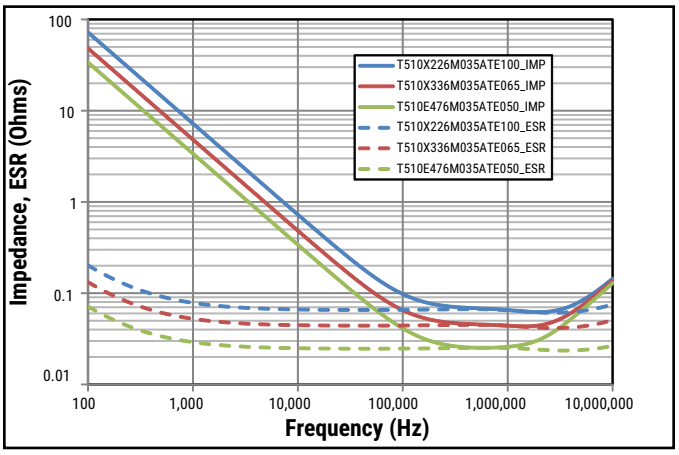
Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		ΔC/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C @ 0 volts, 2,000 hours		ΔC/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55C° to 125° C, 1,000 cycles		ΔC/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C		+25°C	–55°C	+85°C	+125°C
		ΔC/C	IL*	±10%	±10%	±20%
		DF	IL	IL	1.5 x IL	1.5 x IL
		DCL	IL	n/a	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		ΔC/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		ΔC/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

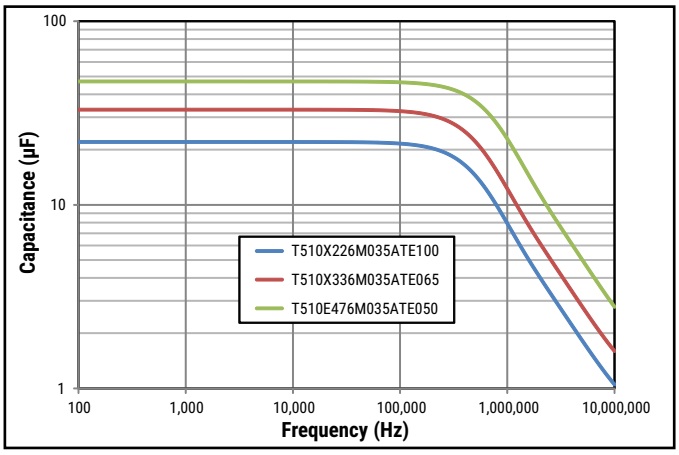
**IL = Initial limit*

Electrical Characteristics

Impedance, ESR vs. Frequency

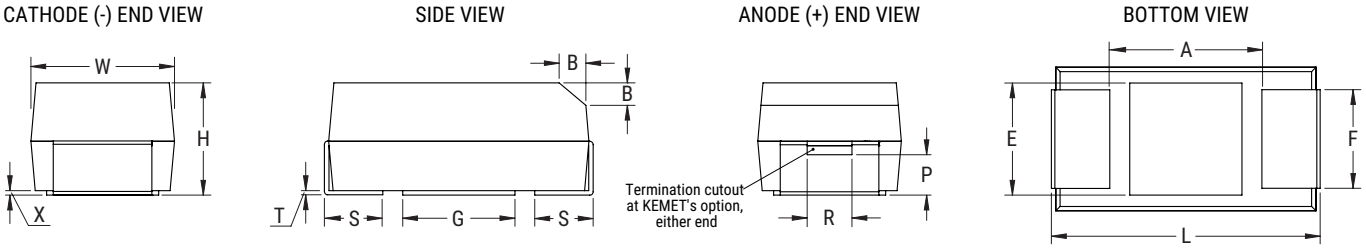


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component													Total Weight
KEMET	EIA	L	W	H	F ±0.1 ±(.004)	S ±0.3 ±(.012)	B ±0.15 (Ref) ±.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)	(mg)
X	7343–43	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	430.15
E	7360–38	7.3 ±0.3 (0.287 ±0.012)	6.0 ±0.3 (0.236 ±0.012)	3.6 ±0.2 (0.142 ±0.008)	4.1 (0.161)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	n/a	n/a	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	500.73

Notes: (Ref) – Dimensions provided for reference only. For low profile cases, no dimensions are provided for B, P or R because these cases do not have a bevel or a notch.

These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative

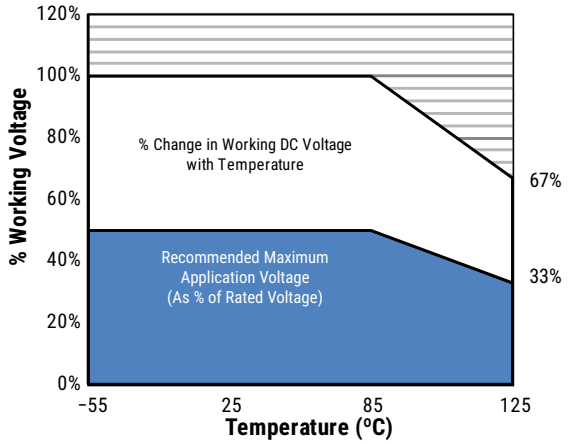
Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	680	X/7343-43	T510X687(1)004A(2)E030	27.2	6.0	30	3000	2700	1200	125	1
4	1000	X/7343-43	T510X108(1)004A(2)E018	40.0	6.0	18	3873	3486	1549	125	1
4	1000	X/7343-43	T510X108(1)004A(2)E023	40.0	6.0	23	3426	3083	1370	125	1
4	1000	X/7343-43	T510X108(1)004A(2)E030	40.0	6.0	30	3000	2700	1200	125	1
4	1000	X/7343-43	T510X108(1)004A(2)E035	40.0	6.0	35	2777	2499	1111	125	1
4	1000	E/7360-38	T510E108(1)004A(2)E018	40.0	6.0	18	3979	3581	1592	125	1
4	1000	E/7360-38	T510E108(1)004A(2)E010	40.0	6.0	10	5339	4805	2136	125	1
6.3	470	X/7343-43	T510X477(1)006A(2)E030	29.6	6.0	30	3000	2700	1200	125	1
6.3	680	X/7343-43	T510X687(1)006A(2)E023	42.8	6.0	23	3426	3083	1370	125	1
6.3	680	X/7343-43	T510X687(1)006A(2)E045	42.8	12.0	45	2449	2204	980	125	1
6.3	680	E/7360-38	T510E687(1)006A(2)E023	42.8	6.0	23	3520	3168	1408	125	1
6.3	680	E/7360-38	T510E687(1)006A(2)E012	42.8	6.0	12	4873	4386	1949	125	1
10	330	X/7343-43	T510X337(1)010A(2)E035	33.0	6.0	35	2777	2499	1111	125	1
16	150	X/7343-43	T510X157(1)016A(2)E030	24.0	6.0	30	3000	2700	1200	125	1
16	150	X/7343-43	T510X157(1)016A(2)E040	24.0	6.0	40	2598	2338	1039	125	1
16	220	X/7343-43	T510X227(1)016A(2)E040	35.2	10.0	40	2598	2338	1039	125	1
16	220	X/7343-43	T510X227(1)016A(2)E025	35.2	10.0	25	3286	2957	1314	125	1
20	68	X/7343-43	T510X686(1)020A(2)E055	14.0	6.0	55	2216	1994	886	125	1
20	68	X/7343-43	T510X686(1)020A(2)E045	14.0	6.0	45	2449	2204	980	125	1
20	100	X/7343-43	T510X107(1)020A(2)E035	20.0	8.0	35	2777	2499	1111	125	1
20	100	X/7343-43	T510X107(1)020A(2)E040	20.0	6.0	40	2598	2338	1039	125	1
20	100	X/7343-43	T510X107(1)020A(2)E045	20.0	6.0	45	2449	2204	980	125	1
20	100	X/7343-43	T510X107(1)020A(2)E055	20.0	6.0	55	2216	1994	886	125	1
25	68	X/7343-43	T510X686(1)025A(2)E045	17.0	8.0	45	2449	2204	980	125	1
25	100	E/7360-38	T510E107(1)025A(2)E050	25.0	8.0	50	2387	2148	955	125	1
35	22	X/7343-43	T510X226(1)035A(2)E100	7.7	6.0	100	1643	1479	657	125	1
35	22	X/7343-43	T510X226(1)035A(2)E080	7.7	6.0	80	1837	1653	735	125	1
35	22	X/7343-43	T510X226(1)035A(2)E060	7.7	6.0	60	2121	1909	848	125	1
35	33	X/7343-43	T510X336(1)035A(2)E065	11.6	6.0	65	2038	1834	815	125	1
35	33	X/7343-43	T510X336(1)035A(2)E050	11.6	6.0	50	2324	2092	930	125	1
35	47	X/7343-43	T510X476(1)035A(2)E055	16.5	8.0	55	2216	1994	886	125	1
35	47	X/7343-43	T510X476(1)035A(2)E065	16.5	8.0	65	2038	1834	815	125	1
35	47	E/7360-38	T510E476(1)035A(2)E050	16.5	8.0	50	2387	2148	955	125	1
50	10	X/7343-43	T510X106(1)050A(2)E120	5.0	8.0	120	1500	1350	600	125	1
50	10	X/7343-43	T510X106(1)050A(2)E090	5.0	8.0	90	1732	1559	693	125	1
50	22	X/7343-43	T510X226(1)050A(2)E100	11.0	8.0	100	1643	1479	657	125	1
50	22	X/7343-43	T510X226(1)050A(2)E075	11.0	8.0	75	1897	1707	759	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts @ 25°C w/+20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

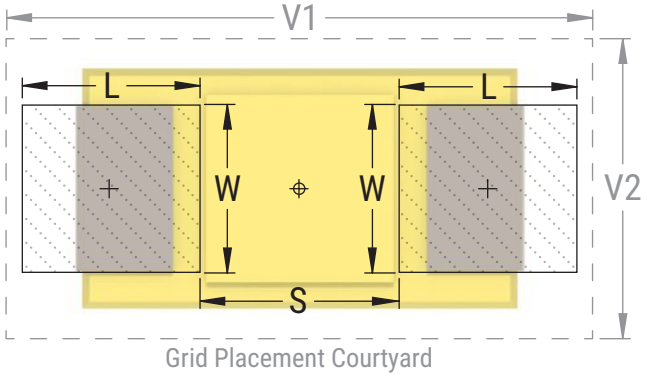
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
E[1]	7360–38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*
[2] *Land pattern geometry is too small for silkscreen outline.*



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

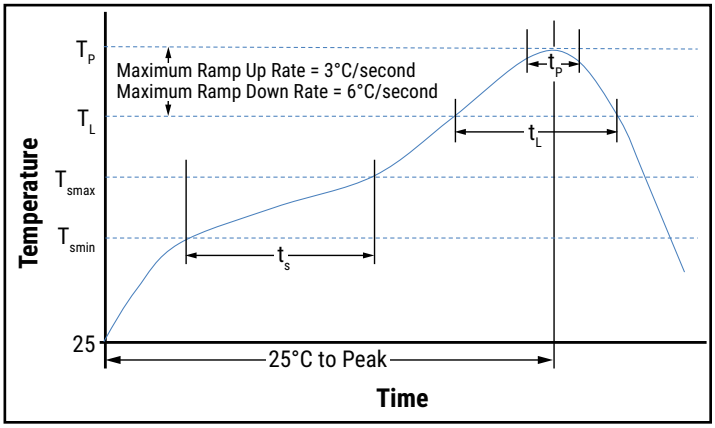
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

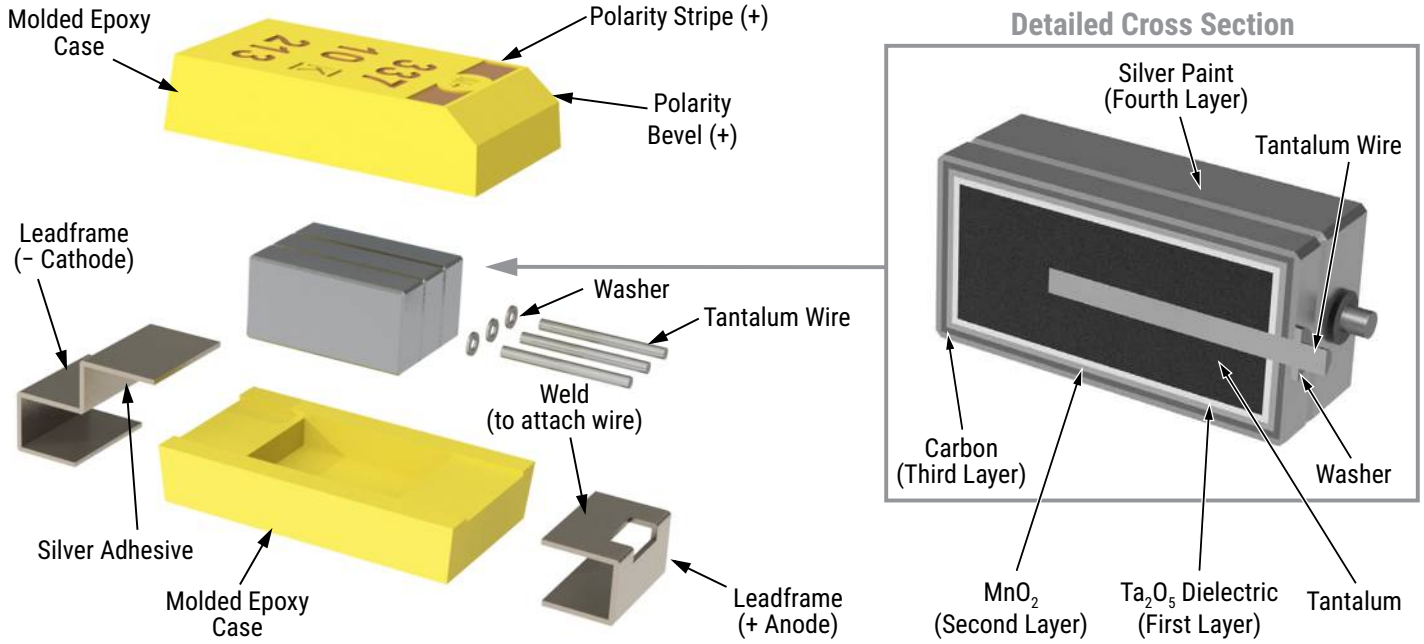
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



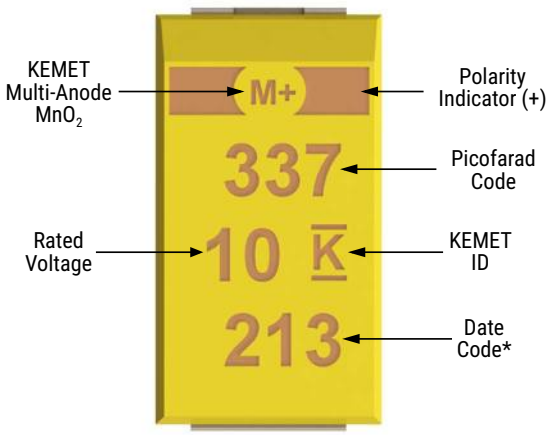
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 213 = 13th week of 2022

Date Code *	
1st digit = last number of year	8 = 2018 9 = 2019 0 = 2020 1 = 2021 2 = 2022
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

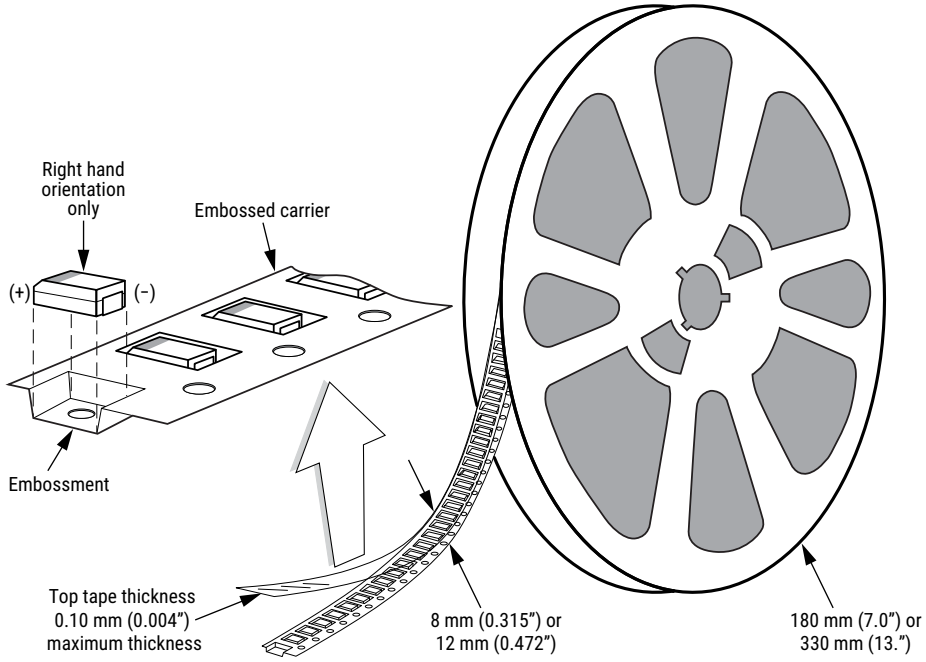


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

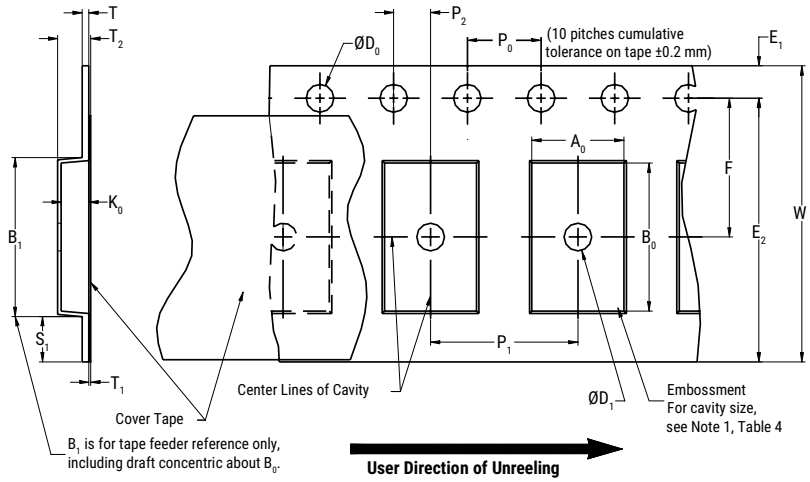


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

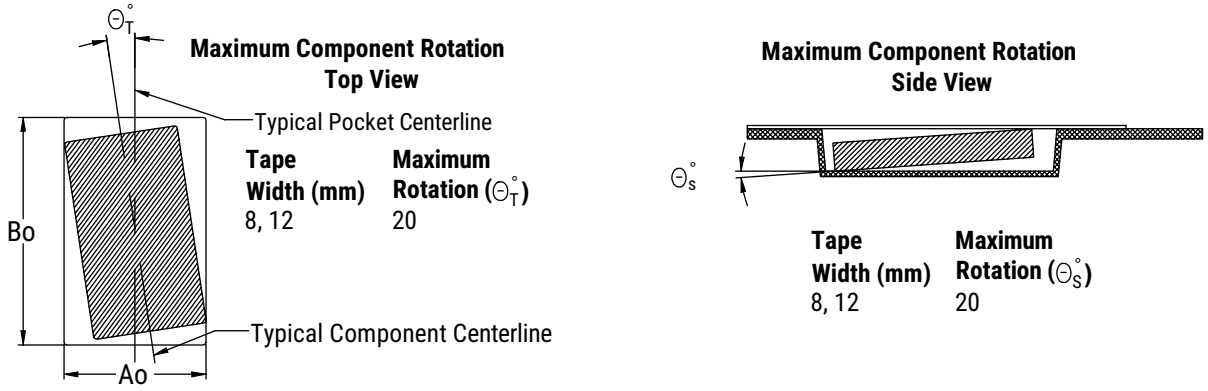


Figure 3 – Maximum Lateral Movement

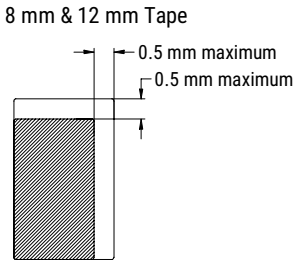


Figure 4 – Bending Radius

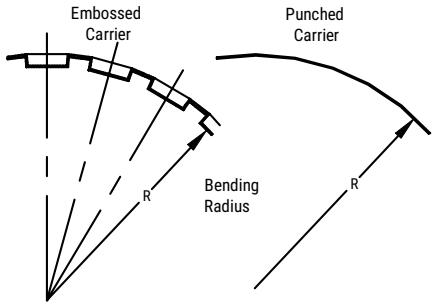
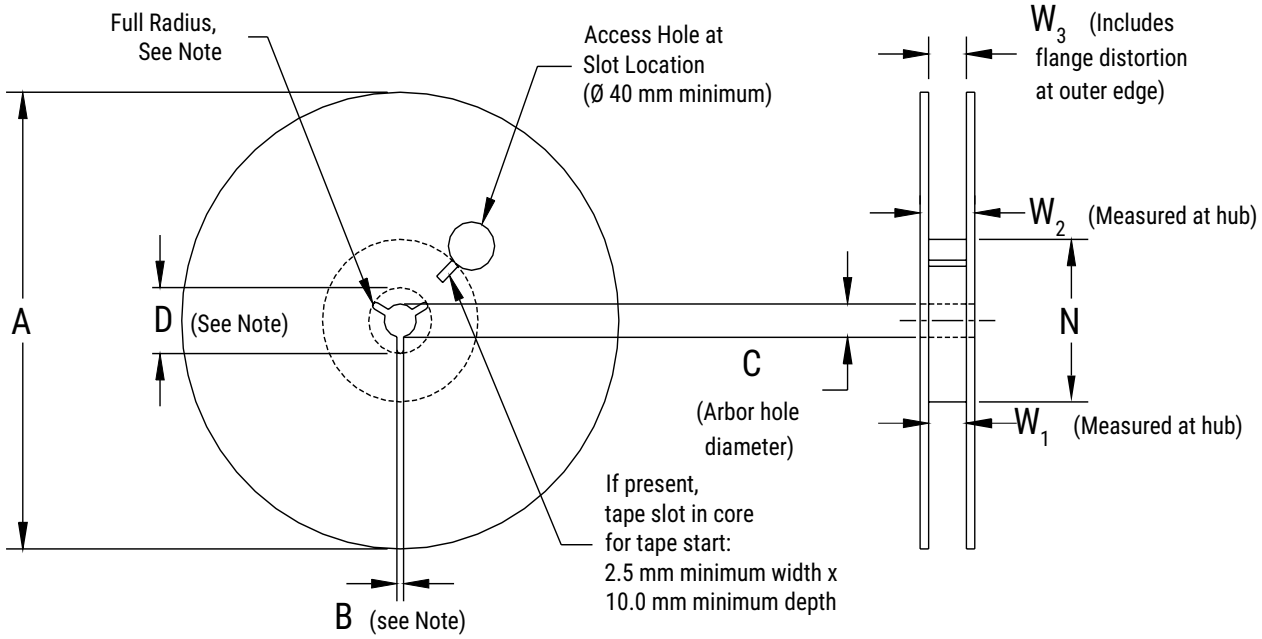


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

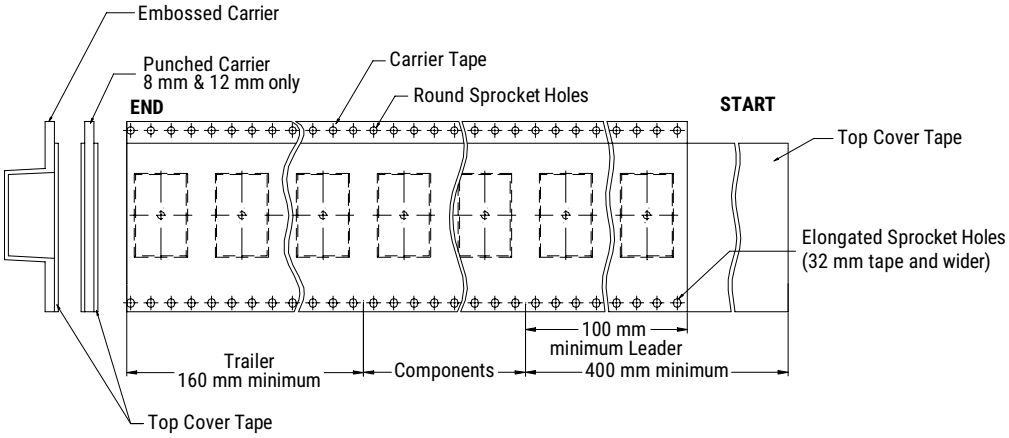
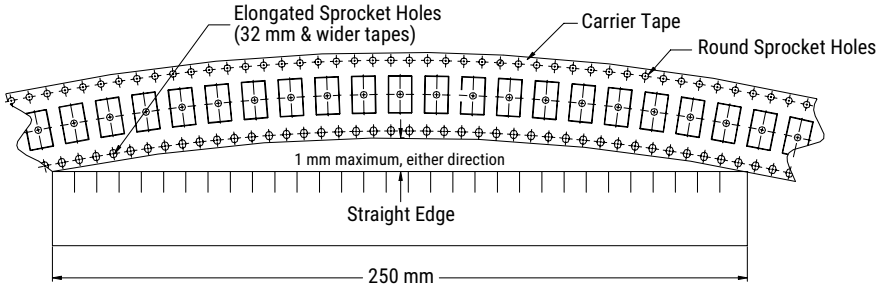


Figure 7 – Maximum Camber



Tantalum Stack MnO_2 (TSM)

Overview

The KEMET Tantalum Stacks MnO_2 (TSM) is designed to provide the highest capacitance/voltage ratings in surface mount configuration. KEMET's T493 COTS military/aerospace capacitors are utilized in stacks of 2, 3, 4,and 6 components to achieve a broad range of capacitance and voltage ratings. The T493 COTS offers component level Weibull grading options, surge current testing options and standard, low, and ultra-low ESR options. All component level lots of this product are conditioned with MIL-PRF-55365 Group A testing. Stacking configurations offer this high reliability product with custom capacitance/voltage solutions and very low ESR options.

Note: Custom stacking solutions are available with other KEMET Tantalum MnO_2 Surface Mount products. Please contact KEMET Sales for availability.

Benefits

- High capacitance
- Surface mountable
- Capacitance values of 9.4 – 2,000 µF
- Capacitance can be custom specified
- Voltage ratings of 6 VDC to 50 VDC
- High volumetric efficiency
- Ultra-low ESR
- Surge capability
- Weibull failure options B and C
- Operating temperature range of −55˚C to +125˚C
- Laser-marked case
- Discrete components EIA standard case sizes (others available)
- High Temperature lead attach material available (> 260°C)

Applications

Typical applications include decoupling and filtering in a variety of market segments. The T493 COTS stack devices can be utilized in military and aerospace applications. Other KEMET series can be utilized in filtering and decoupling applications to service various market segments.

Environmental Compliance

RoHS compliant when ordered with 100% Sn solder on both terminations (component and stack)
- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	SM	2D	447	K	10	A	H	61	20	D493
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Surge	ESR	C-Spec 2
T = Tantalum	Stacks MnO_2 cathode	2C, 3C, 4C, 6C, 2D, 3D, 4D, 6D, 2X, 3X, 4X, 6X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A B = 0.1%/ 1,000 hours C = 0.01%/ 1,000 hours	H = Standard solder-coated (SnPb 5% Pb minimum) C = Hot solder dipped B = Gold-plated T = 100% Tin	61 = None 62 = 10 Cycles 25°C after Weibull 63 = 10 cycles, −55°C and 85°C after Weibull 64 = 10 cycles, −55°C and 85°C before Weibull	10 = ESR - standard 20 = ESR - low 30 = ESR - ultra-low	First digit represents outer leadframe finish D = Silver-plated (Ag) H = Solder-plated (SnPb 5% Pb minimum) T = 100% Tin (Sn) Second, third, and fourth digit designates discrete component series. 493 = T493

Note: Custom discrete component stacking solutions are also available with other KEMET Polymer Electrolytic Surface Mount series/products. Please contact KEMET Sales for availability.

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	9.4 – 2,000 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

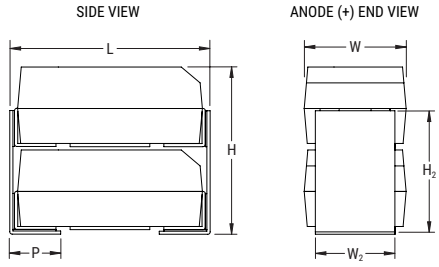
Test	Condition	Characteristics	
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours	Δ C/C	Within ±10% of initial value
		DF	Within initial limits
		DCL	Within 1.25 x initial limit
		ESR	Within initial limits
Thermal Shock	KEMET specified test, mounted, −55°C to 125°C, 5 cycles	Δ C/C	Within ±5% of initial value
		DF	Within initial limits
		DCL	Within 1.25 x initial limit
		ESR	Within initial limits
Surge Voltage	85°C, 1.15 x rated voltage 1,000 cycles	Δ C/C	Within ±5% of initial value
		DF	Within initial limits
		DCL	Within initial limits
		ESR	Within initial limits
Surge Voltage	125°C, 0.77 x rated voltage 1,000 cycles	Δ C/C	Within ±5% of initial value
		DF	Within initial limits
		DCL	Within initial limits
		ESR	Within initial limits
Mechanical Vibration	MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak	Δ C/C	Within ±10% of initial value
		DF	Within initial limits
		DCL	Within initial limits

Dimensions – Millimeters (Inches)

Metric will govern

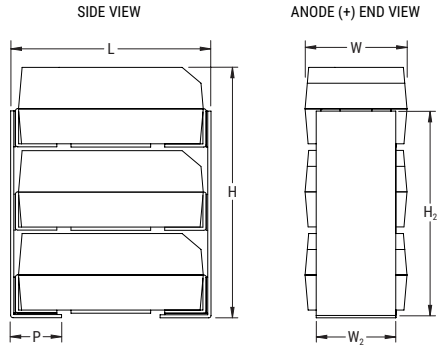
TSM2

KEMET 2 Component Stack Dimensions						
Case Code	L	W	H	W_2	H_2	P
2C	6.5±0.38 (0.258±0.015)	3.3±0.2 (0.130±0.008)	5.3±0.38 (0.210±0.015)	2.5±0.2 (0.100±0.008)	4.5±0.38 (0.176±0.015)	1.4±0.38 (0.055±0.015)
2D	8.0±0.38 (0.315±0.015)	4.4±0.2 (0.174±0.008)	6.2±0.38 (0.245±0.015)	3.0±0.2 (0.120±0.008)	4.8±0.38 (0.192±0.015)	1.9± .38 (0.075±0.015)
2X	8.0±0.38 (0.315±0.015)	4.4±0.2 (0.174±0.008)	8.9±0.38 (0.352±0.015)	3.0±0.2 (0.120±0.008)	6.9±0.38 (0.272±0.015)	1.9±0.38 (0.075±0.015)



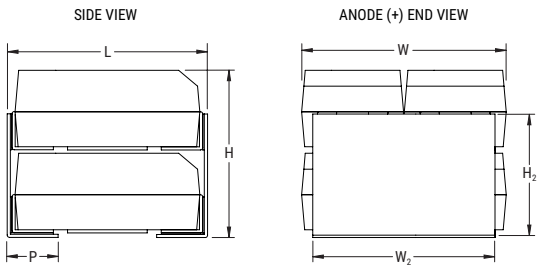
TSM3

KEMET 3 Component Stack Dimensions						
Case Code	L	W	H	W_2	H_2	P
3C	6.5±0.38 (0.258±0.015)	3.3±0.2 (0.130±0.008)	7.8±0.38 (0.310±0.015)	2.5±0.2 (0.100±0.008)	6.4±0.38 (0.252±0.015)	1.4±0.38 (0.055±0.015)
3D	8.0±0.38 (0.315±0.015)	4.4±0.2 (0.174±0.008)	9.2±0.38 (0.365±0.015)	3.0±0.2 (0.120±0.008)	7.7±0.38 (0.304±0.015)	1.9±0.38 (0.075±0.015)
3X	8.0±0.38 (0.315±0.015)	4.4±0.2 (0.174±0.008)	13.3±0.38 (0.525±0.015)	3.0±0.2 (0.120 ±0.008)	11.0±0.38 (0.436±0.015)	1.9±0.38 (0.075±0.015)



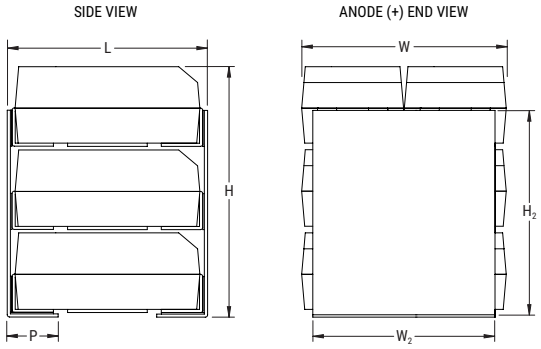
TSM4

KEMET 4 Component Stack Dimensions						
Case Code	L	W	H	W_2	H_2	P
4C	6.5±0.38 (0.258±0.015)	6.6±0.2 (0.262±0.008)	5.3±0.38 (0.210±0.015)	5.8±0.2 (0.230±0.008)	4.6±0.38 (0.180±0.015)	1.4±0.38 (0.055±0.015)
4D	8.0±0.38 (0.315±0.015)	8.9±0.2 (0.350±0.008)	6.2±0.38 (0.245±0.015)	7.4±0.2 (0.292±0.008)	4.8±0.38 (0.192±0.015)	1.9±0.38 (0.075±0.015)
4X	8.0±0.38 (0.315±0.015)	8.9±0.2 (0.350±0.008)	8.9±0.38 (0.352±0.015)	7.4±0.2 (0.292±0.008)	6.9±0.38 (0.272±0.015)	1.9±0.38 (0.075±0.015)



TSM6

KEMET 6 Component Stack Dimensions						
Case Code	L	W	H	W_2	H_2	P
6C	6.5±0.38 (0.258±0.015)	6.6±0.2 (0.262±0.008)	7.8±0.38 (0.310±0.015)	5.8±0.2 (0.230±0.008)	6.6±0.38 (0.260±0.015)	1.4±0.38 (.055±0.015)
6D	8.0±0.38 (0.315±0.015)	8.9±0.2 (0.350±0.008)	9.2±0.38 (0.365±0.015)	7.4±0.2 (0.292±0.008)	7.7±0.38 (0.304±0.015)	1.9±0.38 (0.075±0.015)
6X	8.0±0.38 (0.315±0.015)	8.9±0.2 (0.350±0.008)	13.3±0.38 (0.525±0.015)	7.4±0.2 (0.292±0.008)	11.0±0.38 (0.436±0.015)	1.9±0.38 (0.075±0.015)



Capacitance & Rated Voltage Chart

Capacitance		Rated Voltage						
µF	Code	6 V	10 V	16 V	20 V	25 V	35 V	50 V
9.4	945							2D
14	146							3D
19	196							4D
20	206						2C	2X
28	286							6D
30	306					2C	3C	3X
40	406						4C	4X
44	446				2C		2D	
45	456					3C		
60	606					4C	6C	6X
66	666				3C		3D	
88	886				4C		4D	
90	906					6C		
94	946			2C		2D		
130	137				6C, 2D		6D	
140	147			3C		3D		
190	197			4C		4D		
200	207		2C		3D			
270	277				4D			
280	287			6C		6D		
300	307		3C	2D				
400	407		4C					
410	417				6D			
440	447	2C	2D					
450	457			3D				
600	607		6C	4D				
660	667	3C, 2D	3D, 2X					
880	887	4C	4D					
900	907			6D				
990	997	3D	3X					
1300	138	6C, 4D	6D, 4X					
2000	208	6D	6X					

Table 1A – TSM2 Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	°C	Reflow Temp ≤ 260°C
6.3	440	2C	TSM2C447(1)006(2)(3)(4)(5)	27.8	10	0.600	0.150	0.120	125	1
10	200	2C	TSM2C207(1)010(2)(3)(4)(5)	20.0	8	0.600	0.150	NA	125	1
16	94	2C	TSM2C946(1)016(2)(3)(4)(5)	15.0	6	0.600	0.250	0.175	125	1
20	44	2C	TSM2C446(1)020(2)(3)(4)(5)	8.8	6	0.600	0.200	NA	125	1
25	30	2C	TSM2C306(1)025(2)(3)(4)(5)	7.6	6	0.750	0.450	NA	125	1
35	20	2C	TSM2C206(1)035(2)(3)(4)(5)	7.0	6	1.000	0.600	NA	125	1
6.3	660	2D	TSM2D667(1)006(2)(3)(4)(5)	41.6	8	0.250	0.075	0.050	125	1
10	440	2D	TSM2D447(1)010(2)(3)(4)(5)	44.0	8	0.250	0.100	0.040	125	1
16	300	2D	TSM2D307(1)016(2)(3)(4)(5)	48.0	8	0.350	0.200	0.075	125	1
20	130	2D	TSM2D137(1)020(2)(3)(4)(5)	27.2	8	0.350	0.100	0.075	125	1
25	94	2D	TSM2D946(1)025(2)(3)(4)(5)	23.6	10	0.350	0.100	0.060	125	1
35	44	2D	TSM2D446(1)035(2)(3)(4)(5)	15.4	6	0.350	0.200	0.100	125	1
50	9.4	2D	TSM2D945(1)050(2)(3)(4)(5)	4.8	6	0.750	0.300	0.140	125	1
10	660	2X	TSM2X667(1)010(2)(3)(4)(5)	66.0	10	0.250	0.050	0.025	125	1
50	20	2X	TSM2X206(1)050(2)(3)(4)(5)	10.0	6	0.350	0.200	NA	125	1

Table 1B – TSM3 Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	°C	Reflow Temp ≤ 260°C
6.3	660	3C	TSM3C667(1)006(2)(3)(4)(5)	41.7	10	0.400	0.100	0.077	125	1
10	300	3C	TSM3C307(1)010(2)(3)(4)(5)	30.0	8	0.400	0.100	NA	125	1
16	140	3C	TSM3C147(1)016(2)(3)(4)(5)	22.5	6	0.400	0.167	0.117	125	1
20	66	3C	TSM3C666(1)020(2)(3)(4)(5)	13.2	6	0.400	0.133	NA	125	1
25	45	3C	TSM3C456(1)025(2)(3)(4)(5)	11.4	6	0.500	0.300	NA	125	1
35	30	3C	TSM3C306(1)035(2)(3)(4)(5)	10.5	6	0.667	0.400	NA	125	1
6.3	990	3D	TSM3D997(1)006(2)(3)(4)(5)	62.4	8	0.167	0.050	0.033	125	1
10	660	3D	TSM3D667(1)010(2)(3)(4)(5)	66.0	8	0.167	0.067	0.027	125	1
16	450	3D	TSM3D457(1)016(2)(3)(4)(5)	72.0	8	0.233	0.133	0.050	125	1
20	200	3D	TSM3D207(1)020(2)(3)(4)(5)	40.8	8	0.233	0.067	0.050	125	1
25	140	3D	TSM3D147(1)025(2)(3)(4)(5)	35.4	10	0.233	0.067	0.040	125	1
35	66	3D	TSM3D666(1)035(2)(3)(4)(5)	23.1	6	0.233	0.133	0.067	125	1
50	14	3D	TSM3D146(1)050(2)(3)(4)(5)	7.2	6	0.500	0.200	0.093	125	1
10	990	3X	TSM3X997(1)010(2)(3)(4)(5)	99.0	10	0.167	0.033	0.017	125	1
50	30	3X	TSM3X306(1)050(2)(3)(4)(5)	15.0	6	0.233	0.133	NA	125	1

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold Plated, C = Hot solder dipped, H = Solder Plated, or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles -55°C +85°C after Weibull or 64 = 10 cycles -55°C +85°C before Weibull. Designates Surge current option.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
Refer to Ordering Information for additional detail.

Table 1C – TSM4 Ratings & Part Number Reference

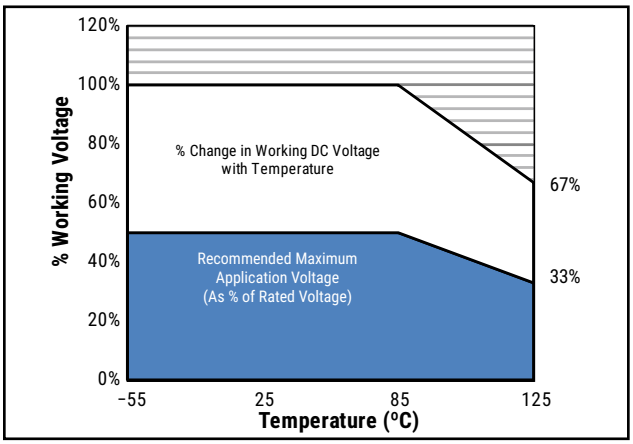
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	°C	Reflow Temp ≤ 260°C
6.3	880	4C	TSM4C887(1)006(2)(3)(4)(5)	55.6	10	0.300	0.075	0.058	125	1
10	400	4C	TSM4C407(1)010(2)(3)(4)(5)	40.0	8	0.300	0.075	NA	125	1
16	190	4C	TSM4C197(1)016(2)(3)(4)(5)	30.0	6	0.300	0.125	0.088	125	1
20	88	4C	TSM4C886(1)020(2)(3)(4)(5)	17.6	6	0.300	0.100	NA	125	1
25	60	4C	TSM4C606(1)025(2)(3)(4)(5)	15.2	6	0.375	0.225	NA	125	1
35	40	4C	TSM4C406(1)035(2)(3)(4)(5)	14.0	6	0.500	0.300	NA	125	1
6.3	1300	4D	TSM4D138(1)006(2)(3)(4)(5)	83.2	8	0.125	0.038	0.025	125	1
10	880	4D	TSM4D887(1)010(2)(3)(4)(5)	88.0	8	0.125	0.050	0.020	125	1
16	600	4D	TSM4D607(1)016(2)(3)(4)(5)	96.0	8	0.175	0.100	0.038	125	1
20	270	4D	TSM4D277(1)020(2)(3)(4)(5)	54.4	8	0.175	0.050	0.038	125	1
25	180	4D	TSM4D187(1)025(2)(3)(4)(5)	47.2	10	0.175	0.050	0.030	125	1
35	88	4D	TSM4D886(1)035(2)(3)(4)(5)	30.8	6	0.175	0.100	0.050	125	1
50	19	4D	TSM4D196(1)050(2)(3)(4)(5)	9.6	6	0.375	0.150	0.070	125	1
10	1300	4X	TSM4X138(1)010(2)(3)(4)(5)	132.0	10	0.125	0.025	0.013	125	1
50	40	4X	TSM4X406(1)050(2)(3)(4)(5)	20.0	6	0.175	0.100	NA	125	1

Table 1D – TSM6 Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	Ω at 25°C 100 kHz Maximum	°C	Reflow Temp ≤ 260°C
6.3	1300	6C	TSM6C138(1)006(2)(3)(4)(5)	83.4	10	0.200	0.050	0.038	125	1
10	600	6C	TSM6C607(1)010(2)(3)(4)(5)	60.0	8	0.200	0.050	NA	125	1
16	280	6C	TSM6C287(1)016(2)(3)(4)(5)	45.0	6	0.200	0.083	0.058	125	1
20	130	6C	TSM6C137(1)020(2)(3)(4)(5)	26.4	6	0.200	0.067	NA	125	1
25	90	6C	TSM6C906(1)025(2)(3)(4)(5)	22.8	6	0.250	0.150	NA	125	1
35	60	6C	TSM6C606(1)035(2)(3)(4)(5)	21.0	6	0.333	0.200	NA	125	1
6.3	2000	6D	TSM6D208(1)006(2)(3)(4)(5)	124.8	8	0.083	0.025	0.017	125	1
10	1300	6D	TSM6D138(1)010(2)(3)(4)(5)	132.0	8	0.083	0.033	0.013	125	1
16	900	6D	TSM6D907(1)016(2)(3)(4)(5)	144.0	8	0.117	0.067	0.025	125	1
20	410	6D	TSM6D417(1)020(2)(3)(4)(5)	81.6	8	0.117	0.033	0.025	125	1
25	280	6D	TSM6D287(1)025(2)(3)(4)(5)	70.8	10	0.117	0.033	0.020	125	1
35	130	6D	TSM6D137(1)035(2)(3)(4)(5)	46.2	6	0.117	0.067	0.033	125	1
50	28	6D	TSM6D286(1)050(2)(3)(4)(5)	14.4	6	0.250	0.100	0.047	125	1
10	2000	6X	TSM6X208(1)010(2)(3)(4)(5)	198.0	10	0.083	0.017	0.008	125	1
50	60	6X	TSM6X606(1)050(2)(3)(4)(5)	30.0	6	0.117	0.067	NA	125	1

1) To complete KEMET part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold Plated, C = Hot solder dipped, H = Solder Plated, or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles -55°C +85°C after Weibull or 64 = 10 cycles -55°C +85°C before Weibull. Designates Surge current option.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines



Reverse Voltage

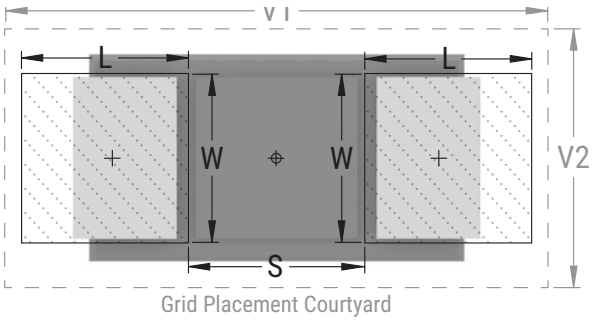
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	L	W	S	V1	V2	L	W	S	V1	V2	L	W	S	V1	V2
TSM2C	2.98	2.74	2.53	9.50	4.50	2.58	2.62	2.73	8.40	4.00	2.20	2.52	2.89	7.54	3.74
TSM2D	3.48	3.24	3.03	11.00	5.60	3.08	3.12	3.23	9.90	5.10	2.70	3.02	3.39	9.04	4.84
TSM2X	3.48	3.24	3.03	11.00	5.60	3.08	3.12	3.23	9.90	5.10	2.70	3.02	3.39	9.04	4.84
TSM3C	2.98	2.74	2.53	9.50	4.50	2.58	2.62	2.73	8.40	4.00	2.20	2.52	2.89	7.54	3.74
TSM3D	3.48	3.24	3.03	11.00	5.60	3.08	3.12	3.23	9.90	5.10	2.70	3.02	3.39	9.04	4.84
TSM3X	3.48	3.24	3.03	11.00	5.60	3.08	3.12	3.23	9.90	5.10	2.70	3.02	3.39	9.04	4.84
TSM4C	2.98	6.04	2.53	9.50	7.80	2.58	5.92	2.73	8.40	7.30	2.20	5.82	2.89	7.54	7.04
TSM4D	3.48	7.64	3.03	11.00	10.10	3.08	7.52	3.23	9.90	9.60	2.70	7.42	3.39	9.04	9.34
TSM4X	3.48	7.64	3.03	11.00	10.10	3.08	7.52	3.23	9.90	9.60	2.70	7.42	3.39	9.04	9.34
TSM6C	2.98	6.04	2.53	9.50	7.80	2.58	5.92	2.73	8.40	7.30	2.20	5.82	2.89	7.54	7.04
TSM6D	3.48	7.64	3.03	11.00	10.10	3.08	7.52	3.23	9.90	9.60	2.70	7.42	3.39	9.04	9.34
TSM6X	3.48	7.64	3.03	11.00	10.10	3.08	7.52	3.23	9.90	9.60	2.70	7.42	3.39	9.04	9.34

Density Level A: *For low-density Product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC-7351).*
[1] *Height of these chips may create problems in wave soldering.*



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

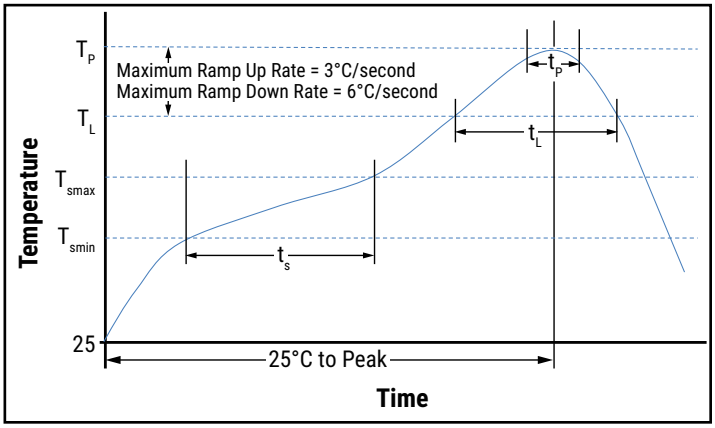
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/seconds maximum	3°C/seconds maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C*	250°C*
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.



Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40ºC and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Packaging Information

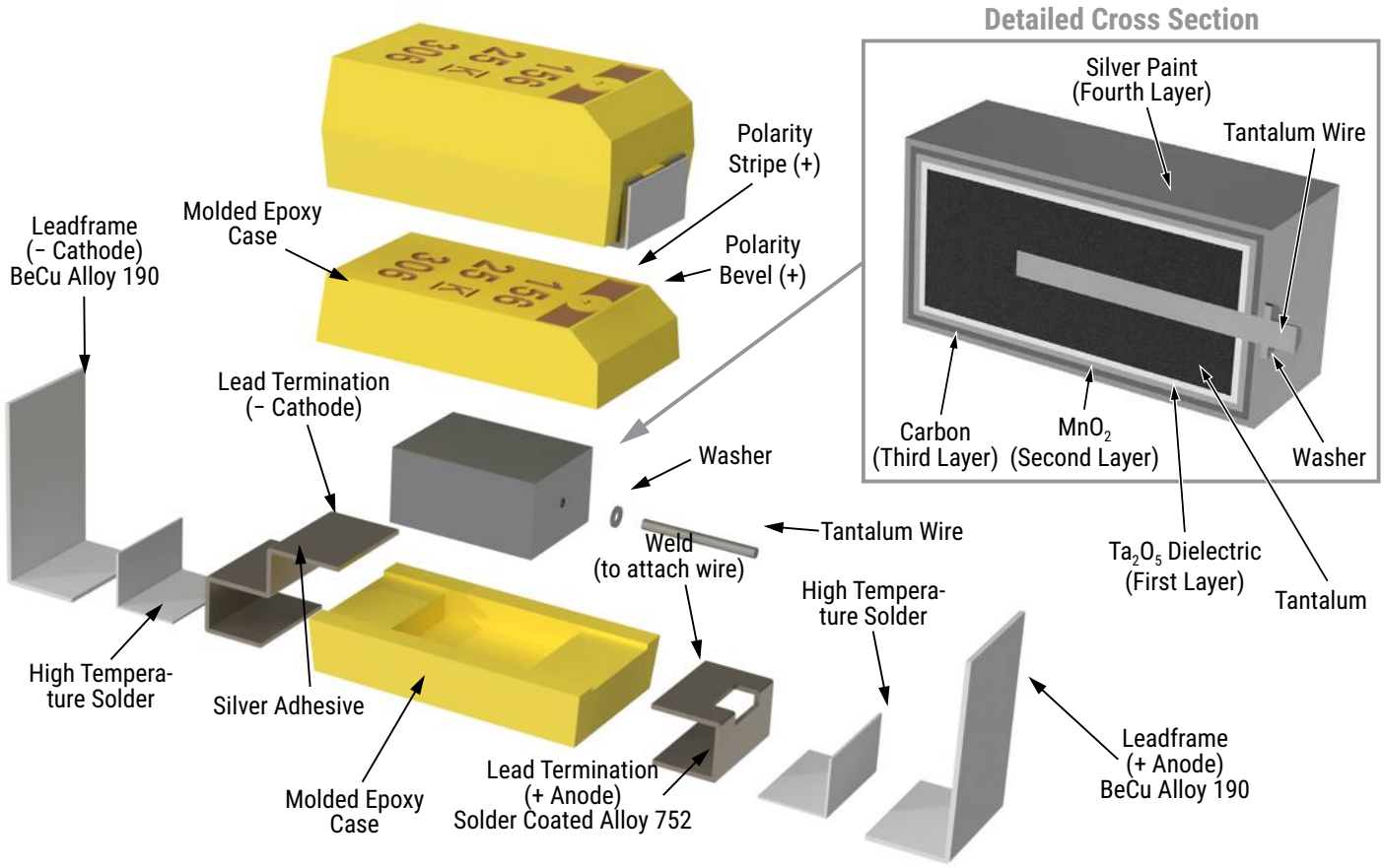
KEMET Tantalum Stack MnO_2 (TSM) are packed in plastic trays
This packaging method is for manual board placement

Packaging Quantity

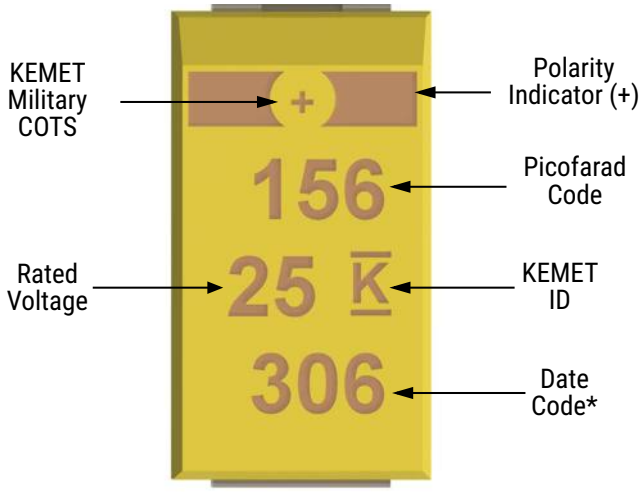
Case Code	Min pcs/tray	Max pcs/tray
2X	1	50
3X	1	50
4X	1	50
6X	1	50

X denotes the different stacks letter (B, C, D, X and O)

Construction



Marking (Discrete Capacitor)



* 306 = 6th week of 2023

Date Code *	
1st digit = Last number of Year	0 = 2020 1 = 2021 2 = 2022 3 = 2023 4 = 2024
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

NOTE: The marking observed is for the discrete capacitor used in the construction of the stacked product.

Tantalum Surface Mount Capacitors – Space Grade

T493 Space Grade High Reliability Alternative (HRA) MnO_2 (CWR11 Style)

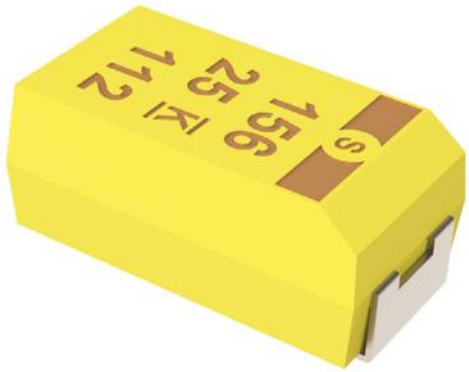
Overview

KEMET's Space Grade capacitors are suitable for use by the defense/aerospace customers in high reliability space applications. These capacitors meet the requirements of MIL–PRF–55365 as well as MIL–STD–1580. These capacitors incorporate an intensive testing and screening protocol which is customizable depending upon customer's specific needs.

The full part number allows for designation of surge current level (10 cycles −55°C and +85°C before and/or after Weibull grading, 10 cycles +25°C), performance testing level (see chart for details on available options), ESR (low and standard), and termination finish (see description in each series). Fused versions are available for built-in circuit protection, as well as multi-anode designs for very low ESR values.

Benefits

- Standard case sizes per EIA 535BAAC
- Termination finishes options per MIL–PRF–55365: Gold Plated B, Hot Solder Dipped C, Solder Plated H, Solder Fused K
- Weibull Grading C (0.01%/1,000 hours)
- Surge current testing available per MIL–PRF–55365: 10 cycles at 25°C, 10 cycles at −55°C and +85°C
- Standard and low ESR options available



Applications

Typical applications include decoupling and filtering in defense and aerospace applications.

Environmental Compliance

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	493	D	227	K	006	C	H	64	2	A	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage (V)	Failure Rate/ Design	Lead Material	Surge	ESR	Testing	Packaging (C-Spec)
T = Tantalum	CRW11 style - Space grade	A B C D X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	C = 0.01% /1,000 hours	C = Hot solder dipped H = Standard solder-coated (SnPb 5% Pb minimum) B = Gold-plated K = Solder fused	61 = No Surge 62 = 10 Cycles after Weibull, 25°C 63 = 10 Cycles, after Weibull, −55°C and 85°C 64 = 10 Cycles before Weibull, −55°C and 85°C 65 = 10 Cycles before and after Weibull, −55°C and 85°C	1 = ESR - standard 2 = ESR - low	A = Option A B = Option B C* = Option C * Option C not available for A case size part numbers	Blank = 7" Reel 7280 = 13" Reel 7610 = Bulk bag 7640 = Bulk plastic box WAFL = Waffle pack

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 330 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (mA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at Rated Voltage, 2,000 hours 125°C at 2/3 Rated Voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 Volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55C° to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C		+25°C	–55°C	+85°C	+125°C
		Δ C/C	IL*	±10%	±10%	±20%
		DF	IL	IL	1.5 x IL	1.5 x IL
		DCL	IL	n/a	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x Rated Voltage 1,000 cycles. (125°C, 1.2 x Rated Voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak. MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Additional qualification tests per MIL–PRF–55365/8						

**IL = Initial Limit*

Certification

MIL–PRF–55365/8

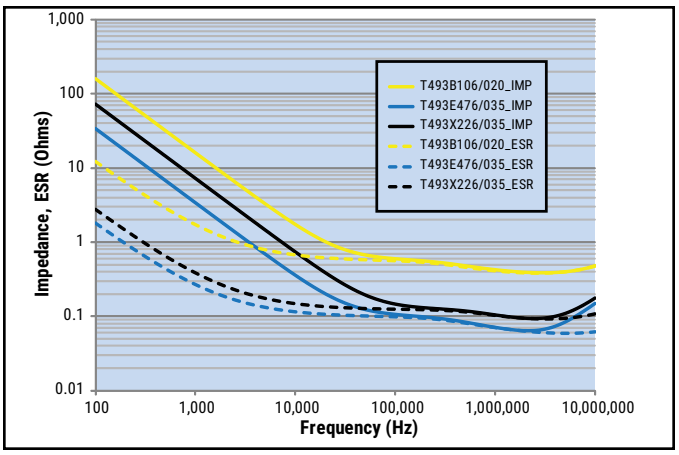
Test Methods

Test Sequence	Test Method	Option A	Option B	Option C
100% Serialization	KEMET Standard			X
100% IR Reflow	MIL–PRF–55365	X	X	X
100% Thermal Shock	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard			X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Surge Current, Option C with 5% PDA Calculation	MIL–PRF–55365 with 5% PDA Calculation	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Voltage Aging, 10 hours at 1.32 V_R	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
100% Weibull Grading C	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Surge Current, Option A or B with 5% PDA Calculation	MIL–PRF–55365 with 5% PDA Calculation	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
3 Sigma Screening – All Electricals	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
Destructive Physical Analysis (DPA) (5 pieces- each lot)	MIL–PRF–55365	X	X	X
Group B Testing (22 pieces – each lot)	* See Note Below		X	X
Temperature Stability – sample	MIL–PRF–55365	X	X	X
Solderability – Sample	MIL–PRF–55365	X	X	X
Group C Testing (57 pieces – each Lot)**	MIL–PRF–55365		X	X
100% X-ray	MIL–PRF–55365	X		
100% X-ray – 2 Plane***	MIL–PRF–55365 and KEMET Standard		X	X
100% Physical Dimension Verification	MIL–PRF–55365	X	X	X
Data Pack				
Group A and C Summaries			X	X
2 Plane X-ray JPEG photos			X	X
DPA Report			X	X
Attributes/Variables Data for Cap/Df/DCL/ESR				X

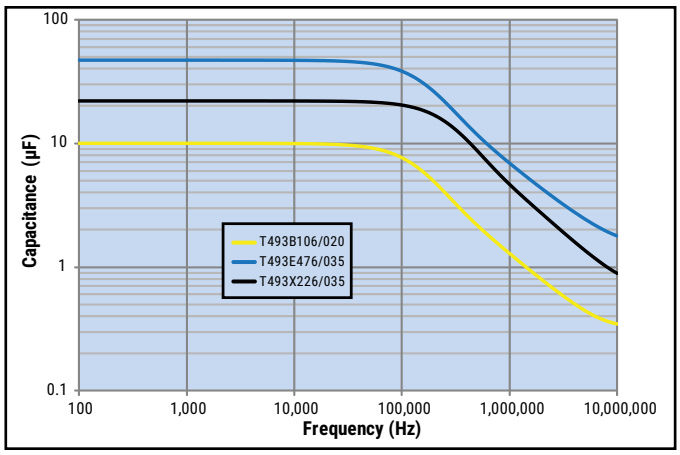
***X** = Included in test option*
** Group B Testing = 10,000 Cycles Surge Current, 85°C, 40% Vr*
*** Group C Post Moisture ESR limit = 1.25 initial limit*
**** 2 Plane X-ray = Top and side views, molded case wall thickness minimum 0.005" on all sides, negative/positive termination attachment criteria per MIL–STD–1580*

Electrical Characteristics

ESR vs. Frequency

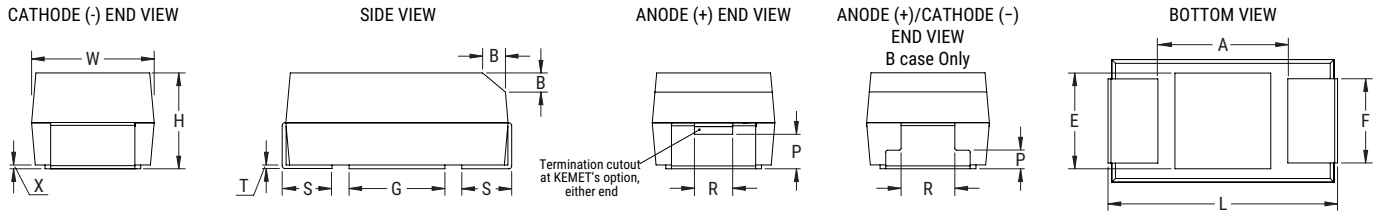


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component													
KEMET	EIA	L	W	H	F±0.1 ±(0.004)	S±0.3 ±(0.012)	B±0.15 (Ref)±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)	Net Weight (mg)
A	3216–18	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	1.2 (0.047)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	0.8 (0.031)	1.1 (0.043)	1.3 (0.051)	58.97
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9±0.2 (0.075±0.008)	2.2 (0.087)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.1 (0.043)	1.8 (0.071)	2.2 (0.087)	102.3
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.5 (0.098)	2.8 (0.110)	2.4 (0.094)	224.2
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	412.33
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	652.04

Notes: (Ref) – Dimensions provided for reference only. No dimensions provided for B, P or R because low profile cases do not have a bevel or a notch. These weights are provided as a reference. If exact weights are needed, please contact your KEMET Sales Representative.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	2.2	A/3216–18	T493A225(1)004C(2)(3)(4)(6)	0.5	6.0	8.0	6.0	97	112	125	1
4	3.3	A/3216–18	T493A335(1)004C(2)(3)(4)(6)	0.5	6.0	8.0	4.0	97	137	125	1
4	4.7	A/3216–18	T493A475(1)004C(2)(3)(4)(6)	0.5	6.0	8.0	3.5	97	146	125	1
4	6.8	A/3216–18	T493A685(1)004C(2)(3)(4)(6)	0.5	6.0	6.0	3.0	112	158	125	1
4	6.8	B/3528-21	T493B685(1)004C(2)(3)(4)(5)	0.5	6.0	5.5	2.0	124	206	125	1
4	10.0	A/3216–18	T493A106(1)004C(2)(3)(4)(6)	0.5	6.0	6.0	2.0	112	194	125	1
4	10.0	B/3528-21	T493B106(1)004C(2)(3)(4)(5)	0.5	6.0	3.5	1.2	156	266	125	1
4	15.0	A/3216–18	T493A156(1)004C(2)(3)(4)(6)	0.6	6.0	4.0	1.5	137	224	125	1
4	15.0	B/3528-21	T493B156(1)004C(2)(3)(4)(5)	0.6	6.0	3.5	1.2	156	266	125	1
4	22.0	A/3216–18	T493A226(1)004C(2)(3)(4)(6)	0.9	6.0	4.0	1.5	137	224	125	1
4	22.0	B/3528-21	T493B226(1)004C(2)(3)(4)(5)	0.9	6.0	3.5	0.6	156	377	125	1
4	22.0	C/6032-28	T493C226(1)004C(2)(3)(4)(5)	0.9	6.0	1.8	0.5	247	469	125	1
4	33.0	B/3528-21	T493B336(1)004C(2)(3)(4)(5)	1.3	6.0	3.5	0.5	156	412	125	1
4	33.0	C/6032-28	T493C336(1)004C(2)(3)(4)(5)	1.3	6.0	1.8	0.5	247	469	125	1
4	47.0	B/3528-21	T493B476(1)004C(2)(3)(4)(5)	1.9	6.0	3.0	0.5	168	412	125	1
4	47.0	C/6032-28	T493C476(1)004C(2)(3)(4)(5)	1.9	6.0	1.8	0.5	247	469	125	1
4	68.0	B/3528-21	T493B686(1)004C(2)(3)(4)(5)	2.7	6.0	3.5	2.0	156	206	125	1
4	68.0	C/6032-28	T493C686(1)004C(2)(3)(4)(5)	2.7	6.0	1.6	0.25	262	663	125	1
4	68.0	D/7343-31	T493D686(1)004C(2)(3)(4)(5)	2.7	6.0	0.8	0.2	433	866	125	1
4	100.0	C/6032-28	T493C107(1)004C(2)(3)(4)(5)	4.0	8.0	1.2	0.2	303	742	125	1
4	100.0	D/7343-31	T493D107(1)004C(2)(3)(4)(5)	4.0	8.0	0.8	0.2	433	866	125	1
4	150	C/6032-28	T493C157(1)004C(2)(3)(4)(5)	6.0	8.0	1.2	0.3	303	606	125	1
4	150	D/7343-31	T493D157(1)004C(2)(3)(4)(5)	6.0	8.0	0.8	0.15	433	1000	125	1
4	220	D/7343-31	T493D227(1)004C(2)(3)(4)(5)	8.8	8.0	0.9	0.7	408	463	125	1
4	330	D/7343-31	T493D337(1)004C(2)(3)(4)(5)	13.2	8.0	0.7	0.15	463	1000	125	1
4	330	X/7343-43	T493X337(1)004C(2)(3)(4)(5)	13.2	8.0	0.5	0.2	574	908	125	1
6.3	1.5	A/3216–18	T493A155(1)006C(2)(3)(4)(6)	0.5	6.0	8.0	6.0	97	112	125	1
6.3	2.2	A/3216–18	T493A225(1)006C(2)(3)(4)(6)	0.5	6.0	8.0	6.0	97	112	125	1
6.3	3.3	A/3216–18	T493A335(1)006C(2)(3)(4)(6)	0.5	6.0	8.0	6.0	97	112	125	1
6.3	4.7	A/3216–18	T493A475(1)006C(2)(3)(4)(6)	0.5	6.0	6.0	3.5	112	146	125	1
6.3	4.7	B/3528-21	T493B475(1)006C(2)(3)(4)(5)	0.5	6.0	5.5	3.5	124	156	125	1
6.3	6.8	A/3216–18	T493A685(1)006C(2)(3)(4)(6)	0.5	6.0	6.0	2.0	112	194	125	1
6.3	6.8	B/3528-21	T493B685(1)006C(2)(3)(4)(5)	0.5	6.0	3.5	1.2	156	266	125	1
6.3	10.0	A/3216–18	T493A106(1)006C(2)(3)(4)(6)	0.6	6.0	4.0	2.0	137	194	125	1
6.3	10.0	B/3528-21	T493B106(1)006C(2)(3)(4)(5)	0.6	6.0	3.5	1.0	156	292	125	1
6.3	15.0	A/3216–18	T493A156(1)006C(2)(3)(4)(6)	0.9	6.0	4.0	1.5	137	224	125	1
6.3	15.0	B/3528-21	T493B156(1)006C(2)(3)(4)(5)	0.9	6.0	3.5	0.7	156	348	125	1
6.3	15.0	C/6032-28	T493C156(1)006C(2)(3)(4)(5)	0.9	6.0	1.8	0.6	247	428	125	1
6.3	22.0	B/3528-21	T493B226(1)006C(2)(3)(4)(5)	1.4	6.0	3.5	0.6	156	377	125	1
6.3	22.0	C/6032-28	T493C226(1)006C(2)(3)(4)(5)	1.4	6.0	1.8	0.5	247	469	125	1
6.3	33.0	B/3528-21	T493B336(1)006C(2)(3)(4)(5)	2.0	6.0	3.0	0.6	168	377	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20% or K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B = Gold Plated, C = Hot Solder Dipped, H = Solder Plated, or K = Solder Fused. Designates Termination Finish.
(3) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
(6) To complete KEMET part number, insert A = Option 1 or B = Option 2. Designates Test Option. See Space Grade Test Methods chart for more information. Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
6.3	33.0	C/6032-28	T493C336(1)006C(2)(3)(4)(5)	2.0	6.0	1.8	0.3	247	606	125	1
6.3	47.0	B/3528-21	T493B476(1)006C(2)(3)(4)(5)	2.9	6.0	3.5	2.0	156	206	125	1
6.3	47.0	C/6032-28	T493C476(1)006C(2)(3)(4)(5)	2.9	6.0	1.6	0.25	262	663	125	1
6.3	47.0	D/7343-31	T493D476(1)006C(2)(3)(4)(5)	2.9	6.0	0.8	0.22	433	826	125	1
6.3	68.0	C/6032-28	T493C686(1)006C(2)(3)(4)(5)	4.1	6.0	1.2	0.2	303	742	125	1
6.3	68.0	D/7343-31	T493D686(1)006C(2)(3)(4)(5)	4.1	6.0	0.8	0.2	433	866	125	1
6.3	100.0	C/6032-28	T493C107(1)006C(2)(3)(4)(5)	6.0	8.0	1.2	0.3	303	606	125	1
6.3	100.0	D/7343-31	T493D107(1)006C(2)(3)(4)(5)	6.0	8.0	0.8	0.15	433	1000	125	1
6.3	150.0	D/7343-31	T493D157(1)006C(2)(3)(4)(5)	9.0	8.0	0.7	0.15	463	1000	125	1
6.3	220.0	D/7343-31	T493D227(1)006C(2)(3)(4)(5)	13.2	8.0	0.7	0.1	463	1225	125	1
6.3	220.0	X/7343-43	T493X227(1)006C(2)(3)(4)(5)	13.2	8.0	0.7	0.15	486	1049	125	1
6.3	330.0	D/7343-31	T493D337(1)006C(2)(3)(4)(5)	19.8	8.0	0.5	0.15	548	1000	125	1
6.3	330.0	X/7343-43	T493X337(1)006C(2)(3)(4)(5)	19.8	8.0	0.5	0.1	574	1285	125	1
10	1.0	A/3216–18	T493A105(1)010C(2)(3)(4)(6)	0.5	4.0	10.0	6.0	87	112	125	1
10	1.5	A/3216–18	T493A155(1)010C(2)(3)(4)(6)	0.5	6.0	8.0	6.0	97	112	125	1
10	2.2	A/3216–18	T493A225(1)010C(2)(3)(4)(6)	0.5	6.0	8.0	6.0	97	112	125	1
10	3.3	A/3216–18	T493A335(1)010C(2)(3)(4)(6)	0.5	6.0	6.0	4.0	112	137	125	1
10	3.3	B/3528-21	T493B335(1)010C(2)(3)(4)(5)	0.5	6.0	5.5	3.5	124	156	125	1
10	4.7	A/3216–18	T493A475(1)010C(2)(3)(4)(6)	0.5	6.0	6.0	3.0	112	158	125	1
10	4.7	B/3528-21	T493B475(1)010C(2)(3)(4)(5)	0.5	6.0	3.5	1.5	156	238	125	1
10	6.8	A/3216–18	T493A685(1)010C(2)(3)(4)(6)	0.7	6.0	6.0	3.0	112	158	125	1
10	6.8	B/3528-21	T493B685(1)010C(2)(3)(4)(5)	0.7	6.0	3.5	1.2	156	266	125	1
10	10.0	A/3216–18	T493A106(1)010C(2)(3)(4)(6)	1.0	6.0	4.0	1.8	137	204	125	1
10	10.0	B/3528-21	T493B106(1)010C(2)(3)(4)(5)	1.0	6.0	3.5	0.8	156	326	125	1
10	10.0	C/6032-28	T493C106(1)010C(2)(3)(4)(5)	1.0	6.0	1.8	0.6	247	428	125	1
10	15.0	B/3528-21	T493B156(1)010C(2)(3)(4)(5)	1.5	6.0	3.5	0.7	156	348	125	1
10	15.0	C/6032-28	T493C156(1)010C(2)(3)(4)(5)	1.5	6.0	1.8	0.5	247	469	125	1
10	22.0	B/3528-21	T493B226(1)010C(2)(3)(4)(5)	2.2	6.0	3.0	0.7	168	348	125	1
10	22.0	C/6032-28	T493C226(1)010C(2)(3)(4)(5)	2.2	6.0	1.8	0.4	247	524	125	1
10	33.0	C/6032-28	T493C336(1)010C(2)(3)(4)(5)	3.3	6.0	1.6	0.3	262	606	125	1
10	33.0	D/7343-31	T493D336(1)010C(2)(3)(4)(5)	3.3	6.0	0.8	0.25	433	775	125	1
10	47.0	C/6032-28	T493C476(1)010C(2)(3)(4)(5)	4.7	6.0	1.2	0.3	303	606	125	1
10	47.0	D/7343-31	T493D476(1)010C(2)(3)(4)(5)	4.7	6.0	0.8	0.22	433	826	125	1
10	68.0	C/6032-28	T493C686(1)010C(2)(3)(4)(5)	6.8	6.0	1.2	0.3	303	606	125	1
10	68.0	D/7343-31	T493D686(1)010C(2)(3)(4)(5)	6.8	6.0	0.8	0.2	433	866	125	1
10	68.0	X/7343-43	T493X686(1)010C(2)(3)(4)(5)	5.4	4.0	0.5	0.15	574	1049	125	1
10	100.0	D/7343-31	T493D107(1)010C(2)(3)(4)(5)	10.0	8.0	0.7	0.1	463	1225	125	1
10	150.0	D/7343-31	T493D157(1)010C(2)(3)(4)(5)	15.0	8.0	0.7	0.1	463	1225	125	1
10	150.0	X/7343-43	T493X157(1)010C(2)(3)(4)(5)	15.0	8.0	0.7	0.15	486	1049	125	1
10	220.0	D/7343-31	T493D227(1)010C(2)(3)(4)(5)	22.0	8.0	0.5	0.15	548	1000	125	1
10	220.0	X/7343-43	T493X227(1)010C(2)(3)(4)(5)	22.0	8.0	0.5	0.1	574	1285	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20% or K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B = Gold Plated, C = Hot Solder Dipped, H = Solder Plated, or K = Solder Fused. Designates Termination Finish.
(3) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
(6) To complete KEMET part number, insert A = Option 1 or B = Option 2. Designates Test Option. See Space Grade Test Methods chart for more information. Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	330.0	X/7343-43	T493X337(1)010C(2)(3)(4)(5)	33.0	10.0	0.5	0.1	574	1285	125	1
16	0.68	A/3216–18	T493A684(1)016C(2)(3)(4)(6)	1.1	6.0	12.0	8.0	79	97	125	1
16	1.0	A/3216–18	T493A105(1)016C(2)(3)(4)(6)	0.5	4.0	10.0	6.0	87	112	125	1
16	1.5	A/3216–18	T493A155(1)016C(2)(3)(4)(6)	0.5	6.0	8.0	6.0	97	112	125	1
16	2.2	A/3216–18	T493A225(1)016C(2)(3)(4)(6)	0.5	6.0	6.0	4.0	112	137	125	1
16	3.3	B/3528-21	T493B335(1)016C(2)(3)(4)(5)	0.5	6.0	3.5	2.0	156	206	125	1
16	4.7	B/3528-21	T493B475(1)016C(2)(3)(4)(5)	0.8	6.0	3.5	1.5	156	238	125	1
16	6.8	B/3528-21	T493B685(1)016C(2)(3)(4)(5)	1.1	6.0	3.5	1.2	156	266	125	1
16	6.8	C/6032-28	T493C685(1)016C(2)(3)(4)(5)	1.1	6.0	1.9	0.8	241	371	125	1
16	10.0	C/6032-28	T493C106(1)016C(2)(3)(4)(5)	1.6	6.0	1.8	0.6	247	428	125	1
16	15.0	C/6032-28	T493C156(1)016C(2)(3)(4)(5)	2.4	6.0	1.8	0.4	247	524	125	1
16	22.0	C/6032-28	T493C226(1)016C(2)(3)(4)(5)	3.6	6.0	1.6	0.35	262	561	125	1
16	22.0	D/7343-31	T493D226(1)016C(2)(3)(4)(5)	3.6	6.0	0.8	0.25	433	775	125	1
16	33.0	D/7343-31	T493D336(1)016C(2)(3)(4)(5)	5.3	6.0	0.8	0.25	433	775	125	1
16	47.0	D/7343-31	T493D476(1)016C(2)(3)(4)(5)	7.5	6.0	0.8	0.2	433	866	125	1
16	68.0	D/7343-31	T493D686(1)016C(2)(3)(4)(5)	10.9	6.0	0.7	0.15	463	1000	125	1
16	100.0	X/7343-43	T493X107(1)016C(2)(3)(4)(5)	16.0	8.0	0.7	0.1	486	1285	125	1
20	0.47	A/3216–18	T493A474(1)020C(2)(3)(4)(6)	0.5	4.0	14.0	9.0	73	91	125	1
20	0.68	A/3216–18	T493A684(1)020C(2)(3)(4)(6)	0.5	4.0	12.0	8.0	79	97	125	1
20	1.0	A/3216–18	T493A105(1)020C(2)(3)(4)(6)	0.5	4.0	10.0	5.5	87	117	125	1
20	1.5	B/3528-21	T493B155(1)020C(2)(3)(4)(5)	0.5	6.0	6.0	4.0	119	146	125	1
20	2.2	B/3528-21	T493B225(1)020C(2)(3)(4)(5)	0.5	6.0	3.5	1.5	156	238	125	1
20	3.3	B/3528-21	T493B335(1)020C(2)(3)(4)(5)	0.7	6.0	3.5	1.3	156	256	125	1
20	4.7	C/6032-28	T493C475(1)020C(2)(3)(4)(5)	1.0	6.0	2.4	0.6	214	428	125	1
20	6.8	C/6032-28	T493C685(1)020C(2)(3)(4)(5)	1.4	6.0	1.9	0.6	241	428	125	1
20	10.0	C/6032-28	T493C106(1)020C(2)(3)(4)(5)	2.0	6.0	1.8	0.5	247	469	125	1
20	15.0	C/6032-28	T493C156(1)020C(2)(3)(4)(5)	3.0	6.0	1.7	0.4	254	524	125	1
20	15.0	D/7343-31	T493D156(1)020C(2)(3)(4)(5)	3.0	6.0	1.0	0.35	387	655	125	1
20	22.0	D/7343-31	T493D226(1)020C(2)(3)(4)(5)	4.4	6.0	0.8	0.3	433	707	125	1
20	33.0	D/7343-31	T493D336(1)020C(2)(3)(4)(5)	6.6	6.0	0.8	0.2	433	866	125	1
20	47.0	X/7343-43	T493X476(1)020C(2)(3)(4)(5)	7.5	4.0	0.7	0.15	486	1049	125	1
20	68.0	X/7343-43	T493X686(1)020C(2)(3)(4)(5)	13.6	6.0	0.7	0.15	486	1049	125	1
25	0.33	A/3216–18	T493A334(1)025C(2)(3)(4)(6)	0.5	4.0	15.0	10.0	71	87	125	1
25	0.47	A/3216–18	T493A474(1)025C(2)(3)(4)(6)	0.5	4.0	14.0	9.0	73	91	125	1
25	0.68	A/3216–18	T493A684(1)025C(2)(3)(4)(6)	0.5	4.0	10.0	6.0	87	112	125	1
25	0.68	B/3528-21	T493B684(1)025C(2)(3)(4)(5)	0.5	4.0	7.5	5.5	106	124	125	1
25	1.0	A/3216–18	T493A105(1)025C(2)(3)(4)(6)	0.5	4.0	8.0	4.0	97	137	125	1
25	1.0	B/3528-21	T493B105(1)025C(2)(3)(4)(5)	0.5	4.0	5.0	2.0	130	206	125	1
25	1.5	A/3216–18	T493A155(1)025C(2)(3)(4)(6)	0.5	6.0	10.0	3.0	87	158	125	1
25	1.5	B/3528-21	T493B155(1)025C(2)(3)(4)(5)	0.5	6.0	5.0	1.5	130	238	125	1
25	2.2	B/3528-21	T493B225(1)025C(2)(3)(4)(5)	0.6	6.0	4.5	1.2	137	266	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20% or K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B = Gold Plated, C = Hot Solder Dipped, H = Solder Plated, or K = Solder Fused. Designates Termination Finish.
(3) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
(6) To complete KEMET part number, insert A = Option 1 or B = Option 2. Designates Test Option. See Space Grade Test Methods chart for more information. Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
25	2.2	C/6032-28	T493C225(1)025C(2)(3)(4)(5)	0.6	6.0	3.5	2.2	177	224	125	1
25	3.3	B/3528-21	T493B335(1)025C(2)(3)(4)(5)	0.9	6.0	3.5	2.0	156	206	125	1
25	3.3	C/6032-28	T493C335(1)025C(2)(3)(4)(5)	0.9	6.0	2.5	1.2	210	303	125	1
25	4.7	C/6032-28	T493C475(1)025C(2)(3)(4)(5)	1.2	6.0	2.4	0.6	214	428	125	1
25	6.8	C/6032-28	T493C685(1)025C(2)(3)(4)(5)	1.7	6.0	1.9	0.6	241	428	125	1
25	6.8	D/7343-31	T493D685(1)025C(2)(3)(4)(5)	1.7	6.0	1.4	1.0	327	387	125	1
25	10.0	C/6032-28	T493C106(1)025C(2)(3)(4)(5)	2.5	6.0	1.5	0.5	271	469	125	1
25	10.0	D/7343-31	T493D106(1)025C(2)(3)(4)(5)	2.5	6.0	1.0	0.4	387	612	125	1
25	15.0	C/6032-28	T493C156(1)025C(2)(3)(4)(5)	3.8	6.0	1.5	0.9	271	350	125	1
25	15.0	D/7343-31	T493D156(1)025C(2)(3)(4)(5)	3.8	6.0	1.0	0.35	387	655	125	1
25	15.0	X/7343-43	T493X156(1)025C(2)(3)(4)(5)	3.0	6.0	0.7	0.2	486	908	125	1
25	22.0	D/7343-31	T493D226(1)025C(2)(3)(4)(5)	5.5	6.0	0.8	0.2	433	866	125	1
25	22.0	X/7343-43	T493X226(1)025C(2)(3)(4)(5)	4.4	4.0	0.7	0.23	486	847	125	1
25	33.0	X/7343-43	T493X336(1)025C(2)(3)(4)(5)	8.3	6.0	0.7	0.3	486	742	125	1
35	0.10	A/3216–18	T493A104(1)035C(2)(3)(4)(6)	0.5	4.0	20.0	10.0	61	87	125	1
35	0.15	A/3216–18	T493A154(1)035C(2)(3)(4)(6)	0.5	4.0	19.0	6.0	63	112	125	1
35	0.22	A/3216–18	T493A224(1)035C(2)(3)(4)(6)	0.5	4.0	18.0	6.0	65	112	125	1
35	0.33	A/3216–18	T493A334(1)035C(2)(3)(4)(6)	0.5	4.0	15.0	6.0	71	112	125	1
35	0.47	A/3216–18	T493A474(1)035C(2)(3)(4)(6)	0.5	4.0	14.0	4.0	73	137	125	1
35	0.47	B/3528-21	T493B474(1)035C(2)(3)(4)(5)	0.5	4.0	8.0	2.5	97	173	125	1
35	0.68	A/3216–18	T493A684(1)035C(2)(3)(4)(6)	0.5	4.0	10.0	6.0	87	112	125	1
35	0.68	B/3528-21	T493B684(1)035C(2)(3)(4)(5)	0.5	4.0	6.5	2.5	114	184	125	1
35	1.0	B/3528-21	T493B105(1)035C(2)(3)(4)(5)	0.5	4.0	5.0	2.0	130	206	125	1
35	1.5	B/3528-21	T493B155(1)035C(2)(3)(4)(5)	0.5	6.0	5.0	3.0	130	168	125	1
35	1.5	C/6032-28	T493C155(1)035C(2)(3)(4)(5)	0.5	6.0	4.5	2.5	156	210	125	1
35	2.2	B/3528-21	T493B225(1)035C(2)(3)(4)(5)	0.8	6.0	4.0	2.5	146	184	125	1
35	2.2	C/6032-28	T493C225(1)035C(2)(3)(4)(5)	0.8	6.0	3.5	1.5	177	271	125	1
35	3.3	C/6032-28	T493C335(1)035C(2)(3)(4)(5)	1.2	6.0	2.5	0.8	210	371	125	1
35	4.7	C/6032-28	T493C475(1)035C(2)(3)(4)(5)	1.7	6.0	2.5	0.6	210	428	125	1
35	4.7	D/7343-31	T493D475(1)035C(2)(3)(4)(5)	1.7	6.0	1.5	0.7	316	463	125	1
35	6.8	D/7343-31	T493D685(1)035C(2)(3)(4)(5)	2.4	6.0	1.3	0.5	340	548	125	1
35	10.0	D/7343-31	T493D106(1)035C(2)(3)(4)(5)	3.5	6.0	1.0	0.3	387	707	125	1
35	10.0	X/7343-43	T493X106(1)035C(2)(3)(4)(5)	2.8	4.0	0.9	0.25	428	812	125	1
35	15.0	D/7343-31	T493D156(1)035C(2)(3)(4)(5)	5.3	6.0	0.8	0.3	433	707	125	1
35	15.0	X/7343-43	T493X156(1)035C(2)(3)(4)(5)	5.3	6.0	0.9	0.3	428	742	125	1
35	22.0	X/7343-43	T493X226(1)035C(2)(3)(4)(5)	7.7	6.0	0.7	0.3	486	742	125	1
35	33.0	D/7343-31	T493D336(1)035C(2)(3)(4)(5)	11.6	6.0	0.3	N/A	707	N/A	125	1
50	0.10	A/3216–18	T493A104(1)050C(2)(3)(4)(6)	0.5	4.0	20.0	10.0	61	87	125	1
50	0.15	A/3216–18	T493A154(1)050C(2)(3)(4)(6)	0.5	4.0	19.0	10.0	63	87	125	1
50	0.15	B/3528-21	T493B154(1)050C(2)(3)(4)(5)	0.5	4.0	16.0	10.0	73	92	125	1
50	0.22	B/3528-21	T493B224(1)050C(2)(3)(4)(5)	0.5	4.0	14.0	10.0	78	92	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20% or K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B = Gold Plated, C = Hot Solder Dipped, H = Solder Plated, or K = Solder Fused. Designates Termination Finish.
(3) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
(6) To complete KEMET part number, insert A = Option 1 or B = Option 2. Designates Test Option. See Space Grade Test Methods chart for more information. Refer to Ordering Information for additional detail.

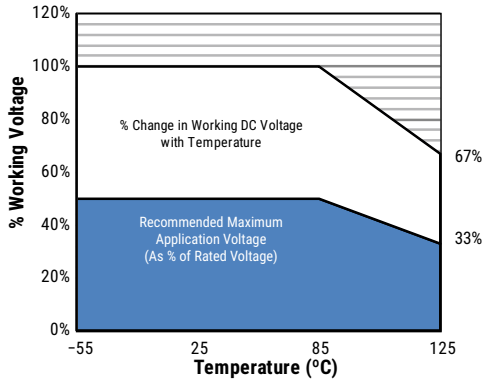
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
50	0.33	B/3528-21	T493B334(1)050C(2)(3)(4)(5)	0.5	4.0	10.0	2.5	92	184	125	1
50	0.47	B/3528-21	T493B474(1)050C(2)(3)(4)(5)	0.5	4.0	9.0	2.0	97	206	125	1
50	0.47	C/6032-28	T493C474(1)050C(2)(3)(4)(5)	0.5	4.0	8.0	1.8	117	247	125	1
50	0.68	C/6032-28	T493C684(1)050C(2)(3)(4)(5)	0.5	4.0	7.0	1.6	125	262	125	1
50	1.0	C/6032-28	T493C105(1)050C(2)(3)(4)(5)	0.5	4.0	5.5	1.6	141	262	125	1
50	1.5	C/6032-28	T493C155(1)050C(2)(3)(4)(5)	0.8	6.0	4.5	1.5	156	271	125	1
50	1.5	D/7343-31	T493D155(1)050C(2)(3)(4)(5)	0.8	6.0	3.5	1.0	207	387	125	1
50	2.2	C/6032-28	T493C225(1)050C(2)(3)(4)(5)	1.1	6.0	3.5	1.5	177	271	125	1
50	2.2	D/7343-31	T493D225(1)050C(2)(3)(4)(5)	1.1	6.0	2.5	0.8	245	433	125	1
50	3.3	D/7343-31	T493D335(1)050C(2)(3)(4)(5)	1.7	6.0	2.0	0.8	274	433	125	1
50	4.7	D/7343-31	T493D475(1)050C(2)(3)(4)(5)	2.4	6.0	1.5	0.6	316	500	125	1
50	4.7	X/7343-43	T493X475(1)050C(2)(3)(4)(5)	1.9	4.0	0.9	0.3	428	742	125	1
50	6.8	X/7343-43	T493X685(1)050C(2)(3)(4)(5)	3.5	6.0	1.0	0.5	406	574	125	1
50	10.0	X/7343-43	T493X106(1)050C(2)(3)(4)(5)	5.0	6.0	0.7	0.4	486	642	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20% or K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B = Gold Plated, C = Hot Solder Dipped, H = Solder Plated, or K = Solder Fused. Designates Termination Finish.
(3) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
(6) To complete KEMET part number, insert A = Option 1 or B = Option 2. Designates Test Option. See Space Grade Test Methods chart for more information. Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165

Using the Pmax of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
Pmax = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

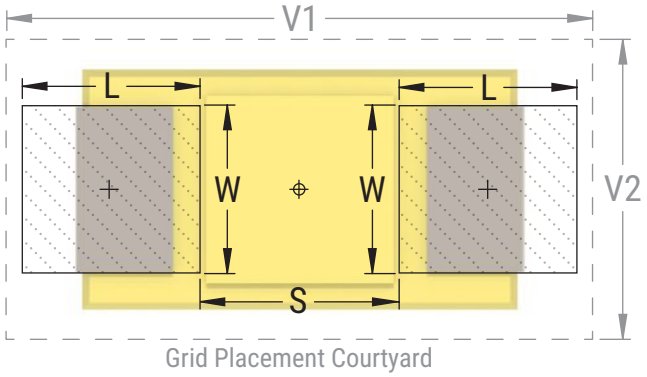
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated voltage
85°C	5% of Rated voltage
125°C	1% of Rated voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC Standard 7351 (IPC–7351).*
[1] Height of these chips may create problems in wave soldering.



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

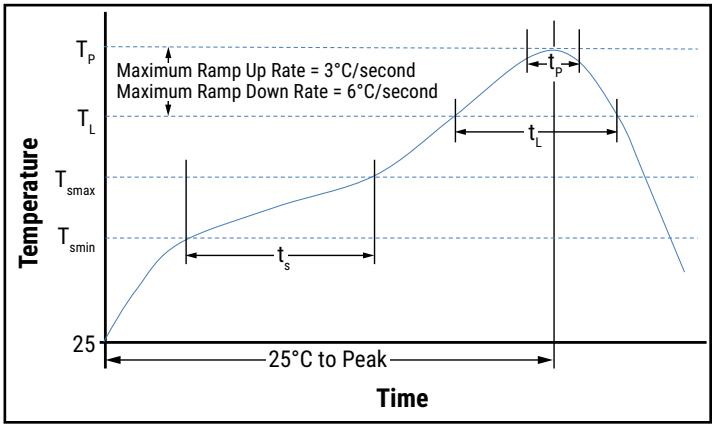
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

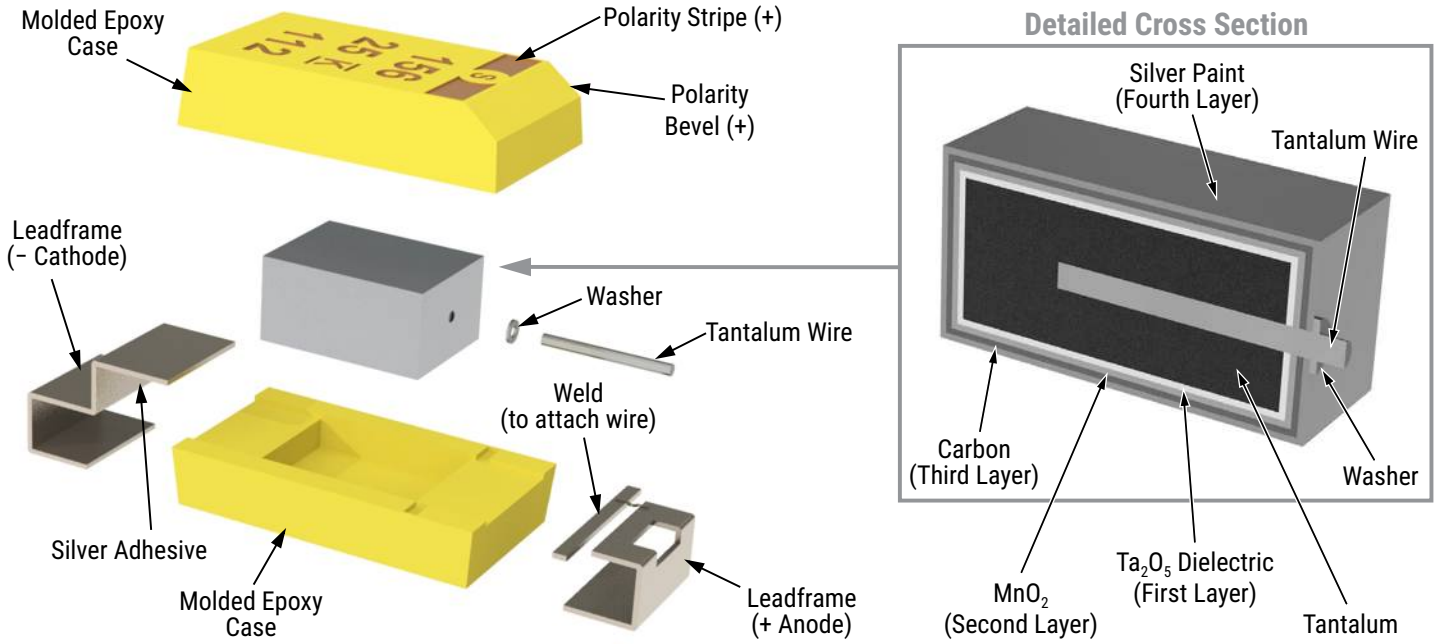
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



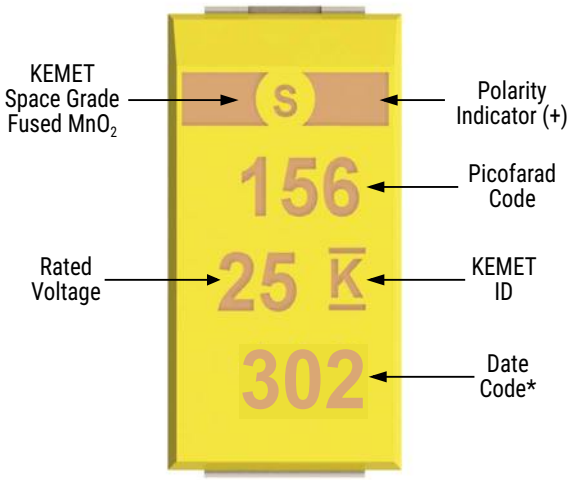
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 302 = 2nd week of 2023

Parts screened with Option C are marked with a serial number below date code characters.

Date Code *	
1st digit = Last number of Year	0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Tape & Reel Packaging Information

KEMET's molded tantalum and aluminum chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

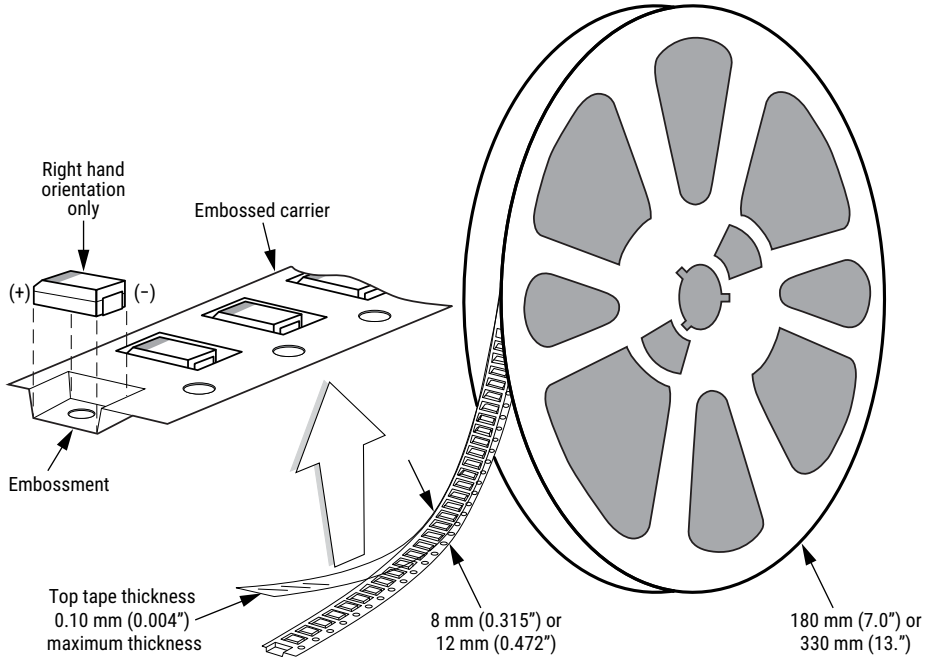


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*
KEMET	EIA		
A	3216-18	8	2,000
B	3528-21	8	2,000
C	6032-28	12	500
D	7343-31	12	500
X	7343-43	12	500

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

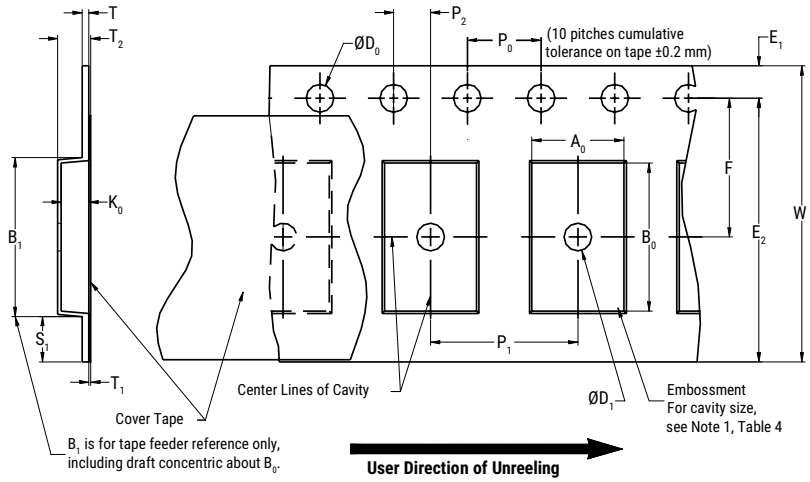


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

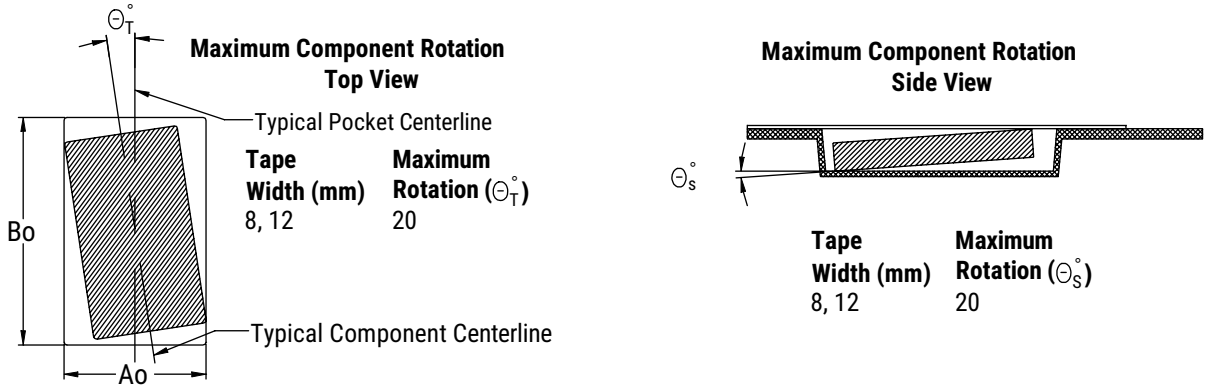


Figure 3 – Maximum Lateral Movement

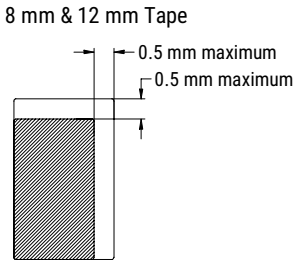


Figure 4 – Bending Radius

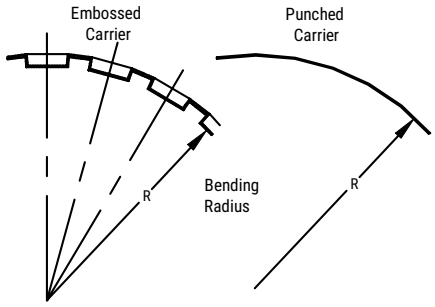
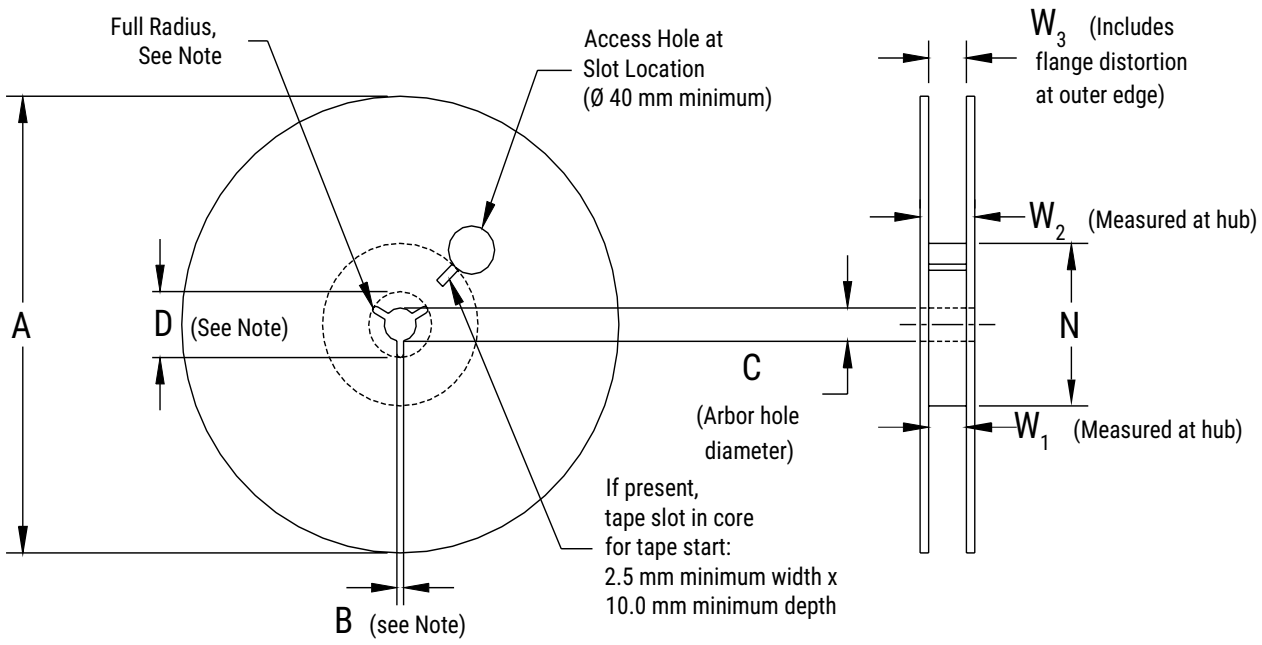


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

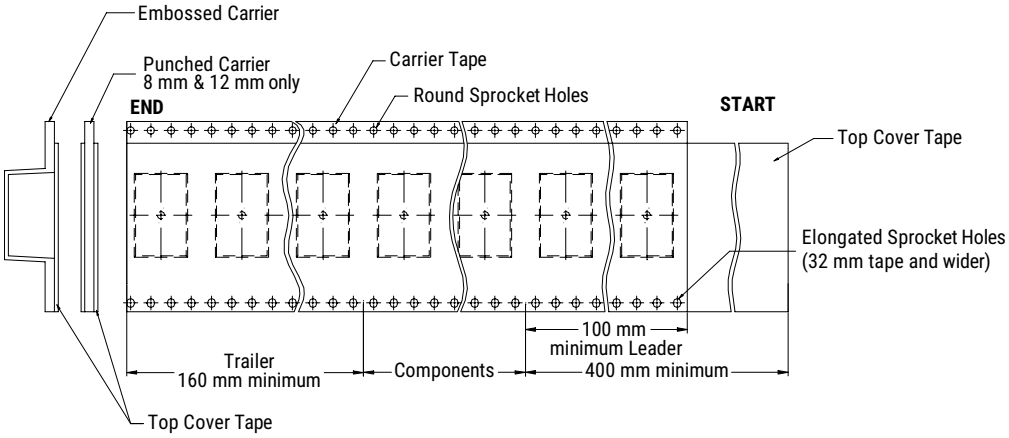
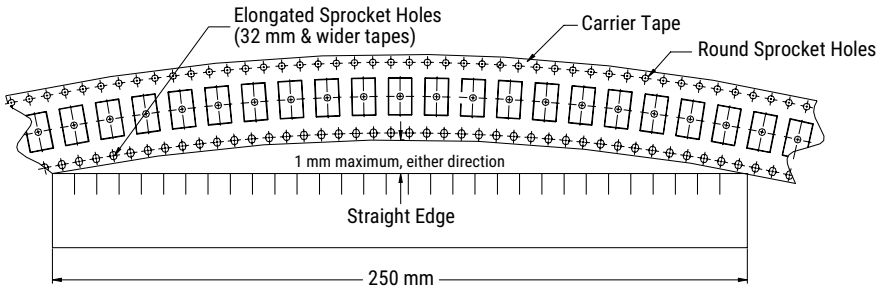


Figure 7 – Maximum Camber



T496 Space Grade High Reliability Alternative (HRA) Fail-Safe Fused MnO_2

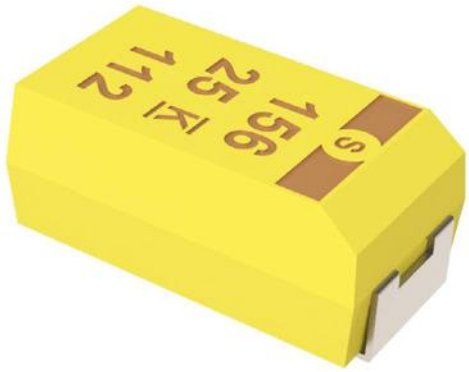
Overview

KEMET's Space Grade capacitors are suitable for use by the defense/aerospace customers in high reliability space applications. These capacitors meet the requirements of MIL–PRF–55365 as well as MIL–STD–1580. These capacitors incorporate an intensive testing and screening protocol which is customizable depending upon customer's specific needs.

The full part number allows for designation of surge current level (10 cycles −55°C and +85°C before and/or after Weibull grading, 10 cycles +25°C), performance testing level (see chart for details on available options), ESR (low and standard), and termination finish (see description in each series). Fused versions are available for built-in circuit protection, as well as multi-anode designs for very low ESR values.

Benefits

- Internal fuse protects against damaging short circuit failure mode
- Standard case sizes B, C, D, X per EIA 535BAAC
- 100% surge current test available
- Optional gold-plated terminations
- Fuse activation, 25°C: within 1 second at fault currents of 4 amps and higher
- Continuous current capability: 0.75 amps
- Post actuation resistance, 25°C: 10 MΩ, minimum
- Test tabs on side of case bypass the capacitor element to allow direct testing of the fuse assembly
- Weibull Grading C (0.01%/1,000 hours)



Environmental Compliance

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	496	X	227	K	010	C	H	63	2	A	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage (V)	Failure Rate/ Design	Lead Material	Surge	ESR	Testing	Packaging (C-Spec)
T = Tantalum	Fail safe - Space grade	B C D X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	C = 0.01% /1,000 hours	C = Hot solder dipped H = Standard solder-coated (SnPb 5% Pb minimum) T = 100% Matte Tin (Sn) plated	61 = No Surge 62 = 10 Cycles after Weibull, 25°C 63 = 10 Cycles, after Weibull, −55°C and 85°C 64 = 10 Cycles before Weibull, −55°C and 85°C 65 = 10 Cycles before and after Weibull, −55°C and 85°C	1 = ESR - standard 2 = ESR - low	A = Option A B = Option B C = Option C	Blank = 7" Reel 7280 = 13" Reel 7610 = Bulk bag 7640 = Bulk plastic box WAFL = Waffle pack

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.15 – 470 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 Volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55C° to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C		+25°C	–55°C	+85°C	+125°C
		Δ C/C	IL*	±10%	±10%	±20%
		DF	IL	IL	1.5 x IL	1.5 x IL
		DCL	IL	n/a	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles. (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak. MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

**IL = Initial Limit*

Certification

DSCC Drawing 04053

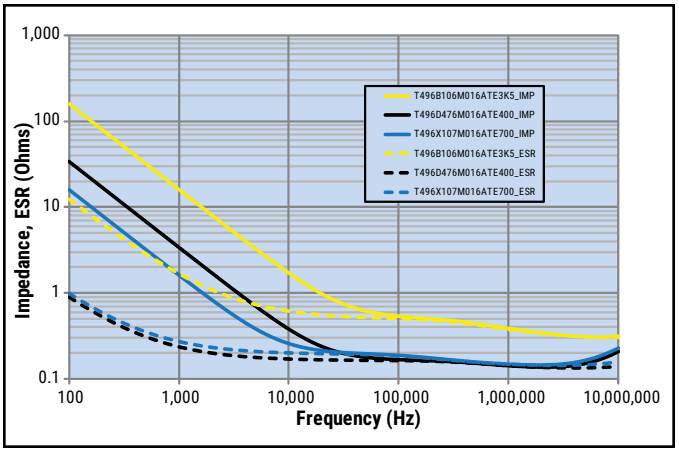
Test Methods

Test Sequence	Test Method	Option A	Option B	Option C
100% Serialization	KEMET Standard			X
100% IR Reflow	MIL–PRF–55365	X	X	X
100% Thermal Shock	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard			X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Surge Current, Option C with 5% PDA Calculation	MIL–PRF–55365 with 5% PDA Calculation	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Voltage Aging, 10 hours at 1.32 Vr	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
100% Weibull Grading C	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Surge Current, Option A or B with 5% PDA Calculation	MIL–PRF–55365 with 5% PDA Calculation	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
3 Sigma Screening – All Electricals	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
Destructive Physical Analysis (DPA) (5 pieces- each lot)	MIL–PRF–55365	X	X	X
Group B Testing (22 pieces – each lot)	* See Note Below		X	X
Temperature Stability – sample	MIL–PRF–55365	X	X	X
Solderability – Sample	MIL–PRF–55365	X	X	X
Group C Testing (57 pieces - each Lot)**	MIL–PRF–55365		X	X
100% X-ray	MIL–PRF–55365	X		
100% X-ray – 2 Plane***	MIL–PRF–55365 and KEMET Standard		X	X
100% Physical Dimension Verification	MIL–PRF–55365	X	X	X
Data Pack				
Group A and C Summaries			X	X
2 Plane X-ray JPEG photos			X	X
DPA Report			X	X
Attributes/Variables Data for Cap/Df/DCL/ESR				X

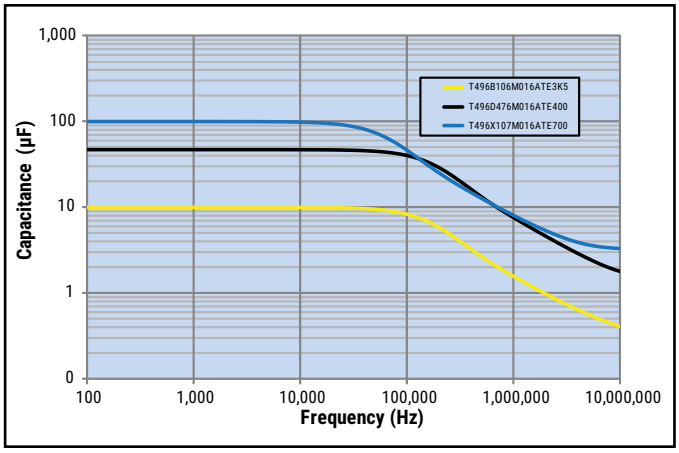
***X** = Included in test option*
** Group B Testing = 10,000 Cycles Surge Current, 85°C, 40% Vr*
*** Group C Post Moisture ESR limit = 1.25 initial limit*
**** 2 Plane X-ray = Top and side views, molded case wall thickness minimum 0.005" on all sides, negative/positive termination attachment criteria per MIL–STD–1580*

Electrical Characteristics

ESR vs. Frequency

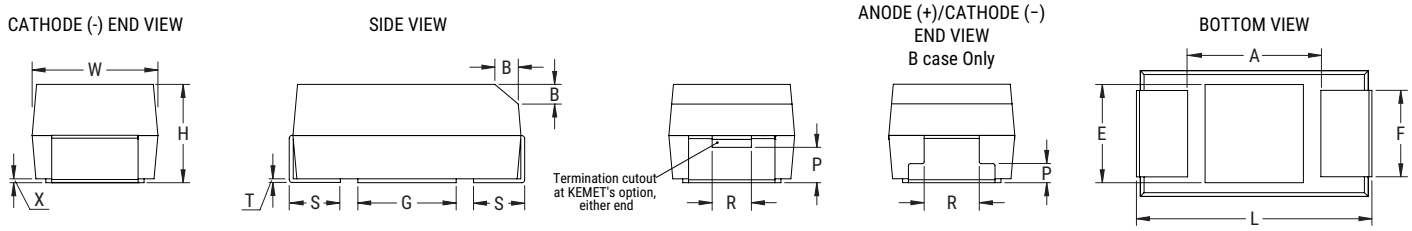


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component													
KEMET	EIA	L	W	H	F±0.1 ±(0.004)	S±0.3 ±(0.012)	B±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)	Net Weight (mg)
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9±0.2 (0.075±0.008)	2.2 (0.087)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.4 (0.016)	1.5 (0.059)	0.13 (0.005)	1.1 (0.043)	1.8 (0.071)	2.2 (0.087)	107.45
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.5 (0.098)	2.8 (0.110)	2.4 (0.094)	224.48
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	446.84
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	652.04

Notes: (Ref) – Dimensions provided for reference only. No dimensions provided for B, P or R because low profile cases do not have a bevel or a notch. These weights are provided as a reference. If exact weights are needed, please contact your KEMET Sales Representative.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	68	C/6032-28	T496C686(1)004C(2)(3)(4)(5)	2.7	6	1.6	0.4	262	524	125	1
4	100	C/6032-28	T496C107(1)004C(2)(3)(4)(5)	4	8	1.2	N/A	303	N/A	125	1
4	150	C/6032-28	T496C157(1)004C(2)(3)(4)(5)	6	8	1.2	N/A	303	N/A	125	1
4	150	D/7343-31	T496D157(1)004C(2)(3)(4)(5)	6	8	0.8	N/A	433	N/A	125	1
4	220	D/7343-31	T496D227(1)004C(2)(3)(4)(5)	8.8	8	0.7	0.4	463	612	125	1
4	330	D/7343-31	T496D337(1)004C(2)(3)(4)(5)	13.2	8	0.7	0.4	463	612	125	1
4	330	X/7343-43	T496X337(1)004C(2)(3)(4)(5)	13.2	8	0.7	N/A	486	N/A	125	1
4	470	X/7343-43	T496X477(1)004C(2)(3)(4)(5)	18.8	8	0.5	N/A	574	N/A	125	1
6.3	4.7	B/3528-21	T496B475(1)006C(2)(3)(4)(5)	0.5	6	3.5	N/A	156	N/A	125	1
6.3	6.8	B/3528-21	T496B685(1)006C(2)(3)(4)(5)	0.5	6	3.5	N/A	156	N/A	125	1
6.3	10	B/3528-21	T496B106(1)006C(2)(3)(4)(5)	0.6	6	3.5	N/A	156	N/A	125	1
6.3	22	B/3528-21	T496B226(1)006C(2)(3)(4)(5)	1.3	6	3.5	1.5	156	238	125	1
6.3	15	C/6032-28	T496C156(1)006C(2)(3)(4)(5)	0.9	6	2	N/A	235	N/A	125	1
6.3	22	C/6032-28	T496C226(1)006C(2)(3)(4)(5)	1.4	6	2	N/A	235	N/A	125	1
6.3	33	C/6032-28	T496C336(1)006C(2)(3)(4)(5)	2	6	2	0.6	235	428	125	1
6.3	47	C/6032-28	T496C476(1)006C(2)(3)(4)(5)	2.9	6	1.6	0.6	262	428	125	1
6.3	47	D/7343-31	T496D476(1)006C(2)(3)(4)(5)	2.9	6	1	N/A	387	N/A	125	1
6.3	68	C/6032-28	T496C686(1)006C(2)(3)(4)(5)	4.1	6	1.2	N/A	303	N/A	125	1
6.3	68	D/7343-31	T496D686(1)006C(2)(3)(4)(5)	4.1	6	1	N/A	387	N/A	125	1
6.3	100	C/6032-28	T496C107(1)006C(2)(3)(4)(5)	6	8	0.4	N/A	524	N/A	125	1
6.3	100	D/7343-31	T496D107(1)006C(2)(3)(4)(5)	6	8	0.8	0.4	433	612	125	1
6.3	100	X/7343-43	T496X107(1)006C(2)(3)(4)(5)	6	8	0.9	0.3	428	742	125	1
6.3	150	D/7343-31	T496D157(1)006C(2)(3)(4)(5)	9	8	0.7	0.3	463	707	125	1
6.3	150	X/7343-43	T496X157(1)006C(2)(3)(4)(5)	9	8	0.3	N/A	742	N/A	125	1
6.3	220	X/7343-43	T496X227(1)006C(2)(3)(4)(5)	13.2	8	0.7	0.3	486	742	125	1
6.3	220	D/7343-31	T496D227(1)006C(2)(3)(4)(5)	13.2	8	0.7	0.3	463	707	125	1
6.3	330	X/7343-43	T496X337(1)006C(2)(3)(4)(5)	19.8	8	0.5	0.3	574	742	125	1
10	3.3	B/3528-21	T496B335(1)010C(2)(3)(4)(5)	0.5	6	3.5	N/A	156	N/A	125	1
10	4.7	B/3528-21	T496B475(1)010C(2)(3)(4)(5)	0.5	6	3.5	N/A	156	N/A	125	1
10	6.8	B/3528-21	T496B685(1)010C(2)(3)(4)(5)	0.7	6	3.5	N/A	156	N/A	125	1
10	10	C/6032-28	T496C106(1)010C(2)(3)(4)(5)	1	6	2	N/A	235	N/A	125	1
10	15	B/3528-21	T496B156(1)010C(2)(3)(4)(5)	1.5	6	3.5	N/A	156	N/A	125	1
10	15	C/6032-28	T496C156(1)010C(2)(3)(4)(5)	1.5	6	2	0.6	235	428	125	1
10	22	C/6032-28	T496C226(1)010C(2)(3)(4)(5)	2.2	6	2	0.5	235	469	125	1
10	33	C/6032-28	T496C336(1)010C(2)(3)(4)(5)	3.3	6	1.6	0.4	262	524	125	1
10	33	D/7343-31	T496D336(1)010C(2)(3)(4)(5)	3.3	6	1	0.4	387	612	125	1
10	47	C/6032-28	T496C476(1)010C(2)(3)(4)(5)	4.7	6	1.2	0.4	303	524	125	1
10	47	D/7343-31	T496D476(1)010C(2)(3)(4)(5)	4.7	6	1	0.4	387	612	125	1
10	68	D/7343-31	T496D686(1)010C(2)(3)(4)(5)	6.8	6	0.8	0.4	433	612	125	1
10	68	X/7343-43	T496X686(1)010C(2)(3)(4)(5)	6.8	6	0.9	N/A	428	N/A	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert C= Hot Solder Dipped or H = Solder Plated. Designates Termination Finish.
(3) To complete KEMET part number, insert 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge Current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	100	D/7343-31	T496D107(1)010C(2)(3)(4)(5)	10	8	0.7	0.4	463	612	125	1
10	100	X/7343-43	T496X107(1)010C(2)(3)(4)(5)	10	8	0.4	N/A	642	N/A	125	1
10	150	D/7343-31	T496D157(1)010C(2)(3)(4)(5)	15	8	0.7	0.4	463	612	125	1
10	150	X/7343-43	T496X157(1)010C(2)(3)(4)(5)	15	8	0.7	0.4	486	642	125	1
10	220	X/7343-43	T496X227(1)010C(2)(3)(4)(5)	22	8	0.5	0.3	574	742	125	1
16	2.2	B/3528-21	T496B225(1)016C(2)(3)(4)(5)	0.5	6	3.5	N/A	156	N/A	125	1
16	3.3	B/3528-21	T496B335(1)016C(2)(3)(4)(5)	0.5	6	3.5	2.1	156	201	125	1
16	4.7	B/3528-21	T496B475(1)016C(2)(3)(4)(5)	0.8	6	3.5	1.6	156	230	125	1
16	6.8	C/6032-28	T496C685(1)016C(2)(3)(4)(5)	1.1	6	2	0.6	235	428	125	1
16	10	C/6032-28	T496C106(1)016C(2)(3)(4)(5)	1.6	6	2	0.7	235	396	125	1
16	15	C/6032-28	T496C156(1)016C(2)(3)(4)(5)	2.4	6	2	0.6	235	428	125	1
16	22	C/6032-28	T496C226(1)016C(2)(3)(4)(5)	3.6	6	1.6	1	262	332	125	1
16	22	D/7343-31	T496D226(1)016C(2)(3)(4)(5)	3.6	6	1	0.5	387	548	125	1
16	33	D/7343-31	T496D336(1)016C(2)(3)(4)(5)	5.3	6	1	0.4	387	612	125	1
16	47	D/7343-31	T496D476(1)016C(2)(3)(4)(5)	7.5	6	0.8	0.4	433	612	125	1
16	47	X/7343-43	T496X476(1)016C(2)(3)(4)(5)	7.5	6	0.9	0.4	428	642	125	1
16	68	D/7343-31	T496D686(1)016C(2)(3)(4)(5)	10.9	8	0.4	N/A	612	N/A	125	1
20	1.5	B/3528-21	T496B155(1)020C(2)(3)(4)(5)	0.5	6	5	N/A	130	N/A	125	1
20	2.2	B/3528-21	T496B225(1)020C(2)(3)(4)(5)	0.5	6	3.5	1.6	156	230	125	1
20	4.7	C/6032-28	T496C475(1)020C(2)(3)(4)(5)	1	6	2	N/A	235	N/A	125	1
20	6.8	C/6032-28	T496C685(1)020C(2)(3)(4)(5)	1.4	6	2	0.6	235	428	125	1
20	10	C/6032-28	T496C106(1)020C(2)(3)(4)(5)	2	6	2	0.8	235	371	125	1
20	15	C/6032-28	T496C156(1)020C(2)(3)(4)(5)	3	6	0.5	N/A	469	N/A	125	1
20	15	D/7343-31	T496D156(1)020C(2)(3)(4)(5)	3	6	1	0.5	387	548	125	1
20	22	D/7343-31	T496D226(1)020C(2)(3)(4)(5)	4.4	6	1	0.5	387	548	125	1
20	33	D/7343-31	T496D336(1)020C(2)(3)(4)(5)	6.6	6	0.4	N/A	612	N/A	125	1
20	33	X/7343-43	T496X336(1)020C(2)(3)(4)(5)	6.6	6	0.9	0.4	428	642	125	1
25	0.68	B/3528-21	T496B684(1)025C(2)(3)(4)(5)	0.5	4	6.5	N/A	114	N/A	125	1
25	1	B/3528-21	T496B105(1)025C(2)(3)(4)(5)	0.5	4	5	3.5	130	156	125	1
25	1.5	B/3528-21	T496B155(1)025C(2)(3)(4)(5)	0.5	6	5	1.6	130	230	125	1
25	2.2	C/6032-28	T496C225(1)025C(2)(3)(4)(5)	0.6	6	3.5	N/A	177	N/A	125	1
25	3.3	C/6032-28	T496C335(1)025C(2)(3)(4)(5)	0.9	6	2.5	2.1	210	229	125	1
25	4.7	B/3528-21	T496B475(1)025C(2)(3)(4)(5)	1.2	6	4	N/A	146	N/A	125	1
25	4.7	C/6032-28	T496C475(1)025C(2)(3)(4)(5)	1.2	6	2.5	1.3	210	291	125	1
25	6.8	C/6032-28	T496C685(1)025C(2)(3)(4)(5)	1.7	6	2	0.6	235	428	125	1
25	10	D/7343-31	T496D106(1)025C(2)(3)(4)(5)	2.5	6	1.2	0.6	354	500	125	1
25	15	C/6032-28	T496C156(1)025C(2)(3)(4)(5)	3.8	6	0.75	N/A	383	N/A	125	1
25	15	D/7343-31	T496D156(1)025C(2)(3)(4)(5)	3.8	6	1	0.5	387	548	125	1
25	22	D/7343-31	T496D226(1)025C(2)(3)(4)(5)	5.5	6	0.8	0.4	433	612	125	1
25	22	X/7343-43	T496X226(1)025C(2)(3)(4)(5)	5.5	6	0.9	0.4	428	642	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert C= Hot Solder Dipped or H = Solder Plated. Designates Termination Finish.
(3) To complete KEMET part number, insert 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge Current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
Refer to Ordering Information for additional detail.

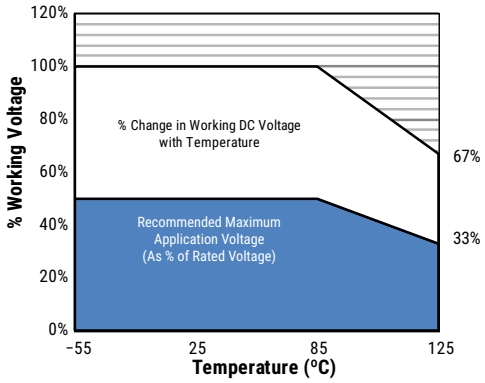
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
35	0.47	B/3528-21	T496B474(1)035C(2)(3)(4)(5)	0.5	4	8	2.6	103	181	125	1
35	0.68	B/3528-21	T496B684(1)035C(2)(3)(4)(5)	0.5	4	6.5	N/A	114	N/A	125	1
35	1	B/3528-21	T496B105(1)035C(2)(3)(4)(5)	0.5	4	5	3.1	130	166	125	1
35	1.5	C/6032-28	T496C155(1)035C(2)(3)(4)(5)	0.5	6	4.5	2.6	156	206	125	1
35	2.2	C/6032-28	T496C225(1)035C(2)(3)(4)(5)	0.8	6	3.5	1.6	177	262	125	1
35	3.3	C/6032-28	T496C335(1)035C(2)(3)(4)(5)	1.2	6	2.5	0.9	210	350	125	1
35	4.7	D/7343-31	T496D475(1)035C(2)(3)(4)(5)	1.7	6	1.5	0.7	316	463	125	1
35	6.8	D/7343-31	T496D685(1)035C(2)(3)(4)(5)	2.4	6	1.3	0.75	340	447	125	1
35	10	D/7343-31	T496D106(1)035C(2)(3)(4)(5)	3.5	6	0.5	N/A	548	N/A	125	1
35	10	X/7343-43	T496X106(1)035C(2)(3)(4)(5)	3.5	6	1	0.5	406	574	125	1
35	15	D/7343-31	T496D156(1)035C(2)(3)(4)(5)	5.3	6	0.5	N/A	548	N/A	125	1
35	15	X/7343-43	T496X156(1)035C(2)(3)(4)(5)	5.3	6	0.9	N/A	428	N/A	125	1
50	0.15	B/3528-21	T496B154(1)050C(2)(3)(4)(5)	0.5	4	16	N/A	73	N/A	125	1
50	0.22	B/3528-21	T496B224(1)050C(2)(3)(4)(5)	0.5	4	14	10	78	92	125	1
50	0.33	B/3528-21	T496B334(1)050C(2)(3)(4)(5)	0.5	4	10	2.6	92	181	125	1
50	0.47	C/6032-28	T496C474(1)050C(2)(3)(4)(5)	0.5	4	8	1.9	117	241	125	1
50	0.68	C/6032-28	T496C684(1)050C(2)(3)(4)(5)	0.5	4	7	1.7	125	254	125	1
50	1	C/6032-28	T496C105(1)050C(2)(3)(4)(5)	0.5	4	5.5	2.7	141	202	125	1
50	1.5	C/6032-28	T496C155(1)050C(2)(3)(4)(5)	0.8	6	5	2	148	235	125	1
50	2.2	D/7343-31	T496D225(1)050C(2)(3)(4)(5)	1.1	6	2.5	0.9	245	408	125	1
50	3.3	D/7343-31	T496D335(1)050C(2)(3)(4)(5)	1.7	6	2	1	274	387	125	1
50	4.7	D/7343-31	T496D475(1)050C(2)(3)(4)(5)	2.4	6	0.4	N/A	612	N/A	125	1
50	4.7	X/7343-43	T496X475(1)050C(2)(3)(4)(5)	2.4	6	1.5	0.4	332	642	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert C= Hot Solder Dipped or H = Solder Plated. Designates Termination Finish.
(3) To complete KEMET part number, insert 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge Current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165

Using the Pmax of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
Pmax = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Reverse Voltage

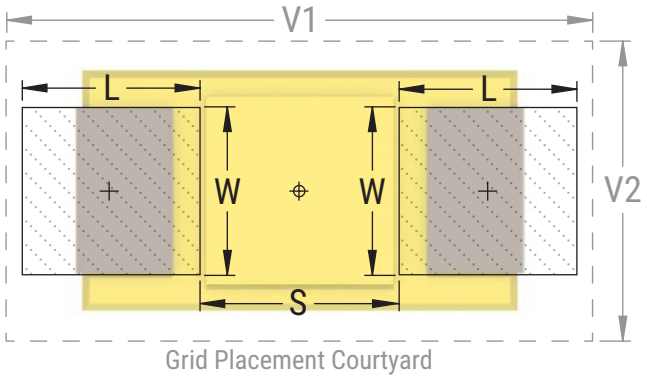
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC Standard 7351 (IPC–7351).*
[1] Height of these chips may create problems in wave soldering.



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

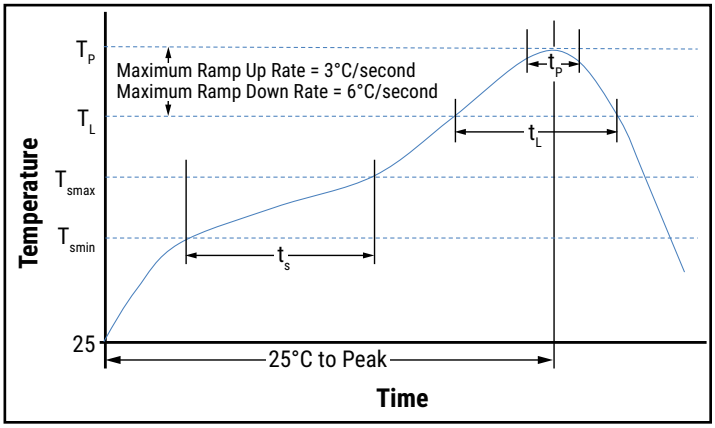
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/seconds maximum	3°C/seconds maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

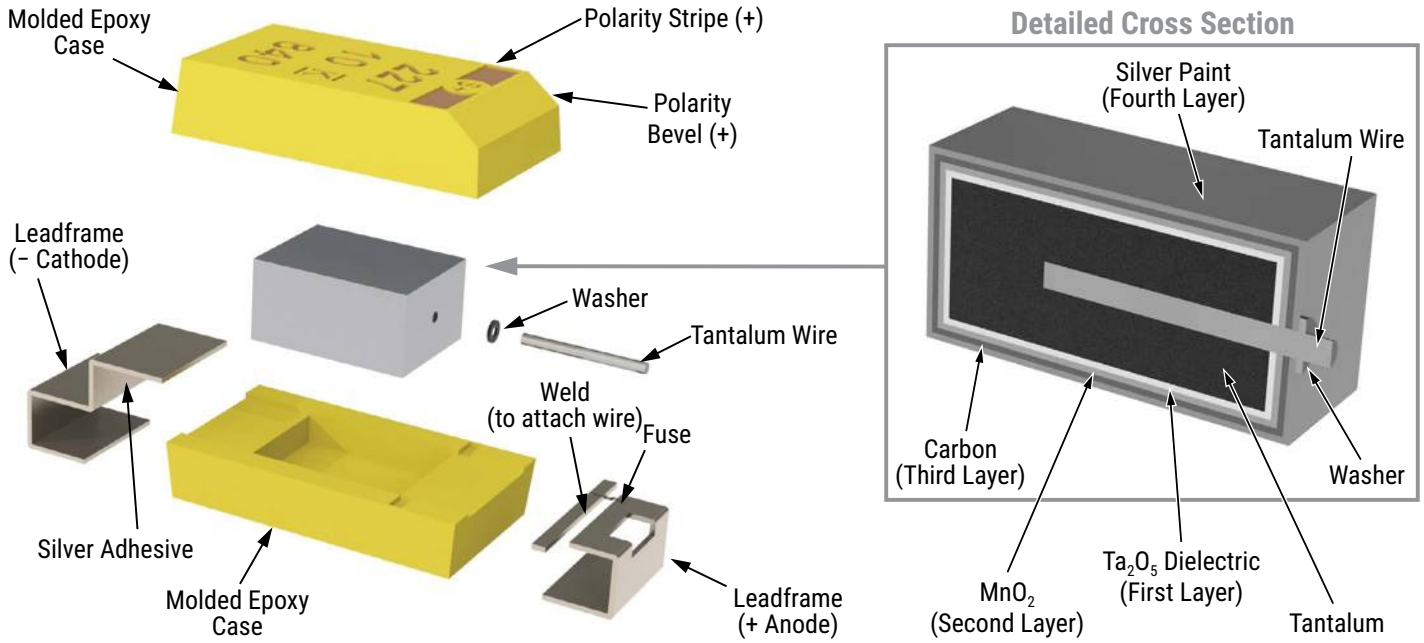
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



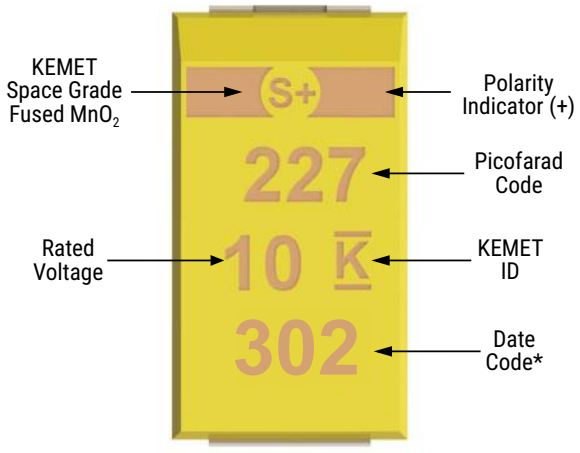
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature–reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 302 = 2nd week of 2023

Date Code *	
1st digit = Last number of Year	0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Parts screened with Option C are marked with a serial number below date code characters.

Tape & Reel Packaging Information

KEMET's molded tantalum and aluminum chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

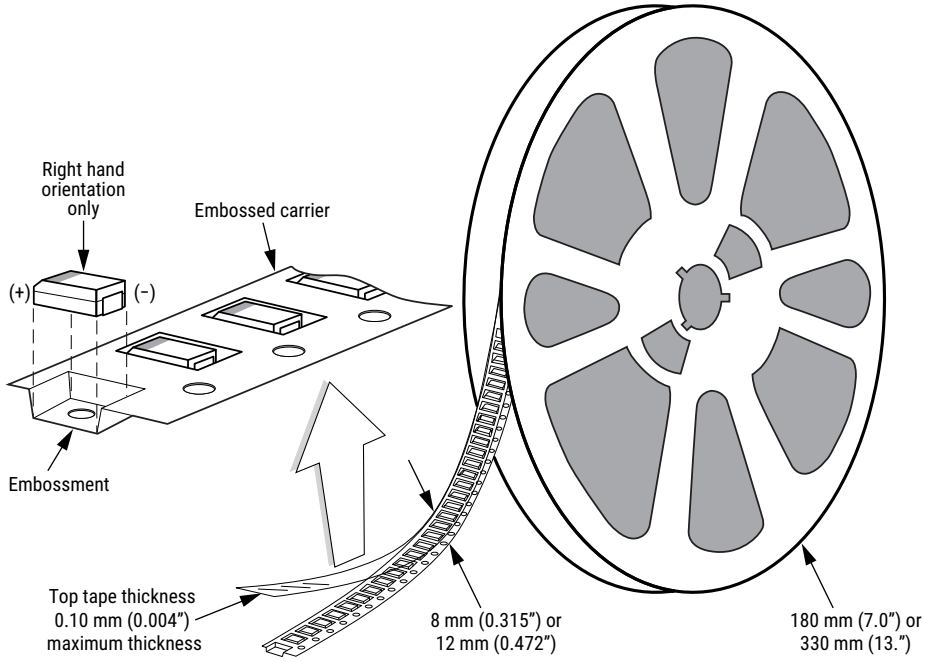


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*
KEMET	EIA		
B	3528-21	8	2,000
C	6032-28	12	500
D	7343-31	12	500
X	7343-43	12	500

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

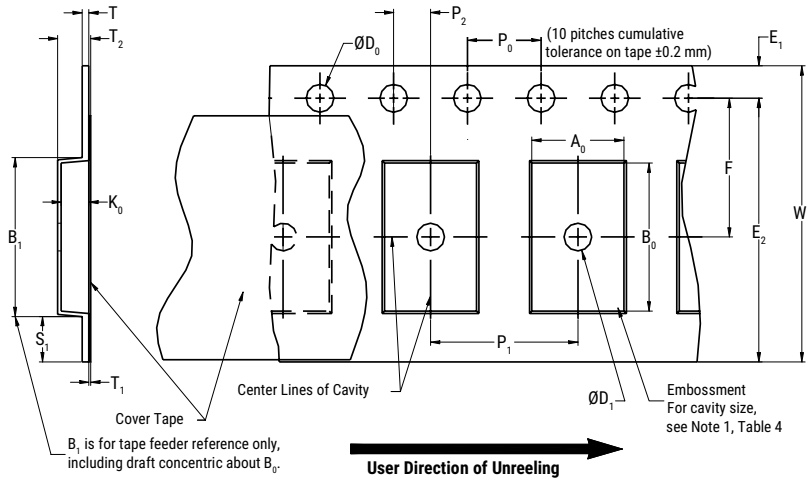


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

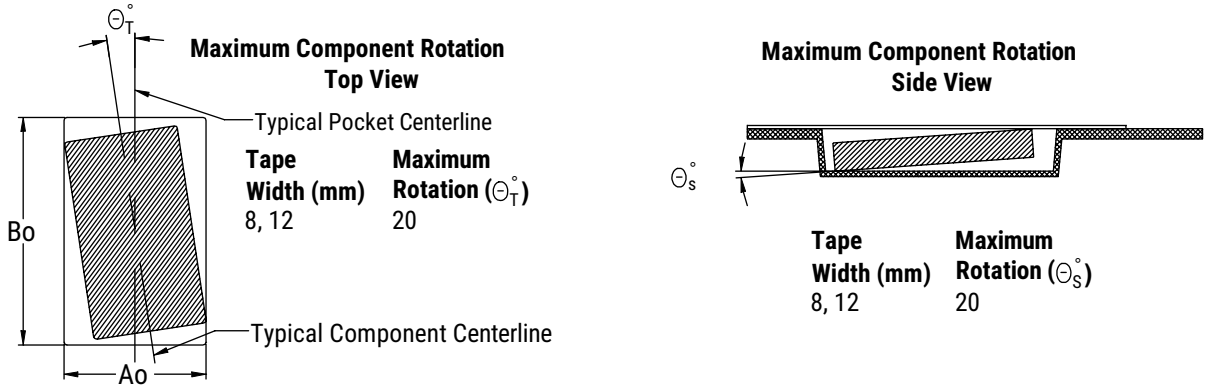


Figure 3 – Maximum Lateral Movement

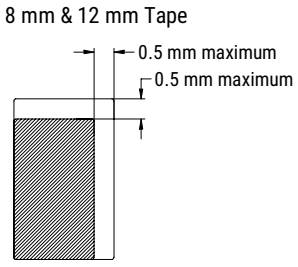


Figure 4 – Bending Radius

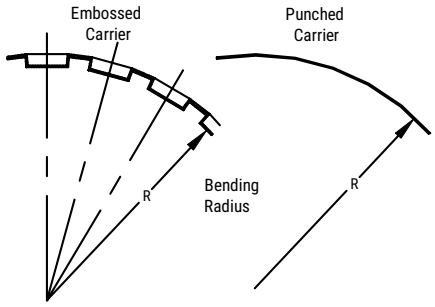
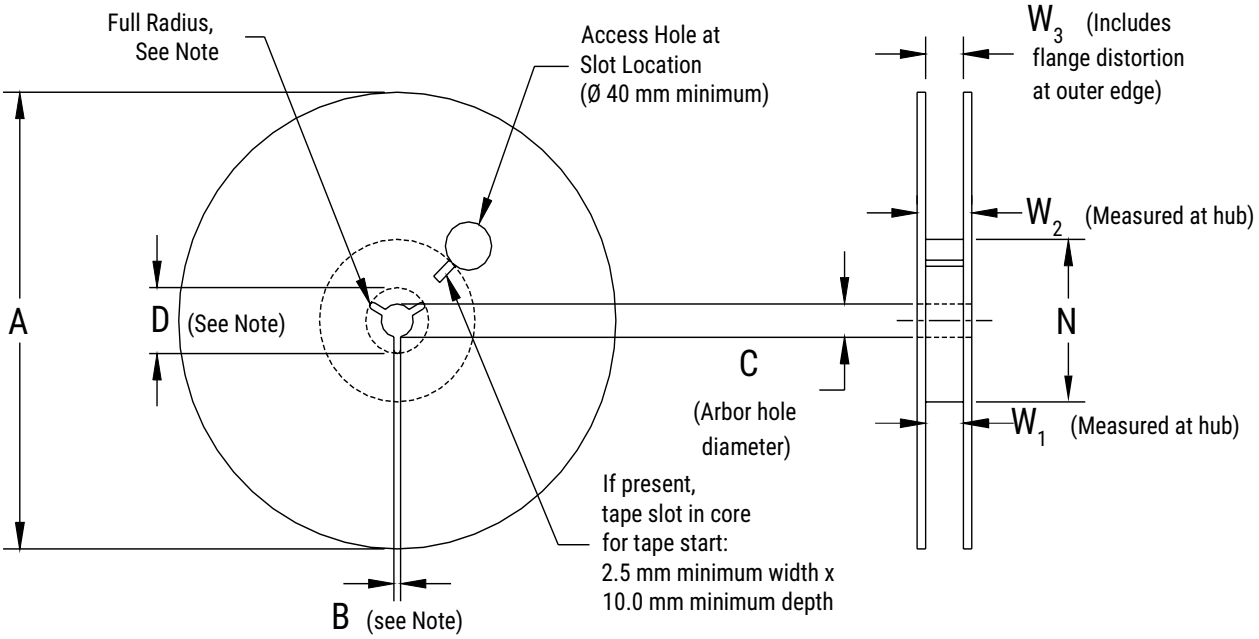


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

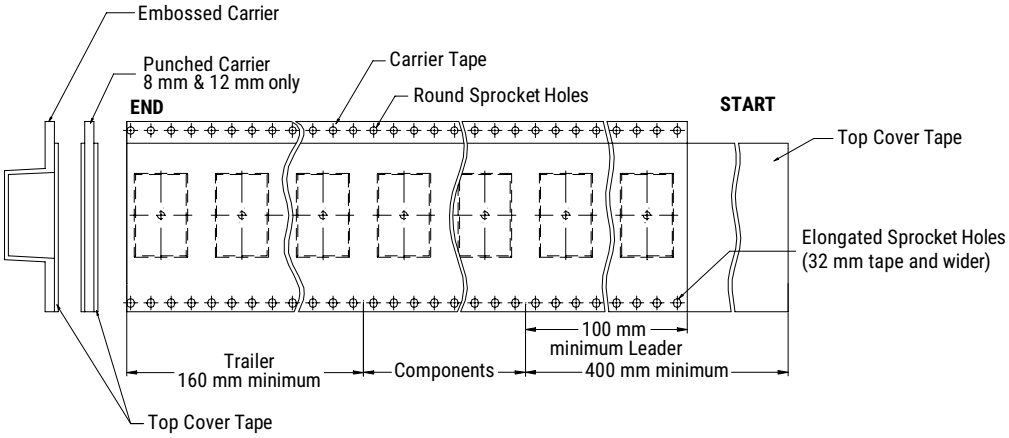
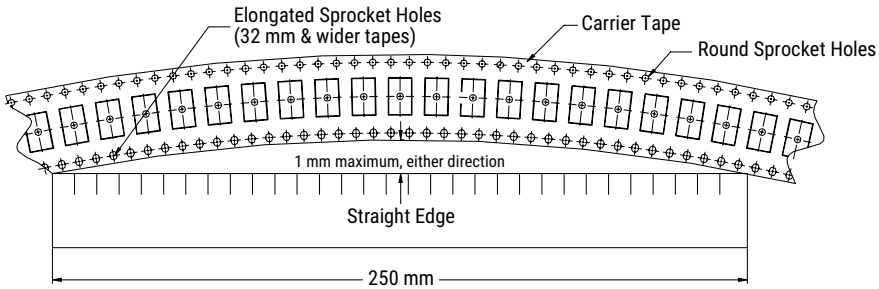


Figure 7 – Maximum Camber



Tantalum Surface Mount Capacitors – Space Grade

T497 Space Grade High Reliability Alternative (HRA) MnO_2 (CWR09/19/29 Style)

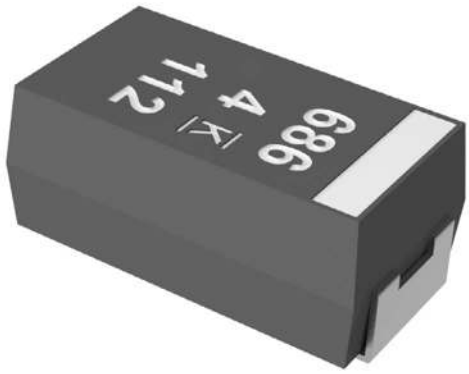
Overview

KEMET's Space Grade capacitors are suitable for use by the defense/aerospace customers in high reliability space applications. These capacitors meet the requirements of MIL–PRF–55365 as well as MIL–STD–1580. These capacitors incorporate an intensive testing and screening protocol which is customizable depending upon customer's specific needs.

The full part number allows for designation of surge current level (10 cycles −55°C and +85°C before and/or after Weibull grading, 10 cycles +25°C), performance testing level (see chart for details on available options), ESR (low and standard), and termination finish (see description in each series). Fused versions are available for built-in circuit protection, as well as multi-anode designs for very low ESR values.

Benefits

- Low profile case sizes
- 100% thermal shock
- 100% surge current test available on all case sizes
- Various termination finishes available
- Weibull Grading C (0.01%/1,000 hours)



Applications

Typical applications include decoupling and filtering in medical, defense, and aerospace applications.

Environmental Compliance

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	497	H	686	K	015	C	H	64	2	A	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage (V)	Failure Rate/ Design	Lead Material	Surge	ESR	Testing	Packaging (C-Spec)
T = Tantalum	High grade – Space grade	A B C D E F G H X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 015 = 15 020 = 20 025 = 25 035 = 35 050 = 50	C = 0.01% /1,000 hours	C = Hot solder dipped H = Standard solder-coated (SnPb 5% Pb minimum) B = Gold-plated	61 = No Surge 62 = 10 Cycles after Weibull, 25°C 63 = 10 Cycles, after Weibull, −55°C and 85°C 64 = 10 Cycles before Weibull, −55°C and 85°C 65 = 10 Cycles before and after Weibull, −55°C and 85°C	1 = ESR - standard 2 = ESR - low	A = Option A B = Option B C* = Option C * Option C not available for A, B or C case size part numbers	Blank = 7" Reel 7280 = 13" Reel 7610 = Bulk bag 7640 = Bulk plastic box WAFL = Waffle pack

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 330 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	105°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within −20%/+10% of initial value		
			DF	≤ Initial Limit		
			DCL	2 x IL at 125°C		
			ESR	2 x Initial Limit		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within −20%/+10% of initial value		
			DF	Within initial limits		
			DCL	Within 2.0 x initial limit		
			ESR	Within 2.0 x initial limit		
Humidity	85°C, 85% RH, 1,000 hours, No Load		Δ C/C	Within −5%/+35% of initial value		
			DF	≤ Initial Limit		
			DCL	Within 3.0 x initial limit		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +125°C, +25°C		+25°C	−55°C	+85°C	+125°C
		Δ C/C	IL*	±20%	±20%	±30%
		DF	IL	IL	1.2 x IL	1.5 x IL
		DCL	IL	n/a	10 x IL	10 x IL
Surge Voltage	105°C, 1.32 x rated voltage 1,000 cycles		Δ C/C	Within −20%/+10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak. MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

**IL = Initial Limit*

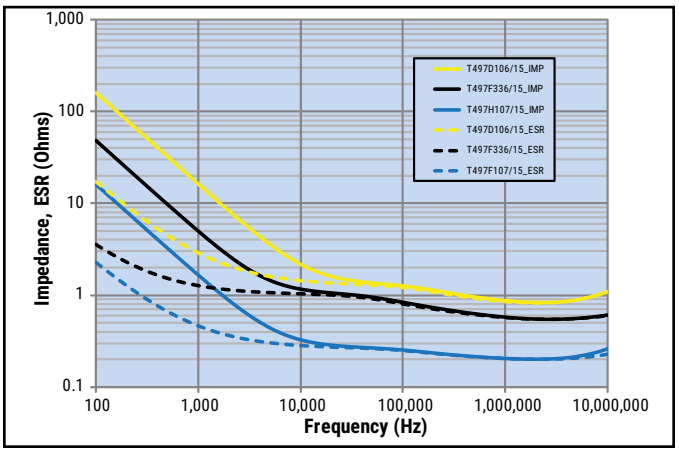
Test Methods

Test Sequence	Test Method	Option A	Option B	Option C
100% Serialization	KEMET Standard			X
100% IR Reflow	MIL–PRF–55365	X	X	X
100% Thermal Shock	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard			X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Surge Current, Option C with 5% PDA Calculation	MIL–PRF–55365 with 5% PDA Calculation	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Voltage Aging, 10 hours at 1.32 Vr	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
100% Weibull Grading C	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Surge Current, Option A or B with 5% PDA Calculation	MIL–PRF–55365 with 5% PDA Calculation	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
3 Sigma Screening – All Electricals	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
Destructive Physical Analysis (DPA) (5 pieces- each lot)	MIL–PRF–55365	X	X	X
Group B Testing (22 pieces – each lot)	* See Note Below		X	X
Temperature Stability – sample	MIL–PRF–55365	X	X	X
Solderability – Sample	MIL–PRF–55365	X	X	X
Group C Testing (57 pieces – each Lot)**	MIL–PRF–55365		X	X
100% X-ray	MIL–PRF–55365	X		
100% X-ray – 2 Plane***	MIL–PRF–55365 and KEMET Standard		X	X
100% Physical Dimension Verification	MIL–PRF–55365	X	X	X
Data Pack				
Group A and C Summaries			X	X
2 Plane X-ray JPEG photos			X	X
DPA Report			X	X
Attributes/Variables Data for Cap/Df/DCL/ESR				X

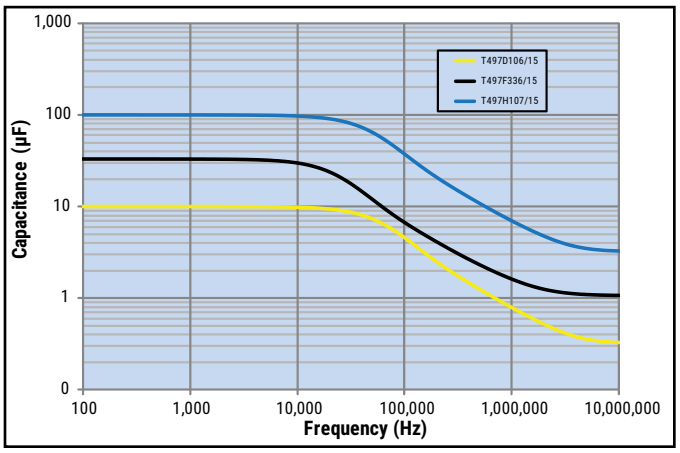
***X** = Included in test option*
** Group B Testing = 10,000 Cycles Surge Current, 85°C, 40% Vr*
*** Group C Post Moisture ESR limit = 1.25 initial limit*
**** 2 Plane X-ray = Top and side views, molded case wall thickness minimum 0.005" on all sides, negative/positive termination attachment criteria per MIL–STD–1580*

Electrical Characteristics

ESR vs. Frequency

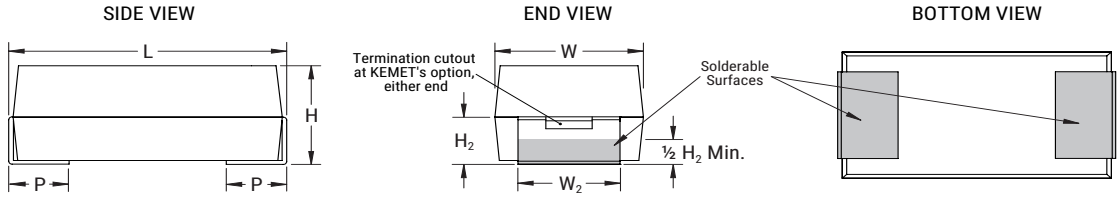


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size	Component						
KEMET	L ±0.38 (0.015)	W ±0.38 (0.015)	H ±0.38 (0.015)	P +0.25 (0.010), −0.13 (0.005)	W_2	H_2 Minimum	Net Weight (mg)
A	2.54 (0.100)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	39.91
B	3.81 (0.150)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	68.73
C	5.08 (0.200)	1.27 (0.050)	1.27 (0.050)	0.76 (0.030)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	146.5
D	3.81 (0.150)	2.54 (0.100)	1.27 (0.050)	0.76 (0.030)	2.41+0.13, −0.25 (0.095+0.005, −0.010)	0.76 (0.030)	264.12
E	5.08 (0.200)	2.54 (0.100)	1.27 (0.050)	0.76 (0.030)	2.41+0.13, −0.25 (0.095+0.005, −0.010)	0.76 (0.030)	421.63
F	5.59 (0.220)	3.43 (0.135)	1.78 (0.070)	0.76 (0.030)	3.30±0.13 (0.130±0.005)	1.02 (0.040)	173.63
G	6.73 (0.265)	2.79 (0.110)	2.79 (0.110)	1.27 (0.050)	2.67±0.13 (0.105±0.005)	1.52 (0.060)	266.42
H	7.24 (0.285)	3.81 (0.150)	2.79 (0.110)	1.27 (0.050)	3.68+0.013, −0.51 (0.145+0.005, −0.020)	1.52 (0.060)	349.01
X	6.93 (0.273)	5.41 (0.213)	2.74 (0.108)	1.19 (0.047)	3.05±0.13 (0.120±0.005)	1.22 (0.048)	590.44

Note: When solder coated terminations are required, add an additional 0.38 mm (0.015 inch) to the above tolerances for "L", "W", "H", "P" ,"W_2" and "H_2" These weights are provided as a reference. If exact weights are needed, please contact your KEMET Sales Representative.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	2.2	A/1005	T497A225(1)004C(2)(3)(4)(6)	1	6	8	4	97	137	125	1
4	3.3	A/1005	T497A335(1)004C(2)(3)(4)(6)	1	6	12	6	79	112	125	1
4	4.7	A/1005	T497A475(1)004C(2)(3)(4)(6)	1	6	12	6	79	112	125	1
4	6.8	A/1005	T497A685(1)004C(2)(3)(4)(6)	1	6	12	6	79	112	125	1
4	4.7	B/1505	T497B475(1)004C(2)(3)(4)(6)	1	6	8	3.2	103	163	125	1
4	10	B/1505	T497B106(1)004C(2)(3)(4)(6)	1	8	8	3.2	103	163	125	1
4	15	B/1505	T497B156(1)004C(2)(3)(4)(6)	1	8	8	3.2	103	163	125	1
4	6.8	C/2005	T497C685(1)004C(2)(3)(4)(6)	1	6	5.5	2.2	141	224	125	1
4	10	D/1510	T497D106(1)004C(2)(3)(4)(5)	1	8	4	1.3	194	340	125	1
4	22	D/1510	T497D226(1)004C(2)(3)(4)(5)	1	8	4	1.3	194	340	125	1
4	33	D/1510	T497D336(1)004C(2)(3)(4)(5)	2	8	4	1.3	194	340	125	1
4	15	E/2010	T497E156(1)004C(2)(3)(4)(5)	1	8	3.5	1	239	447	125	1
4	33	E/2010	T497E336(1)004C(2)(3)(4)(5)	2	8	3	0.9	258	471	125	1
4	47	E/2010	T497E476(1)004C(2)(3)(4)(5)	2	8	3	0.9	258	471	125	1
4	68	E/2010	T497E686(1)004C(2)(3)(4)(5)	3	8	3	0.9	258	471	125	1
4	33	F/2214	T497F336(1)004C(2)(3)(4)(5)	2	8	2.2	0.6	213	408	125	1
4	100	F/2214	T497F107(1)004C(2)(3)(4)(5)	4	10	2	0.55	224	426	125	1
4	68	G/2711	T497G686(1)004C(2)(3)(4)(5)	3	10	1.1	0.275	337	674	125	1
4	150	G/2711	T497G157(1)004C(2)(3)(4)(5)	6	10	1	0.25	354	707	125	1
4	100	H/2915	T497H107(1)004C(2)(3)(4)(5)	4	10	0.9	0.18	408	913	125	1
4	220	H/2915	T497H227(1)004C(2)(3)(4)(5)	8	10	1	0.2	387	866	125	1
4	330	H/2915	T497H337(1)004C(2)(3)(4)(5)	10	10	0.9	0.18	408	913	125	1
6.3	1.5	A/1005	T497A155(1)006C(2)(3)(4)(6)	1	6	8	4	97	137	125	1
6.3	3.3	A/1005	T497A335(1)006C(2)(3)(4)(6)	1	6	12	6	79	112	125	1
6.3	4.7	A/1005	T497A475(1)006C(2)(3)(4)(6)	1	6	12	6	79	112	125	1
6.3	3.3	B/1505	T497B335(1)006C(2)(3)(4)(6)	1	6	8	3.2	103	163	125	1
6.3	6.8	B/1505	T497B685(1)006C(2)(3)(4)(6)	1	6	8	3.2	103	163	125	1
6.3	10	B/1505	T497B106(1)006C(2)(3)(4)(6)	1	6	8	3.2	103	163	125	1
6.3	15	B/1505	T497B156(1)006C(2)(3)(4)(6)	1	8	8	3.2	103	163	125	1
6.3	4.7	C/2005	T497C475(1)006C(2)(3)(4)(6)	1	6	5.5	2.2	141	224	125	1
6.3	6.8	D/1510	T497D685(1)006C(2)(3)(4)(5)	1	6	4.5	1.5	183	316	125	1
6.3	15	D/1510	T497D156(1)006C(2)(3)(4)(5)	1	8	5	1.7	173	297	125	1
6.3	22	D/1510	T497D226(1)006C(2)(3)(4)(5)	1	6	5	1.7	173	297	125	1
6.3	10	E/2010	T497E106(1)006C(2)(3)(4)(5)	1	8	3.5	1	239	447	125	1
6.3	15	E/2010	T497E156(1)006C(2)(3)(4)(5)	1	8	3	0.9	258	471	125	1
6.3	22	E/2010	T497E226(1)006C(2)(3)(4)(5)	2	8	3.5	1	239	447	125	1
6.3	33	E/2010	T497E336(1)006C(2)(3)(4)(5)	2	6	3.5	1	239	447	125	1
6.3	22	F/2214	T497F226(1)006C(2)(3)(4)(5)	2	8	2.2	0.6	213	408	125	1
6.3	47	F/2214	T497F476(1)006C(2)(3)(4)(5)	3	8	3.5	1	169	316	125	1
6.3	68	F/2214	T497F686(1)006C(2)(3)(4)(5)	4	10	1.5	0.4	258	500	125	1
6.3	47	G/2711	T497G476(1)006C(2)(3)(4)(5)	3	10	1.1	0.275	337	674	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert C= Hot Solder Dipped, B = Gold Plated, or H = Solder Plated. Designates Termination Finish.
(3) To complete KEMET part number, insert 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
(6) To complete KEMET part number, insert A = Option 1 or B = Option 2. Designates Test Option. See Space Grade Test Methods chart for more information.
Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
6.3	68	G/2711	T497G686(1)006C(2)(3)(4)(5)	4	10	1	0.25	354	707	125	1
6.3	100	G/2711	T497G107(1)006C(2)(3)(4)(5)	6	10	1.1	0.275	337	674	125	1
6.3	150	G/2711	T497G157(1)006C(2)(3)(4)(5)	10	10	1.1	0.275	337	674	125	1
6.3	68	H/2915	T497H686(1)006C(2)(3)(4)(5)	4	10	0.9	0.18	408	913	125	1
6.3	220	H/2915	T497H227(1)006C(2)(3)(4)(5)	10	10	0.9	0.18	408	913	125	1
6.3	330	H/2915	T497H337(1)006C(2)(3)(4)(5)	20	10	0.9	0.18	408	913	125	1
10	1	A/1005	T497A105(1)010C(2)(3)(4)(6)	1	6	10	5	87	122	125	1
10	2.2	A/1005	T497A225(1)010C(2)(3)(4)(6)	1	6	12	6	79	112	125	1
10	3.3	A/1005	T497A335(1)010C(2)(3)(4)(6)	1	6	12	6	79	112	125	1
10	2.2	B/1505	T497B225(1)010C(2)(3)(4)(6)	1	6	8	3.2	103	163	125	1
10	4.7	B/1505	T497B475(1)010C(2)(3)(4)(6)	1	6	8	3.2	103	163	125	1
10	6.8	B/1505	T497B685(1)010C(2)(3)(4)(6)	1	6	8	3.2	103	163	125	1
10	3.3	C/2005	T497C335(1)010C(2)(3)(4)(6)	1	6	5.5	2.2	141	224	125	1
10	4.7	C/2005	T497C475(1)010C(2)(3)(4)(6)	1	6	5.5	2.2	141	224	125	1
10	6.8	C/2005	T497C685(1)010C(2)(3)(4)(6)	1	6	5.5	2.2	141	224	125	1
10	10	C/2005	T497C106(1)010C(2)(3)(4)(6)	1	6	5.5	2.2	141	224	125	1
10	4.7	D/1510	T497D475(1)010C(2)(3)(4)(5)	1	6	4.5	1.5	183	316	125	1
10	6.8	D/1510	T497D685(1)010C(2)(3)(4)(5)	1	6	5	1.7	173	297	125	1
10	10	D/1510	T497D106(1)010C(2)(3)(4)(5)	1	6	4	1.3	194	340	125	1
10	15	D/1510	T497D156(1)010C(2)(3)(4)(5)	2	6	5	1.7	173	297	125	1
10	6.8	E/2010	T497E685(1)010C(2)(3)(4)(5)	1	6	3.5	1	239	447	125	1
10	10	E/2010	T497E106(1)010C(2)(3)(4)(5)	1	6	3.5	1	239	447	125	1
10	15	E/2010	T497E156(1)010C(2)(3)(4)(5)	2	8	3	0.9	258	471	125	1
10	15	F/2214	T497F156(1)010C(2)(3)(4)(5)	2	8	2.5	0.7	200	378	125	1
10	33	F/2214	T497F336(1)010C(2)(3)(4)(5)	3	8	1.5	0.4	258	500	125	1
10	47	F/2214	T497F476(1)010C(2)(3)(4)(5)	4	10	1.5	0.4	258	500	125	1
10	33	G/2711	T497G336(1)010C(2)(3)(4)(5)	3	10	1.1	0.275	337	674	125	1
10	47	G/2711	T497G476(1)010C(2)(3)(4)(5)	4	10	1	0.25	354	707	125	1
10	68	G/2711	T497G686(1)010C(2)(3)(4)(5)	6	10	1.1	0.275	337	674	125	1
10	100	G/2711	T497G107(1)010C(2)(3)(4)(5)	10	10	1.1	0.275	337	674	125	1
10	47	H/2915	T497H476(1)010C(2)(3)(4)(5)	5	10	0.9	0.18	408	913	125	1
10	100	H/2915	T497H107(1)010C(2)(3)(4)(5)	10	10	0.9	0.18	408	913	125	1
10	150	H/2915	T497H157(1)010C(2)(3)(4)(5)	15	10	0.9	0.18	408	913	125	1
10	220	H/2915	T497H227(1)010C(2)(3)(4)(5)	20	10	0.9	0.18	408	913	125	1
10	150	X/2824	T497X157(1)010C(2)(3)(4)(5)	15	10	0.9	0.065	428	1593	125	1
15	0.68	A/1005	T497A684(1)015C(2)(3)(4)(6)	1	6	12	6	79	112	125	1
15	1.5	A/1005	T497A155(1)015C(2)(3)(4)(6)	1	6	15	7.5	71	100	125	1
15	2.2	A/1005	T497A225(1)015C(2)(3)(4)(6)	1	6	15	7.5	71	100	125	1
15	1.5	B/1505	T497B155(1)015C(2)(3)(4)(6)	1	6	8	3.2	103	163	125	1
15	2.2	C/2005	T497C225(1)015C(2)(3)(4)(6)	1	6	5.5	2.2	141	224	125	1
15	3.3	D/1510	T497D335(1)015C(2)(3)(4)(5)	1	6	5	1.7	173	297	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert C= Hot Solder Dipped, B = Gold Plated, or H = Solder Plated. Designates Termination Finish.
(3) To complete KEMET part number, insert 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
(6) To complete KEMET part number, insert A = Option 1 or B = Option 2. Designates Test Option. See Space Grade Test Methods chart for more information.
Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
15	4.7	D/1510	T497D475(1)015C(2)(3)(4)(5)	1	6	6	2	158	274	125	1
15	6.8	D/1510	T497D685(1)015C(2)(3)(4)(5)	1	6	6	2	158	274	125	1
15	4.7	E/2010	T497E475(1)015C(2)(3)(4)(5)	1	6	4	1.2	224	408	125	1
15	6.8	E/2010	T497E685(1)015C(2)(3)(4)(5)	1	8	3	0.9	258	471	125	1
15	10	F/2214	T497F106(1)015C(2)(3)(4)(5)	2	6	2.5	0.667	200	387	125	1
15	15	F/2214	T497F156(1)015C(2)(3)(4)(5)	2	8	3	0.8	183	354	125	1
15	22	F/2214	T497F226(1)015C(2)(3)(4)(5)	3	8	3	0.8	183	354	125	1
15	33	F/2214	T497F336(1)015C(2)(3)(4)(5)	5	6	3	0.8	183	354	125	1
15	22	G/2711	T497G226(1)015C(2)(3)(4)(5)	4	6	1.1	0.275	337	674	125	1
15	33	G/2711	T497G336(1)015C(2)(3)(4)(5)	6	8	1.1	0.275	337	674	125	1
15	47	G/2711	T497G476(1)015C(2)(3)(4)(5)	10	8	1.1	0.275	337	674	125	1
15	33	H/2915	T497H336(1)015C(2)(3)(4)(5)	5	8	0.9	0.18	408	913	125	1
15	47	H/2915	T497H476(1)015C(2)(3)(4)(5)	10	8	0.9	0.18	408	913	125	1
15	68	H/2915	T497H686(1)015C(2)(3)(4)(5)	10	8	0.9	0.18	408	913	125	1
20	0.47	A/1005	T497A474(1)020C(2)(3)(4)(6)	1	8	14	7.5	73	100	125	1
20	0.68	B/1505	T497B684(1)020C(2)(3)(4)(6)	1	6	10	5.6	92	123	125	1
20	1	B/1505	T497B105(1)020C(2)(3)(4)(6)	1	6	12	4.8	84	133	125	1
20	1.5	C/2005	T497C155(1)020C(2)(3)(4)(6)	1	6	6	2.4	135	214	125	1
20	2.2	D/1510	T497D225(1)020C(2)(3)(4)(5)	1	6	5	1.7	173	297	125	1
20	3.3	D/1510	T497D335(1)020C(2)(3)(4)(5)	1	6	6	2	158	274	125	1
20	3.3	E/2010	T497E335(1)020C(2)(3)(4)(5)	1	6	4	1.2	224	408	125	1
20	4.7	E/2010	T497E475(1)020C(2)(3)(4)(5)	1	6	6	1.7	183	343	125	1
20	6.8	E/2010	T497E685(1)020C(2)(3)(4)(5)	2	6	5	1.5	200	365	125	1
20	6.8	F/2214	T497F685(1)020C(2)(3)(4)(5)	2	6	2.4	0.7	204	378	125	1
20	10	F/2214	T497F106(1)020C(2)(3)(4)(5)	2	6	3	0.8	183	354	125	1
20	15	G/2711	T497G156(1)020C(2)(3)(4)(5)	3	6	1.1	0.275	337	674	125	1
20	22	G/2711	T497G226(1)020C(2)(3)(4)(5)	4	6	2.5	0.625	224	447	125	1
20	22	H/2915	T497H226(1)020C(2)(3)(4)(5)	4	6	0.9	0.18	408	913	125	1
20	33	H/2915	T497H336(1)020C(2)(3)(4)(5)	6	8	0.9	0.18	408	913	125	1
20	47	X/2824	T497X476(1)020C(2)(3)(4)(5)	10	8	0.9	0.11	428	1225	125	1
25	0.68	B/1505	T497B684(1)025C(2)(3)(4)(6)	1	6	7.5	4	106	146	125	1
25	1	B/1505	T497B105(1)025C(2)(3)(4)(6)	1	6	10	4	92	146	125	1
25	1	C/2005	T497C105(1)025C(2)(3)(4)(6)	1	6	6.5	2.6	130	206	125	1
25	1.5	D/1510	T497D155(1)025C(2)(3)(4)(5)	1	6	6.5	1.7	152	297	125	1
25	2.2	D/1510	T497D225(1)025C(2)(3)(4)(5)	1	6	6	2	158	274	125	1
25	2.2	E/2010	T497E225(1)025C(2)(3)(4)(5)	1	6	3.5	1	239	447	125	1
25	3.3	E/2010	T497E335(1)025C(2)(3)(4)(5)	1	6	4	1.2	224	408	125	1
25	4.7	F/2214	T497F475(1)025C(2)(3)(4)(5)	2	6	2.5	0.7	200	378	125	1
25	6.8	F/2214	T497F685(1)025C(2)(3)(4)(5)	2	6	3	0.8	183	354	125	1
25	6.8	G/2711	T497G685(1)025C(2)(3)(4)(5)	2	6	1.2	0.3	323	645	125	1
25	10	G/2711	T497G106(1)025C(2)(3)(4)(5)	3	6	1.4	0.35	299	598	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert C= Hot Solder Dipped, B = Gold Plated, or H = Solder Plated. Designates Termination Finish.
(3) To complete KEMET part number, insert 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
(6) To complete KEMET part number, insert A = Option 1 or B = Option 2. Designates Test Option. See Space Grade Test Methods chart for more information.
Refer to Ordering Information for additional detail.

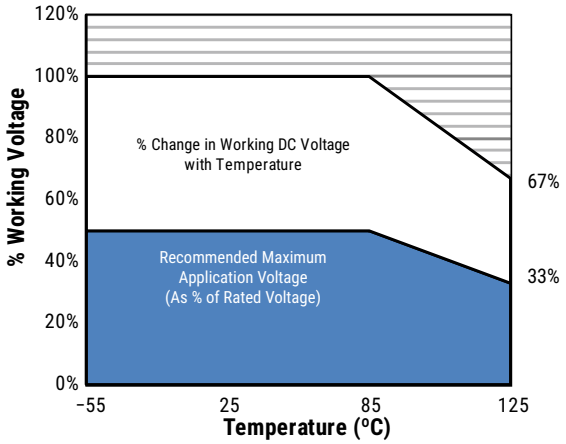
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
25	15	G/2711	T497G156(1)025C(2)(3)(4)(5)	4	6	1.4	0.35	299	598	125	1
25	22	G/2711	T497G226(1)025C(2)(3)(4)(5)	6	6	1.4	0.35	299	598	125	1
25	15	H/2915	T497H156(1)025C(2)(3)(4)(5)	4	6	1	0.2	387	866	125	1
25	22	H/2915	T497H226(1)025C(2)(3)(4)(5)	6	6	0.9	0.18	408	913	125	1
25	33	H/2915	T497H336(1)025C(2)(3)(4)(5)	10	8	0.9	0.18	408	913	125	1
25	22	X/2824	T497X226(1)025C(2)(3)(4)(5)	6	6	0.9	0.16	428	1016	125	1
25	33	X/2824	T497X336(1)025C(2)(3)(4)(5)	10	8	0.9	0.13	428	1127	125	1
35	0.47	B/1505	T497B474(1)035C(2)(3)(4)(6)	1	6	10	6.8	92	112	125	1
35	0.68	C/2005	T497C684(1)035C(2)(3)(4)(6)	1	6	8	4	117	117	125	1
35	1	D/1510	T497D105(1)035C(2)(3)(4)(5)	1	6	6.5	2.2	152	261	125	1
35	1.5	E/2010	T497E155(1)035C(2)(3)(4)(5)	1	6	4.5	1.3	211	392	125	1
35	3.3	F/2214	T497F335(1)035C(2)(3)(4)(5)	1	6	2.5	0.7	200	378	125	1
35	4.7	G/2711	T497G475(1)035C(2)(3)(4)(5)	2	6	1.5	0.375	289	577	125	1
35	6.8	H/2915	T497H685(1)035C(2)(3)(4)(5)	3	6	1.3	0.5	340	548	125	1
35	10	H/2915	T497H106(1)035C(2)(3)(4)(5)	4	8	0.9	0.5	408	548	125	1
35	15	X/2824	T497X156(1)035C(2)(3)(4)(5)	6	6	0.9	0.19	428	932	125	1
50	0.1	A/1005	T497A104(1)050C(2)(3)(4)(6)	1	6	22	12	58	79	125	1
50	0.22	B/1505	T497B224(1)050C(2)(3)(4)(6)	1	6	14	6.8	78	112	125	1
50	0.33	B/1505	T497B334(1)050C(2)(3)(4)(6)	1	6	12	4.8	84	133	125	1
50	0.47	C/2005	T497C474(1)050C(2)(3)(4)(6)	1	6	8	3.2	117	117	125	1
50	0.68	D/1510	T497D684(1)050C(2)(3)(4)(5)	1	6	7	2.3	146	255	125	1
50	1	E/2010	T497E105(1)050C(2)(3)(4)(5)	1	6	6	1.7	183	343	125	1
50	1.5	F/2214	T497F155(1)050C(2)(3)(4)(5)	1	6	4	1.1	158	302	125	1
50	2.2	F/2214	T497F225(1)050C(2)(3)(4)(5)	2	6	2.5	0.7	200	378	125	1
50	3.3	G/2711	T497G335(1)050C(2)(3)(4)(5)	2	6	2	0.5	250	500	125	1
50	4.7	H/2915	T497H475(1)050C(2)(3)(4)(5)	3	6	1.5	0.5	316	548	125	1
VDC @ 85°C	µF	KEMET/EIA	(See below for part options)	µA @ +25°C Maximum/ 5 Min	% @ +25°C 120 Hz Maximum	Ω @ +25°C 100 kHz Maximum	Ω @ +25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Maximum Allowable Ripple Current (rms) Std ESR	Maximum Allowable Ripple Current (rms) Low ESR	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert C= Hot Solder Dipped, B = Gold Plated, or H = Solder Plated. Designates Termination Finish.
(3) To complete KEMET part number, insert 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge current option.
(4) To complete KEMET part number, insert 1 = Standard ESR, 2 = Low ESR. Designates ESR option.
(5) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
(6) To complete KEMET part number, insert A = Option 1 or B = Option 2. Designates Test Option. See Space Grade Test Methods chart for more information.
Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
A	1005	75
B	1505	85
C	2005	110
D	1510	150
E	2010	200
F	2214	100
G	2711	125
H	2915	150
X	2915	165

Using the Pmax of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
Pmax = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

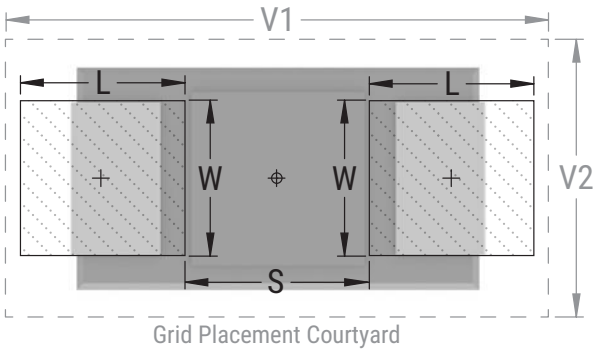
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	1005	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	1505	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	2005	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	1510	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
E[1]	2010	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
F	2214	2.30	3.47	2.98	8.58	4.82	1.90	3.35	3.18	7.48	4.32	1.52	3.25	3.34	6.62	4.06
G	2711	2.81	2.84	3.10	9.72	4.18	2.41	2.72	3.30	8.62	3.68	2.03	2.62	3.46	7.76	3.42
H	2915	2.81	3.84	3.61	10.24	5.20	2.41	3.72	3.81	9.14	4.70	2.03	3.62	3.97	8.28	4.44
X	2824	2.73	3.22	3.46	9.92	6.80	2.33	3.10	3.66	8.82	6.30	1.95	3.00	3.82	7.96	6.04

Density Level A: *For low-density Product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC Standard 7351 (IPC–7351).*
[1] *Land pattern geometry is too small for silkscreen outline.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

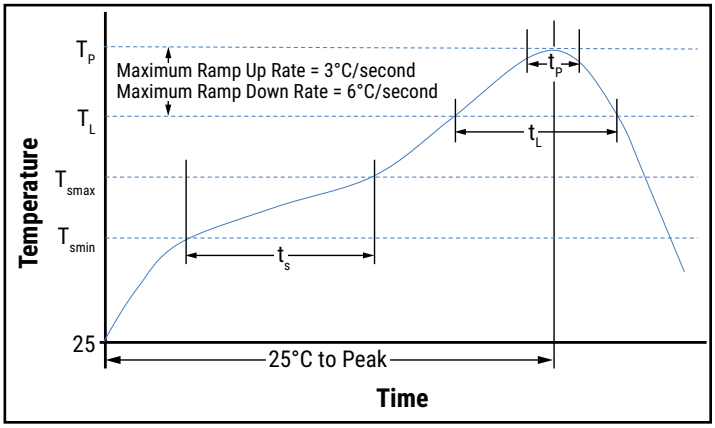
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

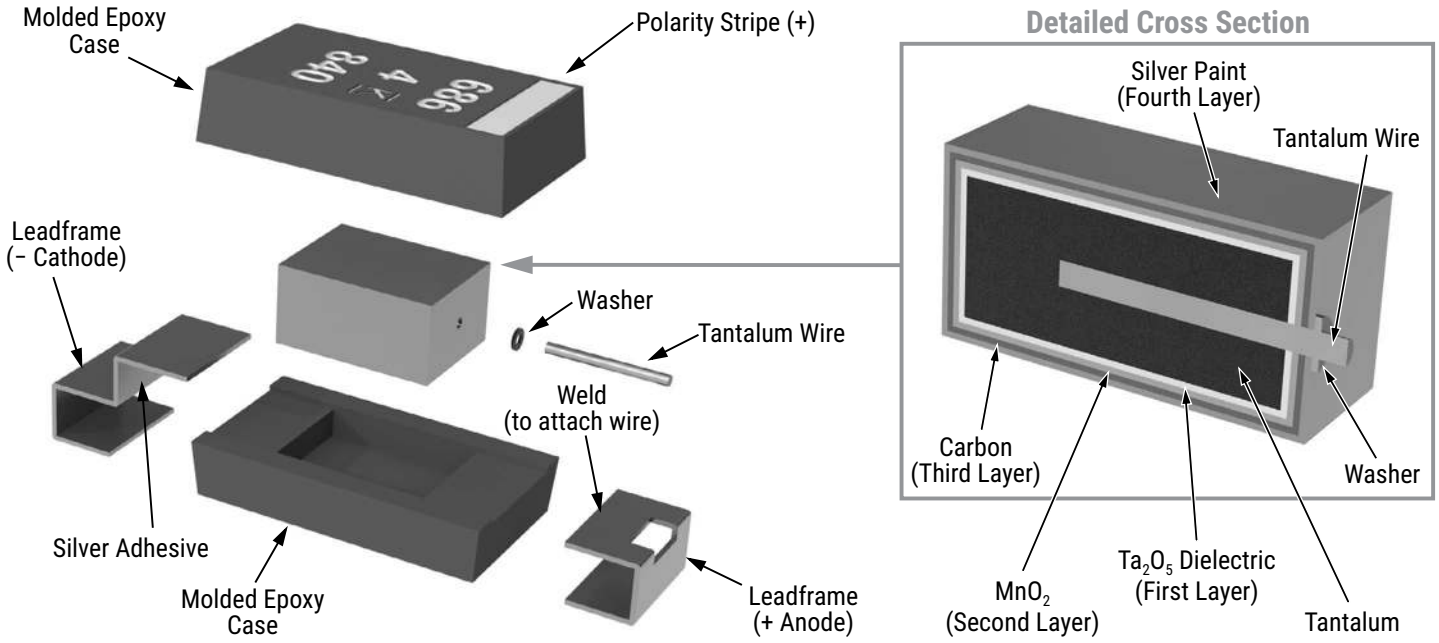
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



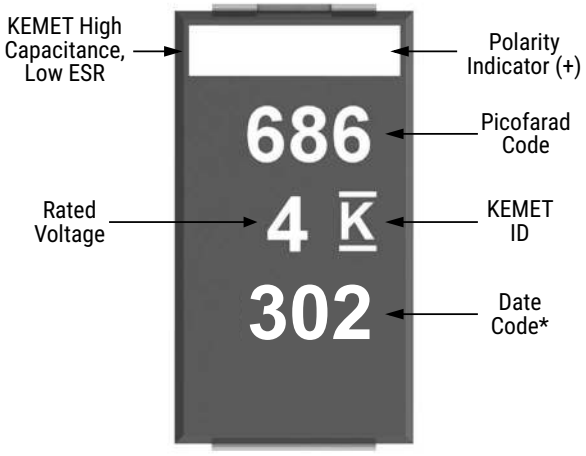
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 302 = 2nd week of 2023

Date Code *	
1st digit = Last number of Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Parts screened with Option C are marked with a serial number below date code characters.

Tape & Reel Packaging Information

KEMET's molded tantalum and aluminum chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

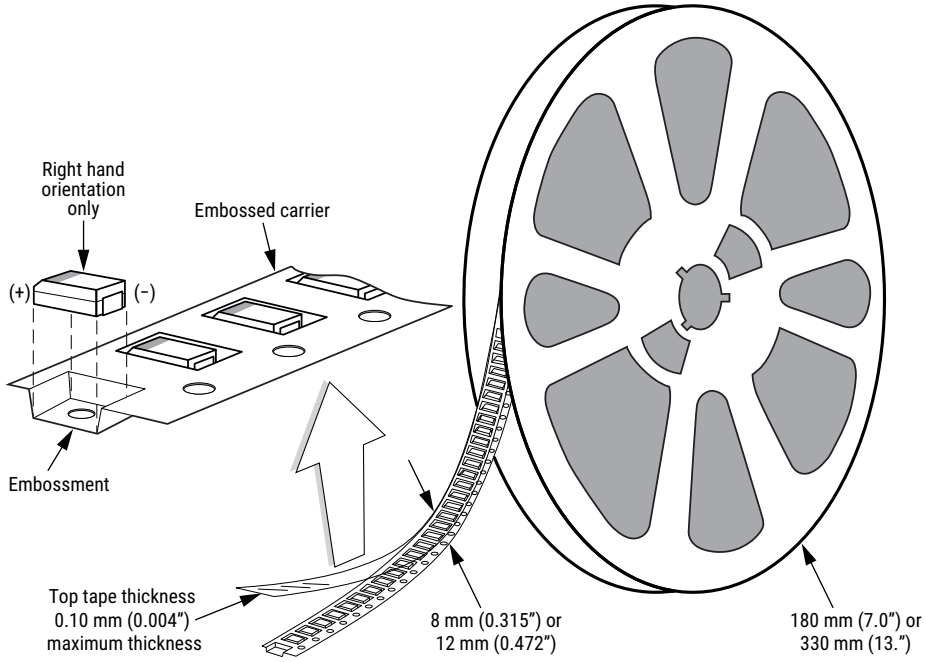


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*
KEMET	Size		
A	1005	8	2,500
B	1505	12	2,500
C	2005	12	2,500
D	1510	12	2,500
E	2010	12	2,500
F	2214	12	1,000
G	2711	12	500
H	2915	12	500
X	2824	12	500

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

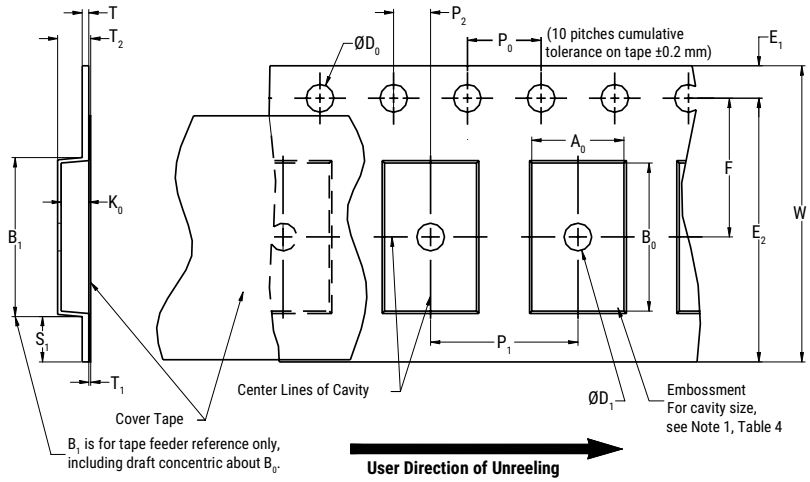


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover Tape Break Force: 1.0 kg minimum.
2. Cover Tape Peel Strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 Newton (10 to 100 gf)
12 and 16 mm	0.1 to 1.3 Newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

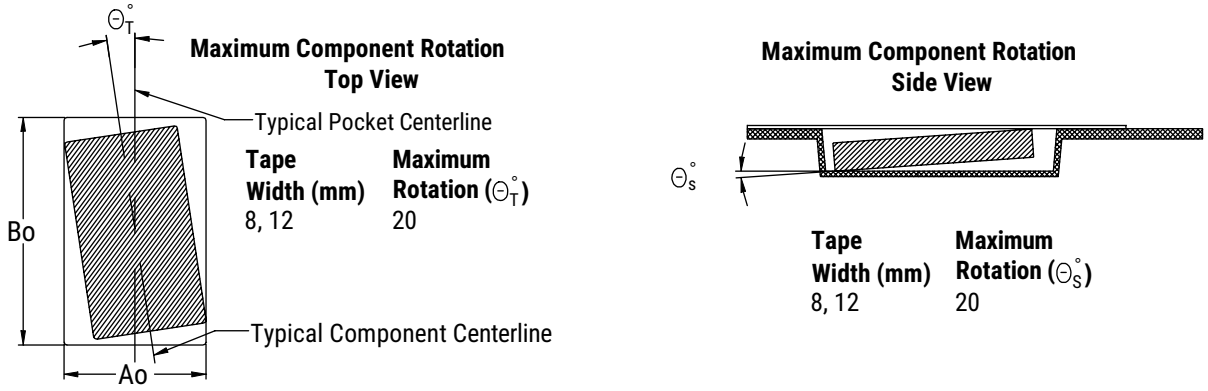


Figure 3 – Maximum Lateral Movement

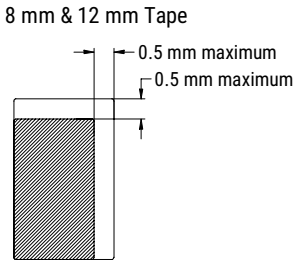


Figure 4 – Bending Radius

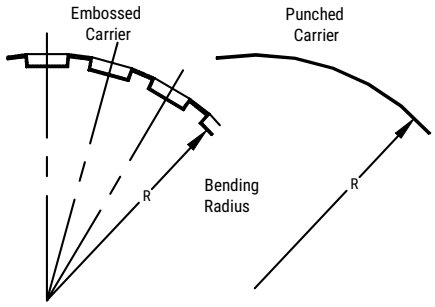
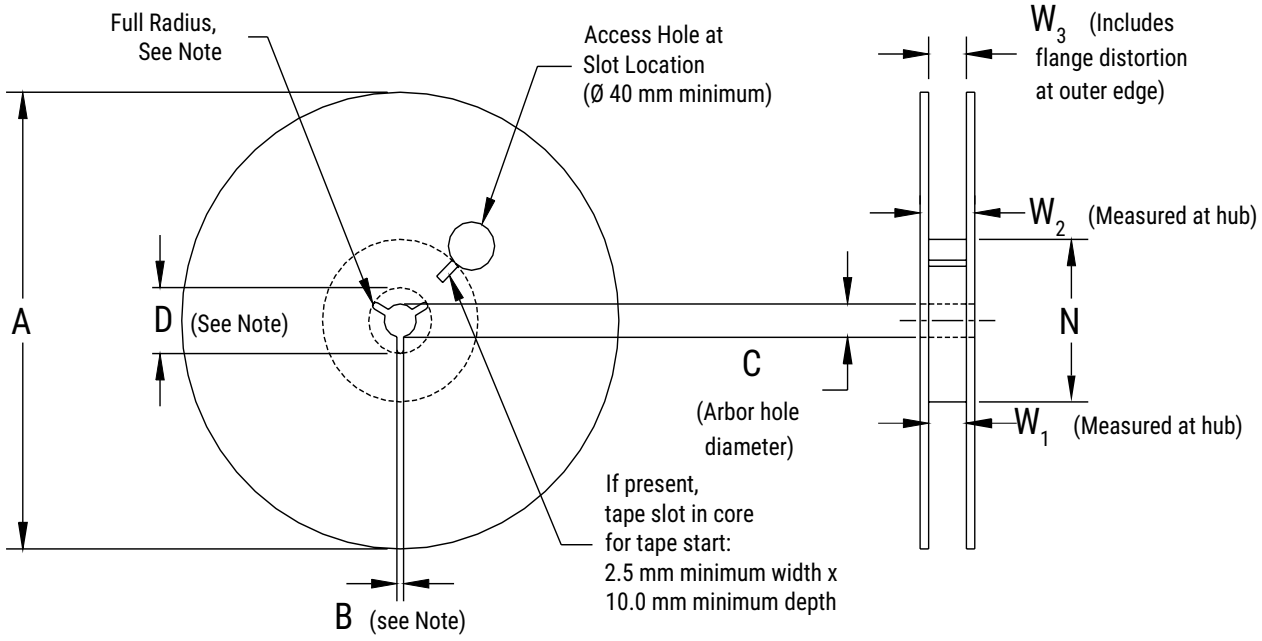


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

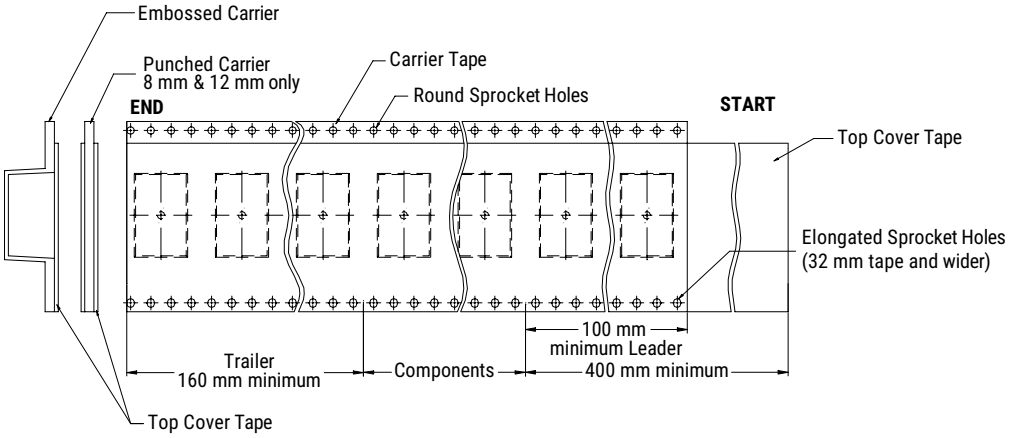
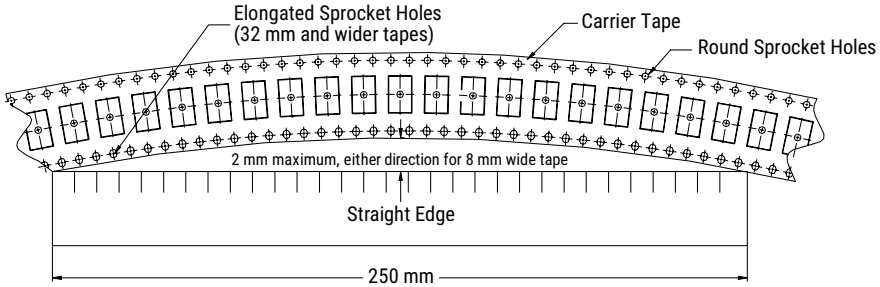


Figure 7 – Maximum Camber



T510 Space Grade High Reliability Alternative (HRA) Multiple Anode Low ESR MnO_2

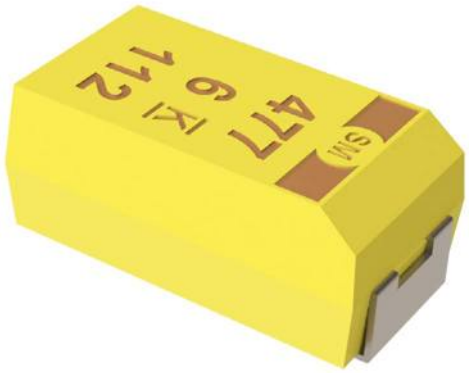
Overview

KEMET's Space Grade capacitors are suitable for use by the defense/aerospace customers in high reliability space applications. These capacitors meet the requirements of MIL–PRF–55365 as well as MIL–STD–1580. These capacitors incorporate an intensive testing and screening protocol which is customizable depending upon customer's specific needs.

The full part number allows for designation of surge current level (10 cycles −55°C and +85°C before and/or after Weibull grading, 10 cycles +25°C), performance testing level (see chart for details on available options), ESR (low and standard), and termination finish (see description in each series). Fused versions are available for built-in circuit protection, as well as multi-anode designs for very low ESR values.

Benefits

- ESR as low as 18 mΩ
- High ripple current capability
- 100% steady-state accelerated aging
- 100% surge current test
- Meets or exceeds EIA standard 535BAAC
- Taped and reeled per EIA 481
- Weibull Grading C (0.01%/1,000 hours)



Applications

Typical applications include decoupling and filtering in defense and aerospace end applications, such as DC/DC converters, portable electronics, telecommunications, and control units requiring high ripple current capability.

Environmental Compliance

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	510	X	337	K	010	C	H	64	1	A	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage (V)	Failure Rate/ Design	Lead Material	Surge	ESR	Testing	Packaging (C-Spec)
T = Tantalum	Ultra-low ESR – Space grade	E X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10	C = 0.01% /1,000 hours	C = Hot solder dipped H = Standard solder-coated (SnPb 5% Pb minimum) T = 100% Matte Tin (Sn) plated	61 = No Surge 62 = 10 Cycles after Weibull, 25°C 63 = 10 Cycles, after Weibull, −55°C and 85°C 64 = 10 Cycles before Weibull, −55°C and 85°C 65 = 10 Cycles before and after Weibull, −55°C and 85°C	1 = ESR - standard	A = Option A B = Option B C = Option C	Blank = 7" Reel 7280 = 13" Reel 7610 = Bulk bag 7640 = Bulk plastic box WAFL = Waffle pack

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	330 – 1,000 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 10 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	n/a	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles. (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak. MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

**IL = Initial limit*

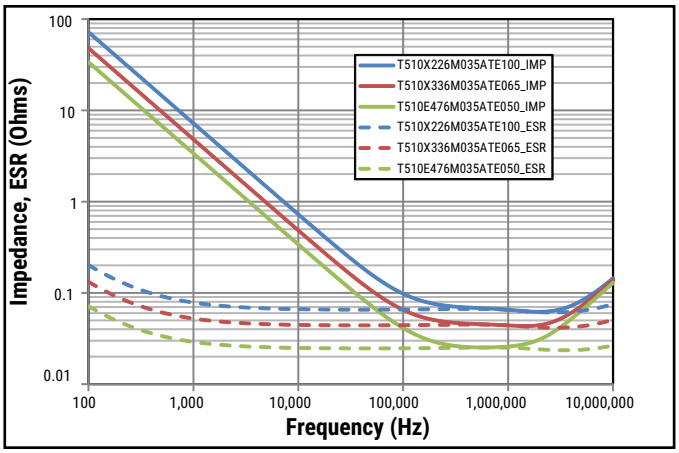
Test Methods

Test Sequence	Test Method	Option A	Option B	Option C
100% Serialization	KEMET Standard			X
100% IR Reflow	MIL–PRF–55365	X	X	X
100% Thermal Shock	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard			X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Surge Current, Option C with 5% PDA Calculation	MIL–PRF–55365 with 5% PDA Calculation	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Voltage Aging, 10 hours at 1.32 Vr	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
100% Weibull Grading C	MIL–PRF–55365	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
100% Surge Current, Option A or B with 5% PDA Calculation	MIL–PRF–55365 with 5% PDA Calculation	X	X	X
100% Electrical Verification	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
3 Sigma Screening – All Electricals	KEMET Standard	X	X	X
Read and Record Attributes/Variables Data	KEMET Standard			X
Destructive Physical Analysis (DPA) (5 pieces–each lot)	MIL–PRF–55365	X	X	X
Group B Testing (22 pieces – each lot)	* See Note Below		X	X
Temperature Stability – sample	MIL–PRF–55365	X	X	X
Solderability – Sample	MIL–PRF–55365	X	X	X
Group C Testing (57 pieces – each Lot)**	MIL–PRF–55365		X	X
100% X-ray	MIL–PRF–55365	X		
100% X-ray – 2 Plane***	MIL–PRF–55365 and KEMET Standard		X	X
100% Physical Dimension Verification	MIL–PRF–55365	X	X	X
Data Pack				
Group A and C Summaries			X	X
2 Plane X-ray JPEG photos			X	X
DPA Report			X	X
Attributes/Variables Data for Cap/Df/DCL/ESR				X

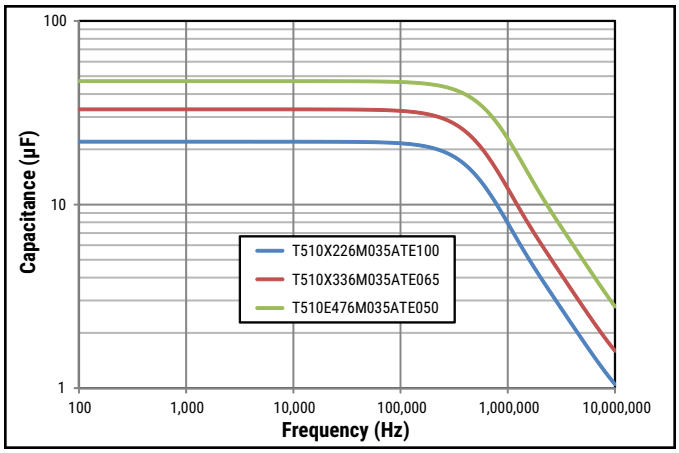
***X** = Included in test option*
** Group B Testing = 10,000 Cycles Surge Current, 85°C, 40% Vr*
*** Group C Post Moisture ESR limit = 1.25 initial limit*
**** 2 Plane X-ray = Top and side views, molded case wall thickness minimum 0.005" on all sides, negative/positive termination attachment criteria per MIL–STD–1580*

Electrical Characteristics

Impedance, ESR vs. Frequency

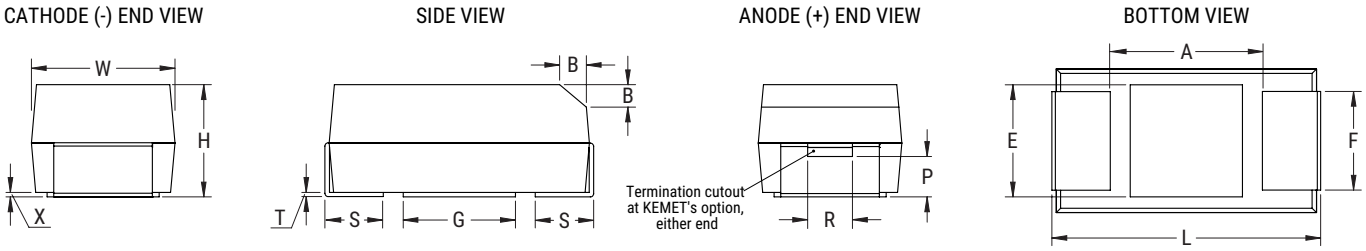


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component													
KEMET	EIA	L	W	H	F±0.1 ±(0.004)	S±0.3 ±(0.012)	B±0.15 (Ref)±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)	Net Weight (mg)
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	430.15
E	7360–38	7.3±0.3 (0.287±0.012)	6.0±0.3 (0.236±0.012)	3.6±0.2 (0.142±0.008)	4.1 (0.161)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	n/a	n/a	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	500.73

Notes: (Ref) – Dimensions provided for reference only. No dimensions are provided for B, P or R because low profile cases do not have a bevel or a notch. These weights are provided as a reference. If exact weights are needed, please contact your KEMET Sales Representative.

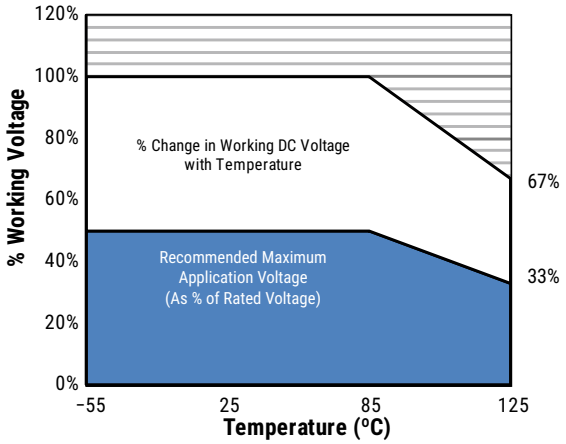
Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (mArms)			Maximum Operating Temperature	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +20°C Maximum/ 5 Minimum	% at +20°C 120 Hz Maximum	mΩ at +20°C 100 kHz Maximum	100 kHz, 25°C	100 kHz, 85°C	100 kHz, 125°C	°C	Reflow Temp ≤ 260°C
4	1000	E/7360-38	T510E108(1)004C(2)(3)1(4)	40.0	6	18	3900	3500	1500	125	1
6.3	470	X/7343-43	T510X477(1)006C(2)(3)1(4)	30.0	6	30	3000	2700	1200	125	1
6.3	680	E/7360-38	T510E687(1)006C(2)(3)1(4)	40.8	6	23	3500	3200	1400	125	1
10	330	X/7343-43	T510X337(1)010C(2)(3)1(4)	33.0	6	35	2800	2500	1100	125	1

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert C= Hot solder dipped, or H = Solder Plated. Designates Termination Finish.
(3) To complete KEMET part number, insert 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull, 64 = 10 cycles −55°C +85°C before Weibull or 65 = Both. Designates Surge current option.
(4) To complete KEMET part number, insert A = Option 1, B = Option 2 or C = Option 3. Designates Test Option. See Space Grade Test Methods chart for more information.
Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

Temperature Compensation Multipliers for Maximum Ripple Current			
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C	T ≤ 150°C
1.00	0.90	0.40	0.30

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

KEMET Series and Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
T510X	7343–43	270
T510E	7360–38	285

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
Pmax = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

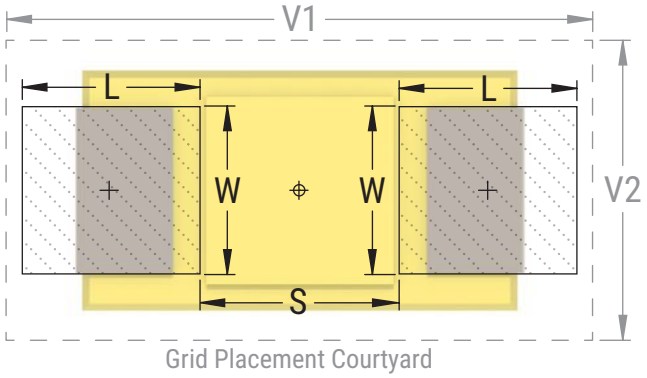
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
E[1]	7360–38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC Standard 7351 (IPC–7351).*
[1] Height of these chips may create problems in wave soldering.



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

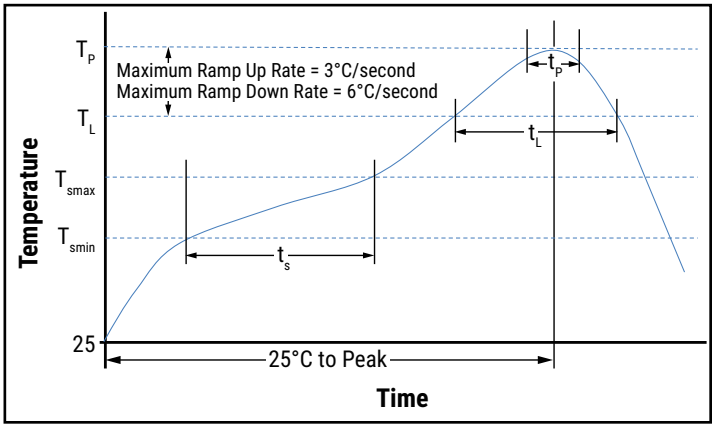
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/seconds maximum	3°C/seconds maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

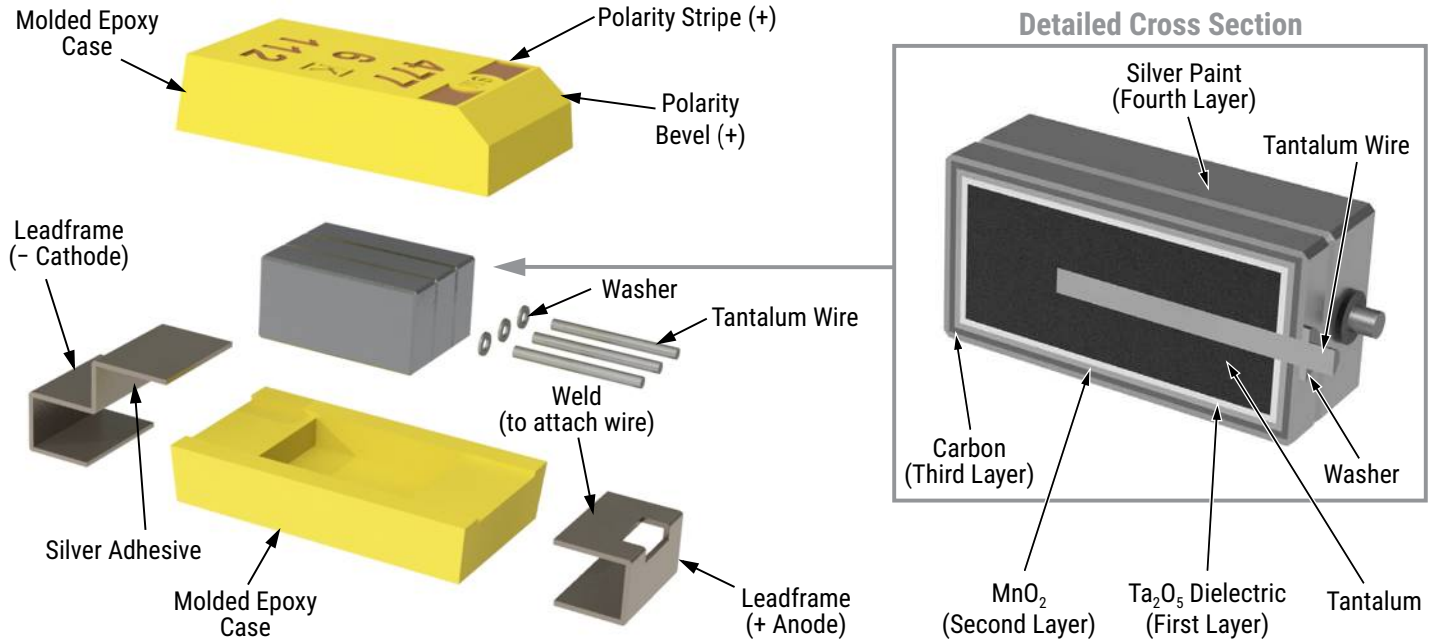
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



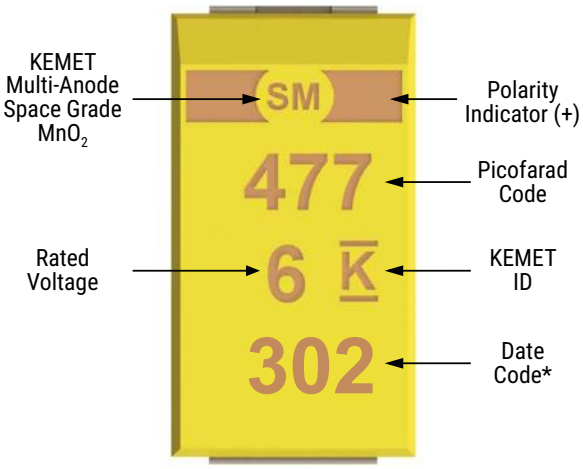
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature–reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 302 = 2nd week of 2023

Parts screened with Option C are marked with a serial number below date code characters.

Date Code *	
1st digit = Last number of Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Tape & Reel Packaging Information

KEMET's molded tantalum and aluminum chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

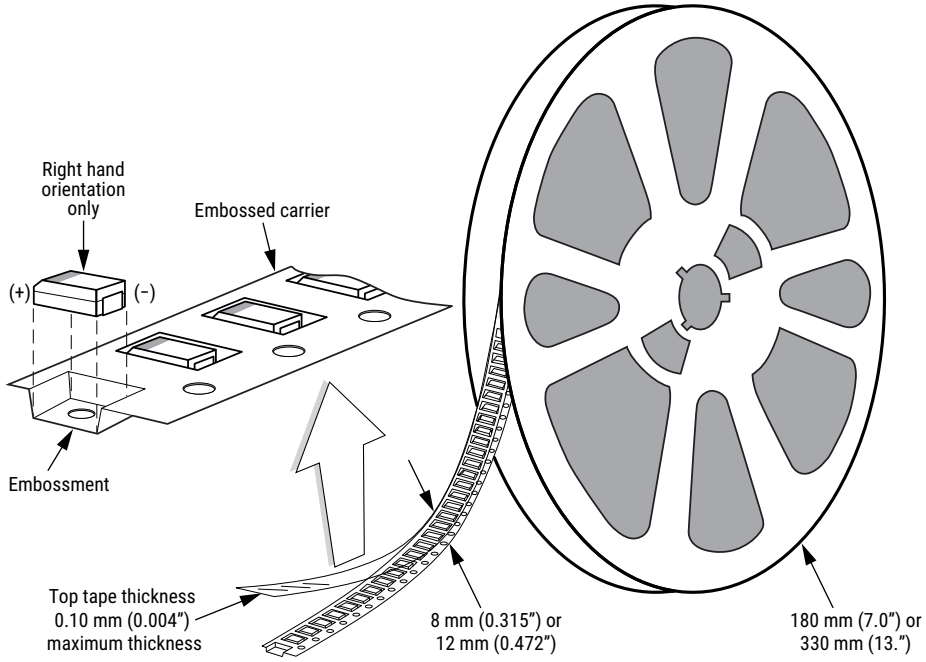


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*
KEMET	EIA		
X	7343–43	12	500
E	7360–38	12	500

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

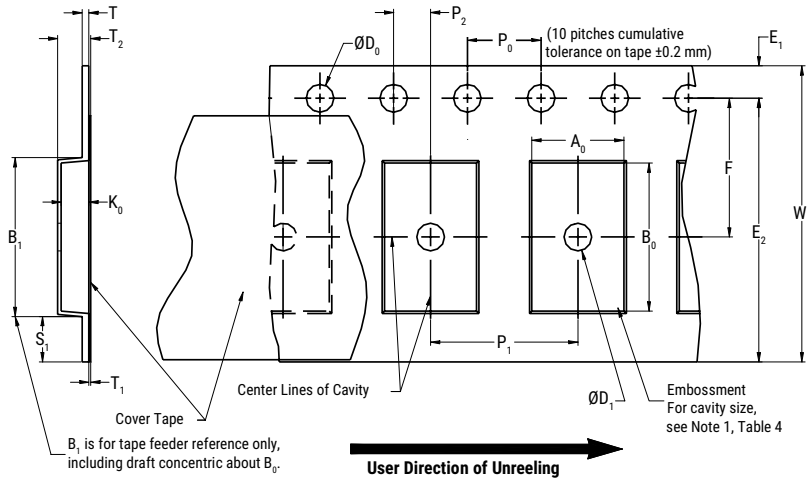


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

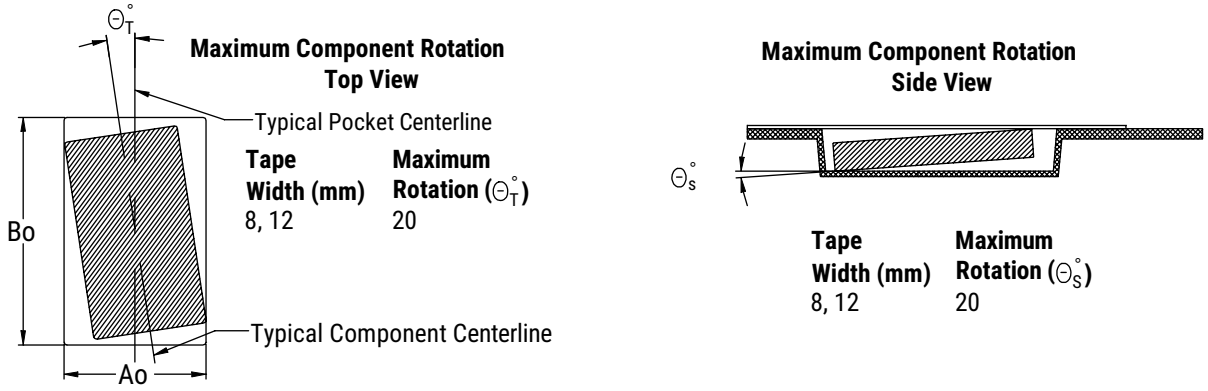


Figure 3 – Maximum Lateral Movement

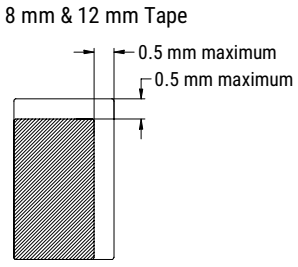


Figure 4 – Bending Radius

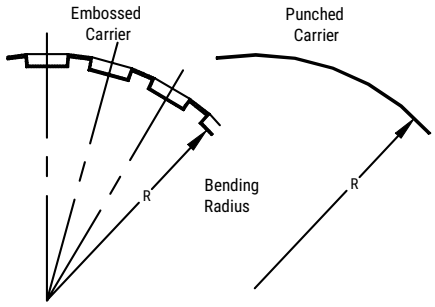
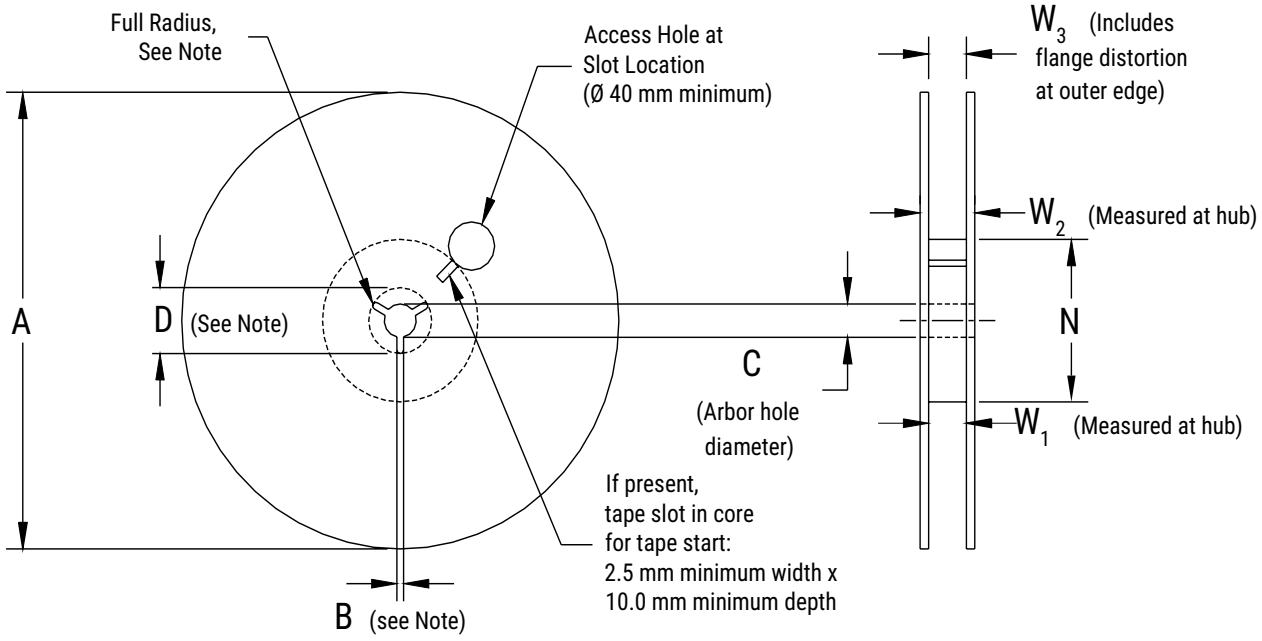


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

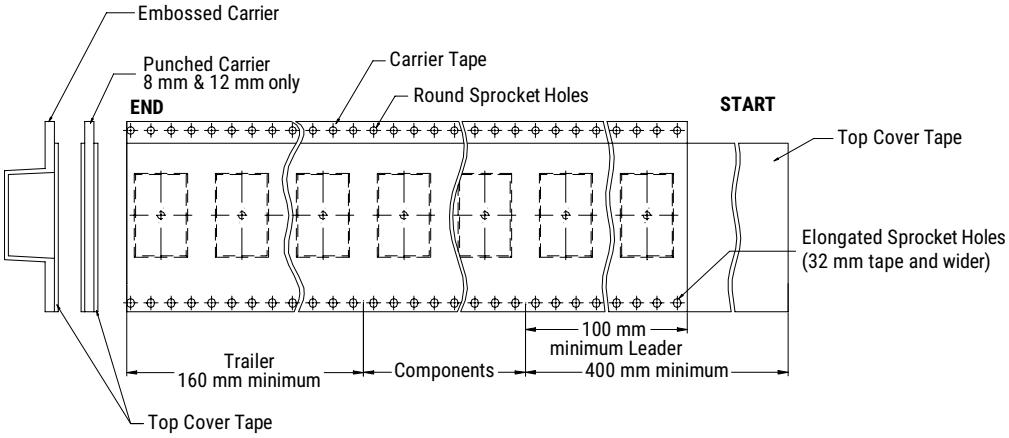
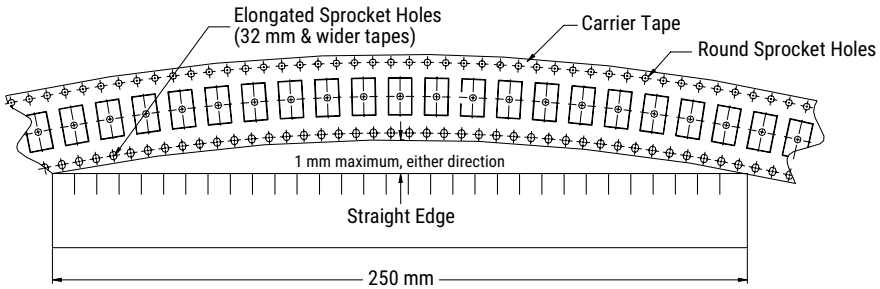


Figure 7 – Maximum Camber



T110 Axial MIL–PRF–39003 Polar Type and T212 (CSR13 Style)

Overview

The KEMET standard hermetically sealed T110 Series is targeted for use in high humidity environments. These capacitors are ruggedly built, designed for miniaturized circuitry, and are especially well-suited for coupling, bypass, filtering and RC timing circuits. The T110 Series exhibits excellent stability as well as extremely low DC leakage current, dissipation factor, and ESR/impedance over a wide temperature and frequency range. Available in standard EIA capacitance values from 0.0047 µF to 330 µF in ±20%, ±10%, and ±5% tolerances, the T110 Series is now offered in working voltages of 6 VDC to 125 VDC and low ESR limits. Higher CV values in comparable case sizes are available in the KEMET T410 Series.

Benefits

- Taped and reeled per EIA Specification RS–296
- Marking per MIL–STD–1285
- Qualified to MIL–PRF–39003 (CSR13 Style)
- Failure rate options: Graded – B, C, D, and G
  Exponential – M, P, R, and S*
- Capacitance values of 0.0047 µF to 330 µF
- Tolerances of ±5%, ±10% and ±20%
- Voltage rating of 6 – 125 VDC
- Operating temperature range of −55°C to +125°C
- Case sizes: A, B, C, D

**Failure rates apply to military products only*

Applications

Typical applications include coupling, bypass, filtering and RC timing circuits in miniaturized circuitry.

Ordering Information – T110

T	110	A	105	K	050	A	T	7200
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	Hermetically sealed axial capacitor	A B C D	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50 060 = 60 075 = 75 100 = 100 125 = 125	A = N/A	T = 100% Tin S = Standard (Sn/Pb)	Blank = Sleeved/ Bulk 0100 = Without sleeve 7200 = Tape & Reel 7293 & 7443 = Ammo All capacitors are sleeved unless specified.

Ordering Information – T212 (CSR13 Style)

MIL product

T	212	A	105	K	050	B	S	7200
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	Hermetically sealed axial military grade capacitor	A B C D	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50 075 = 75 100 = 100	Graded: B = 0.1%/k hours C = 0.01%/k hours D = 0.001%/k hours G= 1.0 %/k hours Exponential: M = 1%/k hours P = 0.1%/k hours R = 0.01%/k hours S = 0.001%/k hours	S = Standard (Sn/Pb)	All capacitors are sleeved unless specified. 0100 = Without sleeve 7200 = Tape & Reel 7293 & 7443 = Ammo 4250 = "A" surge current 4251 = "B" surge current 4252 = "C" surge current

Ordering Information – MIL–PRF–39003

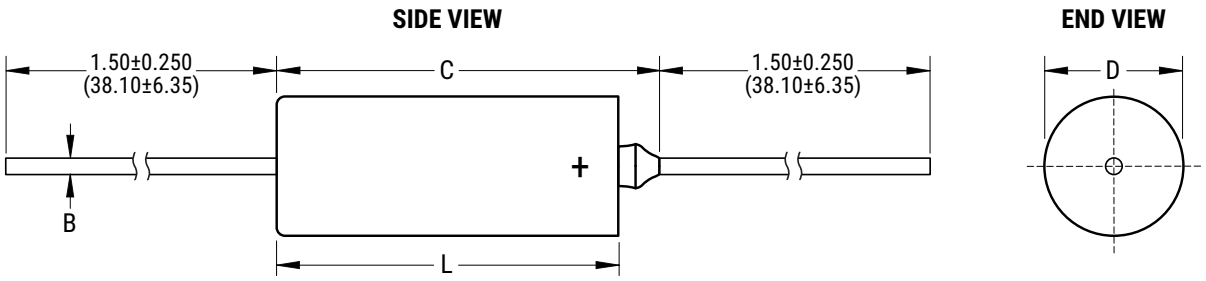
M39003	/01	6003	A
Capacitor Class	Slash	Dash Number	Surge Option
Military specification number	Specification sheet number	Failure rate level	A = C-4250 B = C-4251 C = C-4252 Blank = No surge

Orders should be entered by the military specification number, including the dash number and surge option letter (A, B or C).

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.0047 – 330 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6 – 125 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table (At rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)
Failure Rate (MIL–39003, CSR13 capacitors only)	Approved failure rate: S (0.001%/k hours) – Exponential, D (0.001%/k hours) and C (0.01%/k hours) – Graded

Dimensions – Inches (Millimeters)



Case Size	Uninsulated		Insulated			
	D ±0.005 (±0.13)	L ±0.031 (±0.79)	D ±0.010 (±0.25)	L ±0.031 (±0.79)	B ±0.002 (±0.05)	C Maximum
A	0.125 (3.18)	0.250 (6.35)	0.135 (3.43)	0.286 (7.26)	0.020 (0.51)	0.422 (10.72)
B	0.175 (4.45)	0.438 (11.13)	0.185 (4.70)	0.474 (12.04)	0.020 (0.51)	0.610 (15.49)
C	0.279 (7.09)	0.650 (16.51)	0.289 (7.34)	0.686 (17.42)	0.025 (0.64)	0.822 (20.88)
D	0.341 (8.66)	0.750 (19.05)	0.351 (8.92)	0.786 (19.96)	0.025 (0.64)	0.922 (23.42)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
6	2.2	A	T110A225(1)006A(3)	0.3	4									
6	2.7	A	T110A275(1)006A(3)	0.3	4									
6	3.3	A	T110A335(1)006A(3)	0.3	4									
6	3.9	A	T110A395(1)006A(3)	0.3	4									
6	4.7	A	T110A475(1)006A(3)	0.3	4									
6	5.6	A	T110A565J006A(3)	0.3	4	5001	5201	5401	5601	4001	6001	7001	8001	T212A565J006(2)S
6	5.6	A	T110A565K006A(3)	0.3	4	2241	2481	2721	2961	4002	6002	7002	8002	T212A565K006(2)S
6	5.6	A	T110A565M006A(3)	0.3	4									
6	6.8	A	T110A685J006A(3)	0.3	6	5002	5202	5402	5602	4003	6003	7003	8003	T212A685J006(2)S
6	6.8	A	T110A685K006A(3)	0.3	6	2242	2482	2722	2962	4004	6004	7004	8004	T212A685K006(2)S
6	6.8	A	T110A685M006A(3)	0.3	6	2243	2483	2723	2963	4005	6005	7005	8005	T212A685M006(2)S
6	8.2	B	T110B825(1)006A(3)	0.3	6									
6	10.0	B	T110B106(1)006A(3)	0.3	6									
6	12.0	B	T110B126(1)006A(3)	0.5	6									
6	15.0	B	T110B156(1)006A(3)	0.9	6									
6	18.0	B	T110B186(1)006A(3)	0.9	6									
6	22.0	B	T110B226(1)006A(3)	0.9	6									
6	27.0	B	T110B276(1)006A(3)	0.9	6									
6	33.0	B	T110B336(1)006A(3)	0.9	6									
6	39.0	B	T110B396(1)006A(3)	0.9	6									
6	47.0	B	T110B476J006A(3)	1.5	6	5003	5203	5403	5603	4006	6006	7006	8006	T212B476J006(2)S
6	47.0	B	T110B476K006A(3)	1.5	6	2244	2484	2724	2964	4007	6007	7007	8007	T212B476K006(2)S
6	47.0	B	T110B476M006A(3)	1.5	6	2245	2485	2725	2965	4008	6008	7008	8008	T212B476M006(2)S
6	56.0	B	T110B566J006A(3)	1.5	6	5004	5204	5404	5604	4009	6009	7009	8009	T212B566J006(2)S
6	56.0	B	T110B566K006A(3)	1.5	6	2246	2486	2726	2966	4010	6010	7010	8010	T212B566K006(2)S
6	56.0	B	T110B566M006A(3)	1.5	6									
6	68.0	C	T110C686(1)006A(3)	3.0	6									
6	82.0	C	T110C826(1)006A(3)	3.0	6									
6	100.0	C	T110C107(1)006A(3)	3.0	6									
6	120.0	C	T110C127(1)006A(3)	3.0	6									
6	150.0	C	T110C157J006A(3)	4.5	6	5005	5205	5405	5605	4011	6011	7011	8011	T212C157J006(2)S
6	150.0	C	T110C157K006A(3)	4.5	6	2247	2487	2727	2967	4012	6012	7012	8012	T212C157K006(2)S
6	150.0	C	T110C157M006A(3)	4.5	6	2248	2488	2728	2968	4013	6013	7013	8013	T212C157M006(2)S
6	180.0	C	T110C187J006A(3)	5.5	6	5006	5206	5406	5606	4014	6014	7014	8014	T212C187J006(2)S
6	180.0	C	T110C187K006A(3)	5.5	6	2249	2489	2729	2969	4015	6015	7015	8015	T212C187K006(2)S
6	180.0	C	T110C187M006A(3)	5.5	6									
6	220.0	D	T110D227(1)006A(3)	6.0	8									
6	270.0	D	T110D277J006A(3)	6.0	8	5007	5207	5407	5607	4016	6016	7016	8016	T212D277J006(2)S
6	270.0	D	T110D277K006A(3)	6.0	8	2250	2490	2730	2970	4017	6017	7017	8017	T212D277K006(2)S
6	270.0	D	T110D277M006A(3)	6.0	8									
6	330.0	D	T110D337J006A(3)	7.5	8	5008	5208	5408	5608	4018	6018	7018	8018	T212D337J006(2)S
6	330.0	D	T110D337K006A(3)	7.5	8	2251	2491	2731	2971	4019	6019	7019	8019	T212D337K006(2)S
6	330.0	D	T110D337M006A(3)	7.5	8	2252	2492	2732	2972	4020	6020	7020	8020	T212D337M006(2)S
10	1.0	A	T110A105(1)010A(3)	0.3	3									
10	1.2	A	T110A125(1)010A(3)	0.3	4									
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish. Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
10	1.5	A	T110A155(1)010A(3)	0.3	4									
10	1.8	A	T110A185(1)010A(3)	0.3	4									
10	2.2	A	T110A225(1)010A(3)	0.3	4									
10	2.7	A	T110A275(1)010A(3)	0.3	4									
10	3.3	A	T110A335(1)010A(3)	0.3	4									
10	3.9	A	T110A395J010A(3)	0.3	4	5009	5209	5409	5609	4021	6021	7021	8021	T212A395J010(2)S
10	3.9	A	T110A395K010A(3)	0.3	4	2253	2493	2733	2973	4022	6022	7022	8022	T212A395K010(2)S
10	3.9	A	T110A395M010A(3)	0.3	4									
10	4.7	A	T110A475J010A(3)	0.4	4	5010	5210	5410	5610	4023	6023	7023	8023	T212A475J010(2)S
10	4.7	A	T110A475K010A(3)	0.4	4	2254	2494	2734	2974	4024	6024	7024	8024	T212A475K010(2)S
10	4.7	A	T110A475M010A(3)	0.4	4	2255	2495	2735	2975	4025	6025	7025	8025	T212A475M010(2)S
10	5.6	B	T110B565(1)010A(3)	0.4	4									
10	6.8	B	T110B685(1)010A(3)	1.0	6									
10	8.2	B	T110B825(1)010A(3)	1.0	6									
10	10.0	B	T110B106(1)010A(3)	1.0	6									
10	12.0	B	T110B126(1)010A(3)	1.0	6									
10	15.0	B	T110B156(1)010A(3)	1.0	6									
10	18.0	B	T110B186(1)010A(3)	1.0	6									
10	22.0	B	T110B226(1)010A(3)	2.0	6									
10	27.0	B	T110B276J010A(3)	2.0	6	5011	5211	5411	5611	4026	6026	7026	8026	T212B276J010(2)S
10	27.0	B	T110B276K010(3)	2.0	6	2256	2496	2736	2976	4027	6027	7027	8027	T212B276K010(2)S
10	27.0	B	T110B276M010A(3)	2.0	6									
10	33.0	B	T110B336J010A(3)	2.0	6	5012	5212	5412	5612	4028	6028	7028	8028	T212B336J010(2)S
10	33.0	B	T110B336K010A(3)	2.0	6	2257	2497	2737	2977	4029	6029	7029	8029	T212B336K010(2)S
10	33.0	B	T110B336M010A(3)	2.0	6	2258	2498	2738	2978	4030	6030	7030	8030	T212B336M010(2)S
10	39.0	B	T110B396J010A(3)	2.0	6	5013	5213	5413	5613	4031	6031	7031	8031	T212B396J010(2)S
10	39.0	B	T110B396K010A(3)	2.0	6	2259	2499	2739	2979	4032	6032	7032	8032	T212B396K010(2)S
10	39.0	B	T110B396M010A(3)	2.0	6									
10	47.0	C	T110C476(1)010A(3)	3.0	6									
10	56.0	C	T110C566(1)010A(3)	3.0	6									
10	68.0	C	T110C686(1)010A(3)	3.0	6									
10	82.0	C	T110C826J010A(3)	3.0	6	5014	5214	5414	5614	4033	6033	7033	8033	T212C826J010(2)S
10	82.0	C	T110C826K010A(3)	3.0	6	2260	2500	2740	2980	4034	6034	7034	8034	T212C826K010(2)S
10	82.0	C	T110C826M010A(3)	3.0	6									
10	100.0	C	T110C107J010AS	5.0	6	5015	5215	5415	5615	4035	6035	7035	8035	T212C107J010(2)S
10	100.0	C	T110C107K010AS	5.0	6	2261	2501	2741	2981	4036	6036	7036	8036	T212C107K010(2)S
10	100.0	C	T110C107M010AS	5.0	6	2262	2502	2742	2982	4037	6037	7037	8037	T212C107M010(2)S
10	120.0	C	T110C127J010AS	6.0	6	5016	5216	5416	5616	4038	6038	7038	8038	T212C127J010(2)S
10	120.0	C	T110C127K010A(3)	6.0	6	2263	2503	2743	2983	4039	6039	7039	8039	T212C127K010(2)S
10	120.0	C	T110C127M010A(3)	6.0	6									
10	150.0	D	T110D157(1)010A(3)	9.0	6									
10	180.0	D	T110D187J010A(3)	9.0	6	5017	5217	5417	5617	4040	6040	7040	8040	T212D187J010(2)S
10	180.0	D	T110D187K010A(3)	9.0	6	2264	2504	2744	2984	4041	6041	7041	8041	T212D187K010(2)S
10	180.0	D	T110D187M010A(3)	9.0	6									
10	220.0	D	T110D227J010A(3)	10.0	8	5018	5218	5418	5618	4042	6042	7042	8042	T212D227J010(2)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish. Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
10	220.0	D	T110D227K010A(3)	10.0	8	2265	2505	2745	2985	4043	6043	7043	8043	T212D227K010(2)S
10	220.0	D	T110D227M010A(3)	10.0	8	2266	2506	2746	2986	4044	6044	7044	8044	T212D227M010(2)S
15	0.33	A	T110A334(1)015A(3)	0.3	3									
15	0.39	A	T110A394(1)015A(3)	0.3	3									
15	0.47	A	T110A474(1)015A(3)	0.3	3									
15	0.56	A	T110A564(1)015A(3)	0.3	3									
15	0.68	A	T110A684(1)015A(3)	0.3	3									
15	1.0	A	T110A105(1)015A(3)	0.3	3									
15	1.2	A	T110A125(1)015A(3)	0.3	3									
15	1.5	A	T110A155(1)015A(3)	0.3	4									
15	1.8	A	T110A185(1)015A(3)	0.3	4									
15	2.2	A	T110A225(1)015A(3)	0.3	4									
15	2.7	A	T110A275J015A(3)	0.3	4	5019	5219	5419	5619	4045	6045	7045	8045	T212A275J015(2)S
15	2.7	A	T110A275K015A(3)	0.3	4	2267	2507	2747	2987	4046	6046	7046	8046	T212A275K015(2)S
15	2.7	A	T110A275M015A(3)	0.3	4									
15	3.3	A	T110A335J015A(3)	0.4	4	5020	5220	5420	5620	4047	6047	7047	8047	T212A335J015(2)S
15	3.3	A	T110A335K015A(3)	0.4	4	2268	2508	2748	2988	4048	6048	7048	8048	T212A335K015(2)S
15	3.3	A	T110A335M015A(3)	0.4	4	2269	2509	2749	2989	4049	6049	7049	8049	T212A335M015(2)S
15	3.9	B	T110B395(1)015A(3)	0.4	4									
15	4.7	B	T110B475(1)015A(3)	0.7	4									
15	5.6	B	T110B565(1)015A(3)	0.7	4									
15	6.8	B	T110B685(1)015A(3)	0.7	6									
15	8.2	B	T110B825(1)015A(3)	0.7	6									
15	10.0	B	T110B106(1)015A(3)	1.0	6									
15	12.0	B	T110B126(1)015A(3)	1.0	6									
15	15.0	B	T110B156(1)015A(3)	2.0	6									
15	18.0	B	T110B186J015A(3)	2.0	6	5021	5221	5421	5621	4050	6050	7050	8050	T212B186J015(2)S
15	18.0	B	T110B186K015A(3)	2.0	6	2270	2510	2750	2990	4051	6051	7051	8051	T212B186K015(2)S
15	18.0	B	T110B186M015A(3)	2.0	6									
15	22.0	B	T110B226J015A(3)	2.0	6	5022	5222	5422	5622	4052	6052	7052	8052	T212B226J015(2)S
15	22.0	B	T110B226K015A(3)	2.0	6	2271	2511	2751	2991	4053	6053	7053	8053	T212B226K015(2)S
15	22.0	B	T110B226M015A(3)	2.0	6	2272	2512	2752	2992	4054	6054	7054	8054	T212B226M015(2)S
15	27.0	C	T110C276(1)015A(3)	3.0	6									
15	33.0	C	T110C336(1)015A(3)	3.0	6									
15	39.0	C	T110C396(1)015A(3)	3.0	6									
15	47.0	C	T110C476(1)015A(3)	4.0	6									
15	56.0	C	T110C566J015A(3)	4.0	6	5023	5223	5423	5623	4055	6055	7055	8055	T212C566J015(2)S
15	56.0	C	T110C566K015A(3)	4.0	6	2273	2513	2753	2993	4056	6056	7056	8056	T212C566K015(2)S
15	56.0	C	T110C566M015A(3)	4.0	6									
15	68.0	C	T110C686J015A(3)	5.0	6	5024	5224	5424	5624	4057	6057	7057	8057	T212C686J015(2)S
15	68.0	C	T110C686K015A(3)	5.0	6	2274	2514	2754	2994	4058	6058	7058	8058	T212C686K015(2)S
15	68.0	C	T110C686M015A(3)	5.0	6	2275	2515	2755	2995	4059	6059	7059	8059	T212C686M015(2)S
15	82.0	D	T110D826(1)015A(3)	6.0	6									
15	100.0	D	T110D107(1)015A(3)	6.0	6									
15	120.0	D	T110D127J015A(3)	6.0	6	5025	5225	5425	5625	4060	6060	7060	8060	T212D127J015(2)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
15	120.0	D	T110D127K015A(3)	6.0	6	2276	2516	2756	2996	4061	6061	7061	8061	T212D127K015(2)S
15	120.0	D	T110D127M015A(3)	6.0	6									
15	150.0	D	T110D157J015A(3)	8.0	6	5026	5226	5426	5626	4062	6062	7062	8062	T212D157J015(2)S
15	150.0	D	T110D157K015A(3)	8.0	6	2277	2517	2757	2997	4063	6063	7063	8063	T212D157K015(2)S
15	150.0	D	T110D157M015A(3)	8.0	6	2278	2518	2758	2998	4064	6064	7064	8064	T212D157M015(2)S
20	0.047	A	T110A473(1)020A(3)	0.3	3									
20	0.056	A	T110A563(1)020A(3)	0.3	3									
20	0.068	A	T110A683(1)020A(3)	0.3	3									
20	0.082	A	T110A823(1)020A(3)	0.3	3									
20	0.10	A	T110A104(1)020A(3)	0.3	3									
20	0.12	A	T110A124(1)020A(3)	0.3	3									
20	0.15	A	T110A154(1)020A(3)	0.3	3									
20	0.18	A	T110A184(1)020A(3)	0.3	3									
20	0.22	A	T110A224(1)020A(3)	0.3	3									
20	0.27	A	T110A274(1)020A(3)	0.3	3									
20	0.33	A	T110A334(1)020A(3)	0.3	3									
20	0.39	A	T110A394(1)020A(3)	0.3	3									
20	0.47	A	T110A474(1)020A(3)	0.3	3									
20	0.56	A	T110A564(1)020A(3)	0.3	3									
20	0.68	A	T110A684(1)020A(3)	0.3	3									
20	0.82	A	T110A824(1)020A(3)	0.3	3									
20	1.0	A	T110A105(1)020A(3)	0.3	3									
20	1.2	A	T110A125J020A(3)	0.3	4	5027	5227	5427	5627	4065	6065	7065	8065	T212A125J020(2)S
20	1.2	A	T110A125K020A(3)	0.3	4	2279	2519	2759	2999	4066	6066	7066	8066	T212A125K020(2)S
20	1.2	A	T110A125M020A(3)	0.3	4									
20	1.5	A	T110A155J020A(3)	0.3	4	5028	5228	5428	5628	4067	6067	7067	8067	T212A155J020(2)S
20	1.5	A	T110A155K020A(3)	0.3	4	2280	2520	2760	3000	4068	6068	7068	8068	T212A155K020(2)S
20	1.5	A	T110A155M020A(3)	0.3	4	2281	2521	2761	3001	4069	6069	7069	8069	T212A155M020(2)S
20	1.8	A	T110A185J020A(3)	0.3	4	5029	5229	5429	5629	4070	6070	7070	8070	T212A185J020(2)S
20	1.8	A	T110A185K020A(3)	0.3	4	2282	2522	2762	3002	4071	6071	7071	8071	T212A185K020(2)S
20	1.8	A	T110A185M020A(3)	0.3	4									
20	2.2	A	T110A225J020A(3)	0.4	4	5030	5230	5430	5630	4072	6072	7072	8072	T212A225J020(2)S
20	2.2	A	T110A225K020A(3)	0.4	4	2283	2523	2763	3003	4073	6073	7073	8073	T212A225K020(2)S
20	2.2	A	T110A225M020A(3)	0.4	4	2284	2524	2764	3004	4074	6074	7074	8074	T212A225M020(2)S
20	2.7	B	T110B275(1)020A(3)	0.5	4									
20	3.3	B	T110B335(1)020A(3)	1.0	4									
20	3.9	B	T110B395(1)020A(3)	1.0	4									
20	4.7	B	T110B475(1)020A(3)	1.0	4									
20	5.6	B	T110B565(1)020A(3)	1.0	4									
20	6.8	B	T110B685(1)020A(3)	1.0	4									
20	8.2	B	T110B825J020A(3)	1.0	6	5031	5231	5431	5631	4075	6075	7075	8075	T212B825J020(2)S
20	8.2	B	T110B825K020A(3)	1.0	6	2285	2525	2765	3005	4076	6076	7076	8076	T212B825K020(2)S
20	8.2	B	T110B825M020A(3)	1.0	6									
20	10.0	B	T110B106J020A(3)	1.0	6	5032	5232	5432	5632	4077	6077	7077	8077	T212B106J020(2)S
20	10.0	B	T110B106K020A(3)	1.0	6	2286	2526	2766	3006	4078	6078	7078	8078	T212B106K020(2)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
20	10.0	B	T110B106M020A(3)	1.0	6	2287	2527	2767	3007	4079	6079	7079	8079	T212B106M020(2)S
20	12.0	B	T110B126J020A(3)	1.0	6	5033	5233	5433	5633	4080	6080	7080	8080	T212B126J020(2)S
20	12.0	B	T110B126K020A(3)	1.0	6	2288	2528	2768	3008	4081	6081	7081	8081	T212B126K020(2)S
20	12.0	B	T110B126M020A(3)	1.0	6									
20	15.0	B	T110B156J020A(3)	2.0	6	5034	5234	5434	5634	4082	6082	7082	8082	T212B156J020(2)S
20	15.0	B	T110B156K020A(3)	2.0	6	2289	2529	2769	3009	4083	6083	7083	8083	T212B156K020(2)S
20	15.0	B	T110B156M020A(3)	2.0	6	2290	2530	2770	3010	4084	6084	7084	8084	T212B156M020(2)S
20	18.0	C	T110C186(1)020A(3)	2.0	6									
20	22.0	C	T110C226(1)020A(3)	2.5	6									
20	27.0	C	T110C276J020A(3)	2.5	6	5035	5235	5435	5635	4085	6085	7085	8085	T212C276J020(2)S
20	27.0	C	T110C276K020A(3)	2.5	6	2291	2531	2771	3011	4086	6086	7086	8086	T212C276K020(2)S
20	27.0	C	T110C276M020A(3)	2.5	6									
20	33.0	C	T110C336J020A(3)	3.0	6	5036	5236	5436	5636	4087	6087	7087	8087	T212C336J020(2)S
20	33.0	C	T110C336K020A(3)	3.0	6	2292	2532	2772	3012	4088	6088	7088	8088	T212C336K020(2)S
20	33.0	C	T110C336M020A(3)	3.0	6	2293	2533	2773	3013	4089	6089	7089	8089	T212C336M020(2)S
20	39.0	C	T110C396J020A(3)	3.0	6	5037	5237	5437	5637	4090	6090	7090	8090	T212C396J020(2)S
20	39.0	C	T110C396K020A(3)	3.0	6	2294	2534	2774	3014	4091	6091	7091	8091	T212C396K020(2)S
20	39.0	C	T110C396M020A(3)	3.0	6									
20	47.0	C	T110C476J020A(3)	4.5	6	5038	5238	5438	5638	4092	6092	7092	8092	T212C476J020(2)S
20	47.0	C	T110C476K020A(3)	4.5	6	2295	2535	2775	3015	4093	6093	7093	8093	T212C476K020(2)S
20	47.0	C	T110C476M020A(3)	4.5	6	2296	2536	2776	3016	4094	6094	7094	8094	T212C476M020(2)S
20	56.0	D	T110D566J020A(3)	5.5	6	5039	5239	5439	5639	4095	6095	7095	8095	T212D566J020(2)S
20	56.0	D	T110D566K020A(3)	5.5	6	2297	2537	2777	3017	4096	6096	7096	8096	T212D566K020(2)S
20	56.0	D	T110D566M020A(3)	5.5	6									
20	68.0	D	T110D686J020A(3)	6.0	6	5040	5240	5440	5640	4097	6097	7097	8097	T212D686J020(2)S
20	68.0	D	T110D686K020A(3)	6.0	6	2298	2538	2778	3018	4098	6098	7098	8098	T212D686K020(2)S
20	68.0	D	T110D686M020A(3)	6.0	6	2299	2539	2779	3019	4099	6099	7099	8099	T212D686M020(2)S
20	82.0	D	T110D826J020A(3)	6.0	6	5041	5241	5441	5641	4100	6100	7100	8100	T212D826J020(2)S
20	82.0	D	T110D826K020A(3)	6.0	6	2300	2540	2780	3020	4101	6101	7101	8101	T212D826K020(2)S
20	82.0	D	T110D826M020A(3)	6.0	6									
20	100.0	D	T110D107J020A(3)	10.0	6	5042	5242	5442	5642	4102	6102	7102	8102	T212D107J020(2)S
20	100.0	D	T110D107K020A(3)	10.0	6	2301	2541	2781	3021	4103	6103	7103	8103	T212D107K020(2)S
20	100.0	D	T110D107M020A(3)	10.0	6	2302	2542	2782	3022	4104	6104	7104	8104	T212D107M020(2)S
35	0.0047	A	T110A472(1)035A(3)	0.1	3									
35	0.0056	A	T110A562(1)035A(3)	0.1	3									
35	0.0068	A	T110A682(1)035A(3)	0.1	3									
35	0.0082	A	T110A822(1)035A(3)	0.1	3									
35	0.01	A	T110A103(1)035A(3)	0.1	3									
35	0.012	A	T110A123(1)035A(3)	0.1	3									
35	0.015	A	T110A153(1)035A(3)	0.1	3									
35	0.018	A	T110A183(1)035A(3)	0.1	3									
35	0.022	A	T110A223(1)035A(3)	0.1	3									
35	0.027	A	T110A273(1)035A(3)	0.1	3									
35	0.033	A	T110A333(1)035A(3)	0.1	3									
35	0.039	A	T110A393(1)035A(3)	0.1	3									
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish. Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
35	0.047	A	T110A473(1)035A(3)	0.1	3									
35	0.056	A	T110A563(1)035A(3)	0.1	3									
35	0.068	A	T110A683(1)035A(3)	0.1	3									
35	0.082	A	T110A823(1)035A(3)	0.1	3									
35	0.1	A	T110A104(1)035A(3)	0.5	3									
35	0.12	A	T110A124(1)035A(3)	0.5	3									
35	0.15	A	T110A154(1)035A(3)	0.5	3									
35	0.18	A	T110A184(1)035A(3)	0.5	3									
35	0.22	A	T110A224(1)035A(3)	0.5	3									
35	0.27	A	T110A274(1)035A(3)	0.5	3									
35	0.33	A	T110A334(1)035A(3)	0.5	3									
35	0.39	A	T110A394(1)035A(3)	0.5	3									
35	0.47	A	T110A474(1)035A(3)	0.5	3									
35	0.56	A	T110A564(1)035A(3)	0.5	3									
35	0.68	A	T110A684(1)035A(3)	0.5	3									
35	0.82	A	T110A824(1)035A(3)	0.5	3									
35	1.0	A	T110A105(1)035A(3)	0.5	6									
35	1.2	B	T110B125(1)035A(3)	0.5	4									
35	1.5	B	T110B155(1)035A(3)	0.5	4									
35	1.8	B	T110B185(1)035A(3)	0.5	4									
35	2.2	B	T110B225(1)035A(3)	1.0	4									
35	2.7	B	T110B275(1)035A(3)	1.0	4									
35	3.3	B	T110B335(1)035A(3)	1.0	4									
35	3.9	B	T110B395(1)035A(3)	1.0	4									
35	4.7	B	T110B475(1)035A(3)	1.0	4									
35	5.6	B	T110B565J035A(3)	1.0	4	5043	5243	5443	5643	4105	6105	7105	8105	T212B565J035(2)S
35	5.6	B	T110B565K035A(3)	1.0	4	2303	2543	2783	3023	4106	6106	7106	8106	T212B565K035(2)S
35	5.6	B	T110B565M035A(3)	1.0	4									
35	6.8	B	T110B685J035A(3)	1.5	4	5044	5244	5444	5644	4107	6107	7107	8107	T212B685J035(2)S
35	6.8	B	T110B685K035A(3)	1.5	4	2304	2544	2784	3024	4108	6108	7108	8108	T212B685K035(2)S
35	6.8	B	T110B685M035A(3)	1.5	6	2305	2545	2785	3025	4109	6109	7109	8109	T212B685M035(2)S
35	8.2	C	T110C825(1)035A(3)	3.0	4									
35	10.0	C	T110C106(1)035A(3)	3.0	4									
35	12.0	C	T110C126(1)035A(3)	3.0	4									
35	15.0	C	T110C156(1)035A(3)	3.0	4									
35	18.0	C	T110C186(1)035A(3)	3.0	4									
35	22.0	C	T110C226J035A(3)	4.0	4	5045	5245	5445	5645	4110	6110	7110	8110	T212C226J035(2)S
35	22.0	C	T110C226K035A(3)	4.0	4	2306	2546	2786	3026	4111	6111	7111	8111	T212C226K035(2)S
35	22.0	C	T110C226M035A(3)	4.0	4	2307	2547	2787	3027	4112	6112	7112	8112	T212C226M035(2)S
35	27.0	D	T110D276J035A(3)	4.5	4	5046	5246	5446	5646	4113	6113	7113	8113	T212D276J035(2)S
35	27.0	D	T110D276K035A(3)	4.5	4	2308	2548	2788	3028	4114	6114	7114	8114	T212D276K035(2)S
35	27.0	D	T110D276M035A(3)	4.5	4									
35	33.0	D	T110D336J035A(3)	5.5	4	5047	5247	5447	5647	4115	6115	7115	8115	T212D336J035(2)S
35	33.0	D	T110D336K035A(3)	5.5	4	2309	2549	2789	3029	4116	6116	7116	8116	T212D336K035(2)S
35	33.0	D	T110D336M035A(3)	5.5	4	2310	2550	2790	3030	4117	6117	7117	8117	T212D336M035(2)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								KEMET Equivalent Military
						Dash Number Reference								
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
35	39.0	D	T110D396J035A(3)	6.0	4	5048	5248	5448	5648	4118	6118	7118	8118	T212D396J035(2)S
35	39.0	D	T110D396K035A(3)	6.0	4	2311	2551	2791	3031	4119	6119	7119	8119	T212D396K035(2)S
35	39.0	D	T110D396M035A(3)	6.0	4									
35	47.0	D	T110D476J035A(3)	8.0	4	5049	5249	5449	5649	4120	6120	7120	8120	T212D476J035(2)S
35	47.0	D	T110D476K035A(3)	8.0	4	2312	2552	2792	3032	4121	6121	7121	8121	T212D476K035(2)S
35	47.0	D	T110D476M035A(3)	8.0	4	2313	2553	2793	3033	4122	6122	7122	8122	T212D476M035(2)S
50	0.0047	A	T110A472J050A(3)	0.1	2	5050	5250	5450	5650	4123	6123	7123	8123	T212A472J050(2)S
50	0.0047	A	T110A472K050A(3)	0.1	2	2314	2554	2794	3034	4124	6124	7124	8124	T212A472K050(2)S
50	0.0047	A	T110A472M050A(3)	0.1	2	2315	2555	2795	3035	4125	6125	7125	8125	T212A472M050(2)S
50	0.0056	A	T110A562J050A(3)	0.1	2	5051	5251	5451	5651	4126	6126	7126	8126	T212A562J050(2)S
50	0.0056	A	T110A562K050A(3)	0.1	2	2316	2556	2796	3036	4127	6127	7127	8127	T212A562K050(2)S
50	0.0056	A	T110A562M050A(3)	0.1	2									
50	0.0068	A	T110A682J050A(3)	0.1	2	5052	5252	5452	5652	4128	6128	7128	8128	T212A682J050(2)S
50	0.0068	A	T110A682K050A(3)	0.1	2	2317	2557	2797	3037	4129	6129	7129	8129	T212A682K050(2)S
50	0.0068	A	T110A682M050A(3)	0.1	2	2318	2558	2798	3038	4130	6130	7130	8130	T212A682M050(2)S
50	0.0082	A	T110A822J050A(3)	0.1	2	5053	5253	5453	5653	4131	6131	7131	8131	T212A822J050(2)S
50	0.0082	A	T110A822K050A(3)	0.1	2	2319	2559	2799	3039	4132	6132	7132	8132	T212A822K050(2)S
50	0.0082	A	T110A822M050A(3)	0.1	2									
50	0.01	A	T110A103J050A(3)	0.1	2	5054	5254	5454	5654	4133	6133	7133	8133	T212A103J050(2)S
50	0.01	A	T110A103K050A(3)	0.1	2	2320	2560	2800	3040	4134	6134	7134	8134	T212A103K050(2)S
50	0.01	A	T110A103M050A(3)	0.1	2	2321	2561	2801	3041	4135	6135	7135	8135	T212A103M050(2)S
50	0.012	A	T110A123J050A(3)	0.1	2	5055	5255	5455	5655	4136	6136	7136	8136	T212A123J050(2)S
50	0.012	A	T110A123K050A(3)	0.1	2	2322	2562	2802	3042	4137	6137	7137	8137	T212A123K050(2)S
50	0.012	A	T110A123M050A(3)	0.1	2									
50	0.015	A	T110A153J050A(3)	0.1	2	5056	5256	5456	5656	4138	6138	7138	8138	T212A153J050(2)S
50	0.015	A	T110A153K050A(3)	0.1	2	2323	2563	2803	3043	4139	6139	7139	8139	T212A153K050(2)S
50	0.015	A	T110A153M050A(3)	0.1	2	2324	2564	2804	3044	4140	6140	7140	8140	T212A153M050(2)S
50	0.018	A	T110A183J050A(3)	0.1	2	5057	5257	5457	5657	4141	6141	7141	8141	T212A183J050(2)S
50	0.018	A	T110A183K050A(3)	0.1	2	2325	2565	2805	3045	4142	6142	7142	8142	T212A183K050(2)S
50	0.018	A	T110A183M050A(3)	0.1	2									
50	0.022	A	T110A223J050A(3)	0.1	2	5058	5258	5458	5658	4143	6143	7143	8143	T212A223J050(2)S
50	0.022	A	T110A223K050A(3)	0.1	2	2326	2566	2806	3046	4144	6144	7144	8144	T212A223K050(2)S
50	0.022	A	T110A223M050A(3)	0.1	2	2327	2567	2807	3047	4145	6145	7145	8145	T212A223M050(2)S
50	0.027	A	T110A273J050A(3)	0.1	2	5059	5259	5459	5659	4146	6146	7146	8146	T212A273J050(2)S
50	0.027	A	T110A273K050A(3)	0.1	2	2328	2568	2808	3048	4147	6147	7147	8147	T212A273K050(2)S
50	0.027	A	T110A273M050A(3)	0.1	2									
50	0.033	A	T110A333J050A(3)	0.1	2	5060	5260	5460	5660	4148	6148	7148	8148	T212A333J050(2)S
50	0.033	A	T110A333K050A(3)	0.1	2	2329	2569	2809	3049	4149	6149	7149	8149	T212A333K050(2)S
50	0.033	A	T110A333M050A(3)	0.1	2	2330	2570	2810	3050	4150	6150	7150	8150	T212A333M050(2)S
50	0.039	A	T110A393J050A(3)	0.1	2	5061	5261	5461	5661	4151	6151	7151	8151	T212A393J050(2)S
50	0.039	A	T110A393K050A(3)	0.1	2	2331	2571	2811	3051	4152	6152	7152	8152	T212A393K050(2)S
50	0.039	A	T110A393M050A(3)	0.1	2									
50	0.047	A	T110A473J050A(3)	0.1	2	5062	5262	5462	5662	4153	6153	7153	8153	T212A473J050(2)S
50	0.047	A	T110A473K050A(3)	0.1	2	2332	2572	2812	3052	4154	6154	7154	8154	T212A473K050(2)S
50	0.047	A	T110A473M050A(3)	0.1	2	2333	2573	2813	3053	4155	6155	7155	8155	T212A473M050(2)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								KEMET Equivalent Military
						Dash Number Reference								
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
50	0.056	A	T110A563J050A(3)	0.1	2	5063	5263	5463	5663	4156	6156	7156	8156	T212A563J050(2)S
50	0.056	A	T110A563K050A(3)	0.1	2	2334	2574	2814	3054	4157	6157	7157	8157	T212A563K050(2)S
50	0.056	A	T110A563M050A(3)	0.1	2									
50	0.068	A	T110A683J050A(3)	0.1	2	5064	5264	5464	5664	4158	6158	7158	8158	T212A683J050(2)S
50	0.068	A	T110A683K050A(3)	0.1	2	2335	2575	2815	3055	4159	6159	7159	8159	T212A683K050(2)S
50	0.068	A	T110A683M050A(3)	0.1	2	2336	2576	2816	3056	4160	6160	7160	8160	T212A683M050(2)S
50	0.082	A	T110A823J050A(3)	0.1	2	5065	5265	5465	5665	4161	6161	7161	8161	T212A823J050(2)S
50	0.082	A	T110A823K050A(3)	0.1	2	2337	2577	2817	3057	4162	6162	7162	8162	T212A823K050(2)S
50	0.082	A	T110A823M050A(3)	0.1	2									
50	0.1	A	T110A104J050A(3)	0.3	2	5066	5266	5466	5666	4163	6163	7163	8163	T212A104J050(2)S
50	0.1	A	T110A104K050A(3)	0.3	2	2338	2578	2818	3058	4164	6164	7164	8164	T212A104K050(2)S
50	0.1	A	T110A104M050A(3)	0.3	2	2339	2579	2819	3059	4165	6165	7165	8165	T212A104M050(2)S
50	0.12	A	T110A124J050A(3)	0.3	2	5067	5267	5467	5667	4166	6166	7166	8166	T212A124J050(2)S
50	0.12	A	T110A124K050A(3)	0.3	2	2340	2580	2820	3060	4167	6167	7167	8167	T212A124K050(2)S
50	0.12	A	T110A124M050A(3)	0.3	2									
50	0.15	A	T110A154J050A(3)	0.3	2	5068	5268	5468	5668	4168	6168	7168	8168	T212A154J050(2)S
50	0.15	A	T110A154K050A(3)	0.3	2	2341	2581	2821	3061	4169	6169	7169	8169	T212A154K050(2)S
50	0.15	A	T110A154M050A(3)	0.3	2	2342	2582	2822	3062	4170	6170	7170	8170	T212A154M050(2)S
50	0.18	A	T110A184J050A(3)	0.3	2	5069	5269	5469	5669	4171	6171	7171	8171	T212A184J050(2)S
50	0.18	A	T110A184K050A(3)	0.3	2	2343	2583	2823	3063	4172	6172	7172	8172	T212A184K050(2)S
50	0.18	A	T110A184M050A(3)	0.3	2									
50	0.22	A	T110A224J050A(3)	0.3	2	5070	5270	5470	5670	4173	6173	7173	8173	T212A224J050(2)S
50	0.22	A	T110A224K050A(3)	0.3	2	2344	2584	2824	3064	4174	6174	7174	8174	T212A224K050(2)S
50	0.22	A	T110A224M050A(3)	0.3	2	2345	2585	2825	3065	4175	6175	7175	8175	T212A224M050(2)S
50	0.27	A	T110A274J050A(3)	0.3	2	5071	5271	5471	5671	4176	6176	7176	8176	T212A274J050(2)S
50	0.27	A	T110A274K050A(3)	0.3	2	2346	2586	2826	3066	4177	6177	7177	8177	T212A274K050(2)S
50	0.27	A	T110A274M050A(3)	0.3	2									
50	0.33	A	T110A334J050A(3)	0.3	2	5072	5272	5472	5672	4178	6178	7178	8178	T212A334J050(2)S
50	0.33	A	T110A334K050A(3)	0.3	2	2347	2587	2827	3067	4179	6179	7179	8179	T212A334K050(2)S
50	0.33	A	T110A334M050A(3)	0.3	2	2348	2588	2828	3068	4180	6180	7180	8180	T212A334M050(2)S
50	0.39	A	T110A394J050A(3)	0.3	2	5073	5273	5473	5673	4181	6181	7181	8181	T212A394J050(2)S
50	0.39	A	T110A394K050A(3)	0.3	2	2349	2589	2829	3069	4182	6182	7182	8182	T212A394K050(2)S
50	0.39	A	T110A394M050A(3)	0.3	2									
50	0.47	A	T110A474J050A(3)	0.3	2	5074	5274	5474	5674	4183	6183	7183	8183	T212A474J050(2)S
50	0.47	A	T110A474K050A(3)	0.3	2	2350	2590	2830	3070	4184	6184	7184	8184	T212A474K050(2)S
50	0.47	A	T110A474M050A(3)	0.3	2	2351	2591	2831	3071	4185	6185	7185	8185	T212A474M050(2)S
50	0.56	A	T110A564J050A(3)	0.3	2	5075	5275	5475	5675	4186	6186	7186	8186	T212A564J050(2)S
50	0.56	A	T110A564K050A(3)	0.3	2	2352	2592	2832	3072	4187	6187	7187	8187	T212A564K050(2)S
50	0.56	A	T110A564M050A(3)	0.3	2									
50	0.68	A	T110A684J050A(3)	0.3	2	5076	5276	5476	5676	4188	6188	7188	8188	T212A684J050(2)S
50	0.68	A	T110A684K050A(3)	0.3	2	2353	2593	2833	3073	4189	6189	7189	8189	T212A684K050(2)S
50	0.68	A	T110A684M050A(3)	0.3	2	2354	2594	2834	3074	4190	6190	7190	8190	T212A684M050(2)S
50	0.82	A	T110A824J050A(3)	0.3	2	5077	5277	5477	5677	4191	6191	7191	8191	T212A824J050(2)S
50	0.82	A	T110A824K050A(3)	0.3	2	2355	2595	2835	3075	4192	6192	7192	8192	T212A824K050(2)S
50	0.82	A	T110A824M050A(3)	0.3	2									
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
50	1.0	A	T110A105J050A(3)	0.4	2	5078	5278	5478	5678	4193	6193	7193	8193	T212A105J050(2)S
50	1.0	A	T110A105K050A(3)	0.4	2	2356	2596	2836	3076	4194	6194	7194	8194	T212A105K050(2)S
50	1.0	A	T110A105M050A(3)	0.4	2	2357	2597	2837	3077	4195	6195	7195	8195	T212A105M050(2)S
50	1.2	B	T110B125J050A(3)	0.4	4	5079	5279	5479	5679	4196	6196	7196	8196	T212B125J050(2)S
50	1.2	B	T110B125K050A(3)	0.4	4	2358	2598	2838	3078	4197	6197	7197	8197	T212B125K050(2)S
50	1.2	B	T110B125M050A(3)	0.4	4									
50	1.5	B	T110B155J050A(3)	0.5	4	5080	5280	5480	5680	4198	6198	7198	8198	T212B155J050(2)S
50	1.5	B	T110B155K050A(3)	0.5	4	2359	2599	2839	3079	4199	6199	7199	8199	T212B155K050(2)S
50	1.5	B	T110B155M050A(3)	0.5	4	2360	2600	2840	3080	4200	6200	7200	8200	T212B155M050(2)S
50	1.8	B	T110B185J050A(3)	0.5	4	5081	5281	5481	5681	4201	6201	7201	8201	T212B185J050(2)S
50	1.8	B	T110B185K050A(3)	0.5	4	2361	2601	2841	3081	4202	6202	7202	8202	T212B185K050(2)S
50	1.8	B	T110B185M050A(3)	0.5	4									
50	2.2	B	T110B225J050A(3)	0.8	4	5082	5282	5482	5682	4203	6203	7203	8203	T212B225J050(2)S
50	2.2	B	T110B225K050A(3)	0.8	4	2362	2602	2842	3082	4204	6204	7204	8204	T212B225K050(2)S
50	2.2	B	T110B225M050A(3)	0.8	4	2363	2603	2843	3083	4205	6205	7205	8205	T212B225M050(2)S
50	2.7	B	T110B275J050A(3)	0.8	4	5083	5283	5483	5683	4206	6206	7206	8206	T212B275J050(2)S
50	2.7	B	T110B275K050A(3)	0.8	4	2364	2604	2844	3084	4207	6207	7207	8207	T212B275K050(2)S
50	2.7	B	T110B275M050A(3)	0.8	4									
50	3.3	B	T110B335J050A(3)	1.2	4	5084	5284	5484	5684	4208	6208	7208	8208	T212B335J050(2)S
50	3.3	B	T110B335K050A(3)	1.2	4	2365	2605	2845	3085	4209	6209	7209	8209	T212B335K050(2)S
50	3.3	B	T110B335M050A(3)	1.2	4	2366	2606	2846	3086	4210	6210	7210	8210	T212B335M050(2)S
50	3.9	B	T110B395J050A(3)	1.5	4	5085	5285	5485	5685	4211	6211	7211	8211	T212B395J050(2)S
50	3.9	B	T110B395K050A(3)	1.5	4	2367	2607	2847	3087	4212	6212	7212	8212	T212B395K050(2)S
50	3.9	B	T110B395M050A(3)	1.5	4									
50	4.7	B	T110B475J050A(3)	1.7	4	5086	5286	5486	5686	4213	6213	7213	8213	T212B475J050(2)S
50	4.7	B	T110B475K050A(3)	1.7	4	2368	2608	2848	3088	4214	6214	7214	8214	T212B475K050(2)S
50	4.7	B	T110B475M050A(3)	1.7	4	2369	2609	2849	3089	4215	6215	7215	8215	T212B475M050(2)S
50	5.6	C	T110C565J050A(3)	2.2	4	5087	5287	5487	5687	4216	6216	7216	8216	T212C565J050(2)S
50	5.6	C	T110C565K050A(3)	2.2	4	2370	2610	2850	3090	4217	6217	7217	8217	T212C565K050(2)S
50	5.6	C	T110C565M050A(3)	2.2	4									
50	6.8	C	T110C685J050A(3)	2.2	4	5088	5288	5488	5688	4218	6218	7218	8218	T212C685J050(2)S
50	6.8	C	T110C685K050A(3)	2.2	4	2371	2611	2851	3091	4219	6219	7219	8219	T212C685K050(2)S
50	6.8	C	T110C685M050A(3)	2.2	4	2372	2612	2852	3092	4220	6220	7220	8220	T212C685M050(2)S
50	8.2	C	T110C825J050A(3)	2.5	4	5089	5289	5489	5689	4221	6221	7221	8221	T212C825J050(2)S
50	8.2	C	T110C825K050A(3)	2.5	4	2373	2613	2853	3093	4222	6222	7222	8222	T212C825K050(2)S
50	8.2	C	T110C825M050A(3)	2.5	4									
50	10.0	C	T110C106J050A(3)	2.5	4	5090	5290	5490	5690	4223	6223	7223	8223	T212C106J050(2)S
50	10.0	C	T110C106K050A(3)	2.5	4	2374	2614	2854	3094	4224	6224	7224	8224	T212C106K050(2)S
50	10.0	C	T110C106M050A(3)	2.5	4	2375	2615	2855	3095	4225	6225	7225	8225	T212C106M050(2)S
50	12.0	C	T110C126J050A(3)	3.0	4	5091	5291	5491	5691	4226	6226	7226	8226	T212C126J050(2)S
50	12.0	C	T110C126K050A(3)	3.0	4	2376	2616	2856	3096	4227	6227	7227	8227	T212C126K050(2)S
50	12.0	C	T110C126M050A(3)	3.0	4									
50	15.0	C	T110C156J050A(3)	4.0	4	5092	5292	5492	5692	4228	6228	7228	8228	T212C156J050(2)S
50	15.0	C	T110C156K050A(3)	4.0	4	2377	2617	2857	3097	4229	6229	7229	8229	T212C156K050(2)S
50	15.0	C	T110C156M050A(3)	4.0	4	2378	2618	2858	3098	4230	6230	7230	8230	T212C156M050(2)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
50	18.0	C	T110C186J050A(3)	4.5	4	5093	5293	5493	5693	4231	6231	7231	8231	T212C186J050(2)S
50	18.0	C	T110C186K050A(3)	4.5	4	2379	2619	2859	3099	4232	6232	7232	8232	T212C186K050(2)S
50	18.0	C	T110C186M050A(3)	4.5	4									
50	22.0	D	T110D226J050A(3)	5.5	4	5094	5294	5494	5694	4233	6233	7233	8233	T212D226J050(2)S
50	22.0	D	T110D226K050A(3)	5.5	4	2380	2620	2860	3100	4234	6234	7234	8234	T212D226K050(2)S
50	22.0	D	T110D226M050A(3)	5.5	4	2381	2621	2861	3101	4235	6235	7235	8235	T212D226M050(2)S
60	0.0047	A	T110A472(1)060A(3)	0.3	3									
60	0.0056	A	T110A562(1)060A(3)	0.3	3									
60	0.0068	A	T110A682(1)060A(3)	0.3	3									
60	0.0082	A	T110A822(1)060A(3)	0.3	3									
60	0.01	A	T110A103(1)060A(3)	0.3	3									
60	0.012	A	T110A123(1)060A(3)	0.3	3									
60	0.015	A	T110A153(1)060A(3)	0.3	3									
60	0.018	A	T110A183(1)060A(3)	0.3	3									
60	0.022	A	T110A223(1)060A(3)	0.3	3									
60	0.027	A	T110A273(1)060A(3)	0.3	3									
60	0.033	A	T110A333(1)060A(3)	0.3	3									
60	0.039	A	T110A393(1)060A(3)	0.3	3									
60	0.047	A	T110A473(1)060A(3)	0.3	3									
60	0.056	A	T110A563(1)060A(3)	0.3	3									
60	0.068	A	T110A683(1)060A(3)	0.3	3									
60	0.082	A	T110A823(1)060A(3)	0.3	3									
60	0.1	A	T110A104(1)060A(3)	0.5	3									
60	0.12	A	T110A124(1)060A(3)	0.5	3									
60	0.15	A	T110A154(1)060A(3)	0.5	3									
60	0.18	A	T110A184(1)060A(3)	0.5	3									
60	0.22	A	T110A224(1)060A(3)	0.5	3									
60	0.27	A	T110A274(1)060A(3)	0.5	3									
60	0.33	A	T110A334(1)060A(3)	0.5	3									
60	0.39	A	T110A394(1)060A(3)	0.5	3									
60	0.47	A	T110A474(1)060A(3)	0.5	3									
60	0.56	A	T110A564(1)060A(3)	0.5	3									
60	0.68	A	T110A684(1)060A(3)	0.5	3									
60	0.82	B	T110B824(1)060A(3)	0.5	3									
60	1.0	B	T110B105(1)060A(3)	0.5	3									
60	1.2	B	T110B125(1)060A(3)	0.5	4									
60	1.5	B	T110B155(1)060A(3)	0.5	4									
60	1.8	B	T110B185(1)060A(3)	0.5	4									
60	2.2	B	T110B225(1)060A(3)	1.0	4									
60	2.7	B	T110B275(1)060A(3)	1.0	4									
60	3.3	B	T110B335(1)060A(3)	1.5	4									
60	3.9	B	T110B395(1)060A(3)	1.5	4									
60	4.7	C	T110C475(1)060A(3)	2.0	4									
60	5.6	C	T110C565(1)060A(3)	2.0	4									
60	6.8	C	T110C685(1)060A(3)	3.0	4									
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
60	8.2	C	T110C825(1)060A(3)	4.0	4									
60	10.0	C	T110C106(1)060A(3)	5.0	4									
60	12.0	C	T110C126(1)060A(3)	5.0	4									
60	15.0	D	T110D156(1)060A(3)	4.0	4									
60	18.0	D	T110D186(1)060A(3)	5.0	4									
60	22.0	D	T110D226(1)060A(3)	6.0	4									
75	0.0047	A	T110A472(1)075A(3)	0.3	2									
75	0.0056	A	T110A562(1)075A(3)	0.3	2									
75	0.0068	A	T110A682(1)075A(3)	0.3	2									
75	0.0082	A	T110A822(1)075A(3)	0.3	2									
75	0.01	A	T110A103(1)075A(3)	0.3	2									
75	0.012	A	T110A123(1)075A(3)	0.3	2									
75	0.015	A	T110A153(1)075A(3)	0.3	2									
75	0.018	A	T110A183(1)075A(3)	0.3	2									
75	0.022	A	T110A223(1)075A(3)	0.3	2									
75	0.027	A	T110A273(1)075A(3)	0.3	2									
75	0.033	A	T110A333(1)075A(3)	0.3	2									
75	0.039	A	T110A393(1)075A(3)	0.3	2									
75	0.047	A	T110A473(1)075A(3)	0.3	2									
75	0.056	A	T110A563(1)075A(3)	0.3	2									
75	0.068	A	T110A683(1)075A(3)	0.3	2									
75	0.082	A	T110A823(1)075A(3)	0.3	2									
75	0.1	A	T110A104J075A(3)	0.3	2	5095	5295	5495	5695	4236	6236	7236	8236	T212A104J075(2)S
75	0.1	A	T110A104K075A(3)	0.3	2	2382	2622	2862	3102	4237	6237	7237	8237	T212A104K075(2)S
75	0.1	A	T110A104M075A(3)	0.3	2	2383	2623	2863	3103	4238	6238	7238	8238	T212A104M075(2)S
75	0.12	A	T110A124J075A(3)	0.3	2	5096	5296	5496	5696	4239	6239	7239	8239	T212A124J075(2)S
75	0.12	A	T110A124K075A(3)	0.3	2	2384	2624	2864	3104	4240	6240	7240	8240	T212A124K075(2)S
75	0.12	A	T110A124M075A(3)	0.3	2									
75	0.15	A	T110A154J075A(3)	0.3	2	5097	5297	5497	5697	4241	6241	7241	8241	T212A154J075(2)S
75	0.15	A	T110A154K075A(3)	0.3	2	2385	2625	2865	3105	4242	6242	7242	8242	T212A154K075(2)S
75	0.15	A	T110A154M075A(3)	0.3	2	2386	2626	2866	3106	4243	6243	7243	8243	T212A154M075(2)S
75	0.18	A	T110A184J075A(3)	0.3	2	5098	5298	5498	5698	4244	6244	7244	8244	T212A184J075(2)S
75	0.18	A	T110A184K075A(3)	0.3	2	2387	2627	2867	3107	4245	6245	7245	8245	T212A184K075(2)S
75	0.18	A	T110A184M075A(3)	0.3	2									
75	0.22	A	T110A224J075A(3)	0.3	2	5099	5299	5499	5699	4246	6246	7246	8246	T212A224J075(2)S
75	0.22	A	T110A224K075A(3)	0.3	2	2388	2628	2868	3108	4247	6247	7247	8247	T212A224K075(2)S
75	0.22	A	T110A224M075A(3)	0.3	2	2389	2629	2869	3109	4248	6248	7248	8248	T212A224M075(2)S
75	0.27	A	T110A274J075A(3)	0.3	2	5100	5300	5500	5700	4249	6249	7249	8249	T212A274J075(2)S
75	0.27	A	T110A274K075A(3)	0.3	2	2390	2630	2870	3110	4250	6250	7250	8250	T212A274K075(2)S
75	0.27	A	T110A274M075A(3)	0.3	2									
75	0.33	A	T110A334J075A(3)	0.3	2	5101	5301	5501	5701	4251	6251	7251	8251	T212A334J075(2)S
75	0.33	A	T110A334K075A(3)	0.3	2	2391	2631	2871	3111	4252	6252	7252	8252	T212A334K075(2)S
75	0.33	A	T110A334M075A(3)	0.3	2	2392	2632	2872	3112	4253	6253	7253	8253	T212A334M075(2)S
75	0.39	A	T110A394J075A(3)	0.3	2	5102	5302	5502	5702	4254	6254	7254	8254	T212A394J075(2)S
75	0.39	A	T110A394K075A(3)	0.3	2	2393	2633	2873	3113	4255	6255	7255	8255	T212A394K075(2)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
75	0.39	A	T110A394M075A(3)	0.3	2									
75	0.47	A	T110A474J075A(3)	0.3	2	5103	5303	5503	5703	4256	6256	7256	8256	T212A474J075(2)S
75	0.47	A	T110A474K075A(3)	0.3	2	2394	2634	2874	3114	4257	6257	7257	8257	T212A474K075(2)S
75	0.47	A	T110A474M075A(3)	0.3	2	2395	2635	2875	3115	4258	6258	7258	8258	T212A474M075(2)S
75	0.56	A	T110A564J075A(3)	0.3	2	5104	5304	5504	5704	4259	6259	7259	8259	T212A564J075(2)S
75	0.56	A	T110A564K075A(3)	0.3	2	2396	2636	2876	3116	4260	6260	7260	8260	T212A564K075(2)S
75	0.56	A	T110A564M075A(3)	0.3	2									
75	0.68	A	T110A684J075A(3)	0.3	2	5105	5305	5505	5705	4261	6261	7261	8261	T212A684J075(2)S
75	0.68	A	T110A684K075A(3)	0.3	2	2397	2637	2877	3117	4262	6262	7262	8262	T212A684K075(2)S
75	0.68	A	T110A684M075A(3)	0.3	2	2398	2638	2878	3118	4263	6263	7263	8263	T212A684M075(2)S
75	0.82	B	T110B824J075A(3)	0.3	2	5106	5306	5506	5706	4264	6264	7264	8264	T212B824J075(2)S
75	0.82	B	T110B824K075A(3)	0.3	2	2399	2639	2879	3119	4265	6265	7265	8265	T212B824K075(2)S
75	0.82	B	T110B824M075A(3)	0.3	2									
75	1.0	B	T110B105J075A(3)	0.3	2	5107	5307	5507	5707	4266	6266	7266	8266	T212B105J075(2)S
75	1.0	B	T110B105K075A(3)	0.3	2	2400	2640	2880	3120	4267	6267	7267	8267	T212B105K075(2)S
75	1.0	B	T110B105M075A(3)	0.3	2	2401	2641	2881	3121	4268	6268	7268	8268	T212B105M075(2)S
75	1.2	B	T110B125J075A(3)	0.3	4	5108	5308	5508	5708	4269	6269	7269	8269	T212B125J075(2)S
75	1.2	B	T110B125K075A(3)	0.3	4	2402	2642	2882	3122	4270	6270	7270	8270	T212B125K075(2)S
75	1.2	B	T110B125M075A(3)	0.3	4									
75	1.5	B	T110B155J075A(3)	0.6	4	5109	5309	5509	5709	4271	6271	7271	8271	T212B155J075(2)S
75	1.5	B	T110B155K075A(3)	0.6	4	2403	2643	2883	3123	4272	6272	7272	8272	T212B155K075(2)S
75	1.5	B	T110B155M075A(3)	0.6	4	2404	2644	2884	3124	4273	6273	7273	8273	T212B155M075(2)S
75	1.8	B	T110B185J075A(3)	0.7	4	5110	5310	5510	5710	4274	6274	7274	8274	T212B185J075(2)S
75	1.8	B	T110B185K075A(3)	0.7	4	2405	2645	2885	3125	4275	6275	7275	8275	T212B185K075(2)S
75	1.8	B	T110B185M075A(3)	0.7	4									
75	2.2	B	T110B225J075A(3)	0.8	4	5111	5311	5511	5711	4276	6276	7276	8276	T212B225J075(2)S
75	2.2	B	T110B225K075A(3)	0.8	4	2406	2646	2886	3126	4277	6277	7277	8277	T212B225K075(2)S
75	2.2	B	T110B225M075A(3)	0.8	4	2407	2647	2887	3127	4278	6278	7278	8278	T212B225M075(2)S
75	2.7	B	T110B275J075A(3)	1.0	4	5112	5312	5512	5712	4279	6279	7279	8279	T212B275J075(2)S
75	2.7	B	T110B275K075A(3)	1.0	4	2408	2648	2888	3128	4280	6280	7280	8280	T212B275K075(2)S
75	2.7	B	T110B275M075A(3)	1.2	4									
75	3.3	B	T110B335J075A(3)	1.2	4	5113	5313	5513	5713	4281	6281	7281	8281	T212B335J075(2)S
75	3.3	B	T110B335K075A(3)	1.2	4	2409	2649	2889	3129	4282	6282	7282	8282	T212B335K075(2)S
75	3.3	B	T110B335M075A(3)	1.2	4	2410	2650	2890	3130	4283	6283	7283	8283	T212B335M075(2)S
75	3.9	B	T110B395J075A(3)	1.5	4	5114	5314	5514	5714	4284	6284	7284	8284	T212B395J075(2)S
75	3.9	B	T110B395K075A(3)	1.5	4	2411	2651	2891	3131	4285	6285	7285	8285	T212B395K075(2)S
75	3.9	B	T110B395M075A(3)	1.5	4									
75	4.7	C	T110C475J075A(3)	3.0	4	5115	5315	5515	5715	4286	6286	7286	8286	T212C475J075(2)S
75	4.7	C	T110C475K075A(3)	3.0	4	2412	2652	2892	3132	4287	6287	7287	8287	T212C475K075(2)S
75	4.7	C	T110C475M075A(3)	3.0	4	2413	2653	2893	3133	4288	6288	7288	8288	T212C475M075(2)S
75	5.6	C	T110C565J075A(3)	3.0	4	5116	5316	5516	5716	4289	6289	7289	8289	T212C565J075(2)S
75	5.6	C	T110C565K075A(3)	3.0	4	2414	2654	2894	3134	4290	6290	7290	8290	T212C565K075(2)S
75	5.6	C	T110C565M075A(3)	3.0	4									
75	6.8	C	T110C685J075A(3)	5.0	4	5117	5317	5517	5717	4291	6291	7291	8291	T212C685J075(2)S
75	6.8	C	T110C685K075A(3)	5.0	4	2415	2655	2895	3135	4292	6292	7292	8292	T212C685K075(2)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish. Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
75	6.8	C	T110C685M075A(3)	5.0	4	2416	2656	2896	3136	4293	6293	7293	8293	T212C685M075(2)S
75	8.2	C	T110C825J075A(3)	5.0	4	5118	5318	5518	5718	4294	6294	7294	8294	T212C825J075(2)S
75	8.2	C	T110C825K075A(3)	5.0	4	2417	2657	2897	3137	4295	6295	7295	8295	T212C825K075(2)S
75	8.2	C	T110C825M075A(3)	5.0	4									
75	10.0	C	T110C106J075A(3)	5.0	4	5119	5319	5519	5719	4296	6296	7296	8296	T212C106J075(2)S
75	10.0	C	T110C106K075A(3)	5.0	4	2418	2658	2898	3138	4297	6297	7297	8297	T212C106K075(2)S
75	10.0	C	T110C106M075A(3)	5.0	4	2419	2659	2899	3139	4298	6298	7298	8298	T212C106M075(2)S
75	12.0	D	T110D126J075A(3)	5.0	4	5120	5320	5520	5720	4299	6299	7299	8299	T212D126J075(2)S
75	12.0	D	T110D126K075A(3)	5.0	4	2420	2660	2900	3140	4300	6300	7300	8300	T212D126K075(2)S
75	12.0	D	T110D126M075A(3)	5.0	4									
75	15.0	D	T110D156J075A(3)	7.0	4	5121	5321	5521	5721	4301	6301	7301	8301	T212D156J075(2)S
75	15.0	D	T110D156K075A(3)	7.0	4	2421	2661	2901	3141	4302	6302	7302	8302	T212D156K075(2)S
75	15.0	D	T110D156M075A(3)	7.0	4	2422	2662	2902	3142	4303	6303	7303	8303	T212D156M075(2)S
100	0.0047	A	T110A472J100A(3)	0.3	2	5122	5322	5522	5722	4304	6304	7304	*	T212A472J100(2)S
100	0.0047	A	T110A472K100A(3)	0.3	2	2423	2663	2903	3143	4305	6305	7305	*	T212A472K100(2)S
100	0.0047	A	T110A472M100A(3)	0.3	2	2424	2664	2904	3144	4306	6306	7306	*	T212A472M100(2)S
100	0.0056	A	T110A562J100A(3)	0.3	2	5123	5323	5523	5723	4307	6307	7307	*	T212A562J100(2)S
100	0.0056	A	T110A562K100A(3)	0.3	2	2425	2665	2905	3145	4308	6308	7308	*	T212A562K100(2)S
100	0.0056	A	T110A562M100A(3)	0.3	2								*	
100	0.0068	A	T110A682J100A(3)	0.3	2	5124	5324	5524	5724	4309	6309	7309	*	T212A682J100(2)S
100	0.0068	A	T110A682K100A(3)	0.3	2	2426	2666	2906	3146	4310	6310	7310	*	T212A682K100(2)S
100	0.0068	A	T110A682M100A(3)	0.3	2	2427	2667	2907	3147	4311	6311	7311	*	T212A682M100(2)S
100	0.0082	A	T110A822J100A(3)	0.3	2	5125	5325	5525	5725	4312	6312	7312	*	T212A822J100(2)S
100	0.0082	A	T110A822K100A(3)	0.3	2	2428	2668	2908	3148	4313	6313	7313	*	T212A822K100(2)S
100	0.0082	A	T110A822M100A(3)	0.3	2								*	
100	0.01	A	T110A103J100A(3)	0.3	2	5126	5326	5526	5726	4314	6314	7314	*	T212A103J100(2)S
100	0.01	A	T110A103K100A(3)	0.3	2	2429	2669	2909	3149	4315	6315	7315	*	T212A103K100(2)S
100	0.01	A	T110A103M100A(3)	0.3	2	2430	2670	2910	3150	4316	6316	7316	*	T212A103M100(2)S
100	0.012	A	T110A123J100A(3)	0.3	2	5127	5327	5527	5727	4317	6317	7317	*	T212A123J100(2)S
100	0.012	A	T110A123K100A(3)	0.3	2	2431	2671	2911	3151	4318	6318	7318	*	T212A123K100(2)S
100	0.012	A	T110A123M100A(3)	0.3	2								*	
100	0.015	A	T110A153J100A(3)	0.3	2	5128	5328	5528	5728	4319	6319	7319	*	T212A153J100(2)S
100	0.015	A	T110A153K100A(3)	0.3	2	2432	2672	2912	3152	4320	6320	7320	*	T212A153K100(2)S
100	0.015	A	T110A153M100A(3)	0.3	2	2433	2673	2913	3153	4321	6321	7321	*	T212A153M100(2)S
100	0.018	A	T110A183J100A(3)	0.3	2	5129	5329	5529	5729	4322	6322	7322	*	T212A183J100(2)S
100	0.018	A	T110A183K100A(3)	0.3	2	2434	2674	2914	3154	4323	6323	7323	*	T212A183K100(2)S
100	0.018	A	T110A183M100A(3)	0.3	2								*	
100	0.022	A	T110A223J100A(3)	0.3	2	5130	5330	5530	5730	4324	6324	7324	*	T212A223J100(2)S
100	0.022	A	T110A223K100A(3)	0.3	2	2435	2675	2915	3155	4325	6325	7325	*	T212A223K100(2)S
100	0.022	A	T110A223M100A(3)	0.3	2	2436	2676	2916	3156	4326	6326	7326	*	T212A223M100(2)S
100	0.027	A	T110A273J100A(3)	0.3	2	5131	5331	5531	5731	4327	6327	7327	*	T212A273J100(2)S
100	0.027	A	T110A273K100A(3)	0.3	2	2437	2677	2917	3157	4328	6328	7328	*	T212A273K100(2)S
100	0.027	A	T110A273M100A(3)	0.3	2								*	
100	0.033	A	T110A333J100A(3)	0.3	2	5132	5332	5532	5732	4329	6329	7329	*	T212A333J100(2)S
100	0.033	A	T110A333K100A(3)	0.3	2	2438	2678	2918	3158	4330	6330	7330	*	T212A333K100(2)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish. Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								KEMET Equivalent Military
						Dash Number Reference								
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
100	0.033	A	T110A333M100A(3)	0.3	2	2439	2679	2919	3159	4331	6331	7331	*	T212A333M100(2)S
100	0.039	A	T110A393J100A(3)	0.3	2	5133	5333	5533	5733	4332	6332	7332	*	T212A393J075(2)S
100	0.039	A	T110A393K100A(3)	0.3	2	2440	2680	2920	3160	4333	6333	7333	*	T212A393K075(2)S
100	0.039	A	T110A393M100A(3)	0.3	2								*	
100	0.047	A	T110A473J100A(3)	0.3	2	5134	5334	5534	5734	4334	6334	7334	*	T212A473J100(2)S
100	0.047	A	T110A473K100A(3)	0.3	2	2441	2681	2921	3161	4335	6335	7335	*	T212A473K100(2)S
100	0.047	A	T110A473M100A(3)	0.3	2	2442	2682	2922	3162	4336	6336	7336	*	T212A473M100(2)S
100	0.056	A	T110A563J100A(3)	0.3	2	5135	5335	5535	5735	4337	6337	7337	*	T212A563J100(2)S
100	0.056	A	T110A563K100A(3)	0.3	2	2443	2683	2923	3163	4338	6338	7338	*	T212A563K100(2)S
100	0.056	A	T110A563M100A(3)	0.3	2								*	
100	0.068	A	T110A683J100A(3)	0.3	2	5136	5336	5536	5736	4339	6339	7339	*	T212A683J100(2)S
100	0.068	A	T110A683K100A(3)	0.3	2	2444	2684	2924	3164	4340	6340	7340	*	T212A683K100(2)S
100	0.068	A	T110A683M100A(3)	0.3	2	2445	2685	2925	3165	4341	6341	7341	*	T212A683M100(2)S
100	0.082	A	T110A823J100A(3)	0.3	2	5137	5337	5537	5737	4342	6342	7342	*	T212A823J100(2)S
100	0.082	A	T110A823K100A(3)	0.3	2	2446	2686	2926	3166	4343	6343	7343	*	T212A823K100(2)S
100	0.082	A	T110A823M100A(3)	0.3	2								*	
100	0.1	A	T110A104J100A(3)	0.3	2	5138	5338	5538	5738	4344	6344	7344	*	T212A104J100(2)S
100	0.1	A	T110A104K100A(3)	0.3	2	2447	2687	2927	3167	4345	6345	7345	*	T212A104K100(2)S
100	0.1	A	T110A104M100A(3)	0.3	2	2448	2688	2928	3168	4346	6346	7346	*	T212A104M100(2)S
100	0.12	A	T110A124J100A(3)	0.3	2	5139	5339	5539	5739	4347	6347	7347	*	T212A124J100(2)S
100	0.12	A	T110A124K100A(3)	0.3	2	2449	2689	2929	3169	4348	6348	7348	*	T212A124K100(2)S
100	0.12	A	T110A124M100A(3)	0.3	2								*	
100	0.15	A	T110A154J100A(3)	0.3	2	5140	5340	5540	5740	4349	6349	7349	*	T212A154J100(2)S
100	0.15	A	T110A154K100A(3)	0.3	2	2450	2690	2930	3170	4350	6350	7350	*	T212A154K100(2)S
100	0.15	A	T110A154M100A(3)	0.3	2	2451	2691	2931	3171	4351	6351	7351	*	T212A154M100(2)S
100	0.18	A	T110A184J100A(3)	0.3	2	5141	5341	5541	5741	4352	6352	7352	*	T212A184J100(2)S
100	0.18	A	T110A184K100A(3)	0.3	2	2452	2692	2932	3172	4353	6353	7353	*	T212A184K100(2)S
100	0.18	A	T110A184M100A(3)	0.3	2								*	
100	0.22	A	T110A224J100A(3)	0.3	2	5142	5342	5542	5742	4354	6354	7354	*	T212A224J100(2)S
100	0.22	A	T110A224K100A(3)	0.3	2	2453	2693	2933	3173	4355	6355	7355	*	T212A224K100(2)S
100	0.22	A	T110A224M100A(3)	0.3	2	2454	2694	2934	3174	4356	6356	7356	*	T212A224M100(2)S
100	0.27	A	T110A274J100A(3)	0.3	2	5143	5343	5543	5743	4357	6357	7357	*	T212A274J100(2)S
100	0.27	A	T110A274K100A(3)	0.3	2	2455	2695	2935	3175	4358	6358	7358	*	T212A274K100(2)S
100	0.27	A	T110A274M100A(3)	0.3	2								*	
100	0.33	A	T110A334J100A(3)	0.3	2	5144	5344	5544	5744	4359	6359	7359	*	T212A334J100(2)S
100	0.33	A	T110A334K100A(3)	0.3	2	2456	2696	2936	3176	4360	6360	7360	*	T212A334K100(2)S
100	0.33	A	T110A334M100A(3)	0.3	2	2457	2697	2937	3177	4361	6361	7361	*	T212A334M100(2)S
100	0.39	A	T110A394J100A(3)	0.3	2	5145	5345	5545	5745	4362	6362	7362	*	T212A394J100(2)S
100	0.39	A	T110A394K100A(3)	0.3	2	2458	2698	2938	3178	4363	6363	7363	*	T212A394K100(2)S
100	0.39	A	T110A394M100A(3)	0.3	2								*	
100	0.47	A	T110A474J100A(3)	0.3	2	5146	5346	5546	5746	4364	6364	7364	*	T212A474J100(2)S
100	0.47	A	T110A474K100A(3)	0.3	2	2459	2699	2939	3179	4365	6365	7365	*	T212A474K100(2)S
100	0.47	A	T110A474M100A(3)	0.3	2	2460	2700	2940	3180	4366	6366	7366	*	T212A474M100(2)S
100	0.56	A	T110A564J100A(3)	0.3	2	5147	5347	5547	5747	4367	6367	7367	*	T212A564J100(2)S
100	0.56	A	T110A564K100A(3)	0.3	2	2461	2701	2941	3181	4368	6368	7368	*	T212A564K100(2)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								KEMET Equivalent Military
						Dash Number Reference								
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
100	0.56	A	T110A564M100A(3)	0.3	2								*	
100	0.68	B	T110B684J100A(3)	0.3	2	5148	5348	5548	5748	4369	6369	7369	*	T212B684J100(2)S
100	0.68	B	T110B684K100A(3)	0.3	2	2462	2702	2942	3182	4370	6370	7370	*	T212B684K100(2)S
100	0.68	B	T110B684M100A(3)	0.3	2	2463	2703	2943	3183	4371	6371	7371	*	T212B684M100(2)S
100	0.82	B	T110B824J100A(3)	0.4	2	5149	5349	5549	5749	4372	6372	7372	*	T212B824J100(2)S
100	0.82	B	T110B824K100A(3)	0.4	2	2464	2704	2944	3184	4373	6373	7373	*	T212B824K100(2)S
100	0.82	B	T110B824M100A(3)	0.4	2								*	
100	1.0	B	T110B105J100A(3)	0.5	2	5150	5350	5550	5750	4374	6374	7374	*	T212B105J100(2)S
100	1.0	B	T110B105K100A(3)	0.5	2	2465	2705	2945	3185	4375	6375	7375	*	T212B105K100(2)S
100	1.0	B	T110B105M100A(3)	0.5	2	2466	2706	2946	3186	4376	6376	7376	*	T212B105M100(2)S
100	1.2	B	T110B125J100A(3)	0.5	3	5151	5351	5551	5751	4377	6377	7377	*	T212B125J100(2)S
100	1.2	B	T110B125K100A(3)	0.5	3	2467	2707	2947	3187	4378	6378	7378	*	T212B125K100(2)S
100	1.2	B	T110B125M100A(3)	0.5	3								*	
100	1.5	B	T110B155J100A(3)	0.7	3	5152	5352	5552	5752	4379	6379	7379	*	T212B155J100(2)S
100	1.5	B	T110B155K100A(3)	0.7	3	2468	2708	2948	3188	4380	6380	7380	*	T212B155K100(2)S
100	1.5	B	T110B155M100A(3)	0.7	3	2469	2709	2949	3189	4381	6381	7381	*	T212B155M100(2)S
100	1.8	B	T110B185J100A(3)	0.7	3	5153	5353	5553	5753	4382	6382	7382	*	T212B185J100(2)S
100	1.8	B	T110B185K100A(3)	0.7	3	2470	2710	2950	3190	4383	6383	7383	*	T212B185K100(2)S
100	1.8	B	T110B185M100A(3)	0.7	3								*	
100	2.2	B	T110B225J100A(3)	0.9	3	5154	5354	5554	5754	4384	6384	7384	*	T212B225J100(2)S
100	2.2	B	T110B225K100A(3)	0.9	3	2471	2711	2951	3191	4385	6385	7385	*	T212B225K100(2)S
100	2.2	B	T110B225M100A(3)	0.9	3	2472	2712	2952	3192	4386	6386	7386	*	T212B225M100(2)S
100	2.7	B	T110B275J100A(3)	1.1	3	5155	5355	5555	5755	4387	6387	7387	*	T212B275J100(2)S
100	2.7	B	T110B275K100A(3)	1.1	3	2473	2713	2953	3193	4388	6388	7388	*	T212B275K100(2)S
100	2.7	B	T110B275M100A(3)	1.1	3								*	
100	3.3	C	T110C335J100A(3)	1.5	3	5156	5356	5556	5756	4389	6389	*	*	T212C335J100(2)S
100	3.3	C	T110C335K100A(3)	1.5	3	5157	5357	5557	5757	4390	6390	*	*	T212C335K100(2)S
100	3.3	C	T110C335M100A(3)	1.5	3	5158	5358	5558	5758	4391	6391	*	*	T212C335M100(2)S
100	3.9	C	T110C395J100A(3)	1.5	3	5159	5359	5559	5759	4392	6392	*	*	T212C395J100(2)S
100	3.9	C	T110C395K100A(3)	1.5	3	5160	5360	5560	5760	4393	6393	*	*	T212C395K100(2)S
100	4.7	C	T110C475J100A(3)	2.5	3	5161	5361	5561	5761	4394	6394	*	*	T212C475J100(2)S
100	4.7	C	T110C475K100A(3)	2.5	3	5162	5362	5562	5762	4395	6395	*	*	T212C475K100(2)S
100	4.7	C	T110C475M100A(3)	2.5	3	5163	5363	5563	5763	4396	6396	*	*	T212C475M100(2)S
100	5.6	C	T110C565J100A(3)	2.5	3	5164	5364	5564	5764	4397	6397	*	*	T212C565J100(2)S
100	5.6	C	T110C565K100A(3)	2.5	3	5165	5365	5565	5765	4398	6398	*	*	T212C565K100(2)S
100	6.80	C	T110C685J100A(3)	2.5	3	5166	5366	5566	5766	4399	6399	*	*	T212C685J100(2)S
100	6.80	C	T110C685K100A(3)	2.5	3	5167	5367	5567	5767	4400	6400	*	*	T212C685K100(2)S
100	6.80	C	T110C685M100A(3)	2.5	3	5168	5368	5568	5768	4401	6401	*	*	T212C685M100(2)S
100	8.20	D	T110D825(1)100A(3)	5.0	3									
100	10.0	D	T110D106(1)100A(3)	5.0	3									
125	0.0047	A	T110A472(1)125A(3)	0.5	3									
125	0.0056	A	T110A562(1)125A(3)	0.5	3									
125	0.0068	A	T110A682(1)125A(3)	0.5	3									
125	0.0082	A	T110A822(1)125A(3)	0.5	3									
125	0.01	A	T110A103(1)125A(3)	0.5	3									
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish. Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/1K				MIL–PRF–39003/1K				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
125	0.012	A	T110A123(1)125A(3)	0.5	3									
125	0.015	A	T110A153(1)125A(3)	0.5	3									
125	0.018	A	T110A183(1)125A(3)	0.5	3									
125	0.022	A	T110A223(1)125A(3)	0.5	3									
125	0.027	A	T110A273(1)125A(3)	0.5	3									
125	0.033	A	T110A333(1)125A(3)	0.5	3									
125	0.039	A	T110A393(1)125A(3)	1.5	3									
125	0.047	A	T110A473(1)125A(3)	1.5	3									
125	0.056	A	T110A563(1)125A(3)	1.5	3									
125	0.068	A	T110A683(1)125A(3)	1.5	3									
125	0.082	A	T110A823(1)125A(3)	1.5	3									
125	0.1	A	T110A104(1)125A(3)	1.5	3									
125	0.12	A	T110A124(1)125A(3)	1.5	3									
125	0.15	A	T110A154(1)125A(3)	1.5	3									
125	0.18	A	T110A184(1)125A(3)	1.5	3									
125	0.22	A	T110A224(1)125A(3)	1.5	3									
125	0.27	A	T110A274(1)125A(3)	1.5	3									
125	0.33	A	T110A334(1)125A(3)	1.5	3									
125	0.39	B	T110B394(1)125A(3)	1.5	3									
125	0.47	B	T110B474(1)125A(3)	1.5	3									
125	0.56	B	T110B564(1)125A(3)	1.5	3									
125	0.68	B	T110B684(1)125A(3)	1.5	3									
125	0.82	B	T110B824(1)125A(3)	1.5	3									
125	1.0	B	T110B105(1)125A(3)	1.5	3									
125	1.2	B	T110B125(1)125A(3)	1.5	3									
125	1.5	B	T110B155(1)125A(3)	1.5	3									
125	1.8	B	T110B185(1)125A(3)	1.5	3									
125	2.2	B	T110B225(1)125A(3)	1.5	3									
125	2.7	C	T110C275(1)125A(3)	2.0	3									
125	3.3	C	T110C335(1)125A(3)	2.0	3									
125	3.9	C	T110C395(1)125A(3)	2.0	3									
125	4.7	C	T110C475(1)125A(3)	3.0	3									
125	5.6	C	T110C565(1)125A(3)	3.0	3									
125	6.8	C	T110C685(1)125A(3)	3.0	3									
125	8.2	D	T110D825(1)125A(3)	6.0	3									
125	10.0	D	T110D106(1)125A(3)	6.0	3									
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET Part Number, insert M for ±20%, K for ±10%, or J for 5%. Designates capacitance tolerance.

(2) To complete KEMET Part Number (T212), insert Graded failure rate – B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours, or G for 1%/k hours; or insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

(3) To complete KEMET Part Number (T110), insert Lead Material designator – S for Standard or T for 100% Matte Tin. Designates Termination finish.

Refer to Ordering Information for additional detail.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Permissible AC ripple current can be determined by the following:

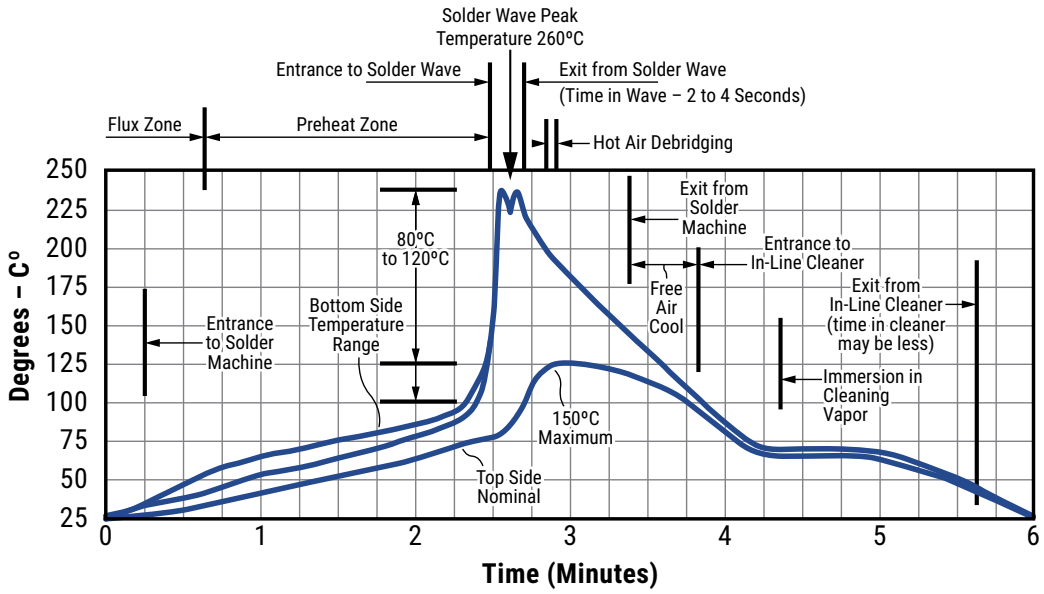
$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

Optimum Solder Wave Profile



Reverse Voltage

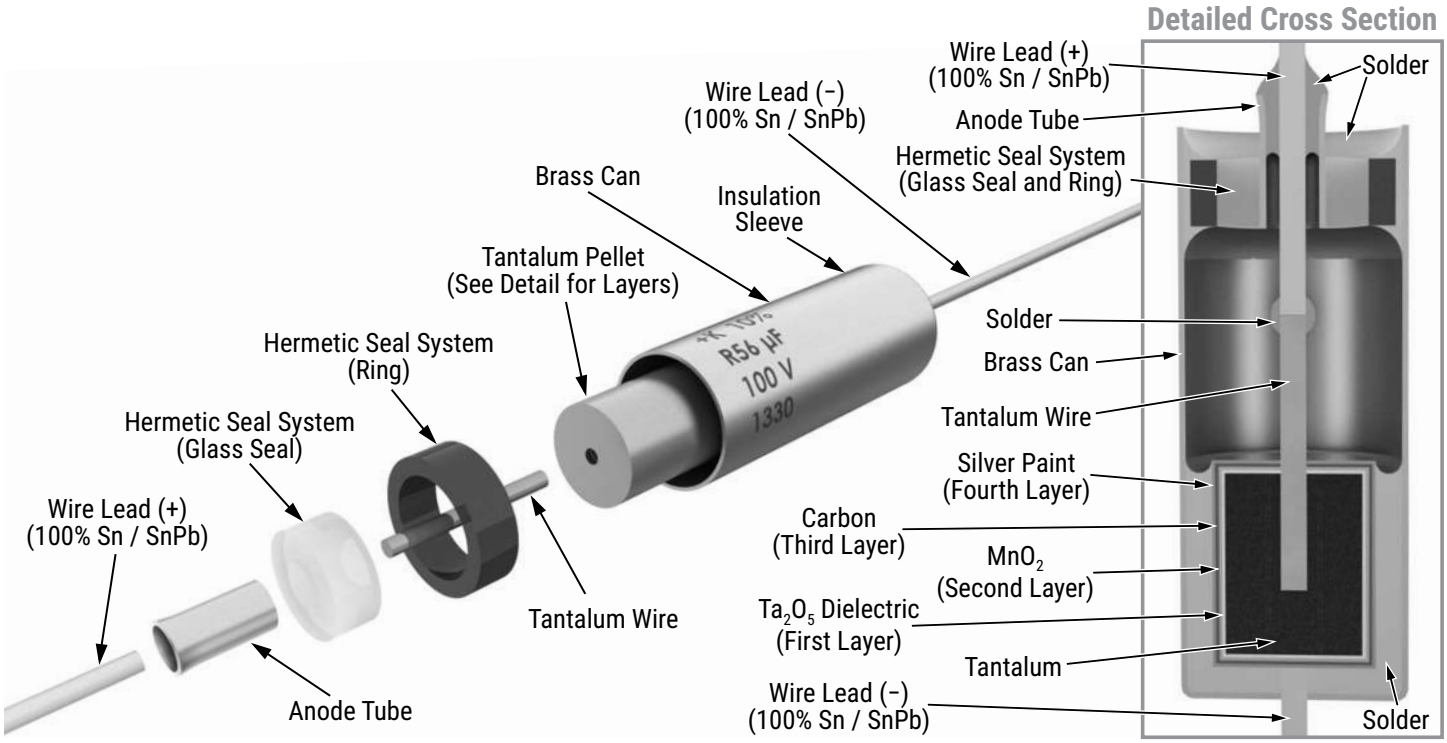
Although these are polar capacitors, some degree of transient voltage reversal is permissible, as seen below. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Pecentage of Rated Voltage
+25°C	15
+85°C	5
+125°C	1

Mounting

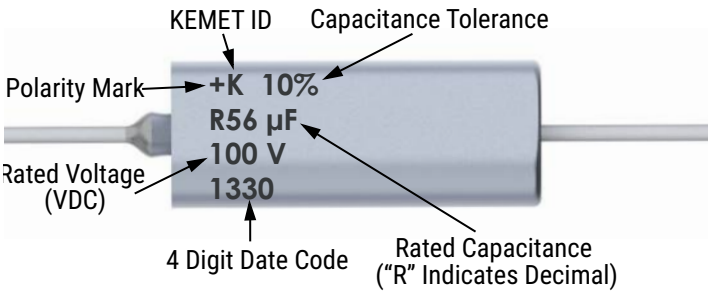
All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Construction

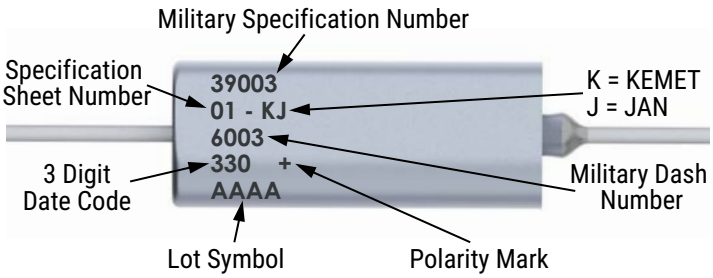


Capacitor Marking

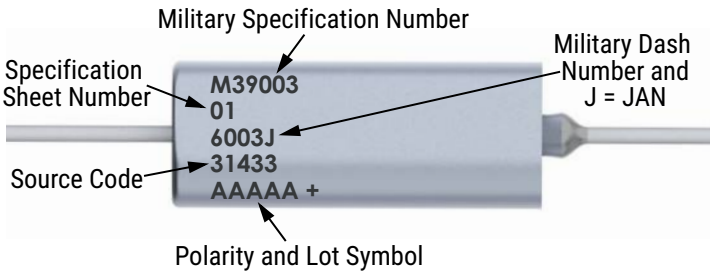
T110



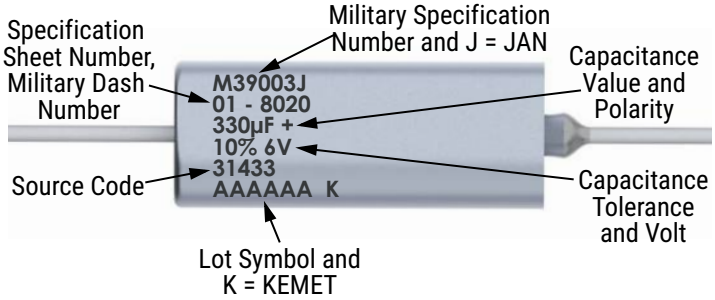
T212 – A Case



T212 – B Case



T212 – C and D Case



Date Code	3 Digit	4 Digit
Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023	19 = 2019 20 = 2020 21 = 2021 22 = 2022 23 = 2023
Week	01 = 1st week of the year to 52 = 52nd week of the year	

Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS–296E.

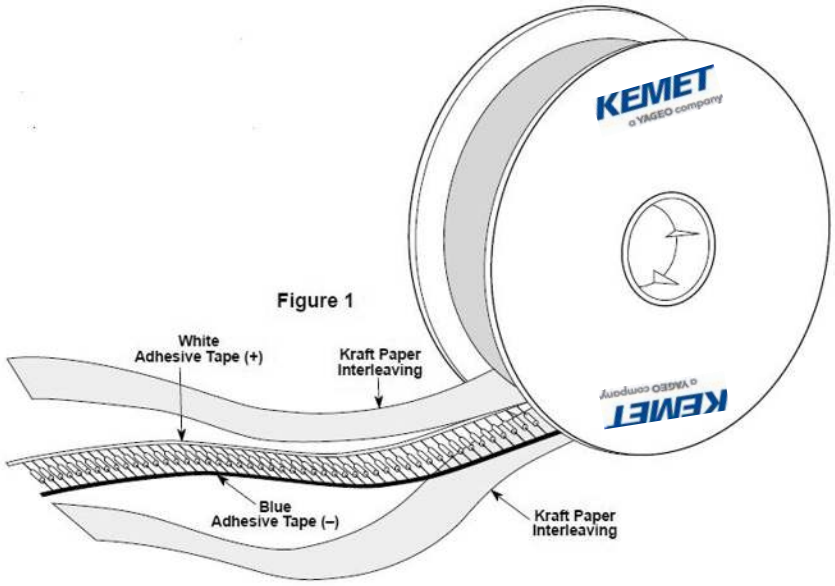


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity	Ammo Pack C-Spec
A	150/Box	3,500	C–7200	1,500	C–7293
B	75/Box	2,500	C–7200	1,000	Class I
C	20/Tray	500	C–7200	250	C–7442
D	20/Tray	400	C–7200	250	Class II C–7443 Class III

Figure 2

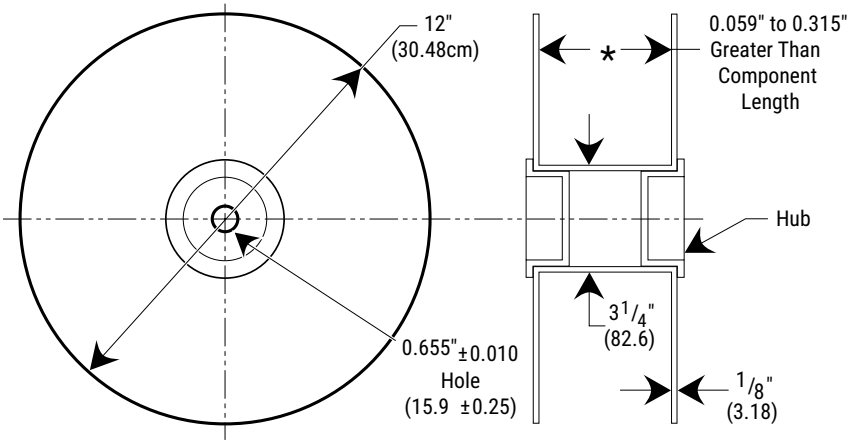


Figure 3

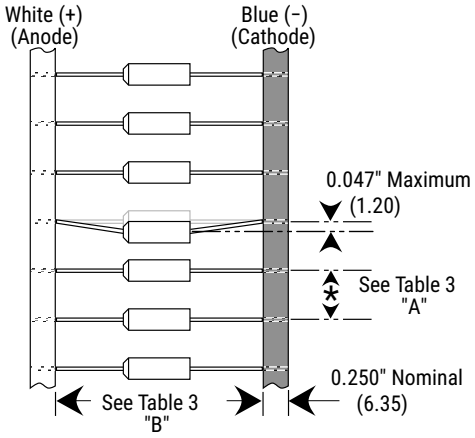


Table 3 – Tape Dimensions

Dimensions in Inches (& Millimeters)

BODY DIAMETER	A PITCH ±0.020 (0.5)	B INSIDE TAPE SPACING ±0.059 (1.5)		
		Class		
		I	II	III
≤ 0.197 (5.0)	0.200 (5.0)	2.063 (52.4)	2.500 (63.5)	2.874 (73)
0.198 (5.0) to 0.394 (10.0)	0.400 (10.0)			

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50 lbs. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lbs. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center.

Figures 1 and 2 show the KEMET standard chipboard tape reel.

A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors.

Universal splicing clips are used to connect the tape.

Tantalum Through-Hole Capacitors – Hermetically Sealed

T111 Axial MIL–PRF–39003 Non-Polar and T213 (CSR91 Style)

Overview

The T111/T213 Series is primarily designed for use in tuned low frequency circuits, phasing low voltage AC motors, servo systems and other applications where reversal of polarity is a primary consideration. The T111 unit consists of two polar T110 Series hermetically sealed tantalum capacitors, electrically and mechanically connected back-to-back and supported by an outer corrosion-resistant metal sleeve. They exhibit comparable electrical and performance characteristics of T110 Series. Available in capacitance values from 0.0023 µF to 160 µF in ±20% and ±10% tolerances, the T111 series is offered in working voltages of 6 VDC to 100 VDC at +85°C.

Benefits

- Taped and reeled per EIA Specification RS–296
- Marking per MIL–STD–1285
- Qualified to MIL–PRF–39003 (CSR91 Style)
- Failure rate options: Graded – B, C, D, and G
  Exponential – M, P, R, and S*
- Capacitance values of 0.0023 µF to 160 µF
- Tolerances of ±5%, ±10% and ±20%
- Voltage rating of 6 – 100 VDC
- Operating temperature range of −55°C to +125°C
- Case sizes: A, B, C, D

**Failure rates apply to military products only*

Applications

Typical applications include use in tuned low frequency circuits, phasing low voltage AC motors, servo systems and other applications where reversal of polarity is a primary consideration.

Ordering Information – T111

T	111	A	105	K	050	A	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	Hermetically sealed axial capacitor	A B C D	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50 075 = 75 100 = 100	A = N/A	S= Standard (Sn/Pb)	All capacitors are sleeved unless specified.

Ordering Information – T213 (CSR91 Style)

MIL product

T	213	A	115	K	020	B	S	7200
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	Hermetically sealed axial military grade capacitor	A B C D	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50 075 = 75 100 = 100	Graded: B = 0.1%/k hours C = 0.01%/k hours D = 0.001%/k hours G= 1.0 %/k hours Exponential: M = 1%/k hours P = 0.1%/k hours R = 0.01%/k hours S = 0.001%/k hours	S = Standard (Sn/Pb)	Blank = Sleeved/Bulk 0100 = Without sleeve 7200 = Tape & Reel 7293 & 7443 = Ammo 4250 = "A" surge current 4251 = "B" surge current 4252 = "C" surge current All capacitors are sleeved unless specified.

Ordering Information – MIL–PRF–39003

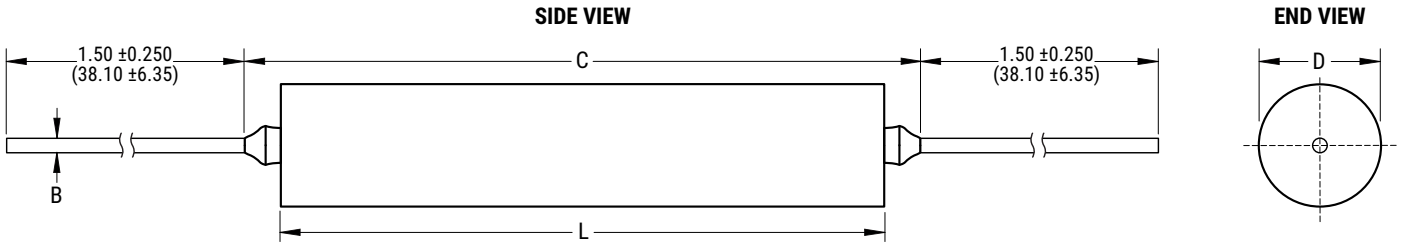
M39003	/04	3007	A
Capacitor Class	Slash	Dash Number	Surge Option
Military specification number	Specification sheet number	Failure rate level	A = C-4250 B = C-4251 C = C-4252 Blank = No surge

Orders should be entered by the military specification number, including the dash number and surge option letter (A, B or C).

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.0023 µF – 160 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6 V – 100 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table (for reference only)
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)
Failure Rate (MIL–39003, CSR91 capacitors only)	Approved failure rate: S (0.001%/k hours) – Exponential, D (0.001%/k hours) – Graded

Dimensions – Inches (Millimeters)



Case Size	Uninsulated		Insulated		B	C
	D ±0.005 (±0.13)	L ±0.031 (±0.79)	D ±0.010 (±0.25)	L ±0.031 (±0.79)	±0.002 (±0.05)	Maximum
A	0.147 (3.73)	0.565 (14.35)	0.161 (4.09)	0.575 (14.61)	0.020 (0.51)	0.750 (19.05)
B	0.194 (4.93)	0.916 (23.27)	0.207 (5.26)	0.955 (24.26)	0.020 (0.51)	1.130 (28.70)
C	0.300 (7.62)	1.340 (34.04)	0.314 (7.98)	1.350 (34.29)	0.025 (0.64)	1.525 (38.74)
D	0.362 (9.19)	1.540 (39.12)	0.376 (9.55)	1.550 (3.937)	0.025 (0.64)	1.725 (43.82)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR91) Capacitors								KEMET Equivalent Military
						Dash Number Reference								
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/4C				MIL–PRF–39003/4C				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
6	2.8	A	T111A285K006AS	0.3	4	0221	0441	0661	0881	6001	3001	4001	5001	T213A285K006(1)S
6	3.4	A	T111A345K006AS	0.3	6	0222	0442	0662	0882	6002	3002	4002	5002	T213A345K006(1)S
6	3.4	A	T111A345M006AS	0.3	6	0223	0443	0663	0883	6003	3003	4003	5003	T213A345M006(1)S
6	23.0	B	T111B236K006AS	1.5	6	0224	0444	0664	0884	6004	3004	4004	5004	T213B236K006(1)S
6	23.0	B	T111B236M006AS	1.5	6	0225	0445	0665	0885	6005	3005	4005	5005	T213B236M006(1)S
6	28.0	B	T111B286K006AS	1.5	6	0226	0446	0666	0886	6006	3006	4006	5006	T213B286K006(1)S
6	75.0	C	T111C756K006AS	4.5	6	0227	0447	0667	0887	6007	3007	4007	5007	T213C756K006(1)S
6	75.0	C	T111C756M006AS	4.5	6	0228	0448	0668	0888	6008	3008	4008	5008	T213C756M006(1)S
6	90.0	C	T111C906K006AS	4.5	6	0229	0449	0669	0889	6009	3009	4009	5009	T213C906K006(1)S
6	90.0	C	T111C906M006AS	5.5	6	0230	0450	0670	0890					T213C906M006(1)S
6	130.0	D	T111D137K006AS	6.0	8	0231	0451	0671	0891	6010	3010	4010	5010	T213D137K006(1)S
6	130.0	D	T111D137M006AS	6.0	8	0232	0452	0672	0892					T213D137M006(1)S
6	160.0	D	T111D167K006AS	7.5	8	0233	0453	0673	0893	6011	3011	4011	5011	T213D167K006(1)S
6	160.0	D	T111D167M006AS	7.5	8	0234	0454	0674	0894	6012	3012	4012	5012	T213D167M006(1)S
10	1.9	A	T111A195K010AS	0.3	4	0235	0455	0675	0895	6013	3013	4013	5013	T213A195K010(1)S
10	2.3	A	T111A235K010AS	0.4	4	0236	0456	0676	0896	6014	3014	4014	5014	T213A235K010(1)S
10	2.3	A	T111A235M010AS	0.4	4	0237	0457	0677	0897	6015	3015	4015	5015	T213A235M010(1)S
10	13.0	B	T111B136K010AS	2.0	6	0238	0458	0678	0898	6016	3016	4016	5016	T213B136K010(1)S
10	16.0	B	T111B166K010AS	2.0	6	0239	0459	0679	0899	6017	3017	4017	5017	T213B166K010(1)S
10	16.0	B	T111B166M010AS	2.0	6	0240	0460	0680	0900	6018	3018	4018	5018	T213B166M010(1)S
10	19.0	B	T111B196K010AS	2.0	6	0241	0461	0681	0901	6019	3019	4019	5019	T213B196K010(1)S
10	41.0	C	T111C416K010AS	3.0	6	0242	0462	0682	0902	6020	3020	4020	5020	T213C416K010(1)S
10	50.0	C	T111C506K010AS	5.0	6	0243	0463	0683	0903	6021	3021	4021	5021	T213C506K010(1)S
10	50.0	C	T111C506M010AS	5.0	6	0244	0464	0684	0904	6022	3022	4022	5022	T213C506M010(1)S
10	60.0	C	T111C606K010AS	6.0	6	0245	0465	0685	0905	6023	3023	4023	5023	T213C606K010(1)S
10	60.0	C	T111C606M010AS	6.0	6	0246	0466	0686	0906					T213C606M010(1)S
10	90.0	D	T111D906K010AS	9.0	6	0247	0467	0687	0907	6024	3024	4024	5024	T213D906K010(1)S
10	110.0	D	T111D117K010AS	10.0	8	0248	0468	0688	0908	6025	3025	4025	5025	T213D117K010(1)S
10	100.0	D	T111D117M010AS	10.0	8	0249	0469	0689	0909	6026	3026	4026	5026	T213D117M010(1)S
15	1.3	A	T111A135K015AS	0.3	4	0250	0470	0690	0910	6027	3027	4027	5027	T213A135K015(1)S
15	1.6	A	T111A165K015AS	0.4	4	0251	0471	0691	0911	6028	3028	4028	5028	T213A165K015(1)S
15	1.6	A	T111A165M015AS	0.4	4	0252	0472	0692	0912	6029	3029	4029	5029	T213A165M015(1)S
15	9.0	B	T111B905K015AS	2.0	6	0253	0473	0693	0913	6030	3030	4030	5030	T213B905K015(1)S
15	10.0	B	T111B106K015AS	1.5	6									
15	11.0	B	T111B116K015AS	2.0	6	0254	0474	0694	0914	6031	3031	4031	5031	T213B116K015(1)S
15	11.0	B	T111B116M015AS	2.0	6	0255	0475	0695	0915	6032	3032	4032	5032	T213B116M015(1)S
15	28.0	C	T111C286K015AS	4.0	6	0256	0476	0696	0916	6033	3033	4033	5033	T213C286K015(1)S
15	34.0	C	T111C346K015AS	5.0	6	0257	0477	0697	0917	6034	3034	4034	5034	T213C346K015(1)S
15	34.0	C	T111C346M015AS	5.0	6	0258	0478	0698	0918	6035	3035	4035	5035	T213C346M015(1)S
15	60.0	D	T111D606K015AS	6.0	6	0259	0479	0699	0919	6036	3036	4036	5036	T213D606K015(1)S
15	75.0	D	T111D756K015AS	10.0	6	0260	0480	0700	0920	6037	3037	4037	5037	T213D756K015(1)S
15	75.0	D	T111D756M015AS	10.0	6	0261	0481	0701	0921	6038	3038	4038	5038	T213D756M015(1)S
20	0.6	A	T111A604K020AS	0.3	4	0262	0482	0702	0922	6039	3039	4039	5039	T213A604K020(1)S
20	0.75	A	T111A754K020AS	0.3	4	0263	0483	0703	0923	6040	3040	4040	5040	T213A754K020(1)S
20	0.75	A	T111A754M020AS	0.3	4	0264	0484	0704	0924	6041	3041	4041	5041	T213A754M020(1)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET part number, insert failure rate code from Ordering Information table.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR91) Capacitors								KEMET Equivalent Military
						Dash Number Reference								
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/4C				MIL–PRF–39003/4C				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
20	0.9	A	T111A904K020AS	0.3	4	0265	0485	0705	0925	6042	3042	4042	5042	T213A904K020(1)S
20	1.1	A	T111A115J020AS	0.4	4									
20	1.1	A	T111A115K020AS	0.4	4	0266	0486	0706	0926	6043	3043	4043	5043	T213A115K020(1)S
20	1.1	A	T111A115M020AS	0.4	4	0267	0487	0707	0927	6044	3044	4044	5044	T213A115M020(1)S
20	4.1	B	T111B415K020AS	1.0	6	0268	0488	0708	0928	6045	3045	4045	5045	T213B415K020(1)S
20	5.0	B	T111B505K020AS	1.0	6	0269	0489	0709	0929	6046	3046	4046	5046	T213B505K020(1)S
20	5.0	B	T111B505M020AS	1.0	6	0270	0490	0710	0930	6047	3047	4047	5047	T213B505M020(1)S
20	6.0	B	T111B605K020AS	1.0	6	0271	0491	0711	0931	6048	3048	4048	5048	T213B605K020(1)S
20	7.5	B	T111B755K020AS	2.0	6	0272	0492	0712	0932	6049	3049	4049	5049	T213B755K020(1)S
20	7.5	B	T111B755M020AS	2.0	6	0273	0493	0713	0933	6050	3050	4050	5050	T213B755M020(1)S
20	13.0	C	T111C136K020AS	2.5	6	0274	0494	0714	0934	6051	3051	4051	5051	T213C136K020(1)S
20	16.0	C	T111C166K020AS	3.0	6	0275	0495	0715	0935	6052	3052	4052	5052	T213C166K020(1)S
20	16.0	C	T111C166M020AS	3.0	6	0276	0496	0716	0936	6053	3053	4053	5053	T213C166M020(1)S
20	19.0	C	T111C196J020AS	3.0	6									
20	19.0	C	T111C196K020AS	3.0	6	0277	0497	0717	0937	6054	3054	4054	5054	T213C196K020(1)S
20	23.0	C	T111C236K020AS	4.5	6	0278	0498	0718	0938	6055	3055	4055	5055	T213C236K020(1)S
20	23.0	C	T111C236M020AS	4.5	6	0279	0499	0719	0939	6056	3056	4056	5056	T213C236M020(1)S
20	28.0	D	T111D286K020AS	5.5	6	0280	0500	0720	0940	6057	3057	4057	5057	T213D286K020(1)S
20	34.0	D	T111D346K020AS	6.0	6	0281	0501	0721	0941	6058	3058	4058	5058	T213D346K020(1)S
20	34.0	D	T111D346M020AS	6.0	6	0282	0502	0722	0942	6059	3059	4059	5059	T213D346M020(1)S
20	41.0	D	T111D416K020AS	6.0	6	0283	0503	0723	0943	6060	3060	4060	5060	T213D416K020(1)S
20	50.0	D	T111D506J020AS	10.0	6									
20	50.0	D	T111D506K020AS	10.0	6	0284	0504	0724	0944	6061	3061	4061	5061	T213D506K020(1)S
20	50.0	D	T111D506M020AS	10.0	6	0285	0505	0725	0945	6062	3062	4062	5062	T213D506M020(1)S
35	0.1	A	T111A114J035AS											
35	2.8	B	T111B285K035AS	1.0	4	0289	0509	0729	0949	6063	3063	4063	5063	T213B285K035(1)S
35	3.4	B	T111B345K035AS	1.5	4	0290	0510	0730	0950	6064	3064	4064	5064	T213B345K035(1)S
35	3.4	B	T111B345M035AS	1.5	4	0291	0511	0731	0951	6065	3065	4065	5065	T213B345M035(1)S
35	5.0	C	T111C505M035AS	2.5	4									
35	11.0	C	T111C116J035AS	4.0	4									
35	11.0	C	T111C116K035AS	4.0	4	0292	0512	0732	0952	6066	3066	4066	5066	T213C116K035(1)S
35	11.0	C	T111C116M035AS	4.0	4	0293	0513	0733	0953	6067	3067	4067	5067	T213C116M035(1)S
35	13.0	D	T111D136K035AS	4.5	4	0294	0514	0734	0954	6068	3068	4068	5068	T213D136K035(1)S
35	16.0	D	T111D166K035AS	5.5	4	0295	0515	0735	0955	6069	3069	4069	5069	T213D166K035(1)S
35	16.0	D	T111D166M035AS	5.5	4	0296	0516	0736	0956	6070	3070	4070	5070	T213D166M035(1)S
35	19.0	D	T111D196K035AS	6.0	4	0297	0517	0737	0957	6071	3071	4071	5071	T213D196K035(1)S
35	23.0	D	T111D236K035AS	8.0	4	0298	0518	0738	0958	6072	3072	4072	5072	T213D236K035(1)S
35	23.0	D	T111D236M035AS	8.0	4	0299	0519	0739	0959	6073	3073	4073	5073	T213D236M035(1)S
50	0.0023	A	T111A232K050AS	0.1	2	1171	1241	1311	1381	6074	3074	4074	5074	T213A232K050(1)S
50	0.0023	A	T111A232M050AS	0.1	2	1172	1242	1312	1382	6075	3075	4075	5075	T213A232M050(1)S
50	0.0028	A	T111A282K050AS	0.1	2	1173	1243	1313	1383	6076	3076	4076	5076	T213A282K050(1)S
50	0.0034	A	T111A342K050AS	0.1	2	1174	1244	1314	1384	6077	3077	4077	5077	T213A342K050(1)S
50	0.0034	A	T111A342M050AS	0.1	2	1175	1245	1315	1385	6078	3078	4078	5078	T213A342M050(1)S
50	0.0041	A	T111A412K050AS	0.1	2	1176	1246	1316	1386	6079	3079	4079	5079	T213A412K050(1)S
50	0.005	A	T111A502K050AS	0.1	2	1177	1247	1317	1387	6080	3080	4080	5080	T213A502K050(1)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET part number, insert failure rate code from Ordering Information table.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR91) Capacitors								KEMET Equivalent Military
						Dash Number Reference								
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/4C				MIL–PRF–39003/4C				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
50	0.005	A	T111A502M050AS	0.1	2	1178	1248	1318	1388	6081	3081	4081	5081	T213A502M050(1)S
50	0.006	A	T111A602K050AS	0.1	2	1179	1249	1319	1389	6082	3082	4082	5082	T213A602K050(1)S
50	0.0075	A	T111A752K050AS	0.1	2	1180	1250	1320	1390	6083	3083	4083	5083	T213A752K050(1)S
50	0.0075	A	T111A752M050AS	0.1	2	1181	1251	1321	1391	6084	3084	4084	5084	T213A752M050(1)S
50	0.009	A	T111A902K050AS	0.1	2	1182	1252	1322	1392	6085	3085	4085	5085	T213A902K050(1)S
50	0.011	A	T111A113K050AS	0.1	2	1183	1253	1323	1393	6086	3086	4086	5086	T213A113K050(1)S
50	0.011	A	T111A113M050AS	0.1	2	1184	1254	1324	1394	6087	3087	4087	5087	T213A113M050(1)S
50	0.013	A	T111A133K050AS	0.1	2	1185	1255	1325	1395	6088	3088	4088	5088	T213A133K050(1)S
50	0.016	A	T111A163J050AS	0.1	2									
50	0.016	A	T111A163K050AS	0.1	2	1186	1256	1326	1396	6089	3089	4089	5089	T213A163K050(1)S
50	0.016	A	T111A163M050AS	0.1	2	1187	1257	1327	1397	6090	3090	4090	5090	T213A163M050(1)S
50	0.019	A	T111A193K050AS	0.1	2	1188	1258	1328	1398	6091	3091	4091	5091	T213A193K050(1)S
50	0.023	A	T111A233J050AS	0.1	2									
50	0.023	A	T111A233K050AS	0.1	2	1189	1259	1329	1399	6092	3092	4092	5092	T213A233K050(1)S
50	0.023	A	T111A233M050AS	0.1	2	1190	1260	1330	1400	6093	3093	4093	5093	T213A233M050(1)S
50	0.028	A	T111A283K050AS	0.1	2	1191	1261	1331	1401	6094	3094	4094	5094	T213A283K050(1)S
50	0.034	A	T111A343K050AS	0.1	2	1192	1262	1332	1402	6095	3095	4095	5095	T213A343K050(1)S
50	0.034	A	T111A343M050AS	0.1	2	1193	1263	1333	1403	6096	3096	4096	5096	T213A343M050(1)S
50	0.041	A	T111A413K050AS	0.1	2	1194	1264	1334	1404	6097	3097	4097	5097	T213A413K050(1)S
50	0.05	A	T111A503K050AS	0.3	2	1195	1265	1335	1405	6098	3098	4098	5098	T213A503K050(1)S
50	0.05	A	T111A503M050AS	0.3	2	1196	1266	1336	1406	6099	3099	4099	5099	T213A503M050(1)S
50	0.06	A	T111A603K050AS	0.3	2	1197	1267	1337	1407	6100	3100	4100	5100	T213A603K050(1)S
50	0.075	A	T111A753J050AS	0.3	2									
50	0.075	A	T111A753K050AS	0.3	2	1198	1268	1338	1408	6101	3101	4101	5101	T213A753K050(1)S
50	0.075	A	T111A753M050AS	0.3	2	1199	1269	1339	1409	6102	3102	4102	5102	T213A753M050(1)S
50	0.09	A	T111A903K050AS	0.3	2	1200	1270	1340	1410	6103	3103	4103	5103	T213A903K050(1)S
50	0.11	A	T111A114J050AS	0.3	2									
50	0.11	A	T111A114K050AS	0.3	2	1201	1271	1341	1411	6104	3104	4104	5104	T213A114K050(1)S
50	0.11	A	T111A114M050AS	0.3	2	1202	1272	1342	1412	6105	3105	4105	5105	T213A114M050(1)S
50	0.13	A	T111A134K050AS	0.3	2	1203	1273	1343	1413	6106	3106	4106	5106	T213A134K050(1)S
50	0.16	A	T111A164K050AS	0.3	2	1204	1274	1344	1414	6107	3107	4107	5107	T213A164K050(1)S
50	0.16	A	T111A164M050AS	0.3	2	1205	1275	1345	1415	6108	3108	4108	5108	T213A164M050(1)S
50	0.19	A	T111A194K050AS	0.3	2	1206	1276	1346	1416	6109	3109	4109	5109	T213A194K050(1)S
50	0.23	A	T111A234K050AS	0.3	2	1207	1277	1347	1417	6110	3110	4110	5110	T213A234K050(1)S
50	0.23	A	T111A234M050AS	0.3	2	1208	1278	1348	1418	6111	3111	4111	5111	T213A234M050(1)S
50	0.28	A	T111A284K050AS	0.3	2	1209	1279	1349	1419	6112	3112	4112	5112	T213A284K050(1)S
50	0.34	A	T111A344K050AS	0.3	2	1210	1280	1350	1420	6113	3113	4113	5113	T213A344K050(1)S
50	0.34	A	T111A344M050AS	0.3	2	1211	1281	1351	1421	6114	3114	4114	5114	T213A344M050(1)S
50	0.41	A	T111A414K050AS	0.3	2	0300	0520	0740	0960	6115	3115	4115	5115	T213A414K050(1)S
50	0.5	A	T111A504J050AS	0.4	2									
50	0.5	A	T111A504K050AS	0.4	2	0301	0521	0741	0961	6116	3116	4116	5116	T213A504K050(1)S
50	0.5	A	T111A504M050AS	0.4	2	0302	0522	0742	0962	6117	3117	4117	5117	T213A504M050(1)S
50	0.6	B	T111B604J050AS	0.4	4									
50	0.6	B	T111B604K050AS	0.4	4	1212	1282	1352	1422	6118	3118	4118	5118	T213B604K050(1)S
50	0.6	B	T111B604M050AS	0.4	4									
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET part number, insert failure rate code from Ordering Information table.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR91) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/4C				MIL–PRF–39003/4C				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
50	0.75	B	T111B754K050AS	0.5	4	2001	2101	2201	2301	6119	3119	4119	5119	T213B754K050(1)S
50	0.75	B	T111B754M050AS	0.5	4	2002	2102	2202	2302	6120	3120	4120	5120	T213B754M050(1)S
50	0.9	B	T111B904K050AS	0.5	4	1215	1285	1355	1425	6121	3121	4121	5121	T213B904K050(1)S
50	0.9	B	T111B904M050AS	0.5	4									
50	1.1	B	T111B115J050AS	0.8	4									
50	1.1	B	T111B115K050AS	0.8	4	1216	1286	1356	1426	6122	3122	4122	5122	T213B115K050(1)S
50	1.1	B	T111B115M050AS	0.8	4	1217	1287	1357	1427	6123	3123	4123	5123	T213B115M050(1)S
50	1.3	B	T111B135K050AS	1.0	4	1218	1288	1358	1428	6124	3124	4124	5124	T213B135K050(1)S
50	1.3	B	T111B135M050AS	1.0	4									
50	1.6	B	T111B165K050AS	1.2	4	1219	1289	1359	1429	6125	3125	4125	5125	T213B165K050(1)S
50	1.6	B	T111B165M050AS	1.2	4	1220	1290	1360	1430	6126	3126	4126	5126	T213B165M050(1)S
50	1.9	B	T111B195J050AS	1.5	4									
50	1.9	B	T111B195K050AS	1.5	4	1221	1291	1361	1431	6127	3127	4127	5127	T213B195K050(1)S
50	1.9	B	T111B195M050AS	1.5	4									
50	2.3	B	T111B235K050AS	1.7	4	1222	1292	1362	1432	6128	3128	4128	5128	T213B235K050(1)S
50	2.3	B	T111B235M050AS	1.7	4	1223	1293	1363	1433	6129	3129	4129	5129	T213B235M050(1)S
50	2.8	C	T111C285K050AS	2.2	4	1224	1294	1364	1434	6130	3130	4130	5130	T213C285K050(1)S
50	2.8	C	T111C285M050AS	2.2	4									
50	3.4	C	T111C345K050AS	2.2	4	1225	1295	1365	1435	6131	3131	4131	5131	T213C345K050(1)S
50	3.4	C	T111C345M050AS	2.2	4	1226	1296	1366	1436	6132	3132	4132	5132	T213C345M050(1)S
50	4.1	C	T111C415K050AS	2.5	4	1227	1297	1367	1437	6133	3133	4133	5133	T213C415K050(1)S
50	4.1	C	T111C415M050AS	2.5	4									
50	5.0	C	T111C505J050AS	2.5	4									
50	5.0	C	T111C505K050AS	2.5	4	1228	1298	1368	1438	6134	3134	4134	5134	T213C505K050(1)S
50	5.0	C	T111C505M050AS	2.5	4	1229	1299	1369	1439	6135	3135	4135	5135	T213C505M050(1)S
50	6.0	C	T111C605K050AS	3.0	4	0303	0523	0743	0963	6136	3136	4136	5136	T213C605K050(1)S
50	6.0	C	T111C605M050AS	3.0	4									
50	7.5	C	T111C755K050AS	4.1	4	0304	0524	0744	0964	6137	3137	4137	5137	T213C755K050(1)S
50	7.5	C	T111C755M050AS	4.1	4	0305	0525	0745	0965	6138	3138	4138	5138	T213C755M050(1)S
50	9.0	C	T111C905K050AS	4.5	4	0306	0526	0746	0966	6139	3139	4139	5139	T213C905K050(1)S
50	9.0	C	T111C905M050AS	4.5	4									
50	11.0	D	T111D116K050AS	5.5	4	0307	0527	0747	0967	6140	3140	4140	5140	T213D116K050(1)S
50	11.0	D	T111D116M050AS	5.5	4	0308	0528	0748	0968	6141	3141	4141	5141	T213D116M050(1)S
75	0.34	A	T111A344K075AS	0.3	2	0309	0529	0749	0969	6142	3142	4142	5142	T213A344K075(1)S
75	0.34	A	T111A344M075AS	0.3	2	0310	0530	0750	0970	6143	3143	4143	5143	T213A344M075(1)S
75	0.41	B	T111B414K075AS	0.3	2	2008	2108	2208	2308	6144	3144	4144	5144	T213B414K075(1)S
75	0.5	B	T111B504K075AS	0.4	2	2009	2109	2209	2309	6145	3145	4145	5145	T213B504K075(1)S
75	0.5	B	T111B504M075AS	0.4	2	2010	2110	2210	2310	6146	3146	4146	5146	T213B504M075(1)S
75	0.6	B	T111B604K075AS	0.4	4	2011	2111	2211	2311	6147	3147	4147	5147	T213B604K075(1)S
75	0.75	B	T111B754K075AS	0.6	4	2012	2112	2212	2312	6148	3148	4148	5148	T213B754K075(1)S
75	0.75	B	T111B754M075AS	0.6	4	2013	2113	2213	2313	6149	3149	4149	5149	T213B754M075(1)S
75	0.9	B	T111B904K075AS	0.7	4	2014	2114	2214	2314	6150	3150	4150	5150	T213B904K075(1)S
75	1.1	B	T111B115K075AS	0.8	4	2015	2115	2215	2315	6151	3151	4151	5151	T213B115K075(1)S
75	1.1	B	T111B115M075AS	0.8	4	2016	2116	2216	2316	6152	3152	4152	5152	T213B115M075(1)S
75	1.3	B	T111B135K075AS	1.0	4	2017	2117	2217	2317	6153	3153	4153	5153	T213B135K075(1)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET part number, insert failure rate code from Ordering Information table.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR91) Capacitors								KEMET Equivalent Military
						Dash Number Reference								
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/4C				MIL–PRF–39003/4C				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
75	1.6	B	T111B165K075AS	1.2	4	0311	0531	0751	0971	6154	3154	4154	5154	T213B165K075(1)S
75	1.6	B	T111B165M075AS	1.2	4	0312	0532	0752	0972	6155	3155	4155	5155	T213B165M075(1)S
75	1.9	B	T111B195J075AS	1.5	4									
75	1.9	B	T111B195K075AS	1.5	4	0313	0533	0753	0973	6156	3156	4156	5156	T213B195K075(1)S
75	2.3	C	T111C235K075AS	3.0	4	2003	2103	2203	2303	6157	3157	4157	5157	T213C235K075(1)S
75	2.3	C	T111C235M075AS	3.0	4	2004	2104	2204	2304	6158	3158	4158	5158	T213C235M075(1)S
75	2.8	C	T111C285K075AS	3.0	4	2005	2105	2205	2305	6159	3159	4159	5159	T213C285K075(1)S
75	3.4	C	T111C345K075AS	5.0	4	2006	2106	2206	2306	6160	3160	4160	5160	T213C345K075(1)S
75	3.4	C	T111C345M075AS	5.0	4	2007	2107	2207	2307	6161	3161	4161	5161	T213C345M075(1)S
75	4.1	C	T111C415K075AS	5.0	4	0314	0534	0754	0974	6162	3162	4162	5162	T213C415K075(1)S
75	5.0	C	T111C505J075AS	5.0	4									
75	5.0	C	T111C505K075AS	5.0	4	0315	0535	0755	0975	6163	3163	4163	5163	T213C505K075(1)S
75	5.0	C	T111C505M075AS	5.0	4	0316	0536	0756	0976	6164	3164	4164	5164	T213C505M075(1)S
75	6.0	D	T111D605K075AS	5.0	4	0317	0537	0757	0977	6165	3165	4165	5165	T213D605K075(1)S
75	7.5	D	T111D755K075AS	7.0	4	0318	0538	0758	0978	6166	3166	4166	5166	T213D755K075(1)S
75	7.5	D	T111D755M075AS	7.0	4	0319	0539	0759	0979	6167	3167	4167	5167	T213D755M075(1)S
100	0.0023	A	T111A232K100AS	0.3	2	0320	0540	0760	0980	6168	3168	4168	*	T213A232K100(1)S
100	0.0023	A	T111A232M100AS	0.3	2	0321	0541	0761	0981	6169	3169	4169	*	T213A232M100(1)S
100	0.0028	A	T111A282K100AS	0.3	2	0322	0542	0762	0982	6170	3170	4170	*	T213A282K100(1)S
100	0.0034	A	T111A342K100AS	0.3	2	0323	0543	0763	0983	6171	3171	4171	*	T213A342K100(1)S
100	0.0034	A	T111A342M100AS	0.3	2	0324	0544	0764	0984	6172	3172	4172	*	T213A342M100(1)S
100	0.0041	A	T111A412K100AS	0.3	2	0325	0545	0765	0985	6173	3173	4173	*	T213A412K100(1)S
100	0.0050	A	T111A502J100AS	0.3	2									
100	0.005	A	T111A502K100AS	0.3	2	0326	0546	0766	0986	6174	3174	4174	*	T213A502K100(1)S
100	0.005	A	T111A502M100AS	0.3	2	0327	0547	0767	0987	6175	3175	4175	*	T213A502M100(1)S
100	0.006	A	T111A602K100AS	0.3	2	0328	0548	0768	0988	6176	3176	4176	*	T213A602K100(1)S
100	0.0075	A	T111A752K100AS	0.3	2	0329	0549	0769	0989	6177	3177	4177	*	T213A752K100(1)S
100	0.0075	A	T111A752M100AS	0.3	2	0330	0550	0770	0990	6178	3178	4178	*	T213A752M100(1)S
100	0.009	A	T111A902K100AS	0.3	2	0331	0551	0771	0991	6179	3179	4179	*	T213A902K100(1)S
100	0.011	A	T111A113K100AS	0.3	2	0332	0552	0772	0992	6180	3180	4180	*	T213A113K100(1)S
100	0.011	A	T111A113M100AS	0.3	2	0333	0553	0773	0993	6181	3181	4181	*	T213A113M100(1)S
100	0.013	A	T111A133K100AS	0.3	2	0334	0554	0774	0994	6182	3182	4182	*	T213A133K100(1)S
100	0.016	A	T111A163K100AS	0.3	2	0335	0555	0775	0995	6183	3183	4183	*	T213A163K100(1)S
100	0.016	A	T111A163M100AS	0.3	2	0336	0556	0776	0996	6184	3184	4184	*	T213A163M100(1)S
100	0.019	A	T111A193K100AS	0.3	2	0337	0557	0777	0997	6185	3185	4185	*	T213A193K100(1)S
100	0.023	A	T111A233K100AS	0.3	2	0338	0558	0778	0998	6186	3186	4186	*	T213A223K100(1)S
100	0.023	A	T111A233M100AS	0.3	2	0339	0559	0779	0999	6187	3187	4187	*	T213A223M100(1)S
100	0.028	A	T111A283K100AS	0.3	2	0340	0560	0780	1000	6188	3188	4188	*	T213A283K100(1)S
100	0.034	A	T111A343K100AS	0.3	2	0341	0561	0781	1001	6189	3189	4189	*	T213A343K100(1)S
100	0.034	A	T111A343M100AS	0.3	2	0342	0562	0782	1002	6190	3190	4190	*	T213A343M100(1)S
100	0.041	A	T111A413K100AS	0.3	2	0343	0563	0783	1003	6191	3191	4191	*	T213A413K100(1)S
100	0.050	A	T111A503K100AS	0.3	2	0344	0564	0784	1004	6192	3192	4192	*	T213A503K100(1)S
100	0.050	A	T111A503M100AS	0.3	2	0345	0565	0785	1005	6193	3193	4193	*	T213A503M100(1)S
100	0.060	A	T111A603K100AS	0.3	2	0346	0566	0786	1006	6194	3194	4194	*	T213A603K100(1)S
100	0.075	A	T111A753K100AS	0.3	2	0347	0567	0787	1007	6195	3195	4195	*	T213A753K100(1)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET part number, insert failure rate code from Ordering Information table.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR91) Capacitors								KEMET Equivalent Military
						Dash Number Reference								
						Failure Rate Level (%/1,000 hours)								
						MIL–PRF–39003/4C				MIL–PRF–39003/4C				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
100	0.075	A	T111A753M100AS	0.3	2	0348	0568	0788	1008	6196	3196	4196	*	T213A753M100(1)S
100	0.09	A	T111A903K100AS	0.3	2	0349	0569	0789	1009	6197	3197	4197	*	T213A903K100(1)S
100	0.11	A	T111A114K100AS	0.3	2	0350	0570	0790	1010	6198	3198	4198	*	T213A114K100(1)S
100	0.11	A	T111A114M100AS	0.3	2	0351	0571	0791	1011	6199	3199	4199	*	T213A114M100(1)S
100	0.13	A	T111A134K100AS	0.3	2	0352	0572	0792	1012	6200	3200	4200	*	T213A134K100(1)S
100	0.16	A	T111A164J100AS	0.3	2									
100	0.16	A	T111A164K100AS	0.3	2	0353	0573	0793	1013	6201	3201	4201	*	T213A164K100(1)S
100	0.16	A	T111A164M100AS	0.3	2	0354	0574	0794	1014	6202	3202	4202	*	T213A164M100(1)S
100	0.19	A	T111A194K100AS	0.3	2	0355	0575	0795	1015	6203	3203	4203	*	T213A194K100(1)S
100	0.23	A	T111A234K100AS	0.3	2	0356	0576	0796	1016	6204	3204	4204	*	T213A234K100(1)S
100	0.23	A	T111A234M100AS	0.3	2	0357	0577	0797	1017	6205	3205	4205	*	T213A234M100(1)S
100	0.28	A	T111A284K100AS	0.3	2	0358	0578	0798	1018	6206	3206	4206	*	T213A284K100(1)S
100	0.34	B	T111B344K100AS	0.3	2	0359	0579	0799	1019	6207	3207	4207	*	T213B344K100(1)S
100	0.34	B	T111B344M100AS	0.3	2	0360	0580	0800	1020	6208	3208	4208	*	T213B344M100(1)S
100	0.41	B	T111B414K100AS	0.4	2	0361	0581	0801	1021	6209	3209	4209	*	T213B414K100(1)S
100	0.5	B	T111B504K100AS	0.5	2	0362	0582	0802	1022	6210	3210	4210	*	T213B504K100(1)S
100	0.5	B	T111B504M100AS	0.5	2	0363	0583	0803	1023	6211	3211	4211	*	T213B504M100(1)S
100	0.6	B	T111B604K100AS	0.5	3	0364	0584	0804	1024	6212	3212	4212	*	T213B604K100(1)S
100	0.75	B	T111B754K100AS	0.7	3	0365	0585	0805	1025	6213	3213	4213	*	T213B754K100(1)S
100	0.8	B	T111B754M100AS	0.7	3	0366	0586	0806	1026	6214	3214	4214	*	T213B754M100(1)S
100	0.9	B	T111B904K100AS	0.7	3	0367	0587	0807	1027	6215	3215	4215	*	T213B904K100(1)S
100	1.1	B	T111B115K100AS	0.9	3	0368	0588	0808	1028	6216	3216	4216	*	T213B115K100(1)S
100	1.1	B	T111B115M100AS	0.9	3	0369	0589	0809	1029	6217	3217	4217	*	T213B115M100(1)S
100	1.3	B	T111B135K100AS	1.1	3	0370	0590	0810	1030	6218	3218	4218	*	T213B135K100(1)S
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minimum	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1.0)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors								

(1) To complete KEMET part number, insert failure rate code from Ordering Information table.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Permissible AC ripple current can be determined by the following:

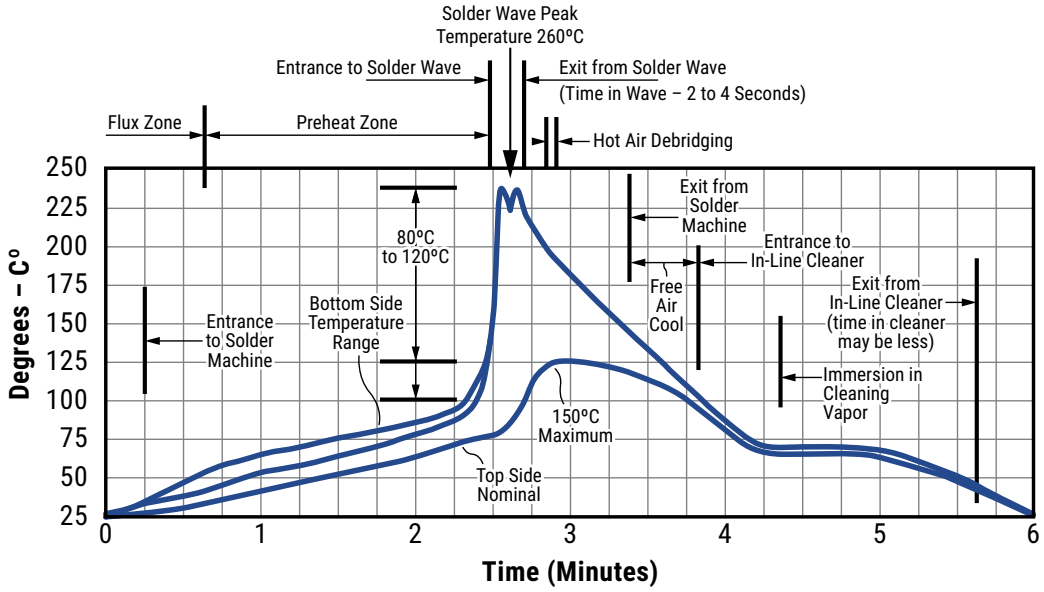
$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

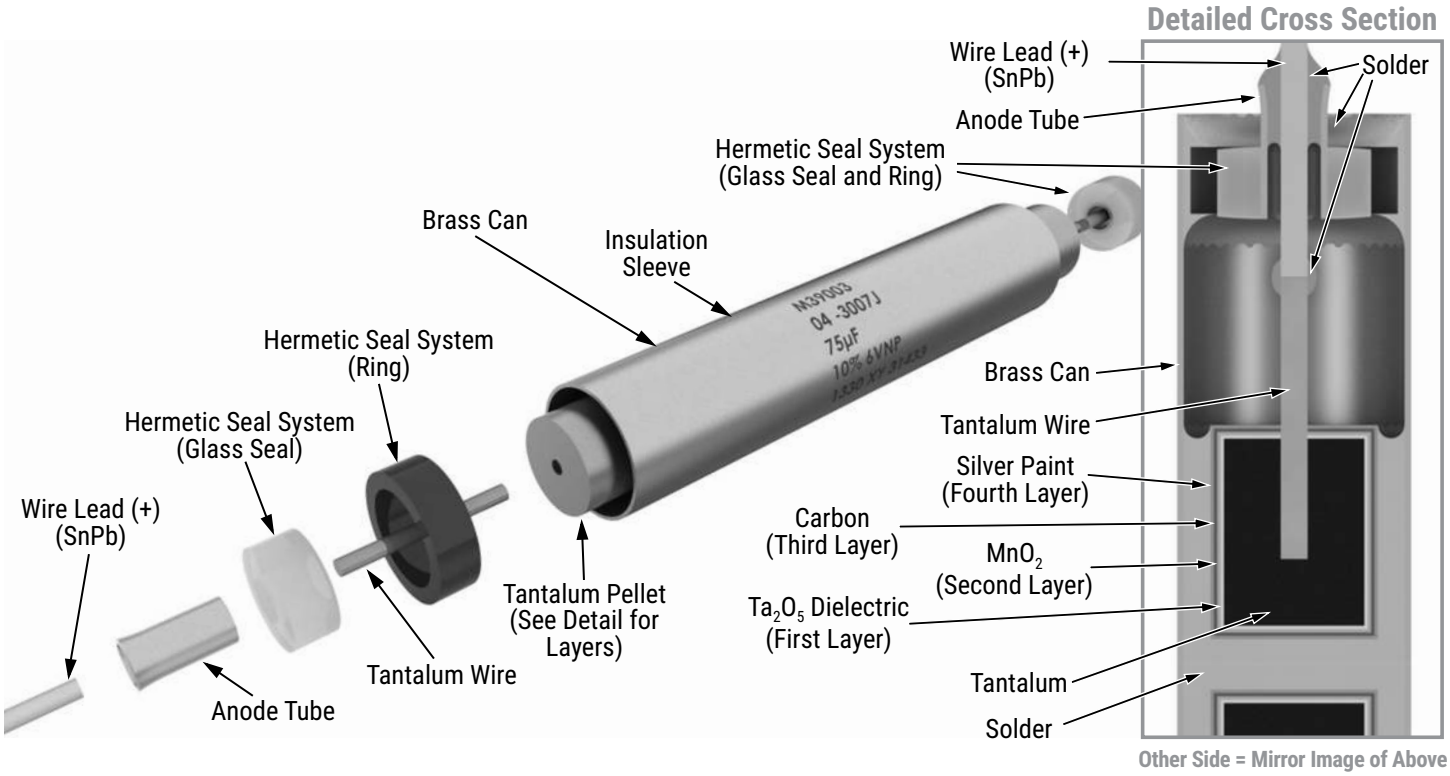
Optimum Solder Wave Profile



Mounting

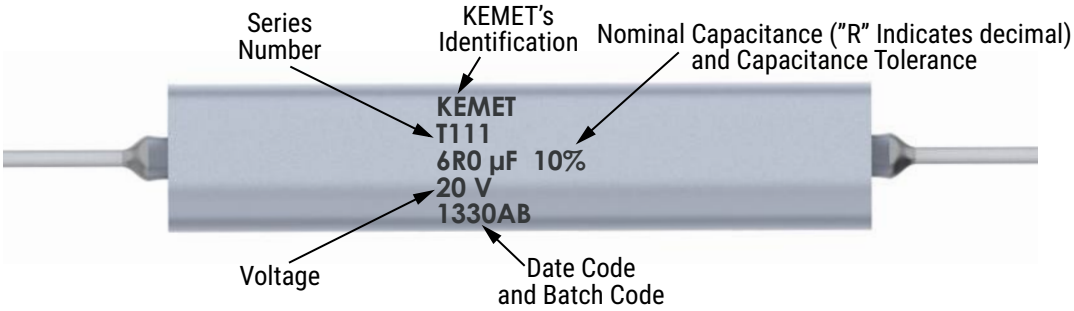
All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Construction

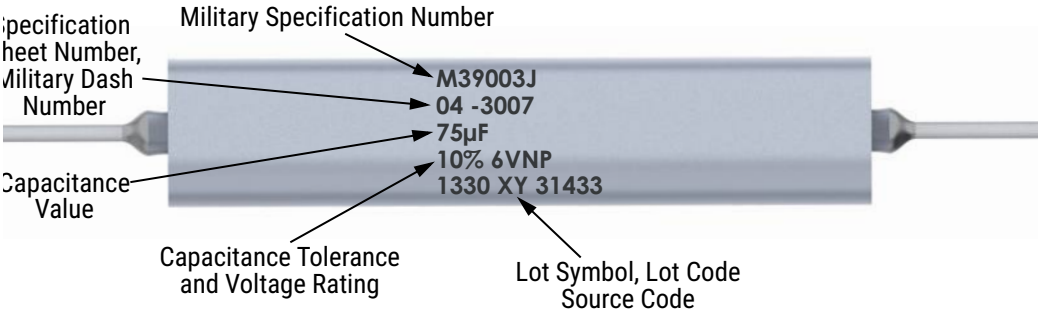


Capacitor Marking

T111



T213 – A, B, C, and D Case



Date Code	3 Digit	4 Digit
Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023	19 = 2019 20 = 2020 21 = 2021 22 = 2022 23 = 2023
Week	01 = 1st week of the year to 52 = 52nd week of the year	

Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS–296E.

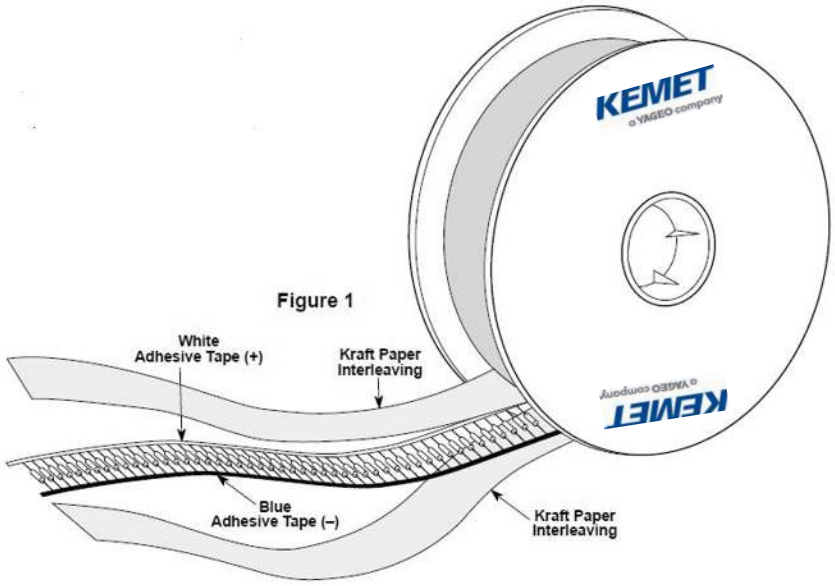


Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity	Ammo Pack C-Spec
A	60/Box	3,000	C–7200	N/A	N/A
B	30/Box	2,000	C–7200		
C	10/Card	N/A	N/A		
D	10/Card	N/A	N/A		

Figure 2

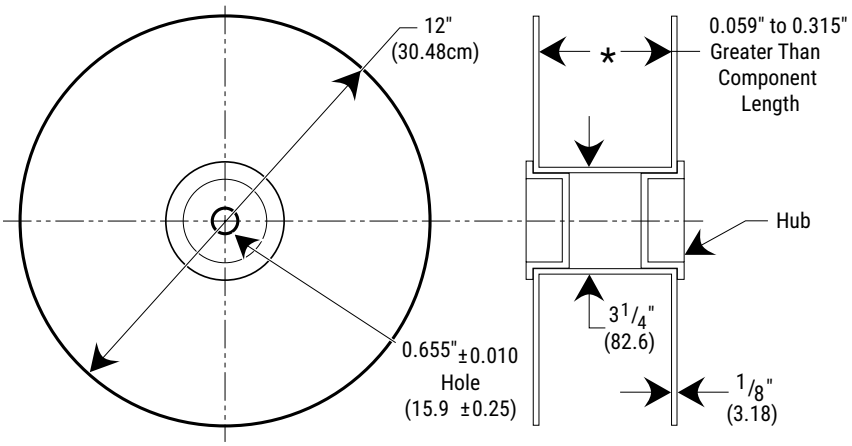


Figure 3

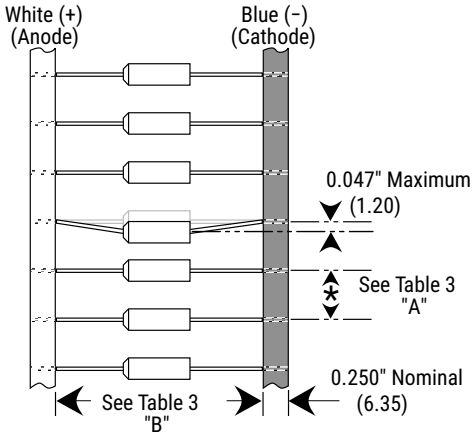


Table 3 – Tape Dimensions

Component Body Diameter	Component Pitch "A"	Inside Tape Spacing "B" ±1.5 mm (0.059")		
	0.020" or (±0.5 mm)	I	II	III
0" (0 mm) to 0.197" (5 mm)	0.200" or (5 mm)	2.062"	2.500"	2.874"
0.197" (5.01 mm) to 0.394" (10 mm)	0.400 or (10 mm)	(52.4 mm)	(63.5 mm)	(73 mm)

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50lb. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lb. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center. Figures 1 and 2 show the KEMET standard chipboard tape reel. A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors. Universal splicing clips are used to connect the tape.

T222 Series Axial MIL–PRF–39003 Polar Miniature (CSR09 Style)

Overview

The KEMET ultra-miniature T222 Series solid tantalum capacitors are especially designed for miniaturization and employ a unique glass-to-metal compression end seal which has no protruding eyelet. This flush end seal construction ideally suits the T222 Series for all miniature high density packaging applications. The capacitors consist of a dry porous tantalum pellet hermetically sealed in a solder coated metal case with solder coated alloy 52 and solder coated nickel. The T222 series is approved to all ratings and failure rates of MIL–PRF–39003/2.

Benefits

- Taped and reeled per EIA Specification RS–296
- Marking per MIL–STD–1285
- Qualified to MIL–PRF–39003 (CSR09 Style)
- Failure rate options: Graded - B, C, D, and G
  Exponential – M, P, R, and S*
- Capacitance values of 0.047 µF to 18 µF
- Tolerances of ± 5%, and ±10%
- Voltage rating of 6 – 75 VDC
- Operating temperature range of −55˚C to +125˚C
- Case sizes: A and B

**Failure rates apply to military products only*

Applications

KEMET ultra-miniature T222 Series solid tantalum capacitors are especially designed for miniaturization.

Ordering Information

T	222	A	225	K	010	B	S	C
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	T222 (CSR09)	A B	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50 075 = 75	Graded: B = 0.1%/k hours C = 0.01%/k hours D = 0.001%/k hours G = 1.0%/k hours Exponential: M = 1%/k hours P = 0.1%/k hours R = 0.01%/k hours S = 0.001%/k hours	S = Standard Positive: Alloy 52 (solder-coated) Negative: Solder-coated nickel	Blank = Bulk/Sleeved 7200 = Tape & Reel 7293 & 7443 = Ammo All capacitors are sleeved unless specified.

Ordering Information – T222 (CSR09 Style)

MIL product

M39003	/02	2061	D
Capacitor Class	Slash	Dash Number	Surge Option
Military specification number	Specification sheet number	Failure rate level	D = C-4250 E = C-4251 F = C-4252 H = No C-Spec

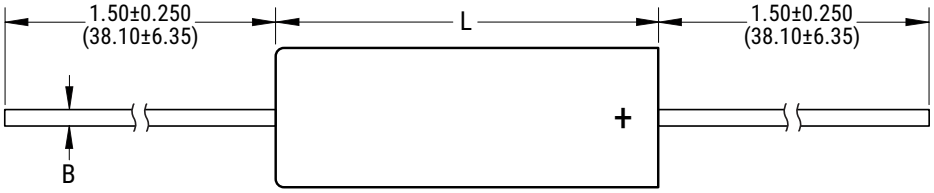
Orders should be entered by the military specification number, including the dash number and surge option letter (D, E, F, or H).

Performance Characteristics

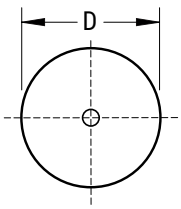
Item	Performance Characteristics
Operating Temperature	–55°C to 125°C
Rated Capacitance Range	0.047 – 18 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%)
Rated Voltage Range	6 – 75 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table (for reference only)
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)
Failure Rate (MIL–39003, CSR13 capacitors only)	Approved failure rate: S (0.001%/k hours) – Exponential, D (0.001%/k hours) – Graded

Dimensions – Inches (Millimeters)

SIDE VIEW



END VIEW



Case Size	Uninsulated		Insulated		B Wire Diameter
	D ±0.005 (±0.13)	L	D	L	
A	0.085 (2.16)	0.245+0.015/−0.010 (6.22+0.38/−0.25)	0.090±0.009 (2.29±0.23)	0.250+0.031/−0.015 (6.35+0.79/−0.38)	0.016+0.005/−0.001 (0.41+0.13/−0.03)
B	0.127 (3.23)	0.375±0.015 (9.53±0.38)	0.138±0.010 (3.51±0.25)	0.390±0.015 (9.91±0.38)	0.016+0.005/−0.001 (0.41+0.13/−0.03)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR09) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 Hours)							
						MIL–PRF–39003/2J				MIL–PRF–39003/2J			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
6	2.7	A	T222A275J006(1)S	0.6	6	1001	1061	1121	1181	5001	2001	3001	4001
6	2.7	A	T222A275K006(1)S	0.6	6	0001	0061	0121	0181	5002	2002	3002	4002
6	18.0	B	T222B186J006(1)S	1.4	6	1002	1062	1122	1182	5003	2003	3003	4003
6	18.0	B	T222B186K006(1)S	1.4	6	0002	0062	0122	0182	5004	2004	3004	4004
10	1.8	A	T222A185J010(1)S	0.6	6	1007	1067	1127	1187	5005	2005	3005	4005
10	1.8	A	T222A185K010(1)S	0.6	6	0007	0067	0127	0187	5006	2006	3006	4006
10	2.2	A	T222A225J010(1)S	0.6	6	1008	1068	1128	1188	5007	2007	3007	4007
10	2.2	A	T222A225K010(1)S	0.6	6	0008	0068	0128	0188	5008	2008	3008	4008
10	10.0	B	T222B106J010(1)S	2.0	6	1009	1069	1129	1189	5009	2009	3009	4009
10	10.0	B	T222B106K010(1)S	2.0	6	0009	0069	0129	0189	5010	2010	3010	4010
10	12.0	B	T222B126J010(1)S	2.0	6	1010	1070	1130	1190	5011	2011	3011	4011
10	12.0	B	T222B126K010(1)S	2.0	6	0010	0070	0130	0190	5012	2012	3012	4012
10	15.0	B	T222B156J010(1)S	2.0	6	1011	1071	1131	1191	5013	2013	3013	4013
10	15.0	B	T222B156K010(1)S	2.0	6	0011	0071	0131	0191	5014	2014	3014	4014
15	1.0	A	T222A105J015(1)S	0.6	6	1012	1072	1132	1192	5015	2015	3015	4015
15	1.0	A	T222A105K015(1)S	0.6	6	0012	0072	0132	0192	5016	2016	3016	4016
15	1.2	A	T222A125J015(1)S	0.6	6	1013	1073	1133	1193	5017	2017	3017	4017
15	1.2	A	T222A125K015(1)S	0.6	6	0013	0073	0133	0193	5018	2018	3018	4018
15	1.5	A	T222A155J015(1)S	0.6	6	1014	1074	1134	1194	5019	2019	3019	4019
15	1.5	A	T222A155K015(1)S	0.6	6	0014	0074	0134	0194	5020	2020	3020	4020
15	8.2	B	T222B825J015(1)S	1.8	6	1015	1075	1135	1195	5021	2021	3021	4021
15	8.2	B	T222B825K075(1)S	1.8	6	0015	0075	0135	0195	5022	2022	3022	4022
20	0.56	A	T222A564J020(1)S	0.6	3	1016	1076	1136	1196	5023	2023	3023	4023
20	0.56	A	T222A564K020(1)S	0.6	3	0016	0076	0136	0196	5024	2024	3024	4024
20	0.68	A	T222A684J020(1)S	0.6	3	1017	1077	1137	1197	5025	2025	3025	4025
20	0.68	A	T222A684K020(1)S	0.6	3	0017	0077	0137	0197	5026	2026	3026	4026
20	0.82	A	T222A824J020(1)S	0.6	3	1018	1078	1138	1198	5027	2027	3027	4027
20	0.82	A	T222A824K020(1)S	0.6	3	0018	0078	0138	0198	5028	2028	3028	4028
20	1.0	A	T222A105J020(1)S	0.6	3	1019	1079	1139	1199	5029	2029	3029	4029
20	1.0	A	T222A105K020(1)S	0.6	3	0019	0079	0139	0199	5030	2030	3030	4030
20	3.3	B	T222B335J020(1)S	1.0	3	1020	1080	1140	1200	5031	2031	3031	4031
20	3.3	B	T222B335K020(1)S	1.0	3	0020	0080	0140	0200	5032	2032	3032	4032
20	3.9	B	T222B395J020(1)S	2.0	3	1021	1081	1141	1201	5033	2033	3033	4033
20	3.9	B	T222B395K020(1)S	2.0	3	0021	0081	0141	0201	5034	2034	3034	4034
20	4.7	B	T222B475J020(1)S	2.0	3	1022	1082	1142	1202	5035	2035	3035	4035
20	4.7	B	T222B475K020(1)S	2.0	3	0022	0082	0142	0202	5036	2036	3036	4036
20	5.6	B	T222B565J020(1)S	2.0	3	1023	1083	1143	1203	5037	2037	3037	4037
20	5.6	B	T222B565K020(1)S	2.0	3	0023	0083	0143	0203	5038	2038	3038	4038
20	6.8	B	T222B685J020(1)S	2.0	3	1024	1084	1144	1204	5039	2039	3039	4039
20	6.8	B	T222B685K020(1)S	2.0	3	0024	0084	0144	0204	5040	2040	3040	4040
35	0.33	A	T222A334J035(1)S	0.6	3	1025	1085	1145	1205	5041	2041	3041	4041
35	0.33	A	T222A334K035(1)S	0.6	3	0025	0085	0145	0205	5042	2042	3042	4042
35	0.39	A	T222A394J035(1)S	0.6	3	1026	1086	1146	1206	5043	2043	3043	4043
35	0.39	A	T222A394K035(1)S	0.6	3	0026	0086	0146	0206	5044	2044	3044	4044
35	0.47	A	T222A474J035(1)S	0.6	3	1027	1087	1147	1207	5045	2045	3045	4045
35	0.47	A	T222A474K035(1)S	0.6	3	0027	0087	0147	0207	5046	2046	3046	4046
35	2.2	B	T222B225J035(1)S	1.4	3	1028	1088	1148	1208	5047	2047	3047	4047
35	2.2	B	T222B225K035(1)S	1.4	3	0028	0088	0148	0208	5048	2048	3048	4048
(V) 85°C	µF	Case Size Code	(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR09) Capacitors							

(1) To complete KEMET Part Number (T222), insert Graded failure rate - A for Not Applicable, B for 0.1%/k hours, C for 0.01%/k hours , D for 0.001%/k hours or G for 1%/k hours. Designates Reliability Level.

(2) To complete KEMET Part Number (T222), insert Exponential failure rate - M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates reliability level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR09) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 Hours)							
						MIL–PRF–39003/2J				MIL–PRF–39003/2J			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
35	2.7	B	T222B275J035(1)S	1.4	3	1029	1089	1149	1209	5049	2049	3049	4049
35	2.7	B	T222B275K035(1)S	1.4	3	0029	0089	0149	0209	5050	2050	3050	4050
50	0.22	A	T222A224J050(1)S	0.6	3	1030	1090	1150	1210	5051	2051	3051	4051
50	0.22	A	T222A224K050(1)S	0.6	3	0030	0090	0150	0210	5052	2052	3052	4052
50	0.27	A	T222A274J050(1)S	0.6	3	1031	1091	1151	1211	5053	2053	3053	4053
50	0.27	A	T222A274K050(1)S	0.6	3	0031	0091	0151	0211	5054	2054	3054	4054
50	1.5	B	T222B155J050(1)S	1.4	3	1032	1092	1152	1212	5055	2055	3055	4055
50	1.5	B	T222B155K050(1)S	1.4	3	0032	0092	0152	0212	5056	2056	3056	4056
50	1.8	B	T222B185J050(1)S	1.4	3	1033	1093	1153	1213	5057	2057	3057	4057
50	1.8	B	T222B185K050(1)S	1.4	3	0033	0093	0153	0213	5058	2058	3058	4058
75	0.047	A	T222A473J075(1)S	0.6	3	1034	1094	1154	1214	5059	2059	3059	4059
75	0.047	A	T222A473K075(1)S	0.6	3	0034	0094	0154	0214	5060	2060	3060	4060
75	0.056	A	T222A563J075(1)S	0.6	3	1035	1095	1155	1215	5061	2061	3061	4061
75	0.056	A	T222A563K075(1)S	0.6	3	0035	0095	0155	0215	5062	2062	3062	4062
75	0.068	A	T222A683J075(1)S	0.6	3	1036	1096	1156	1216	5063	2063	3063	4063
75	0.068	A	T222A683K075(1)S	0.6	3	0036	0096	0156	0216	5064	2064	3064	4064
75	0.082	A	T222A823J075(1)S	1.8	3	1037	1097	1157	1217	5065	2065	3065	4065
75	0.082	A	T222A823K075(1)S	1.8	3	0037	0097	0157	0217	5066	2066	3066	4066
75	0.10	A	T222A104J075(1)S	0.6	3	1038	1098	1158	1218	5067	2067	3067	4067
75	0.10	A	T222A104K075(1)S	0.6	3	0038	0098	0158	0218	5068	2068	3068	4068
75	0.12	A	T222A124J075(1)S	0.6	3	1039	1099	1159	1219	5069	2069	3069	4069
75	0.12	A	T222A124K075(1)S	0.6	3	0039	0099	0159	0219	5070	2070	3070	7070
75	0.15	A	T222A154J075(1)S	0.6	3	1040	1100	1160	1220	5071	2071	3071	4071
75	0.15	A	T222A154K075(1)S	0.6	3	0040	0100	0160	0220	5072	2072	3072	4072
75	0.18	A	T222A184J075(1)S	0.6	3	1041	1101	1161	1221	5073	2073	3073	4073
75	0.18	A	T222A184K075(1)S	0.6	3	0041	0101	0161	0221	5074	2074	3074	4074
75	0.22	B	T222B224J075(1)S	1.0	3	1042	1102	1162	1222	5075	2075	3075	4075
75	0.22	B	T222B224K075(1)S	1.0	3	0042	0102	0162	0222	5076	2076	3076	4076
75	0.27	B	T222B274J075(1)S	2.0	3	1043	1103	1163	1223	5077	2077	3077	4077
75	0.27	B	T222B274K075(1)S	2.0	3	0043	0103	0163	0223	5078	2078	3078	4078
75	0.33	B	T222B334J075(1)S	2.0	3	1044	1104	1164	1224	5079	2079	3079	4079
75	0.33	B	T222B334K075(1)S	2.0	3	0044	0104	0164	0224	5080	2080	3080	4080
75	0.39	B	T222B394J075(1)S	2.0	3	1045	1105	1165	1225	5081	2081	3081	4081
75	0.39	B	T222B394K075(1)S	2.0	3	0045	0105	0165	0225	5082	2082	3082	4082
75	0.47	B	T222B474J075(1)S	2.0	3	1046	1106	1166	1226	5083	2083	3083	4083
75	0.47	B	T222B474K075(1)S	2.0	3	0046	0106	0166	0226	5084	2084	3084	4084
75	0.56	B	T222B564J075(1)S	0.6	3	1047	1107	1167	1227	5085	2085	3085	4085
75	0.56	B	T222B564K075(1)S	0.6	3	0047	0107	0167	0227	5086	2086	3086	4086
75	0.68	B	T222B684J075(1)S	0.6	3	1048	1108	1168	1228	5087	2087	3087	4087
75	0.68	B	T222B684K075(1)S	0.6	3	0048	0108	0168	0228	5088	2088	3088	4088
75	0.82	B	T222B824J075(1)S	0.6	3	1049	1109	1169	1229	5089	2089	3089	4089
75	0.82	B	T222B824K075(1)S	0.6	3	0049	0109	0169	0229	5090	2090	3090	4090
75	1.0	B	T222B105J075(1)S	1.4	3	1050	1110	1170	1230	5091	2091	3091	4091
75	1.0	B	T222B105K075(1)S	1.4	3	0050	0110	0170	0230	5092	2092	3092	4092
75	1.2	B	T222B125J075(1)S	1.4	3	1051	1111	1171	1231	5093	2093	3093	4093
75	1.2	B	T222B125K075(1)S	1.4	3	0051	0111	0171	0231	5094	2094	3094	4094
(V) 85°C	µF	Case Size Code	(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR09) Capacitors							

(1) To complete KEMET Part Number (T222), insert Graded failure rate - A for Not Applicable, B for 0.1%/k hours, C for 0.01%/k hours , D for 0.001%/k hours or G for 1%/k hours. Designates Reliability Level.
(2) To complete KEMET Part Number (T222), insert Exponential failure rate - M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates reliability level.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Permissible AC ripple current can be determined by the following:

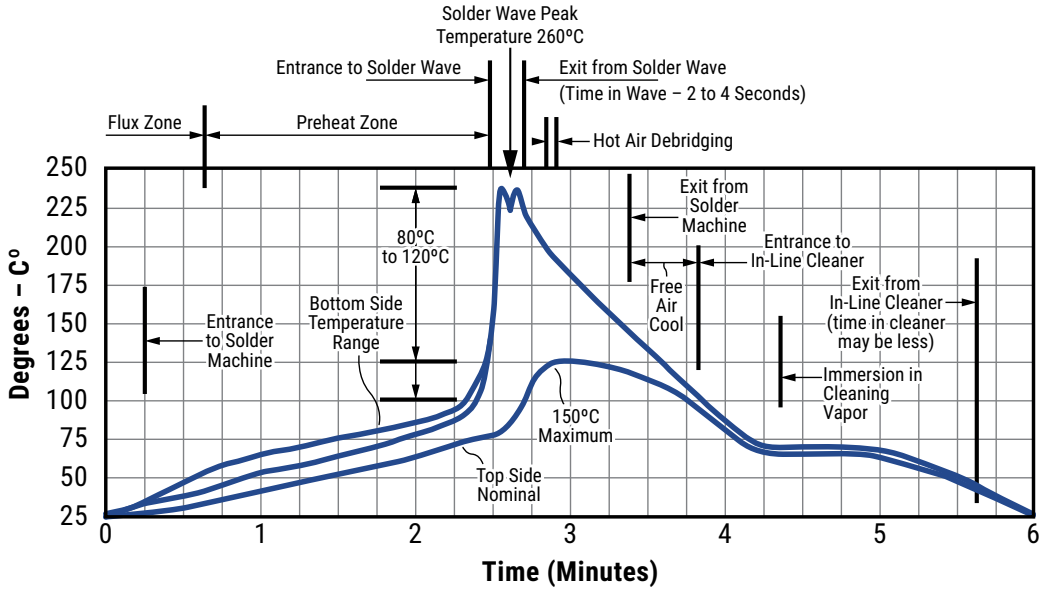
$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

Optimum Solder Wave Profile



Reverse Voltage

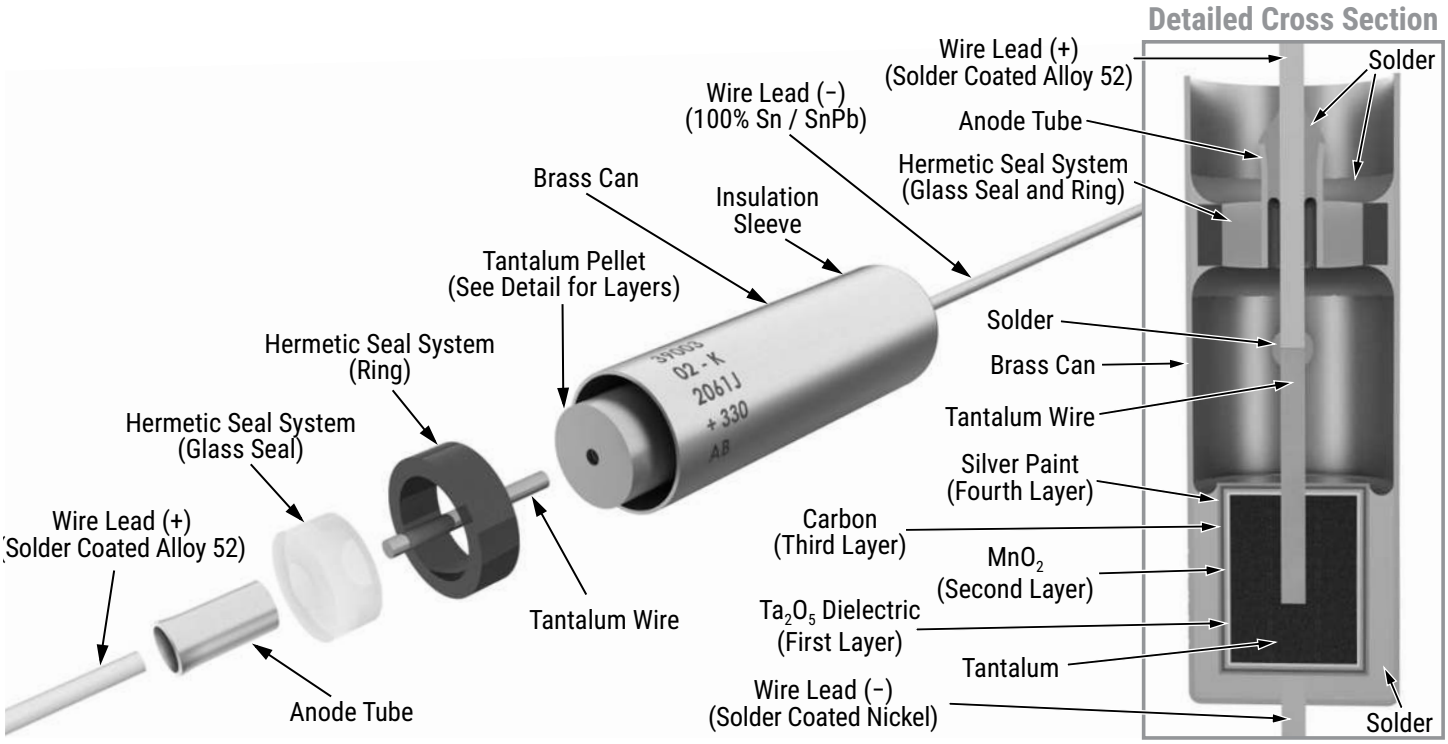
Although these are polar capacitors, some degree of transient voltage reversal is permissible, as seen below. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Pecentage of Rated Voltage
+25°C	15
+85°C	5
+125°C	1

Mounting

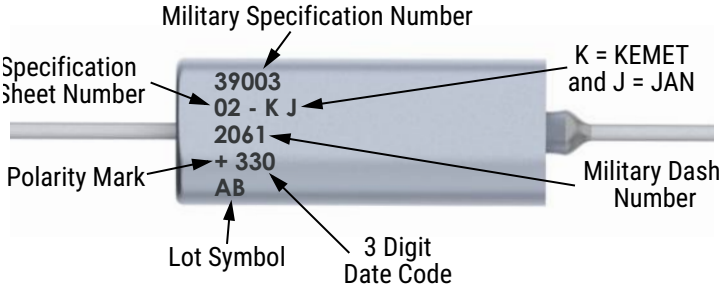
All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Construction



Capacitor Marking

A & B Case



Date Code	3 Digit	4 Digit
Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023	19 = 2019 20 = 2020 21 = 2021 22 = 2022 23 = 2023
Week	01 = 1st week of the year to 52 = 52nd week of the year	

Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS–296E.

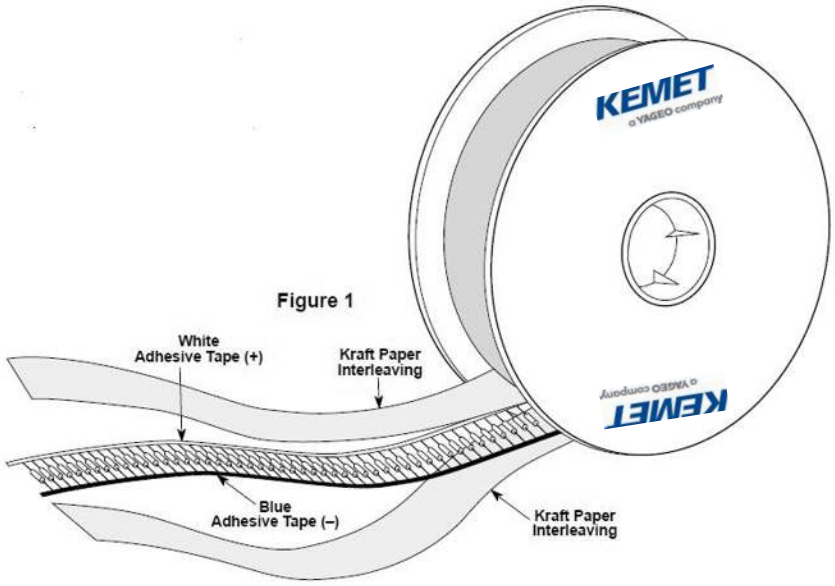


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity
A/B	50/Tray
A	300/Box
B	150/Box

Figure 2

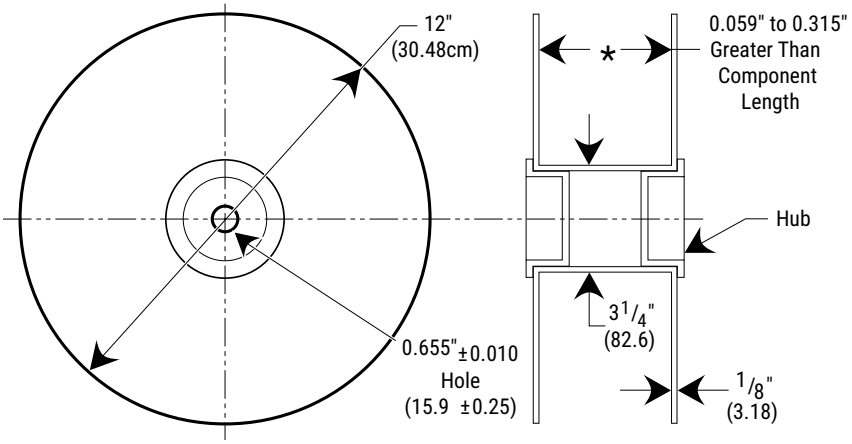


Figure 3

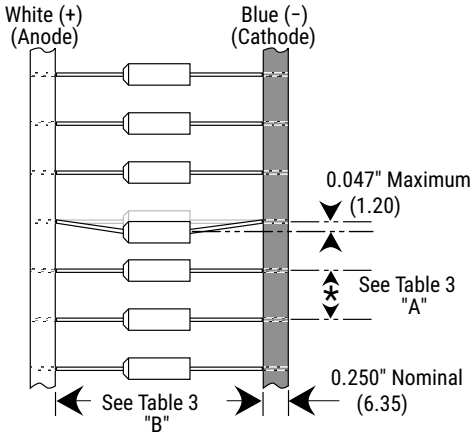


Table 3 – Tape Dimensions

Component Body Diameter	Component Pitch "A"	Inside Tape Spacing "B" ±1.5 mm (0.059")		
	0.020" or (±0.5 mm)	I	II	III
0" (0 mm) to 0.197" (5 mm)	0.200" or (5 mm)	2.062"	2.500"	2.874"
0.197" (5.01 mm) to 0.394" (10 mm)	0.400 or (10 mm)	(52.4 mm)	(63.5 mm)	(73 mm)

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50lb. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lb. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center. Figures 1 and 2 show the KEMET standard chipboard tape reel. A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors. Universal splicing clips are used to connect the tape.

T140 Series Axial MIL–PRF–39003 Polar Type and T242 (CSR23 Style)

Overview

The KEMET standard MIL case hermetically sealed T140 Series (Extended Capacitance Range) is compact, ruggedly built and designed for miniaturized circuitry. The capacitors are especially well-suited for coupling, bypass filtering and RC timing circuits. The T140 Series exhibits excellent stability, low DC leakage current, dissipation factor, and ESR/impedance over a wide temperature and frequency range. Available in standard EIA capacitance values from 0.82 µF to 1,200 µF in ±20% and ±10% tolerances and working voltages of 6 VDC to 60 VDC.

Benefits

- Taped and reeled per EIA Specification RS–296
- Marking per MIL–STD–1285
- Qualified to MIL–PRF–39003 (CSR23 Style)
- Failure rate options: Graded – B, C, D and G
  Exponential – M, P, R, and S*
- Capacitance values of 0.82 µF to 1200 µF
- Tolerances of ±10% and ±20%
- Voltage rating of 6 VDC–60 VDC
- Operating temperature range of -55˚C to +125˚C
- Case sizes: A, B, C, D

**Failure rates apply to military products only*

Applications

Typical applications include coupling, bypass, filtering and RC timing circuits in miniaturized circuitry.

Ordering Information – T140

T	140	A	105	K	050	A	S	7200
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	Hermetically sealed axial capacitor	A B C D	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20 030 = 30 035 = 35 060 = 60 050 = 50 060 = 60	A = N/A	S = Standard (Sn/Pb) T = 100% Tin	Blank = Sleeved /Bulk 0100 = Without sleeve 7200 = Tape & Reel 7293 & 7443 = Ammo 4250 = 10 cycles, 25°C after Weibull 4251 = 10 cycles, −55 & 85°C after Weibull 4252 = 10 cycles, −55 & 85°C before Weibull All capacitors are sleeved unless specified.

Ordering Information – T242 (CSR23 Style)

T	242	A	105	K	050	A	S	C
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	T242 = CSR23	A B C D	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20 030 = 30 035 = 35 060 = 60 050 = 50 060 = 60	Graded: B = 0.1%/k hours C = 0.01%/k hours D = 0.001%/k hours G = 1.0%/k hours Exponential: M = 1%/k hours P = 0.1%/k hours R = 0.01%/k hours S = 0.001%/k hours	S = Standard	Blank = Sleeved/Bulk 0100 = Without sleeve 7200 = Tape & Reel 7293 & 7443= Ammo 4250 = 10 cycles, 25°C after Weibull 4251 = 10 cycles, −55 & 85°C after Weibull 4252 = 10 cycles, −55 & 85°C before Weibull All capacitors are sleeved unless specified.

Ordering Information – MIL–PRF 39003

M39003	/03	3075	A
Capacitor Class	Slash	Dash Number	Surge Option
Military specification number	Specification sheet number	Failure rate level	A = C-4250 B = C-4251 C = C-4252 Blank = No surge

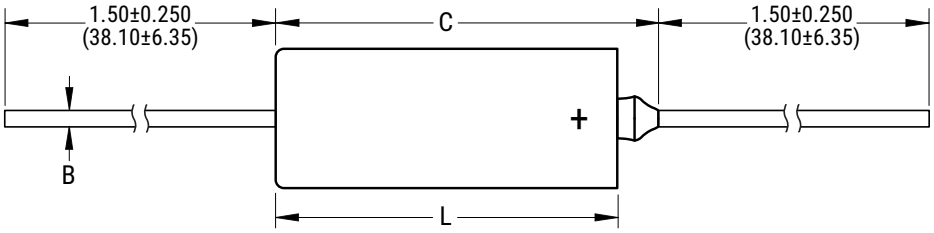
Orders should be entered by the military specification number, including the dash number and surge option letter (A, B or C).

Performance Characteristics

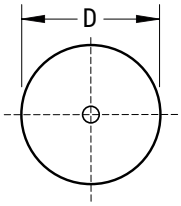
Item	Performance Characteristics
Operating Temperature	–55°C to 125°C
Rated Capacitance Range	0.82 – 1,200 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6 – 60 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table (for reference only)
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)
Failure Rate (MIL–39003, CSR13 capacitors only)	Approved failure rate: S (0.001%/k hours) – Exponential, D (0.001%/k hours) – Graded

Dimensions – Inches (Millimeters)

SIDE VIEW



END VIEW



Case Size	Uninsulated		Insulated			
	D ±0.005 ±(0.13)	L ±0.031 ±(0.79)	D ±0.010 ±(0.25)	L ±0.031 ±(0.79)	B ±0.002 ±(0.05)	C Maximum
A	0.125 (3.18)	0.250 (6.35)	0.135 (3.43)	0.286 (7.26)	0.020 (0.51)	0.422 (10.72)
B	0.175 (4.45)	0.438 (11.13)	0.185 (4.70)	0.474 (12.04)	0.020 (0.51)	0.610 (15.49)
C	0.279 (7.09)	0.650 (16.51)	0.289 (7.34)	0.686 (17.42)	0.025 (0.64)	0.822 (20.88)
D	0.341 (8.66)	0.750 (19.05)	0.351 (8.92)	0.786 (19.96)	0.025 (0.64)	0.922 (23.42)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 Hours)								
						MIL–PRF–39003/3F				MIL–PRF–39003/3F				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
6	8.2	A	T140A825(1)006A(3)	0.9	6									
6	10.0	A	T140A106K006A(3)	0.9	6	0101	0201	0301	0401	5001	2001	3001	4001	T242A106K006(2)S
6	10.0	A	T140A106M006A(3)	0.9	6	0102	0202	0302	0402	5002	2002	3002	4002	T242A106M006(2)S
6	12.0	A	T140A126K006A(3)	1.0	6	0103	0203	0303	0403	5003	2003	3003	4003	T242A126K006(2)S
6	12.0	A	T140A126M006A(3)	1.0	6									
6	68.0	B	T140B686(1)006A(3)	3.0	6									
6	82.0	B	T140B826(1)006A(3)	3.0	6									
6	100.0	B	T140B107K006A(3)	6.0	6	0104	0204	0304	0404	5004	2004	3004	4004	T242B107K006(2)S
6	100.0	B	T140B107M006A(3)	6.0	6	0105	0205	0305	0405	5005	2005	3005	4005	T242B107M006(2)S
6	220.0	C	T140C227(1)006A(3)	10.0	8									
6	270.0	C	T140C277(1)006A(3)	10.0	8									
6	330.0	C	T140C337K006A(3)	10.0	8	0106	0206	0306	0406	5006	2006	3006	4006	T242C337K006(2)S
6	330.0	C	T140C337M006A(3)	10.0	8	0107	0207	0307	0407	5007	2007	3007	4007	T242C337M006(2)S
6	390.0	C	T140C397K006A(3)	10.0	10	0108	0208	0308	0408	5008	2008	3008	4008	T242C397K006(2)S
6	390.0	C	T140C397M006A(3)	10.0	10									
6	470.0	C	T140C477K006A(3)	10.0	10	0109	0209	0309	0409	5009	2009	3009	4009	T242C477K006(2)S
6	470.0	C	T140C477M006A(3)	10.0	10	0110	0210	0310	0410	5010	2010	3010	4010	T242C477M006(2)S
6	560.0	D	T140D567(1)006A(3)	20.0	10									
6	680.0	D	T140D687K006A(3)	20.0	10	0111	0211	0311	0411	5011	2011	3011	4011	T242D687K006(2)S
6	680.0	D	T140D687M006A(3)	20.0	10	0112	0212	0312	0412	5012	2012	3012	4012	T242D687M006(2)S
6	820.0	D	T140D827K006A(3)	20.0	10	0113	0213	0313	0413	5013	2013	3013	4013	T242D827K006(2)S
6	820.0	D	T140D827M006A(3)	20.0	10									
6	1000.0	D	T140D108K006A(3)	20.0	10	0114	0214	0314	0414	5014	2014	3014	4014	T242D108K006(2)S
6	1000.0	D	T140D108M006A(3)	20.0	10	0115	0215	0315	0415	5015	2015	3015	4015	T242D108M006(2)S
6	1200.0	D	T140D128M006A(3)	20.0	10									
10	5.6	A	T140A565(1)010A(3)	1.0	4									
10	6.8	A	T140A685K010A(3)	1.0	6	0116	0216	0316	0416	5016	2016	3016	4016	T242A685K010(2)S
10	6.8	A	T140A685M010A(3)	1.0	6	0117	0217	0317	0417	5017	2017	3017	4017	T242A685M010(2)S
10	8.2	A	T140A825K010A(3)	1.2	6	0118	0218	0318	0418	5018	2018	3018	4018	T242A825K010(2)S
10	8.2	A	T140A825M010A(3)	1.2	6									
10	47.0	B	T140B476K010A(3)	4.0	6	0119	0219	0319	0419	5019	2019	3019	4019	T242B476K010(2)S
10	47.0	B	T140B476M010A(3)	4.0	6	0120	0220	0320	0420	5020	2020	3020	4020	T242B476M010(2)S
10	56.0	B	T140B566K010A(3)	5.0	6	0121	0221	0321	0421	5021	2021	3021	4021	T242B566K010(2)S
10	56.0	B	T140B566M010A(3)	5.0	6									
10	68.0	B	T140B686K010A(3)	6.0	6	0122	0222	0322	0422	5022	2022	3022	4022	T242B686K010(2)S
10	68.0	B	T140B686M010A(3)	6.0	6	0123	0223	0323	0423	5023	2023	3023	4023	T242B686M010(2)S
10	82.0	B	T140B826K010A(3)	7.0	6	0124	0224	0324	0424	5024	2024	3024	4024	T242B826K010(2)S
10	82.0	B	T140B826M010A(3)	7.0	6									
10	150.0	C	T140C157(1)010A(3)	8.0	8									
10	180.0	C	T140C187(1)010A(3)	8.0	8									
10	220.0	C	T140C227K010A(3)	12.0	8	0125	0225	0325	0425	5025	2025	3025	4025	T242C227K010(2)S
10	220.0	C	T140C227M010A(3)	12.0	8	0126	0226	0326	0426	5026	2026	3026	4026	T242C227M010(2)S
10	270.0	C	T140C277K010A(3)	13.0	8	0127	0227	0327	0427	5027	2027	3027	4027	T242C277K010(2)S
10	270.0	C	T140C277M010A(3)	13.0	8									
10	330.0	D	T140D337(1)010A(3)	16.0	8									
10	390.0	D	T140D397K010A(3)	16.0	10	0128	0228	0328	0428	5028	2028	3028	4028	T242D397K010(2)S
10	390.0	D	T140D397M010A(3)	16.0	10									
10	470.0	D	T140D477K010A(3)	16.0	10	0129	0229	0329	0429	5029	2029	3029	4029	T242D477K010(2)S
10	470.0	D	T140D477M010A(3)	16.0	10	0130	0230	0330	0430	5030	2030	3030	4030	T242D477M010(2)S
(V) 85°C	µF	Case Size Code	(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors								

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number (T242), insert failure rate code from Ordering Information table.
(3) To complete KEMET T140 Part Number, insert Lead Material designator: S – Standard or T – 100% Matte Tin. Designates termination finish.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors								KEMET Equivalent Military
						Dash Number Reference								
						Failure Rate Level (%/1,000 Hours)								
						MIL–PRF–39003/3F				MIL–PRF–39003/3F				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
10	560.0	D	T140D567K010A(3)	20.0	10	0131	0231	0331	0431	5031	2031	3031	4031	T242D567K010(2)S
10	560.0	D	T140D567M010A(3)	20.0	10									
15	3.9	A	T140A395(1)015A(3)	1	4									
15	4.7	A	T140A475K015A(3)	1	4	0132	0232	0332	0432	5032	2032	3032	4032	T242A475K015(2)S
15	4.7	A	T140A475M015A(3)	1	4	0133	0233	0333	0433	5033	2033	3033	4033	T242A475M015(2)S
15	5.6	A	T140A565K015A(3)	1.3	4	0134	0234	0334	0434	5034	2034	3034	4034	T242A565K015(2)S
15	5.6	A	T140A565M015A(3)	1.3	4									
15	27.0	B	T140B276(1)015A(3)	3	6									
15	33.0	B	T140B336K015A(3)	5	6	0135	0235	0335	0435	5035	2035	3035	4035	T242B336K015(2)S
15	33.0	B	T140B336M015A(3)	5	6	0136	0236	0336	0436	5036	2036	3036	4036	T242B336M015(2)S
15	39.0	B	T140B396K015A(3)	5.3	6	0137	0237	0337	0437	5037	2037	3037	4037	T242B396K015(2)S
15	39.0	B	T140B396M015A(3)	5.3	6									
15	82.0	C	T140C826(1)015A(3)	8	6									
15	100.0	C	T140C107(1)015A(3)	10	6									
15	120.0	C	T140C127(1)015A(3)	10	6									
15	150.0	C	T140C157K015A(3)	15	8	0138	0238	0338	0438	5038	2038	3038	4038	T242C157K015(2)S
15	150.0	C	T140C157M015A(3)	15	8	0139	0239	0339	0439	5039	2039	3039	4039	T242C157M015(2)S
15	180.0	C	T140C187K015A(3)	15	8	0140	0240	0340	0440	5040	2040	3040	4040	T242C187K015(2)S
15	180.0	C	T140C187M015A(3)	15	8									
15	220.0	D	T140D227K015A(3)	20	8	0141	0241	0341	0441	5041	2041	3041	4041	T242D227K015(2)S
15	220.0	D	T140D227M015A(3)	20	8	0142	0242	0342	0442	5042	2042	3042	4042	T242D227M015(2)S
15	270.0	D	T140D277K015A(3)	20	8	0143	0243	0343	0443	5043	2043	3043	4043	T242D277K015(2)S
15	270.0	D	T140D277M015A(3)	20	8									
15	330.0	D	T140D337K015A(3)	20	8	0144	0244	0344	0444	5044	2044	3044	4044	T242D337K015(2)S
15	330.0	D	T140D337M015A(3)	20	8	0145	0245	0345	0445	5045	2045	3045	4045	T242D337M015(2)S
20	2.7	A	T140A275K020A(3)	0.8	4	0146	0246	0346	0446	5046	2046	3046	4046	T242A275K020(2)S
20	2.7	A	T140A275M020A(3)	0.8	4									
20	3.3	A	T140A335K020A(3)	1.0	4	0147	0247	0347	0447	5047	2047	3047	4047	T242A335K020(2)S
20	3.3	A	T140A335M020A(3)	1.0	4	0148	0248	0348	0448	5048	2048	3048	4048	T242A335M020(2)S
20	3.9	A	T140A395K020A(3)	1.2	4	0149	0249	0349	0449	5049	2049	3049	4049	T242A395K020(2)S
20	3.9	A	T140A395M020A(3)	1.2	4									
20	18.0	B	T140B186K020A(3)	3.0	6	0150	0250	0350	0450	5050	2050	3050	4050	T242B186K020(2)S
20	18.0	B	T140B186M020A(3)	3.0	6									
20	22.0	B	T140B226K020A(3)	3.0	6	0151	0251	0351	0451	5051	2051	3051	4051	T242B226K020(2)S
20	22.0	B	T140B226M020A(3)	3.0	6	0152	0252	0352	0452	5052	2052	3052	4052	T242B226M020(2)S
20	27.0	B	T140B276K020A(3)	4.0	6	0153	0253	0353	0453	5053	2053	3053	4053	T242B276K020(2)S
20	27.0	B	T140B276M020A(3)	4.0	6									
20	56.0	C	T140C566K020A(3)	7.0	6	0154	0254	0354	0454	5054	2054	3054	4054	T242C566K020(2)S
20	56.0	C	T140C566M020A(3)	7.0	6									
20	68.0	C	T140C686K020A(3)	8.0	6	0155	0255	0355	0455	5055	2055	3055	4055	T242C686K020(2)S
20	68.0	C	T140C686M020A(3)	8.0	6	0156	0256	0356	0456	5056	2056	3056	4056	T242C686M020(2)S
20	82.0	C	T140C826K020A(3)	10.0	6	0157	0257	0357	0457	5057	2057	3057	4057	T242C826K020(2)S
20	82.0	C	T140C826M020A(3)	10.0	6									
20	100.0	C	T140C107K020A(3)	12.0	6	0158	0258	0358	0458	5058	2058	3058	4058	T242C107K020(2)S
20	100.0	C	T140C107M020A(3)	12.0	6	0159	0259	0359	0459	5059	2059	3059	4059	T242C107M020(2)S
20	120.0	C	T140C127K020A(3)	12.0	6	0160	0260	0360	0460	5060	2060	3060	4060	T242C127K020(2)S
20	120.0	C	T140C127M020A(3)	12.0	6									
20	150.0	D	T140D157K020A(3)	15.0	8	0161	0261	0361	0461	5061	2061	3061	4061	T242D157K020(2)S
20	150.0	D	T140D157M020A(3)	15.0	8	0162	0262	0362	0462	5062	2062	3062	4062	T242D157M020(2)S
(V) 85°C	µF	Case Size Code	(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors								

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.

(2) To complete KEMET part number (T242), insert failure rate code from Ordering Information table.

(3) To complete KEMET T140 Part Number, insert Lead Material designator: S – Standard or T – 100% Matte Tin. Designates termination finish.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors								
						Dash Number Reference								KEMET Equivalent Military
						Failure Rate Level (%/1,000 Hours)								
						MIL–PRF–39003/3F				MIL–PRF–39003/3F				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
20	180.0	D	T140D187K020A(3)	15.0	8	0163	0263	0363	0463	5063	2063	3063	4063	T242D187K020(2)S
20	180.0	D	T140D187M020A(3)	15.0	8									
30	1.2	A	T140A125(1)030A(3)	1.0	4									
30	1.5	A	T140A155(1)030A(3)	1.0	4									
30	1.8	A	T140A185(1)030A(3)	1.0	4									
30	2.2	A	T140A225(1)030A(3)	1.0	4									
30	2.7	A	T140A275(1)030A(3)	1.0	4									
30	12.0	B	T140B126(1)030A(3)	3.0	4									
30	15.0	B	T140B156(1)030A(3)	3.0	4									
30	18.0	B	T140B186(1)030A(3)	3.0	4									
30	33.0	C	T140C336(1)030A(3)	6.0	6									
30	39.0	C	T140C396(1)030A(3)	6.0	6									
30	47.0	C	T140C476(1)030A(3)	7.0	6									
30	56.0	C	T140C566(1)030A(3)	7.0	6									
30	68.0	C	T140C686(1)030A(3)	7.0	6									
30	82.0	D	T140D826(1)030A(3)	10.0	6									
30	100.0	D	T140D107(1)030A(3)	10.0	8									
35	1.2	A	T140A125(1)035A(3)	0.6	4									
35	1.5	A	T140A155(1)035A(3)	0.8	4									
35	1.8	A	T140A185K035A(3)	1.0	4	0164	0264	0364	0464	5064	2064	3064	4064	T242A185K035(2)S
35	1.8	A	T140A185M035A(3)	1.0	4									
35	8.2	B	T140B825K035A(3)	3.0	4	0165	0265	0365	0465	5065	2065	3065	4065	T242B825K035(2)S
35	8.2	B	T140B825M035A(3)	3.0	4									
35	10.0	B	T140B106K035A(3)	3.0	4	0166	0266	0366	0466	5066	2066	3066	4066	T242B106K035(2)S
35	10.0	B	T140B106M035A(3)	3.0	4	0167	0267	0367	0467	5067	2067	3067	4067	T242B106M035(2)S
35	27.0	C	T140C276(1)035A(3)	7.0	6									
35	33.0	C	T140C336K035A(3)	8.0	6	0168	0268	0368	0468	5068	2068	3068	4068	T242C336K035(2)S
35	33.0	C	T140C336M035A(3)	8.0	6	0169	0269	0369	0469	5069	2069	3069	4069	T242C336M035(2)S
35	39.0	C	T140C396K035A(3)	10.0	6	0170	0270	0370	0470	5070	2070	3070	4070	T242C396K035(2)S
35	39.0	C	T140C396M035A(3)	10.0	6									
35	47.0	C	T140C476K035A(3)	10.0	6	0171	0271	0371	0471	5071	2071	3071	4071	T242C476K035(2)S
35	47.0	C	T140C476M035A(3)	10.0	6	0172	0272	0372	0472	5072	2072	3072	4072	T242C476M035(2)S
35	56.0	D	T140D566K035A(3)	12.0	6	0173	0273	0373	0473	5073	2073	3073	4073	T242D566K035(2)S
35	56.0	D	T140D566M035A(3)	12.0	6									
35	68.0	D	T140D686K035A(3)	12.0	6	0174	0274	0374	0474	5074	2074	3074	4074	T242D686K035(2)S
35	68.0	D	T140D686M035A(3)	12.0	6	0175	0275	0375	0475	5075	2075	3075	4075	T242D686M035(2)S
35	82.0	D	T140D826(1)035A(3)	20.0	8									
35	100.0	D	T140D107(1)035A(3)	20.0	8									
50	1.2	A	T140A125K050A(3)	0.6	4	0176	0276	0376	0476	5076	2076	3076	4076	T242A125K050(2)S
50	1.2	A	T140A125M050A(3)	0.6	4									
50	1.5	A	T140A155K050A(3)	0.8	4	0177	0277	0377	0477	5077	2077	3077	4077	T242A155K050(2)S
50	1.5	A	T140A155M050A(3)	0.8	4	0178	0278	0378	0478	5078	2078	3078	4078	T242A155M050(2)S
50	5.6	B	T140B565K050A(3)	2.5	4	0179	0279	0379	0479	5079	2079	3079	4079	T242B565K050(2)S
50	5.6	B	T140B565M050A(3)	2.5	4									
50	6.8	B	T140B685K050A(3)	2.5	4	0180	0280	0380	0480	5080	2080	3080	4080	T242B685K050(2)S
50	6.8	B	T140B685M050A(3)	2.5	4	0181	0281	0381	0481	5081	2081	3081	4081	T242B685M050(2)S
50	22.0	C	T140C226K050A(3)	7.0	6	0182	0282	0382	0482	5082	2082	3082	4082	T242C226K050(2)S
50	22.0	C	T140C226M050A(3)	7.0	6	0183	0283	0383	0483	5083	2083	3083	4083	T242C226M050(2)S
50	27.0	C	T140C276K050A(3)	8.0	6	0184	0284	0384	0484	5084	2084	3084	4084	T242C276K050(2)S
(V) 85°C	µF	Case Size Code	(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors								

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number (T242), insert failure rate code from Ordering Information table.
(3) To complete KEMET T140 Part Number, insert Lead Material designator: S – Standard or T – 100% Matte Tin. Designates termination finish.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors								KEMET Equivalent Military
						Dash Number Reference								
						Failure Rate Level (%/1,000 Hours)								
						MIL–PRF–39003/3F				MIL–PRF–39003/3F				
						Exponential				Graded				
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
50	27.0	C	T140C276M050A(3)	8.0	6									
50	33.0	D	T140D336K050A(3)	10.0	6	0185	0285	0385	0485	5085	2085	*	*	T242D336K050(2)S
50	33.0	D	T140D336M050A(3)	10.0	6	0186	0286	0386	0486	5086	2086	*	*	T242D336M050(2)S
50	39.0	D	T140D396K050A(3)	10.0	6	0187	0287	0387	0487	5087	2087	*	*	T242D396K050(2)S
50	39.0	D	T140D396M050A(3)	10.0	6									
50	47.0	D	T140D476M050A(3)	10.0	6									
60	0.82	A	T140A824(1)060A(3)	0.5	4									
60	1.0	A	T140A105(1)060A(3)	0.5	4									
60	4.7	B	T140B475(1)060A(3)	3.0	4									
60	5.6	B	T140B565(1)060A(3)	3.0	4									
60	15.0	C	T140C156(1)060A(3)	5.0	6									
60	18.0	C	T140C186(1)060A(3)	6.0	6									
60	22.0	C	T140C226(1)060A(3)	7.0	6									
60	27.0	D	T140D276(1)060A(3)	10.0	6									
60	33.0	D	T140D336(1)060A(3)	10.0	6									
(V) 85°C	µF	Case Size Code	(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors								

(1) To complete KEMET part number, insert M for ±20% or K for ± 10%. Designates capacitance tolerance.
(2) To complete KEMET part number (T242), insert failure rate code from Ordering Information table.
(3) To complete KEMET T140 Part Number, insert Lead Material designator: S – Standard or T – 100% Matte Tin. Designates termination finish.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

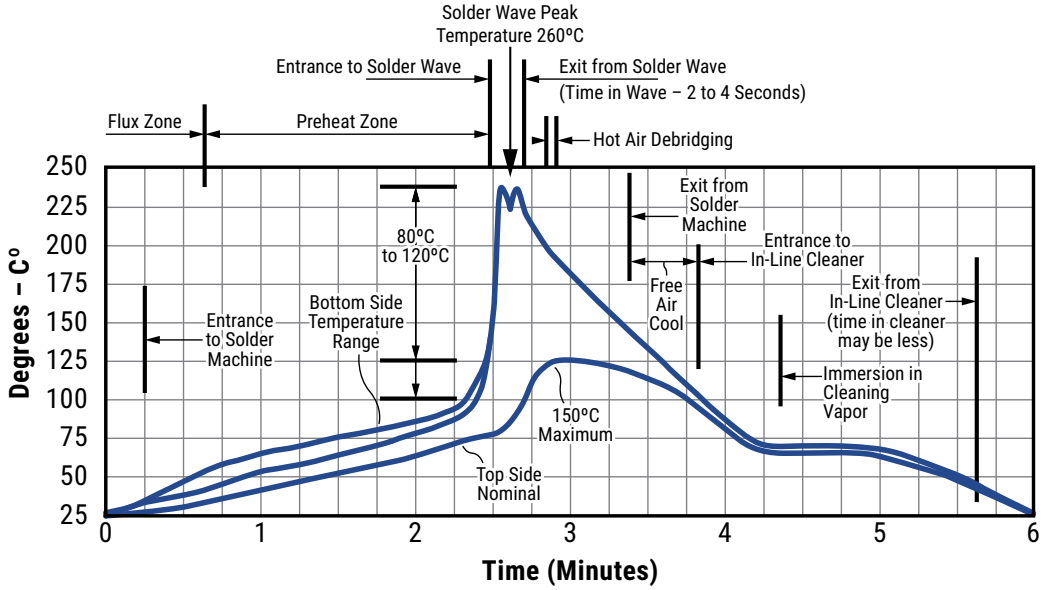
Maximum Power Dissipation: 25°C Ambient

Permissible AC ripple current can be determined by the following:

$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

Optimum Solder Wave Profile



Reverse Voltage

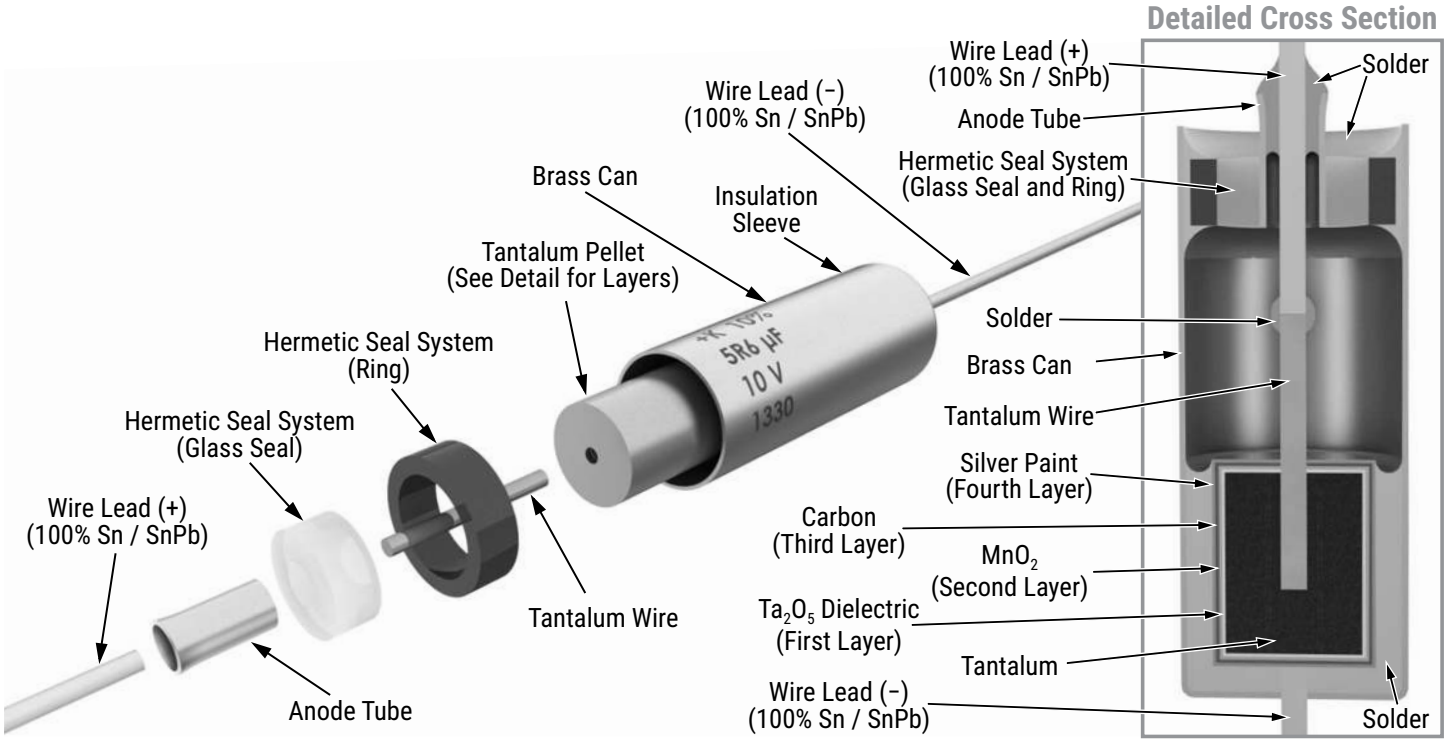
Although these are polar capacitors, some degree of transient voltage reversal is permissible, as seen below. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Pecentage of Rated Voltage
+25°C	15
+85°C	5
+125°C	1

Mounting

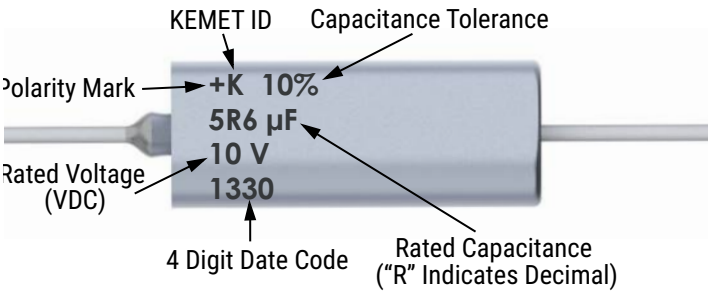
All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.Construction

Construction



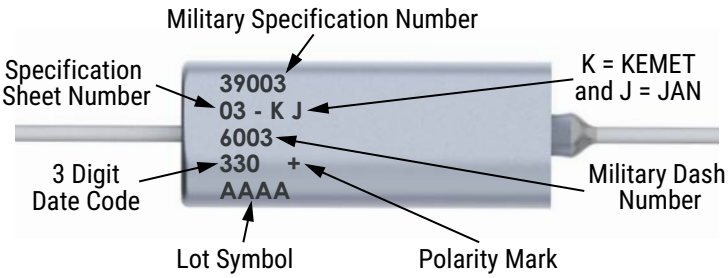
Capacitor Marking

T140

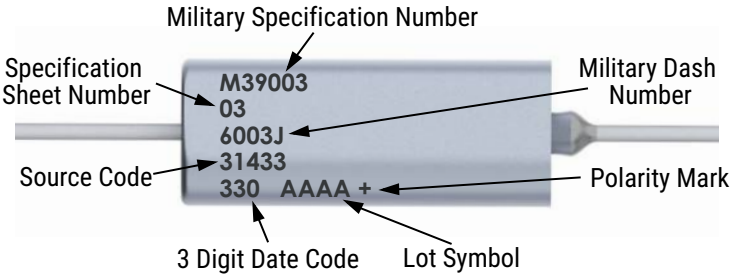


Date Code	3 Digit	4 Digit
Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023	19 = 2019 20 = 2020 21 = 2021 22 = 2022 23 = 2023
Week	01 = 1st week of the year to 52 = 52nd week of the year	

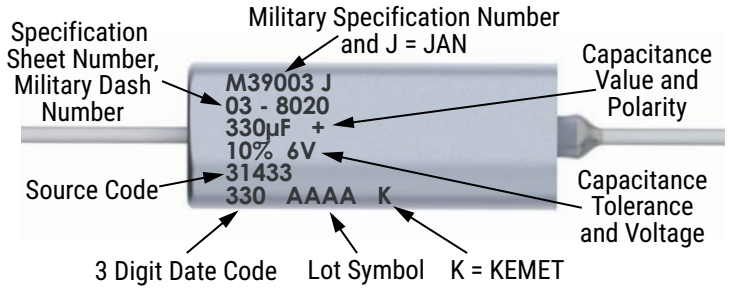
T242 – A Case



T242 – B Case



T242 – C and D Case



Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS–296E.

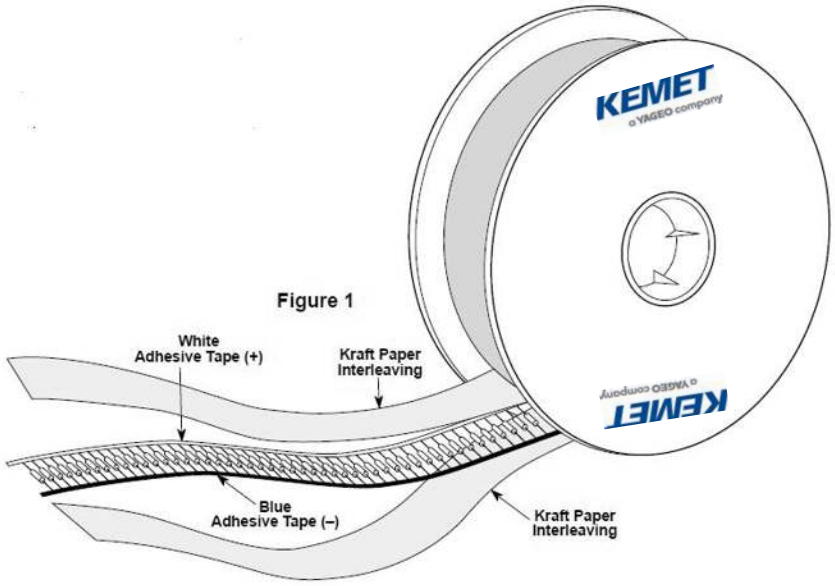


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity	Ammo Pack C-Spec
A	150/Box	3,500	C–7200	1,500	C–7293
B	75/Box	2,500	C–7200	1,000	Class I
C	20/Tray	500	C–7200	250	C–7442
D	20/Tray	400	C–7200	250	Class II C–7443 Class III

Figure 2

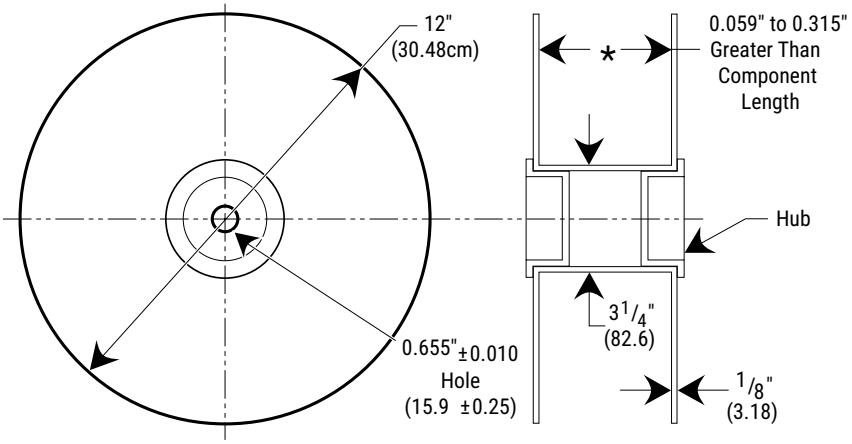


Figure 3

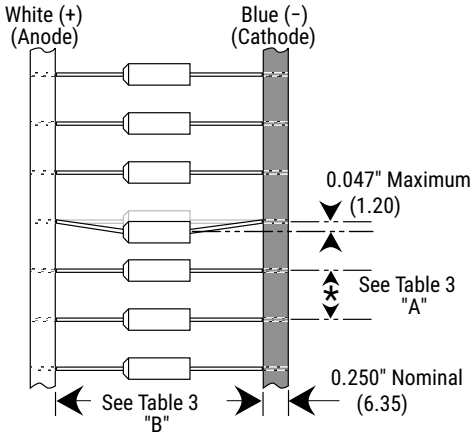


Table 3 – Tape Dimensions

Dimensions in Inches (& Millimeters)

BODY DIAMETER	A PITCH ±0.020 (0.5)	B INSIDE TAPE SPACING ±0.059 (1.5)		
		Class		
		I	II	III
≤ 0.197 (5.0)	0.200 (5.0)	2.063 (52.4)	2.500 (63.5)	2.874 (73)
0.198 (5.0) to 0.394 (10.0)	0.400 (10.0)			

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50 lbs. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lbs. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center.

Figures 1 and 2 show the KEMET standard chipboard tape reel.

A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors.

Universal splicing clips are used to connect the tape.

T252 Series Axial MIL–PRF–39003 (CSR33 Style)

Overview

The hermetically sealed T252 Series solid tantalum capacitors offer high capacitance-to-volume ratios and are offered in standard MIL style A, B, C, and D cases. They meet or exceed the environmental and mechanical requirements of MIL–C–39003. Designed to operate from −55°C to +125°C, The T252 Series exhibits exceptionally low DC leakage, dissipation factor and impedance characteristics. They are ideal for coupling, bypass, filtering and timing circuits, and are excellent substitutes for wet tantalum's in low voltage applications. These parts are available in style CSR33 (T252 Series) per MIL–PRF–39003/06 in capacitance value of 1.2 µF to 1000 µF and working voltages pF 6 VDC to 50 VDC.

Benefits

- Taped and reeled per EIA Specification RS–296
- Marking per MIL–STD–1285
- Qualified to MIL–PRF–39003 (CSR33 Style)
- Failure rate options: Graded – B, C, D and G
  Exponential - M, P, R, and S*
- Capacitance values of 1.2 µF to 1000 µF
- Tolerances of ±10% and ±20%
- Voltage rating of 6 – 50 VDC
- Operating temperature range of −55˚C to +125˚C
- Case sizes: A, B, C, D

**Failure rates apply to military products only*

Applications

These capacitors are ideal for coupling, bypass, filtering and timing circuits, and are excellent substitutes for wet tantalum's in low voltage applications.

Ordering Information

T	252	A	125	K	050	M	S	C
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	252 (CSR33)	A B C D	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50	Graded: B = 0.1%/k hours C = 0.01%/k hours D = 0.001%/k hours Exponential: M = 1%/k hours P = 0.1%/k hours R = 0.01%/k hours S = 0.001%/k hours	S = Standard	All capacitors are sleeved unless specified. 0100 = Without sleeve 7200 = Tape & Reel 7293 & 7443 = Ammo 4250 = 10 cycles, 25°C after Weibull 4251 = 10 cycles, −55°C and 85°C after Weibull 4252 = 10 cycles, −55°C and 85°C before Weibull

Ordering Information – T252 (CSR33 Style)

MIL product

M39003	/06	4073	B
Capacitor Class	Slash	Dash Number	Surge Option
Military specification number	Specification sheet number	Failure rate level	B = C-4251 C = C-4252

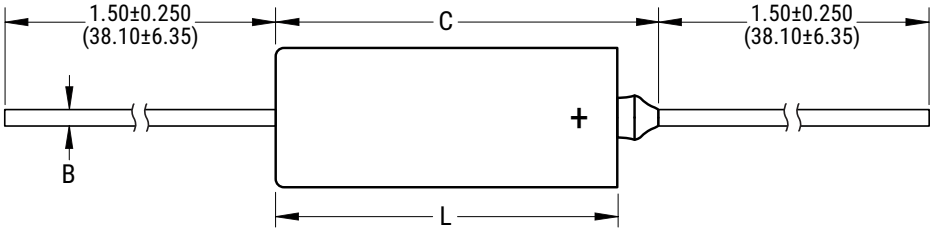
Orders should be entered by the military specification number, including the dash number and surge option letter (B or C).

Performance Characteristics

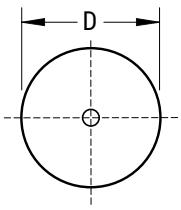
Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	1.2 – 1,000 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6 – 50 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table (for reference only)
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)
Failure Rate (MIL–39003, CSR13 capacitors only)	Approved failure rate: S (0.001%/k hours) – Exponential, D (0.001%/k hours) – Graded

Dimensions – Inches (Millimeters)

SIDE VIEW



END VIEW



Case Size	Uninsulated		Insulated			
	D ±0.005 ±(0.13)	L ±0.031 ±(0.79)	D ±0.010 ±(0.25)	L ±0.031 ±(0.79)	B ±0.002 ±(0.05)	C Maximum
A	0.125 (3.18)	0.250 (6.35)	0.135 (3.43)	0.286 (7.26)	0.020 (0.51)	0.422 (10.72)
B	0.175 (4.45)	0.438 (11.13)	0.185 (4.70)	0.474 (12.04)	0.020 (0.51)	0.610 (15.49)
C	0.279 (7.09)	0.650 (16.51)	0.289 (7.34)	0.686 (17.42)	0.025 (0.64)	0.822 (20.88)
D	0.341 (8.66)	0.750 (19.05)	0.351 (8.92)	0.786 (19.96)	0.025 (0.64)	0.922 (23.42)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Size Code	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR33) Capacitors								
					Dash Number Reference								KEMET Equivalent Military
					Failure Rate Level (%/1,000 Hours)								
					MIL–PRF–39003/6F				MIL–PRF–39003/6F				
					Exponential				Graded				
(V) 85°C	µF		µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
6	10.0	A	0.5	6	0001	0101	0201	0301	5001	2001	3001	4001	T252A106K006(1)S
6	10.0	A	0.5	6	0002	0102	0202	0302	5002	2002	3002	4002	T252A106M006(1)S
6	12.0	A	0.5	6	0003	0103	0203	0303	5003	2003	3003	4003	T252A126K006(1)S
6	100.0	B	1.0	8	0004	0104	0204	0304	5004	2004	3004	4004	T252B107K006(1)S
6	100.0	B	1.0	8	0005	0105	0205	0305	5005	2005	3005	4005	T252B107M006(1)S
6	330.0	C	2.0	8	0006	0106	0206	0306	5006	2006	3006	4006	T252C337K006(1)S
6	330.0	C	2.0	8	0007	0107	0207	0307	5007	2007	3007	4007	T252C337M006(1)S
6	390.0	C	2.0	10	0008	0108	0208	0308	5008	2008	3008	4008	T252C397K006(1)S
6	470.0	C	2.0	10	0009	0109	0209	0309	5009	2009	3009	4009	T252C477K006(1)S
6	470.0	C	2.0	10	0010	0110	0210	0310	5010	2010	3010	4010	T252C477M006(1)S
6	680.0	D	5.0	10	0011	0111	0211	0311	5011	2011	3011	4011	T252D687K006(1)S
6	680.0	D	5.0	10	0012	0112	0212	0312	5012	2012	3012	4012	T252D687M006(1)S
6	820.0	D	5.0	10	0013	0113	0213	0313	5013	2013	3013	4013	T252D827K006(1)S
6	1000.0	D	5.0	10	0014	0114	0214	0314	5014	2014	3014	4014	T252D108K006(1)S
6	1000.0	D	5.0	10	0015	0115	0215	0315	5015	2015	3015	4015	T252D108M006(1)S
10	6.8	A	0.5	6	0016	0116	0216	0316	5016	2016	3016	4016	T252A685K010(1)S
10	6.8	A	0.5	6	0017	0117	0217	0317	5017	2017	3017	4017	T252A685M010(1)S
10	8.2	A	0.5	6	0018	0118	0218	0318	5018	2018	3018	4018	T252A825K010(1)S
10	47.0	B	1.0	6	0019	0119	0219	0319	5019	2019	3019	4019	T252B476K010(1)S
10	47.0	B	1.0	6	0020	0120	0220	0320	5020	2020	3020	4020	T252B476M010(1)S
10	56.0	B	1.0	6	0021	0121	0221	0321	5021	2021	3021	4021	T252B566K010(1)S
10	68.0	B	1.0	6	0022	0122	0222	0322	5022	2022	3022	4022	T252B686K010(1)S
10	68.0	B	1.0	6	0023	0123	0223	0323	5023	2023	3023	4023	T252B686M010(1)S
10	82.0	B	1.0	6	0024	0124	0224	0324	5024	2024	3024	4024	T252B826K010(1)S
10	220.0	C	1.0	8	0025	0125	0225	0325	5025	2025	3025	4025	T252C227K010(1)S
10	220.0	C	1.0	8	0026	0126	0226	0326	5026	2026	3026	4026	T252C227M010(1)S
10	270.0	C	2.0	8	0027	0127	0227	0327	5027	2027	3027	4027	T252C277K010(1)S
10	390.0	D	2.0	10	0028	0128	0228	0328	5028	2028	3028	4028	T252D397K010(1)S
10	470.0	D	4.0	10	0029	0129	0229	0329	5029	2029	3029	4029	T252D477K010(1)S
10	470.0	D	4.0	10	0030	0130	0230	0330	5030	2030	3030	4030	T252D477M010(1)S
10	560.0	D	4.0	10	0031	0131	0231	0331	5031	2031	3031	4031	T252D567K010(1)S
15	4.7	A	0.5	4	0032	0132	0232	0332	5032	2032	3032	4032	T252A475K015(1)S
15	4.7	A	0.5	4	0033	0133	0233	0333	5033	2033	3033	4033	T252A475M015(1)S
15	5.6	A	0.5	4	0034	0134	0234	0334	5034	2034	3034	4034	T252A565K015(1)S
15	33.0	B	1.0	6	0035	0135	0235	0335	5035	2035	3035	4035	T252B336K015(1)S
15	33.0	B	1.0	6	0036	0136	0236	0336	5036	2036	3036	4036	T252B336M015(1)S
15	39.0	B	1.0	6	0037	0137	0237	0337	5037	2037	3037	4037	T252B396K015(1)S
15	150.0	C	1.0	8	0038	0138	0238	0338	5038	2038	3038	4038	T252C157K015(1)S
15	150.0	C	1.0	8	0039	0139	0239	0339	5039	2039	3039	4039	T252C157M015(1)S
15	180.0	C	2.0	8	0040	0140	0240	0340	5040	2040	3040	4040	T252C187K015(1)S
15	220.0	D	2.0	8	0041	0141	0241	0341	5041	2041	3041	4041	T252D227K015(1)S
15	220.0	D	2.0	8	0042	0142	0242	0342	5042	2042	3042	4042	T252D227M015(1)S
15	270.0	D	2.0	8	0043	0143	0243	0343	5043	2043	3043	4043	T252D277K015(1)S
15	330.0	D	2.0	8	0044	0144	0244	0344	5044	2044	3044	4044	T252D337K015(1)S
15	330.0	D	2.0	8	0045	0145	0245	0345	5045	2045	3045	4045	T252D337M015(1)S
20	2.7	A	0.5	4	0046	0146	0246	0346	5046	2046	3046	4046	T252A275K020(1)S
20	3.3	A	0.5	4	0047	0147	0247	0347	5047	2047	3047	4047	T252A335K020(1)S
(V) 85°C	µF	Case Size Code	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Capacitance		DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR33) Capacitors								

(1) To complete KEMET Part Number (T252), insert Graded failure rate – A for Not Applicable, B for 0.1%/k hours, C for 0.01%/k hours , D for 0.001%/k hours or G for 1%/k hours. Designates Reliability Level.
(2) To complete KEMET Part Number (T252), insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates reliability level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR33) Capacitors								
					Dash Number Reference								KEMET Equivalent Military
					Failure Rate Level (%/1,000 Hours)								
					MIL–PRF–39003/6F				MIL–PRF–39003/6F				
					Exponential				Graded				
(V) 85°C	µF		µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
20	3.3	A	0.5	4	0048	0148	0248	0348	5048	2048	3048	4048	T252A335M020(1)S
20	3.9	A	0.5	4	0049	0149	0249	0349	5049	2049	3049	4049	T252A395K020(1)S
20	18.0	B	1.0	6	0050	0150	0250	0350	5050	2050	3050	4050	T252B186K020(1)S
20	22.0	B	1.0	6	0051	0151	0251	0351	5051	2051	3051	4051	T252B226K020(1)S
20	22.0	B	1.0	6	0052	0152	0252	0352	5052	2052	3052	4052	T252B226M020(1)S
20	27.0	B	1.0	6	0053	0153	0253	0353	5053	2053	3053	4053	T252B276K020(1)S
20	56.0	C	1.0	6	0054	0154	0254	0354	5054	2054	3054	4054	T252C556K020(1)S
20	68.0	C	1.0	6	0055	0155	0255	0355	5055	2055	3055	4055	T252C686K020(1)S
20	68.0	C	1.0	6	0056	0156	0256	0356	5056	2056	3056	4056	T252C686M020(1)S
20	82.0	C	1.0	6	0057	0157	0257	0357	5057	2057	3057	4057	T252C826K020(1)S
20	100.0	C	1.0	6	0058	0158	0258	0358	5058	2058	3058	4058	T252C107K020(1)S
20	100.0	C	1.0	6	0059	0159	0259	0359	5059	2059	3059	4059	T25C107M020(1)S
20	120.0	C	1.0	6	0060	0160	0260	0360	5060	2060	3060	4060	T252C127K020(1)S
20	150.0	D	2.0	8	0061	0161	0261	0361	5061	2061	3061	4061	T252D157K020(1)S
20	150.0	D	2.0	8	0062	0162	0262	0362	5062	2062	3062	4062	T252D157M020(1)S
20	180.0	D	2.0	8	0063	0163	0263	0363	5063	2063	3063	4063	T252D187K020(1)S
35	1.8	A	0.5	4	0064	0164	0264	0364	5064	2064	3064	4064	T252A185K035(1)S
35	8.2	B	1.0	6	0065	0165	0265	0365	5065	2065	3065	4065	T252B825K035(1)S
35	10.0	B	1.0	6	0066	0166	0266	0366	5066	2066	3066	4066	T252B106K035(1)S
35	10.0	B	1.0	6	0067	0167	0267	0367	5067	2067	3067	4067	T252B106M035(1)S
35	33.0	C	1.0	6	0068	0168	0268	0368	5068	2068	3068	4068	T252C336K035(1)S
35	33.0	C	1.0	6	0069	0169	0269	0369	5069	2069	3069	4069	T252C336M035(1)S
35	39.0	C	1.0	6	0070	0170	0270	0370	5070	2070	3070	4070	T252C396K035(1)S
35	47.0	C	1.0	6	0071	0171	0271	0371	5071	2071	3071	4071	T252C476K035(1)S
35	47.0	C	1.0	6	0072	0172	0272	0372	5072	2072	3072	4072	T252C476M035(1)S
35	56.0	D	2.0	6	0073	0173	0273	0373	5073	2073	3073	4073	T252D566K035(1)S
35	68.0	D	2.0	6	0074	0174	0274	0374	5074	2074	3074	4074	T252D686K035(1)S
35	68.0	D	2.0	6	0075	0175	0275	0375	5075	2075	3075	4075	T252D686M035(1)S
50	1.2	A	0.5	4	0076	0176	0276	0376	5076	2076	3076	4076	T252A125K050(1)S
50	1.5	A	0.5	4	0077	0177	0277	0377	5077	2077	3077	4077	T252A155K050(1)S
50	1.5	A	0.5	4	0078	0178	0278	0378	5078	2078	3078	4078	T252A155M050(1)S
50	5.6	B	1.0	4	0079	0179	0279	0379	5079	2079	3079	4079	T252B565K050(1)S
50	6.8	B	1.0	6	0080	0180	0280	0380	5080	2080	3080	4080	T252B685K050(1)S
50	6.8	B	1.0	6	0081	0181	0281	0381	5081	2081	3081	4081	T252B685M050(1)S
50	22.0	C	1.0	6	0082	0182	0282	0382	5082	2082	3082	4082	T252C226K050(1)S
50	22.0	C	1.0	6	0083	0183	0283	0383	5083	2083	3083	4083	T252C226M050(1)S
50	27.0	C	1.0	6	0084	0184	0284	0384	5084	2084	3084	4084	T252C276K050(1)S
50	33.0	D	1.0	6	0085	0185	0285	0385	5085	2085	*	*	T252D336K050(1)S
50	33.0	D	1.0	6	0086	0186	0286	0386	5086	2086	*	*	T252D336M050(1)S
50	39.0	D	1.0	6	0087	0187	0287	0387	5087	2087	*	*	T252D396K050(1)S
(V) 85°C	µF	Case Size Code	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Capacitance		DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR33) Capacitors								

(1) To complete KEMET Part Number (T252), insert Graded failure rate – A for Not Applicable, B for 0.1%/k hours, C for 0.01%/k hours , D for 0.001%/k hours or G for 1%/k hours. Designates Reliability Level.
(2) To complete KEMET Part Number (T252), insert Exponential failure rate – M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates reliability level.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Permissible AC ripple current can be determined by the following:

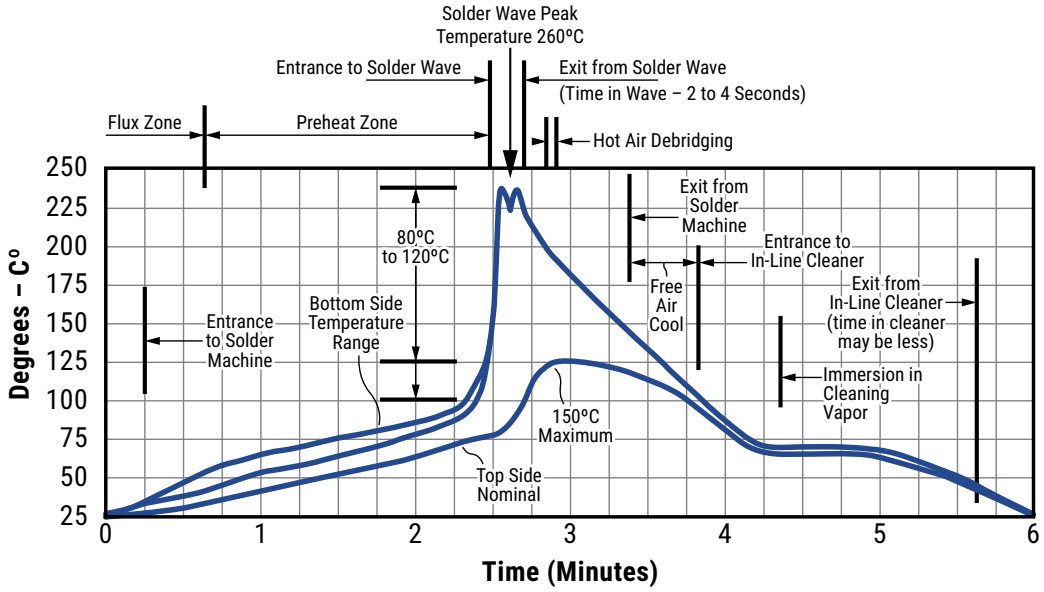
$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

Optimum Solder Wave Profile



Reverse Voltage

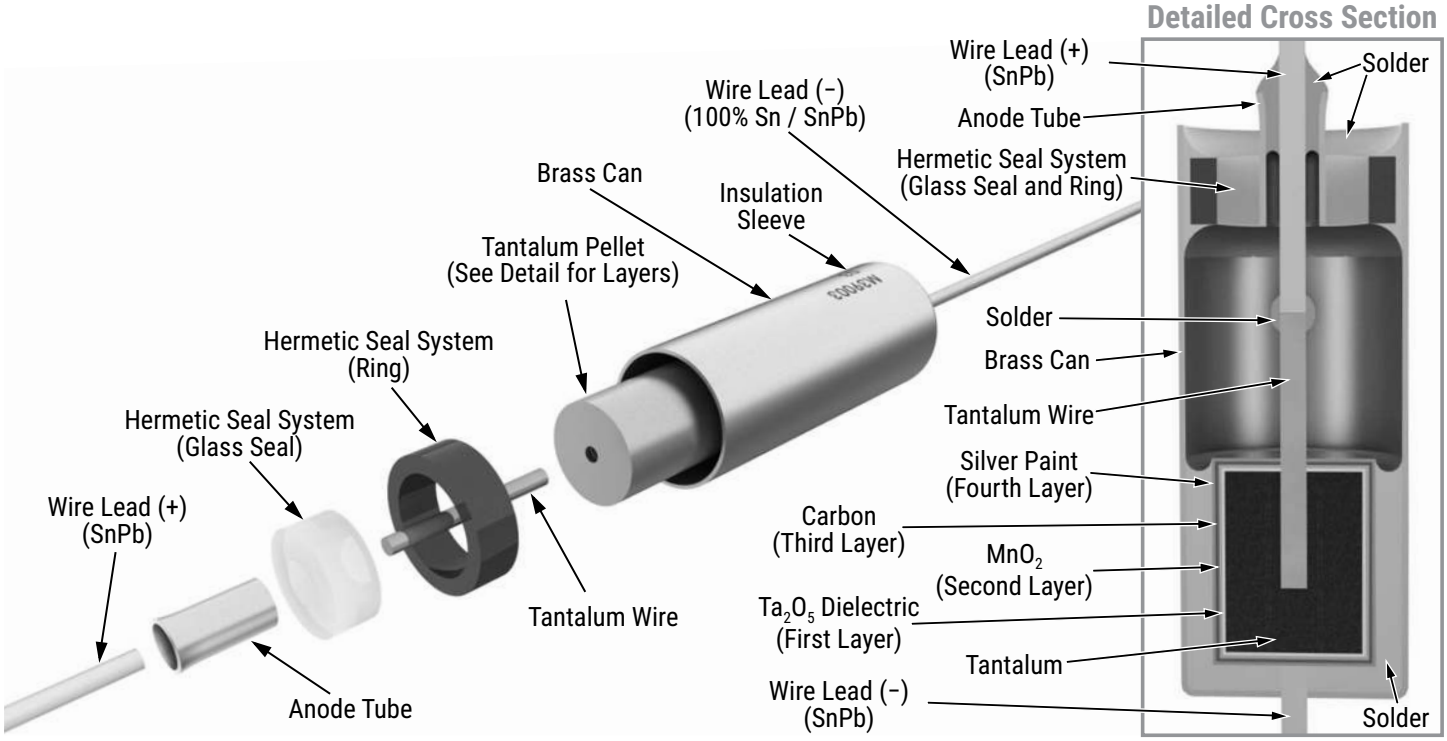
Although these are polar capacitors, some degree of transient voltage reversal is permissible, as seen below. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Pecentage of Rated Voltage
+25°C	15
+85°C	5
+125°C	1

Mounting

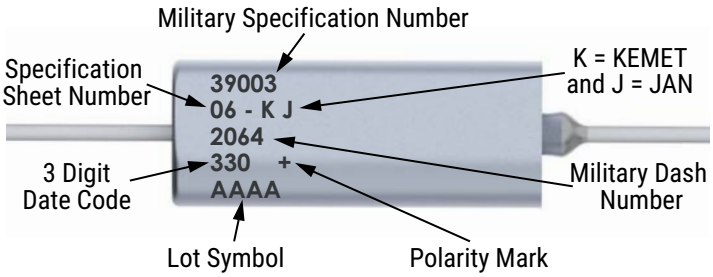
All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Construction

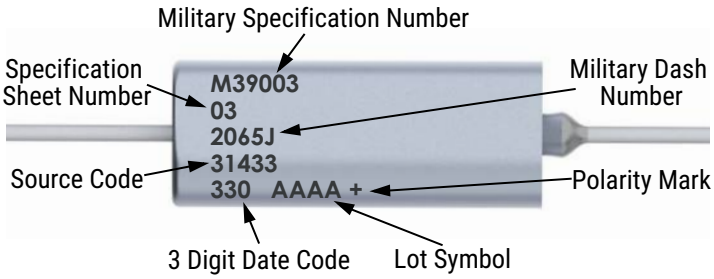


Capacitor Marking

A Case

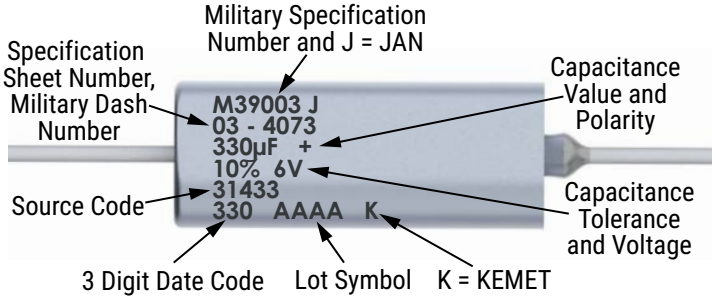


B Case



Date Code	3 Digit	4 Digit
Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023	19 = 2019 20 = 2020 21 = 2021 22 = 2022 23 = 2023
Week	01 = 1st week of the year to 52 = 52nd week of the year	

C and D Case



Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS–296E.

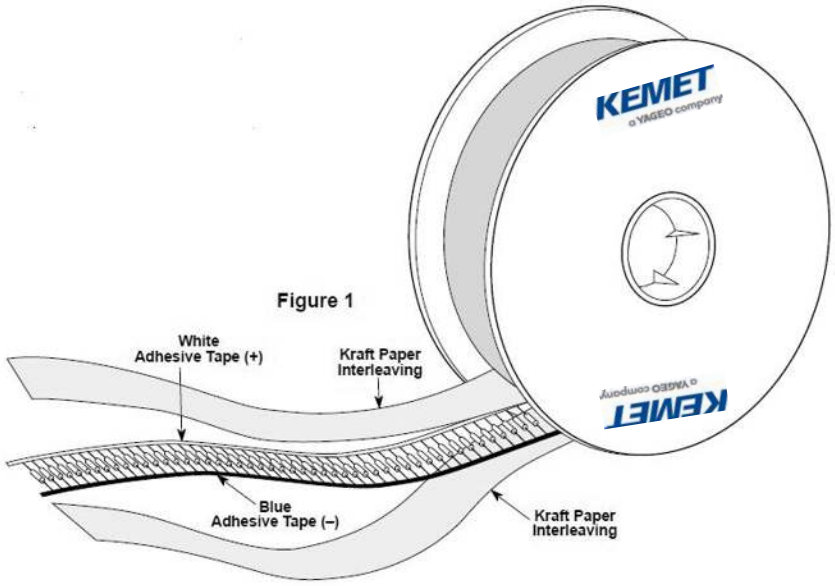


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity	Ammo Pack C-Spec
A	150/Box	3,500	C–7200	1,500	C–7293
B	75/Box	2,500	C–7200	1,000	Class I
C	20/Tray	500	C–7200	250	C–7442
D	20/Tray	400	C–7200	250	Class II C–7443 Class III

Figure 2

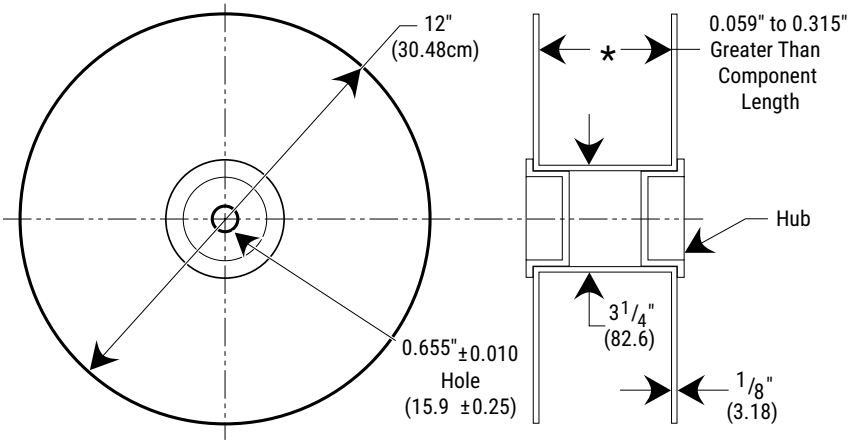


Figure 3

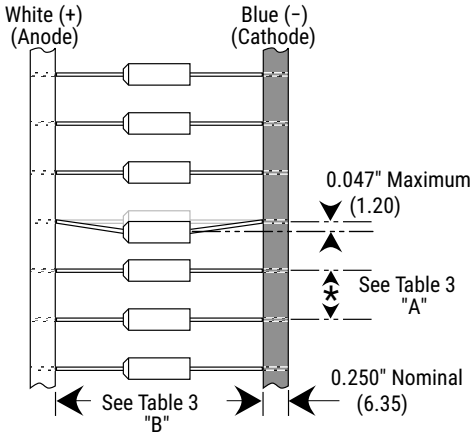


Table 3 – Tape Dimensions

Dimensions in Inches (& Millimeters)

BODY DIAMETER	A PITCH ±0.020 (0.5)	B INSIDE TAPE SPACING ±0.059 (1.5)		
		Class		
		I	II	III
≤ 0.197 (5.0)	0.200 (5.0)	2.063 (52.4)	2.500 (63.5)	2.874 (73)
0.198 (5.0) to 0.394 (10.0)	0.400 (10.0)			

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50 lbs. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lbs. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center.

Figures 1 and 2 show the KEMET standard chipboard tape reel.

A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors.

Universal splicing clips are used to connect the tape.

T262 Axial MIL–PRF–39003 (CSR21 Style)

Overview

KEMET's T262 Series (CSR21 Style) hermetically sealed solid tantalum capacitors are qualified to MIL-C-39003/09. This series is similar to KEMET's popular T212 (CSR13 per MIL-PRF-39003/01) capacitors, but offer higher ripple current handling capability and exhibit exceptionally low equivalent series resistance (ESR). The T262 Series is ideal for filtering applications and in military power supplies where low ESR is essential. These capacitors are 100% surge current tested and their capacitance and dissipation factor is screened at 1kHz.

Benefits

- Tape & Reel packaging per EIA Specification RS–296
- Marking per MIL–STD–1285
- Qualified to MIL–PRF–39003 (CSR21 Style)
- Failure rate options: Graded – B, C, D, and G
  Exponential - M, P, R, and S*
- Capacitance values of 5.6 – 330 µF
- Tolerances of ±5%, ±10%, and ±20%
- Voltage rating of 6 – 50 VDC
- Operating temperature range of −55˚C to +125˚C
- 100% surge current test available on all case sizes
- Capacitance and dissipation factor is screened at 1 kHz
- Case sizes: C, D

**Failure rates apply to military products only*

Applications

The T262 Series is ideal for filtering applications and in defense power supplies where low ESR is essential.

Ordering Information

T	262	C	106	K	050	C	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate	Termination Finish	Specification
T = Tantalum	Hermetically sealed axial capacitor	C D	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50	Graded: B = 0.1%/k hours C = 0.01%/k hours D = 0.001%/k hours Exponential: M = 1%/k hours P = 0.1%/k hours R = 0.01%/k hours S = 0.001%/k hours	S = Standard (Solder-coated nickel)	Blank = Sleeved/Bulk 0100 = Without sleeve 7200 = Tape & Reel 7293 and 7443 = Ammo 4251 = 10 cycles, −55 & 85°C after Weibull 4252 = 10 cycles, −55 & 85°C before Weibull All capacitors are sleeved unless specified.

Ordering Information – T262 (CSR21 Style)

MIL product

M39003	/09	3074	B
Capacitor Class	Slash	Dash Number	Surge Option
Military specification number	Specification sheet number	Failure rate level	B = C-4251 C = C-4252

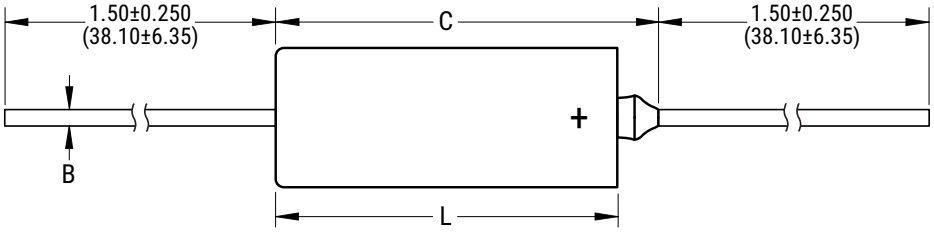
Orders should be entered by the military specification number, including the dash number and surge option letter (B or C).

Performance Characteristics

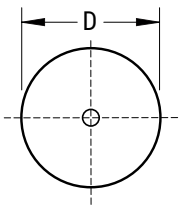
Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	5.6 – 330 µF at 1 kHz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6 – 50 V
DF (1 kHz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)
Failure Rate (MIL–39003, CSR13 capacitors only)	Approved failure rate: S (0.001%/k hours) - Exponential, D (0.001%/k hours) – Graded

Dimensions – Inches (Millimeters)

SIDE VIEW



END VIEW



Case Size	Uninsulated		Insulated			
	D ±0.005 ±(0.13)	L ±0.031 ±(0.79)	D ±0.010 ±(0.25)	L ±0.031 ±(0.79)	B ±0.002 ±(0.05)	C Maximum
C	0.279 (7.09)	0.650 (16.51)	0.289 (7.34)	0.686 (17.42)	0.025 (0.64)	0.822 (20.88)
D	0.341 (8.66)	0.750 (19.05)	0.351 (8.92)	0.786 (19.96)	0.025 (0.64)	0.922 (23.42)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Size Code	DC Leakage	DF	ESR	Ripple Current	MIL–PRF–39003/09 (CSR21) Capacitors								
							Dash Number Reference								KEMET Equivalent Military
							Failure Rate Level (%/1,000 Hours)								
							MIL–PRF–39003/9D				MIL–PRF–39003/9D				
							Exponential				Graded				
(V) 85°C	1 kHz/25°C µF		µA at 25°C Max/5 Min	% at 25°C 1 kHz Max	Ω at25°C 100 kHz Max	Arms at 25°C 40 kHz Max	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
6	150.0	C	4.5	10	0.065	3.3	0001	0101	0201	0301	5001	2001	3001	4001	T262C157J006(1)S
6	150.0	C	4.5	10	0.065	3.3	0002	0102	0202	0302	5002	2002	3002	4002	T262C157K006(1)S
6	150.0	C	4.5	10	0.065	3.3	0003	0103	0203	0303	5003	2003	3003	4003	T262C157M006(1)S
6	180.0	C	5.5	10	0.060	3.4	0004	0104	0204	0304	5004	2004	3004	4004	T262C187J006(1)S
6	180.0	C	5.5	10	0.060	3.4	0005	0105	0205	0305	5005	2005	3005	4005	T262C187K006(1)S
6	270.0	D	6.5	10	0.050	4.1	0006	0106	0206	0306	5006	2006	3006	4006	T262D277J006(1)S
6	270.0	D	6.5	10	0.050	4.1	0007	0107	0207	0307	5007	2007	3007	4007	T262D277K006(1)S
6	330.0	D	7.5	12	0.045	4.3	0008	0108	0208	0308	5008	2008	3008	4008	T262D337J006(1)S
6	330.0	D	7.5	12	0.045	4.3	0009	0109	0209	0309	5009	2009	3009	4009	T262D337K006(1)S
6	330.0	D	7.5	12	0.045	4.3	0010	0110	0210	0310	5010	2010	3010	4010	T262D337M006(1)S
10	82.0	C	4.0	8	0.085	2.9	0011	0111	0211	0311	5011	2011	3011	4011	T262C826J010(1)S
10	82.0	C	4.0	8	0.085	2.9	0012	0112	0212	0312	5012	2012	3012	4012	T262C826K010(1)S
10	100.0	C	5.0	8	0.075	3.0	0013	0113	0213	0313	5013	2013	3013	4013	T262C107J010(1)S
10	100.0	C	5.0	8	0.075	3.0	0014	0114	0214	0314	5014	2014	3014	4014	T262C107K010(1)S
10	100.0	C	5.0	8	0.075	3.0	0015	0115	0215	0315	5015	2015	3015	4015	T262C107M010(1)S
10	120.0	C	6.0	8	0.070	3.2	0016	0116	0216	0316	5016	2016	3016	4016	T262C127J010(1)S
10	120.0	C	6.0	8	0.070	3.2	0017	0117	0217	0317	5017	2017	3017	4017	T262C127K010(1)S
10	180.0	D	9.0	8	0.060	3.7	0018	0118	0218	0318	5018	2018	3018	4018	T262D187J010(1)S
10	180.0	D	9.0	8	0.060	3.7	0019	0119	0219	0319	5019	2019	3019	4019	T262D187K010(1)S
10	220.0	D	10.0	10	0.055	3.9	0020	0120	0220	0320	5020	2020	3020	4020	T262D227J010(1)S
10	220.0	D	10.0	10	0.055	3.9	0021	0121	0221	0321	5021	2021	3021	4021	T262D227K010(1)S
10	220.0	D	10.0	10	0.055	3.9	0022	0122	0222	0322	5022	2022	3022	4022	T262D227M010(1)S
15	56.0	C	4.0	6	0.100	2.6	0023	0123	0223	0323	5023	2023	3023	4023	T262C566J015(1)S
15	56.0	C	4.0	6	0.100	2.6	0024	0124	0224	0324	5024	2024	3024	4024	T262C566K015(1)S
15	68.0	C	5.0	6	0.095	2.7	0025	0125	0225	0325	5025	2025	3025	4025	T262C686J015(1)S
15	68.0	C	5.0	6	0.095	2.7	0026	0126	0226	0326	5026	2026	3026	4026	T262C686K015(1)S
15	68.0	C	5.0	6	0.095	2.7	0027	0127	0227	0327	5027	2027	3027	4027	T262C686M015(1)S
15	120.0	D	9.0	8	0.070	3.5	0028	0128	0228	0328	5028	2028	3028	4028	T262D127J015(1)S
15	120.0	D	9.0	8	0.070	3.5	0029	0129	0229	0329	5029	2029	3029	4029	T262D127K015(1)S
15	150.0	D	10.0	8	0.065	3.6	0030	0130	0230	0330	5030	2030	3030	4030	T262D157J015(1)S
15	150.0	D	10.0	8	0.065	3.6	0031	0131	0231	0331	5031	2031	3031	4031	T262D157K015(1)S
15	150.0	D	10.0	8	0.065	3.6	0032	0132	0232	0332	5032	2032	3032	4032	T262D157M015(1)S
20	27.0	C	2.5	5	0.145	2.2	0033	0133	0233	0333	5033	2033	3033	4033	T262C276J020(1)S
20	27.0	C	2.5	5	0.145	2.2	0034	0134	0234	0334	5034	2034	3034	4034	T262C276K020(1)S
20	33.0	C	3.5	5	0.130	2.3	0035	0135	0235	0335	5035	2035	3035	4035	T262C336J020(1)S
20	33.0	C	3.5	5	0.130	2.3	0036	0136	0236	0336	5036	2036	3036	4036	T262C336K020(1)S
20	33.0	C	3.5	5	0.130	2.3	0037	0137	0237	0337	5037	2037	3037	4037	T262C336M020(1)S
20	39.0	C	4.0	5	0.120	2.4	0038	0138	0238	0338	5038	2038	3038	4038	T262C396J020(1)S
20	39.0	C	4.0	5	0.120	2.4	0039	0139	0239	0339	5039	2039	3039	4039	T262C396K020(1)S
20	47.0	C	4.5	6	0.110	2.5	0040	0140	0240	0340	5040	2040	3040	4040	T262C476J020(1)S
20	47.0	C	4.5	6	0.110	2.5	0041	0141	0241	0341	5041	2041	3041	4041	T262C476K020(1)S
20	47.0	C	4.5	6	0.110	2.5	0042	0142	0242	0342	5042	2042	3042	4042	T262C476M020(1)S
20	56.0	D	5.5	6	0.100	2.9	0043	0143	0243	0343	5043	2043	3043	4043	T262D566J020(1)S
20	56.0	D	5.5	6	0.100	2.9	0044	0144	0244	0344	5044	2044	3044	4044	T262D566K020(1)S
20	68.0	D	7.0	6	0.095	3.0	0045	0145	0245	0345	5045	2045	3045	4045	T262D686J020(1)S
(V) 85°C	µF	Case Size Code	µA at 25°C Max/5 Min	% at 25°C 1 kHz Max	Ω at25°C 100 kHz Max	Arms at 25°C 40 kHz Max	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		DC Leakage	DF	ESR	Ripple Current	MIL–PRF–39003/09 (CSR21) Capacitors								

(1) To complete KEMET Part Number (T262), insert Graded failure rate - A for Not Applicable, B for 0.1%/k hours, C for 0.01%/k hours , D for 0.001%/k hours or G for 1%/k hours. Designates Reliability Level.
(2) To complete KEMET Part Number (T262), insert Exponential failure rate - M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates reliability level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Size Code	DC Leakage	DF	ESR	Ripple Current	MIL–PRF–39003/09 (CSR21) Capacitors								
							Dash Number Reference								KEMET Equivalent Military
							Failure Rate Level (%/1,000 Hours)								
							MIL–PRF–39003/9D				MIL–PRF–39003/9D				
							Exponential				Graded				
(V) 85°C	1 kHz/25°C µF		µA at 25°C Max/5 Min	% at 25°C 1 kHz Max	Ω at25°C 100 kHz Max	Arms at 25°C 40 kHz Max	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
20	68.0	D	7.0	6	0.095	3.0	0046	0146	0246	0346	5046	2046	3046	4046	T262D686K020(1)S
20	68.0	D	7.0	6	0.095	3.0	0047	0147	0247	0347	5047	2047	3047	4047	T262D686M020(1)S
20	82.0	D	8.0	6	0.085	3.1	0048	0148	0248	0348	5048	2048	3048	4048	T262D826J020(1)S
20	82.0	D	8.0	6	0.085	3.1	0049	0149	0249	0349	5049	2049	3049	4049	T262D826K020(1)S
20	100.0	D	10.0	8	0.075	3.3	0050	0150	0250	0350	5050	2050	3050	4050	T262D107J020(1)S
20	100.0	D	10.0	8	0.075	3.3	0051	0151	0251	0351	5051	2051	3051	4051	T262D107K020(1)S
20	100.0	D	10.0	8	0.075	3.3	0052	0152	0252	0352	5052	2052	3052	4052	T262D107M020(1)S
35	22.0	C	4.0	4	0.160	2.1	0053	0153	0253	0353	5053	2053	3053	4053	T262C226J035(1)S
35	22.0	C	4.0	4	0.160	2.1	0054	0154	0254	0354	5054	2054	3054	4054	T262C226K035(1)S
35	22.0	C	4.0	4	0.160	2.1	0055	0155	0255	0355	5055	2055	3055	4055	T262C226M035(1)S
35	27.0	D	4.5	4	0.145	2.4	0056	0156	0256	0356	5056	2056	3056	4056	T262D276J035(1)S
35	27.0	D	4.5	4	0.145	2.4	0057	0157	0257	0357	5057	2057	3057	4057	T262D276K035(1)S
35	33.0	D	5.5	5	0.130	2.5	0058	0158	0258	0358	5058	2058	3058	4058	T262D336J035(1)S
35	33.0	D	5.5	5	0.130	2.5	0059	0159	0259	0359	5059	2059	3059	4059	T262D336K035(1)S
35	33.0	D	5.5	5	0.130	2.5	0060	0160	0260	0360	5060	2060	3060	4060	T262D336M035(1)S
35	39.0	D	7.0	5	0.120	2.6	0061	0161	0261	0361	5061	2061	3061	4061	T262D396J035(1)S
35	39.0	D	7.0	5	0.120	2.6	0062	0162	0262	0362	5062	2062	3062	4062	T262D396K035(1)S
35	47.0	D	8.0	5	0.110	2.7	0063	0163	0263	0363	5063	2063	3063	4063	T262D476J035(1)S
35	47.0	D	8.0	5	0.110	2.7	0064	0164	0264	0364	5064	2064	3064	4064	T262D476K035(1)S
35	47.0	D	8.0	5	0.110	2.7	0065	0165	0265	0365	5065	2065	3065	4065	T262D476M035(1)S
50	5.6	C	2.2	3	0.300	1.5	0066	0166	0266	0366	5066	2066	3066	4066	T262C565J050(1)S
50	5.6	C	2.2	3	0.300	1.5	0067	0167	0267	0367	5067	2067	3067	4067	T262C565K050(1)S
50	6.8	C	2.2	3	0.275	1.6	0068	0168	0268	0368	5068	2068	3068	4068	T262C685J050(1)S
50	6.8	C	2.2	3	0.275	1.6	0069	0169	0269	0369	5069	2069	3069	4069	T262C685K050(1)S
50	6.8	C	2.2	3	0.275	1.6	0070	0170	0270	0370	5070	2070	3070	4070	T262C685M050(1)S
50	8.2	C	2.5	3	0.250	1.6	0071	0171	0271	0371	5071	2071	3071	4071	T262C825J050(1)S
50	8.2	C	2.5	3	0.250	1.6	0072	0172	0272	0372	5072	2072	3072	4072	T262C825K050(1)S
50	10.0	C	2.5	3	0.230	1.7	0073	0173	0273	0373	5073	2073	3073	4073	T262C106J050(1)S
50	10.0	C	2.5	3	0.230	1.7	0074	0174	0274	0374	5074	2074	3074	4074	T262C106K050(1)S
50	10.0	C	2.5	3	0.230	1.7	0075	0175	0275	0375	5075	2075	3075	4075	T262C106M050(1)S
50	12.0	C	3.0	3	0.210	1.8	0076	0176	0276	0376	5076	2076	3076	4076	T262C126J050(1)S
50	12.0	C	3.0	3	0.210	1.8	0077	0177	0277	0377	5077	2077	3077	4077	T262C126K050(1)S
50	15.0	C	4.0	3	0.190	1.9	0078	0178	0278	0378	5078	2078	3078	4078	T262C156J050(1)S
50	15.0	C	4.0	3	0.190	1.9	0079	0179	0279	0379	5079	2079	3079	4079	T262C156K050(1)S
50	15.0	C	4.0	3	0.190	1.9	0080	0180	0280	0380	5080	2080	3080	4080	T262C156M050(1)S
50	18.0	C	4.5	4	0.175	2.0	0081	0181	0281	0381	5081	2081	3081	4081	T262C186J050(1)S
50	18.0	C	4.5	4	0.175	2.0	0082	0182	0282	0382	5082	2082	3082	4082	T262C186K050(1)S
50	22.0	D	5.5	4	0.160	2.3	0083	0183	0283	0383	5083	2083	3083	4083	T262D226J050(1)S
50	22.0	D	5.5	4	0.160	2.3	0084	0184	0284	0384	5084	2084	3084	4084	T262D226K050(1)S
50	22.0	D	5.5	4	0.160	2.3	0085	0185	0285	0385	5085	2085	3085	4085	T262D226M050(1)S
(V) 85°C	µF	Case Size Code	µA at 25°C Max/5 Min	% at 25°C 1 kHz Max	Ω at25°C 100 kHz Max	Arms at 25°C 40 kHz Max	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)	Part Number
Rated Voltage	Rated Cap		DC Leakage	DF	ESR	Ripple Current	MIL–PRF–39003/09 (CSR21) Capacitors								

(1) To complete KEMET Part Number (T262), insert Graded failure rate - A for Not Applicable, B for 0.1%/k hours, C for 0.01%/k hours , D for 0.001%/k hours or G for 1%/k hours. Designates Reliability Level.
(2) To complete KEMET Part Number (T262), insert Exponential failure rate - M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates reliability level.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Permissible AC ripple current can be determined by the following:

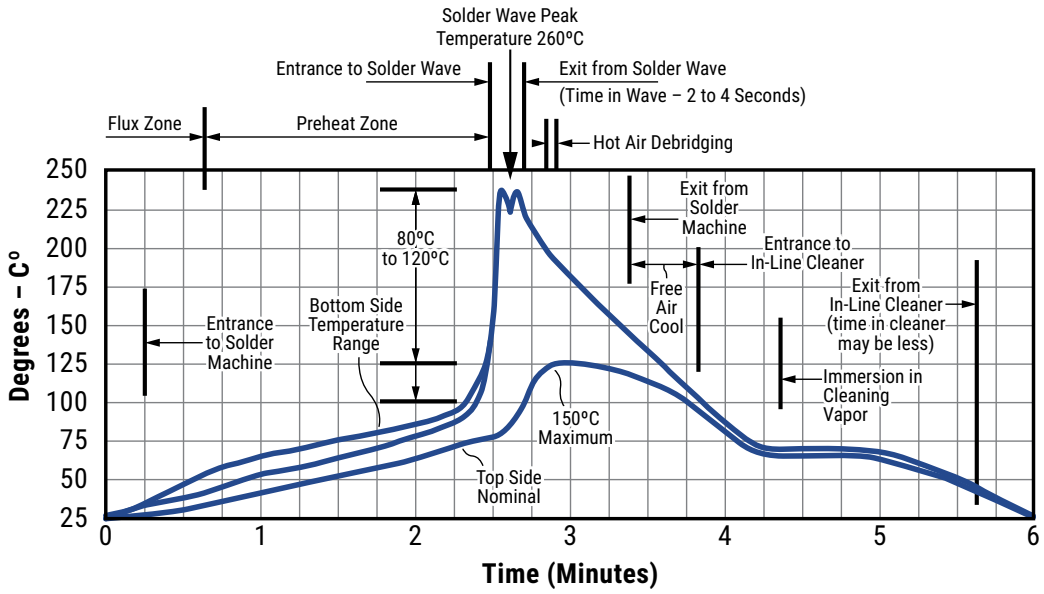
$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

Optimum Solder Wave Profile



Reverse Voltage

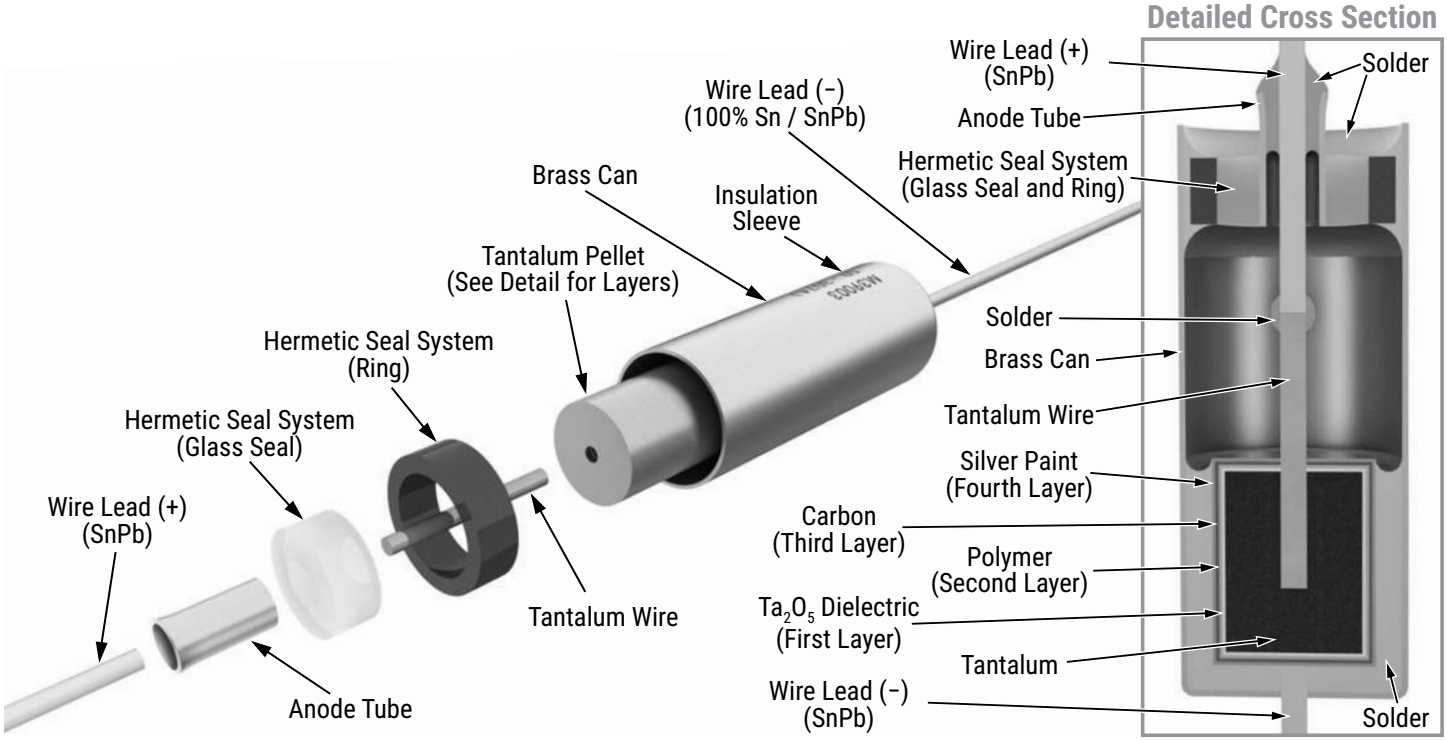
Although these are polar capacitors, some degree of transient voltage reversal is permissible, as seen below. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Pecentage of Rated Voltage
+25°C	15
+85°C	5
+125°C	1

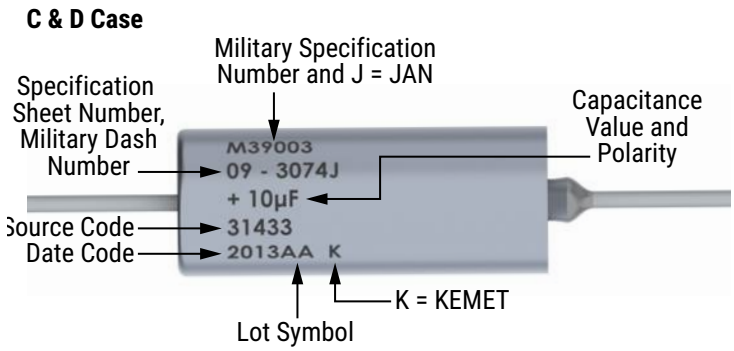
Mounting

All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Construction



Capacitor Marking



Date Code	3 Digit	4 Digit
Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023	19 = 2019 20 = 2020 21 = 2021 22 = 2022 23 = 2023
Week	01 = 1st week of the year to 52 = 52nd week of the year	

Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS–296E.

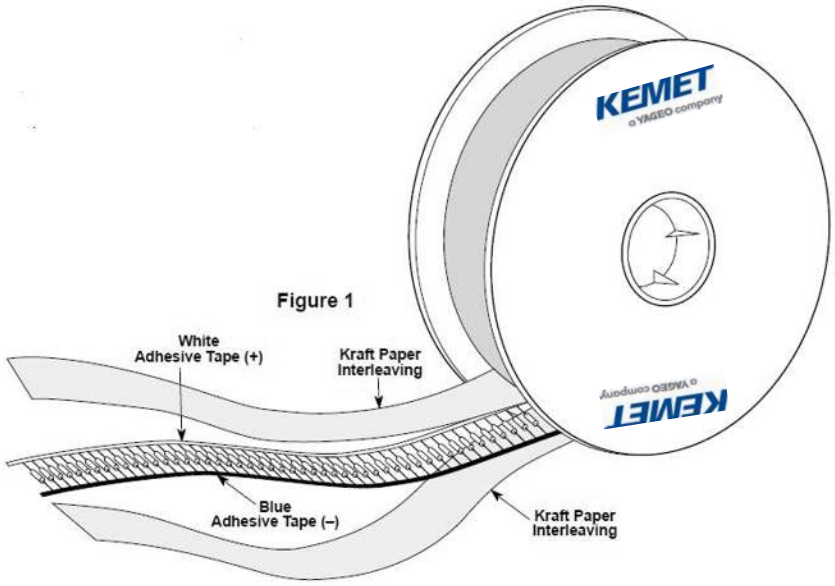


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity	Ammo Pack C-Spec
A	150/Box	3,500	C–7200	1,500	C–7293
B	75/Box	2,500	C–7200	1,000	Class I
C	20/Tray	500	C–7200	250	C–7442
D	20/Tray	400	C–7200	250	Class II C–7443 Class III

Figure 2

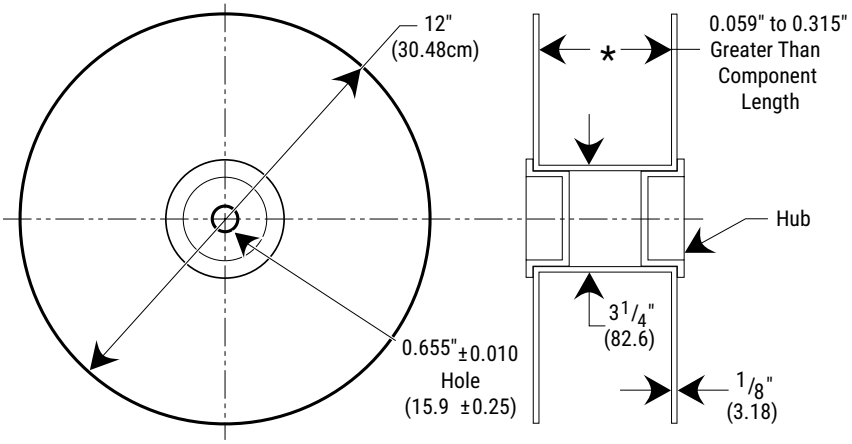


Figure 3

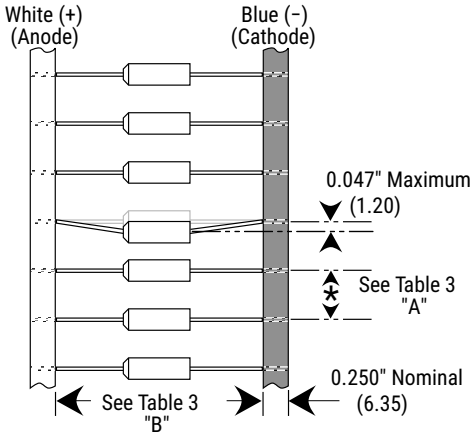


Table 3 – Tape Dimensions

Dimensions in Inches (& Millimeters)

BODY DIAMETER	A PITCH ±0.020 (0.5)	B INSIDE TAPE SPACING ±0.059 (1.5)		
		Class		
		I	II	III
≤ 0.197 (5.0)	0.200 (5.0)	2.063 (52.4)	2.500 (63.5)	2.874 (73)
0.198 (5.0) to 0.394 (10.0)	0.400 (10.0)			

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50 lbs. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lbs. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center.

Figures 1 and 2 show the KEMET standard chipboard tape reel.

A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors.

Universal splicing clips are used to connect the tape.

T216 Series Axial MIL–PRF–39003 (CSS13 Style) and T256 (CSS33 Style)

Overview

The T216 and T256 are KEMET's designation for MIL Style CSS13 and CSS33 capacitors. The T216/T256 Series is qualified to all failure rates per MIL-PRF-39003/10. Products meeting this specification have passed rigorous test requirements and are used in space applications or other equally demanding environments.

Applications

These capacitors provide circuit designers an excellent choice for blocking, bypass, decoupling, filtering, and timing applications.

Benefits

- Taped and reeled per EIA Specification RS–296
- Marking per MIL–STD–1285
- Qualified to MIL–PRF–39003 (CSS13 and CSS33 Style)
- Failure rate options: Graded – B, C
- The T216 is available in capacitance ratings from 0.12 – 330 µF and voltage rating from 6 – 75 VDC
- The T256 is available in capacitance ratings from 1.2 – 1,000 µF and voltage rating from 6 – 50 VDC
- Tolerances of ±10%
- Operating temperature range of −55°C to +125°C
- Case sizes: A, B, C, D

Ordering Information – T216/T256

T	216	A	106	K	050	C	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate	Termination Finish	C-Spec
T = Tantalum	216 (MIL–C–39003/10, CSS13) 256 (MIL–C–39003/10, CSS33)	A B C D	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50 075 = 75	Graded: B = 0.1%/k hours C = 0.01%/k hours	S = Standard (Solder-coated nickel)	Blank = Sleeved/Bulk 0100 = Unsleeved/Bulk 7200 = Tape & Reel All capacitors are sleeved unless specified.

Ordering Information – T216 (CSS13 Style)

MIL product

M39003	/10	2049	S
Capacitor Class	Slash	Dash Number	Sleeve
Military specification number	Specification sheet number	Failure rate level	S = Sleeved U = Unsleeved use C - 0100

Ordering Information – T256 (CSS33 Style)

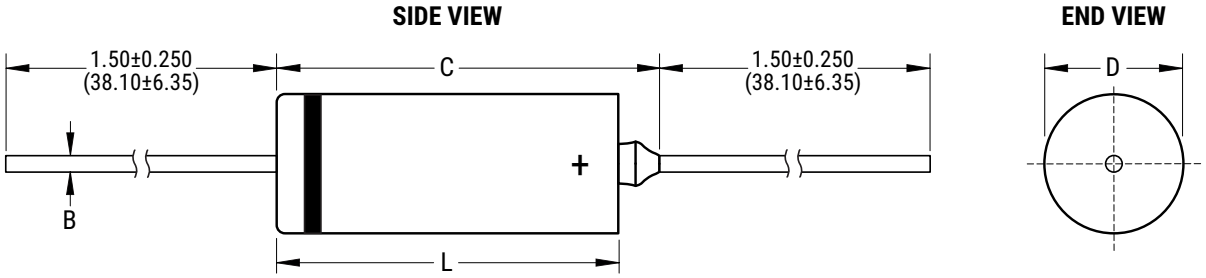
MIL product

M39003	/10	2549	S
Capacitor Class	Slash	Dash Number	Sleeve
Military specification number	Specification sheet number	Failure rate level	S = Sleeved U = Unsleeved use C - 0100

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	CSS13 = 0.12 – 330 µF at 120 Hz/25°C CSS33 = 1.2 – 1,000 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%)
Rated Voltage Range	CSS13 = 6 – 75 V CSS33 = 6 – 50 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table (rated voltage up to +125°C)
Failure Rate (MIL-PRF-39003, CSS13 and CSS33 capacitors only)	Approved failure rate: C (0.01%/k hours) – Graded

Dimensions – Inches (Millimeters)



Case Size	Uninsulated		Insulated			
	D ±0.005 ±(0.13)	L ±0.031 ±(0.79)	D ±0.010 ±(0.25)	L ±0.031 ±(0.79)	B ±0.002 ±(0.05)	C Maximum
A	0.125 (3.18)	0.250 (6.35)	0.135 (3.43)	0.286 (7.26)	0.020 (0.51)	0.422 (10.72)
B	0.175 (4.45)	0.438 (11.13)	0.185 (4.70)	0.474 (12.04)	0.020 (0.51)	0.610 (15.49)
C	0.279 (7.09)	0.650 (16.51)	0.289 (7.34)	0.686 (17.42)	0.025 (0.64)	0.822 (20.88)
D	0.341 (8.66)	0.750 (19.05)	0.351 (8.92)	0.786 (19.96)	0.025 (0.64)	0.922 (23.42)

Table 1A – T216 Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Size Code	DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS13 Style)		
						Dash Number Reference		KEMET Equivalent Military
						Failure Rate Level (%/1,000 Hours)		
						MIL–PRF–39003/10		
						Graded		
(V) 85°C	µF		µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
6	5.6	A	0.3	4	0.90	2001(1)	3001(1)	T216A565K006(2)S
6	6.8	A	0.3	6	0.80	2002(1)	3002(1)	T216A685K006(2)S
6	47.0	B	1.5	6	0.24	2003(1)	3003(1)	T216B476K006(2)S
6	56.0	B	1.5	6	0.24	2004(1)	3004(1)	T216B566K006(2)S
6	150.0	C	4.5	8	0.09	2005(1)	3005(1)	T216C157K006(2)S
6	180.0	C	5.5	8	0.08	2006(1)	3006(1)	T216C187K006(2)S
6	270.0	D	6.5	8	0.07	2007(1)	3007(1)	T216D277K006(2)S
6	330.0	D	7.5	8	0.06	2008(1)	3008(1)	T216D337K006(2)S
10	3.9	A	0.3	4	1.00	2009(1)	3009(1)	T216A395K010(2)S
10	4.7	A	0.4	4	0.90	2010(1)	3010(1)	T216A475K010(2)S
10	27.0	B	2.0	6	0.25	2011(1)	3011(1)	T216B276K010(2)S
10	33.0	B	2.5	6	0.24	2012(1)	3012(1)	T216B336K010(2)S
10	39.0	B	2.5	6	0.24	2013(1)	3013(1)	T216B396K010(2)S
10	82.0	C	4.0	6	0.12	2014(1)	3014(1)	T216C826K010(2)S
10	100.0	C	5.0	8	0.11	2015(1)	3015(1)	T216C107K010(2)S
10	120.0	C	6.0	8	0.10	2016(1)	3016(1)	T216C127K010(2)S
10	180.0	D	9.0	8	0.08	2017(1)	3017(1)	T216D187K010(2)S
10	220.0	D	10.0	8	0.07	2018(1)	3018(1)	T216D227K010(2)S
15	2.7	A	0.3	4	1.20	2019(1)	3019(1)	T216A275K015(2)S
15	3.3	A	0.4	4	1.00	2020(1)	3020(1)	T216A335K015(2)S
15	18.0	B	2.0	6	0.27	2021(1)	3021(1)	T216B186K015(2)S
15	22.0	B	2.0	6	0.26	2022(1)	3022(1)	T216B226K015(2)S
15	56.0	C	4.0	6	0.15	2023(1)	3023(1)	T216C566K015(2)S
15	68.0	C	5.0	6	0.13	2024(1)	3024(1)	T216C686K015(2)S
15	120.0	D	9.0	8	0.09	2025(1)	3025(1)	T216D127K015(2)S
15	150.0	D	10.0	8	0.09	2026(1)	3026(1)	T216D157K015(2)S
20	1.2	A	0.3	4	1.40	2027(1)	3027(1)	T216A125K020(2)S
20	1.5	A	0.3	4	1.30	2028(1)	3028(1)	T216A155K020(2)S
20	1.8	A	0.3	4	1.25	2029(1)	3029(1)	T216A185K020(2)S
20	2.2	A	0.4	4	1.20	2030(1)	3030(1)	T216A225K020(2)S
20	8.2	B	1.0	6	0.39	2031(1)	3031(1)	T216B825K020(2)S
20	10.0	B	1.5	6	0.35	2032(1)	3032(1)	T216B106K020(2)S
20	12.0	B	1.8	6	0.32	2033(1)	3033(1)	T216B126K020(2)S
20	15.0	B	2.0	6	0.29	2034(1)	3034(1)	T216B156K020(2)S
20	27.0	C	2.5	6	0.21	2035(1)	3035(1)	T216C276K020(2)S
20	33.0	C	3.5	6	0.19	2036(1)	3036(1)	T216C336K020(2)S
20	39.0	C	4.0	6	0.17	2037(1)	3037(1)	T216C396K020(2)S
20	47.0	C	4.5	6	0.16	2038(1)	3038(1)	T216C476K020(2)S
20	56.0	D	5.5	6	0.13	2039(1)	3039(1)	T216D566K020(2)S
20	68.0	D	7.0	6	0.12	2040(1)	3040(1)	T216D686K020(2)S
20	82.0	D	8.0	6	0.11	2041(1)	3041(1)	T216D826K020(2)S
20	100.0	D	10.0	8	0.10	2042(1)	3042(1)	T216D107K020(2)S
35	5.6	B	1.3	4	0.47	2043(1)	3043(1)	T216B565K035(2)S
35	6.8	B	1.5	6	0.43	2044(1)	3044(1)	T216B685K035(2)S
35	22.0	C	4.0	6	0.25	2045(1)	3045(1)	T216C226K035(2)S
35	27.0	D	4.5	6	0.18	2046(1)	3046(1)	T216D276K035(2)S
35	33.0	D	5.5	6	0.17	2047(1)	3047(1)	T216D336K035(2)S
35	39.0	D	7.0	6	0.15	2048(1)	3048(1)	T216D396K035(2)S
(V) 85°C	µF	Case Size Code	µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
Rated Voltage	Rated Capacitance		DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS13 Style)		

(1) To complete MIL–PRF–39003 dash part number, insert S for sleeved or U for unsleeved. If "U" ordered also use C0100.
(2) To complete KEMET Part Number (T216, T256), insert Graded failure rate - B for .1%/k hours, C for .01%/k hours. Designates reliability level.

Table 1A – T216 Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS13 Style)		
						Dash Number Reference		KEMET Equivalent Military
						Failure Rate Level (%/1,000 Hours)		
						MIL–PRF–39003/10		
						Graded		
(V) 85°C	µF		µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
35	47.0	D	8.0	6	0.14	2049(1)	3049(1)	T216D476K035(2)S
50	0.12	A	0.3	4	6.50	2067(1)	3067(1)	T216A124K050(2)S
50	0.15	A	0.3	4	5.50	2068(1)	3068(1)	T216A154K050(2)S
50	0.18	A	0.3	4	5.00	2069(1)	3069(1)	T216A184K050(2)S
50	0.22	A	0.3	4	4.00	2070(1)	3070(1)	T216A224K050(2)S
50	0.27	A	0.3	4	3.50	2071(1)	3071(1)	T216A274K050(2)S
50	0.33	A	0.3	4	3.30	2072(1)	3072(1)	T216A334K050(2)S
50	0.39	A	0.3	4	3.20	2073(1)	3073(1)	T216A394K050(2)S
50	0.47	A	0.3	4	3.00	2074(1)	3074(1)	T216A474K050(2)S
50	0.56	A	0.3	4	2.50	2075(1)	3075(1)	T216A564K050(2)S
50	0.68	A	0.3	4	1.80	2076(1)	3076(1)	T216A684K050(2)S
50	0.82	A	0.3	4	1.60	2077(1)	3077(1)	T216A824K050(2)S
50	1.0	A	0.4	4	1.40	2078(1)	3078(1)	T216A105K050(2)S
50	1.2	B	0.4	4	1.20	2079(1)	3079(1)	T216B125K050(2)S
50	1.5	B	0.6	4	1.10	2080(1)	3080(1)	T216B155K050(2)S
50	1.8	B	0.7	4	0.92	2081(1)	3081(1)	T216B185K050(2)S
50	2.2	B	0.8	4	0.80	2082(1)	3082(1)	T216B225K050(2)S
50	2.7	B	1.0	4	0.68	2083(1)	3083(1)	T216B275K050(2)S
50	3.3	B	1.2	4	0.62	2084(1)	3084(1)	T216B335K050(2)S
50	3.9	B	1.5	4	0.56	2085(1)	3085(1)	T216B395K050(2)S
50	4.7	B	1.7	4	0.51	2086(1)	3086(1)	T216B475K050(2)S
50	5.6	C	2.2	4	0.44	2087(1)	3087(1)	T216C565K050(2)S
50	6.8	C	2.2	6	0.40	2088(1)	3088(1)	T216C685K050(2)S
50	8.2	C	2.5	6	0.36	2089(1)	3089(1)	T216C825K050(2)S
50	10.0	C	2.5	6	0.33	2090(1)	3090(1)	T216C106K050(2)S
50	12.0	C	3.0	6	0.30	2091(1)	3091(1)	T216C126K050(2)S
50	15.0	C	4.0	6	0.27	2092(1)	3092(1)	T216C156K050(2)S
50	18.0	C	4.5	6	0.25	2093(1)	3093(1)	T216C186K050(2)S
50	22.0	D	5.5	6	0.20	2094(1)	3094(1)	T216D226K050(2)S
75	0.15	A	0.3	4	4.4	2097(1)	3097(1)	T216A154K075(2)S
75	0.18	A	0.3	4	4.0	2098(1)	3098(1)	T216A184K075(2)S
75	0.22	A	0.3	4	3.5	2099(1)	3099(1)	T216A224K075(2)S
75	0.27	A	0.3	4	3.1	2100(1)	3100(1)	T216A274K075(2)S
75	0.33	A	0.3	4	2.8	2101(1)	3101(1)	T216A334K075(2)S
75	0.39	A	0.3	4	2.6	2102(1)	3102(1)	T216A394K075(2)S
75	0.47	A	0.3	4	2.4	2103(1)	3103(1)	T216A474K075(2)S
75	0.56	A	0.3	4	2.25	2104(1)	3104(1)	T216A564K075(2)S
75	0.68	A	0.3	4	2.10	2105(1)	3105(1)	T216A684K075(2)S
75	0.82	B	0.3	4	1.47	2106(1)	3106(1)	T216B824K075(2)S
75	1.0	B	0.4	4	1.40	2107(1)	3107(1)	T216B105K075(2)S
75	1.2	B	0.4	4	1.33	2108(1)	3108(1)	T216B125K075(2)S
75	1.5	B	0.6	4	1.06	2109(1)	3109(1)	T216B155K075(2)S
75	1.8	B	0.7	4	0.92	2110(1)	3110(1)	T216B185K075(2)S
75	2.2	B	0.8	4	0.80	2111(1)	3111(1)	T216B225K075(2)S
75	2.7	B	1.0	4	0.68	2112(1)	3112(1)	T216B275K075(2)S
75	3.3	B	1.2	4	0.62	2113(1)	3113(1)	T216B335K075(2)S
75	3.9	B	1.5	4	0.56	2114(1)	3114(1)	T216B395K075(2)S
75	4.7	C	3.0	4	0.47	2115(1)	3115(1)	T216C475K075(2)S
(V) 85°C	µF	Case Size Code	µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
Rated Voltage	Rated Capacitance		DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS13 Style)		

(1) To complete MIL–PRF–39003 dash part number, insert S for sleeved or U for unsleeved. If "U" ordered also use C0100.
(2) To complete KEMET Part Number (T216, T256), insert Graded failure rate - B for .1%/k hours, C for .01%/k hours. Designates reliability level.

Table 1A – T216 Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS13 Style)		
						Dash Number Reference		KEMET Equivalent Military
						Failure Rate Level (%/1,000 Hours)		
						MIL–PRF–39003/10		
						Graded		
(V) 85°C	µF		µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
75	5.6	C	3.0	4	0.44	2116(1)	3116(1)	T216C565K075(2)S
75	6.8	C	5.0	6	0.44	2117(1)	3117(1)	T216C685K075(2)S
75	8.2	C	5.0	6	0.36	2118(1)	3118(1)	T216C825K075(2)S
75	10.0	C	5.0	6	0.33	2119(1)	3119(1)	T216C106K075(2)S
75	12.0	D	5.0	6	0.26	2120(1)	3120(1)	T216D126K075(2)S
75	15.0	D	7.0	6	0.23	2121(1)	3121(1)	T216D156K075(2)S
(V) 85°C	µF	Case Size Code	µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
Rated Voltage	Rated Capacitance		DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS13 Style)		

Table 1B – T256 Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Size Code	DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS33 Style)		
						Dash Number Reference		KEMET Equivalent Military
						Failure Rate Level (%/1,000 Hours)		
						MIL–PRF–39003/10		
						Graded		
(V) 85°C	µF		µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
6	10.0	A	0.5	6	0.70	2500(1)	3500(1)	T256A106K006(2)S
6	12.0	A	0.5	6	0.60	2501(1)	3501(1)	T256A126K006(2)S
6	100.0	B	1.0	8	0.20	2502(1)	3502(1)	T256B107K006(2)S
6	330.0	C	2.0	8	0.065	2503(1)	3503(1)	T256B337K006(2)S
6	390.0	C	2.0	10	0.065	2504(1)	3504(1)	T256C397K006(2)S
6	470.0	C	2.0	10	0.060	2505(1)	3505(1)	T256C447K006(2)S
6	680.0	D	5.0	10	0.060	2506(1)	3506(1)	T256D687K006(2)S
6	820.0	D	5.0	10	0.055	2507(1)	3507(1)	T256D827K006(2)S
6	1000.0	D	5.0	10	0.050	2508(1)	3508(1)	T256D108K006(2)S
10	6.8	A	0.5	6	0.80	2509(1)	3509(1)	T256A685K010(2)S
10	8.2	A	0.5	6	0.70	2510(1)	3510(1)	T256A825K010(2)S
10	47.0	B	1.0	6	0.22	2511(1)	3511(1)	T256B476K010(2)S
10	56.0	B	1.0	6	0.20	2512(1)	3512(1)	T256B566K010(2)S
10	68.0	B	1.0	6	0.18	2513(1)	3513(1)	T256B686K010(2)S
10	82.0	B	1.0	6	0.15	2514(1)	3514(1)	T256B826K010(2)S
10	220.0	C	1.0	2	0.090	2515(1)	3515(1)	T256C227K010(2)S
(V) 85°C	µF	Case Size Code	µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
Rated Voltage	Rated Capacitance		DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS33 Style)		

(1) To complete MIL–PRF–39003 dash part number, insert S for sleeved or U for unsleeved. If "U" ordered also use C0100.
(2) To complete KEMET Part Number (T216, T256), insert Graded failure rate - B for .1%/k hours, C for .01%/k hours. Designates reliability level.

Table 1B – T256 Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS33 Style)		
						Dash Number Reference		KEMET Equivalent Military
						Failure Rate Level (%/1,000 Hours)		
						MIL–PRF–39003/10		
						Graded		
(V) 85°C	µF		µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
10	270.0	C	2.0	2	0.075	2516(1)	3516(1)	T256C277K010(2)S
10	390.0	D	2.0	10	0.070	2517(1)	3517(1)	T256D397K010(2)S
10	470.0	D	4.0	10	0.065	2518(1)	3518(1)	T256D477K010(2)S
10	560.0	D	4.0	10	0.060	2519(1)	3519(1)	T256D567K010(2)S
15	4.7	A	0.5	4	0.90	2520(1)	3520(1)	T256A475K015(2)S
15	5.6	A	0.5	4	0.80	2521(1)	3521(1)	T256A565K015(2)S
15	33.0	B	1.0	6	0.24	2522(1)	3522(1)	T256B336K015(2)S
15	39.0	B	1.0	6	0.22	2523(1)	3523(1)	T256B396K015(2)S
15	150.0	C	1.0	8	0.10	2524(1)	3524(1)	T256C157K015(2)S
15	180.0	C	2.0	8	0.09	2525(1)	3525(1)	T256C187K015(2)S
15	220.0	D	2.0	8	0.07	2526(1)	3526(1)	T256D227K015(2)S
15	270.0	D	2.0	8	0.065	2527(1)	3527(1)	T256D277K015(2)S
15	330.0	D	2.0	8	0.060	2528(1)	3528(1)	T256D337K015(2)S
20	2.7	A	0.5	4	1.15	2529(1)	3529(1)	T256A275K020(2)S
20	3.3	A	0.5	4	0.95	2530(1)	3530(1)	T256A335K020(2)S
20	3.9	A	0.5	4	0.90	2531(1)	3531(1)	T256A395K020(2)S
20	18.0	B	1.0	6	0.27	2532(1)	3532(1)	T256B186K020(2)S
20	22.0	B	1.0	6	0.26	2533(1)	3533(1)	T256B226K020(2)S
20	27.0	B	1.0	6	0.24	2534(1)	3534(1)	T256B276K020(2)S
20	56.0	C	1.0	6	0.15	2535(1)	3535(1)	T256C566K020(2)S
20	68.0	C	1.0	6	0.14	2536(1)	3536(1)	T256C686K020(2)S
20	82.0	C	1.0	6	0.12	2537(1)	3537(1)	T256C826K020(2)S
20	100.0	C	1.0	6	0.10	2538(1)	3538(1)	T256C107K020(2)S
20	120.0	C	1.0	6	0.09	2539(1)	3539(1)	T256C127K020(2)S
20	150.0	D	2.0	8	0.08	2540(1)	3540(1)	T256D157K020(2)S
20	180.0	D	2.0	8	0.07	2541(1)	3541(1)	T256D187K020(2)S
35	1.8	A	0.5	4	0.20	2542(1)	3542(1)	T256A185K035(2)S
35	8.2	B	1.0	6	0.40	2543(1)	3543(1)	T256B825K035(2)S
35	10.0	B	1.0	6	0.35	2544(1)	3544(1)	T256B106K035(2)S
35	33.0	C	1.0	6	0.19	2545(1)	3545(1)	T256C336K035(2)S
35	39.0	C	1.0	6	0.17	2546(1)	3546(1)	T256C396K035(2)S
35	47.0	C	1.0	6	0.15	2547(1)	3547(1)	T256C476K035(2)S
35	56.0	D	2.0	6	0.13	2548(1)	3548(1)	T256D566K035(2)S
35	68.0	D	2.0	6	0.12	2549(1)	3549(1)	T256D686K035(2)S
50	1.2	A	0.5	4	1.30	2550(1)	3550(1)	T256A125K050(2)S
50	1.5	A	0.5	4	1.20	2551(1)	3551(1)	T256A155K050(2)S
50	5.6	B	1.0	4	0.47	2552(1)	3552(1)	T256B565K050(2)S
50	6.8	B	1.0	6	0.43	2553(1)	3553(1)	T256B685K050(2)S
50	22.0	C	1.0	6	0.22	2554(1)	3554(1)	T256C226K050(2)S
50	27.0	C	1.0	6	0.20	2555(1)	3555(1)	T256C276K050(2)S
50	33.0	D	1.0	6	0.18	2556(1)	3556(1)	T256D336K050(2)S
50	39.0	D	1.0	6	0.16	2557(1)	3557(1)	T256D396K050(2)S
(V) 85°C	µF	Case Size Code	µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
Rated Voltage	Rated Capacitance		DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS33 Style)		

(1) To complete MIL–PRF–39003 dash part number, insert S for sleeved or U for unsleeved. If "U" ordered also use C0100.
(2) To complete KEMET Part Number (T216, T256), insert Graded failure rate - B for .1%/k hours, C for .01%/k hours. Designates reliability level.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Permissible AC ripple current can be determined by the following:

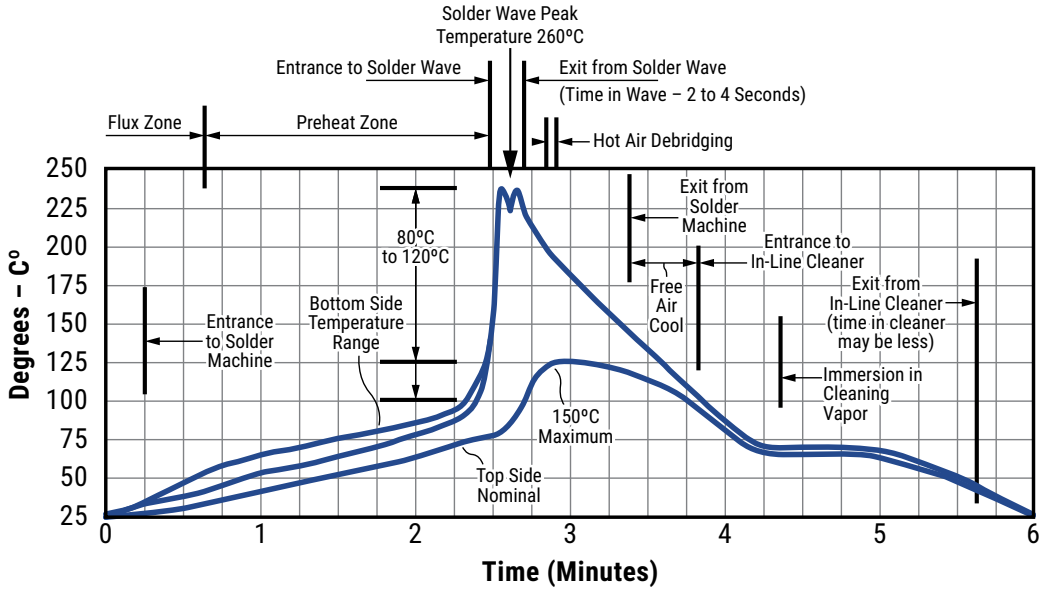
$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

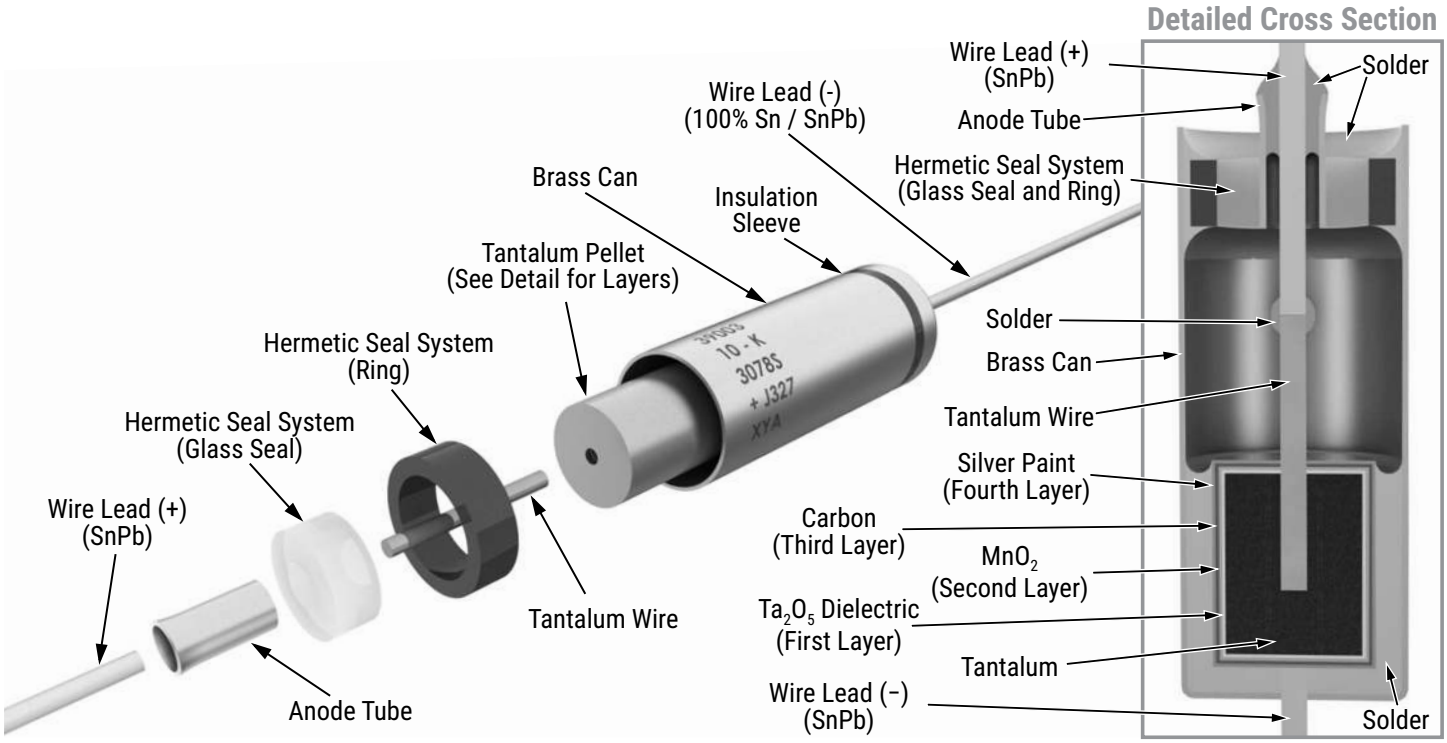
Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

Optimum Solder Wave Profile

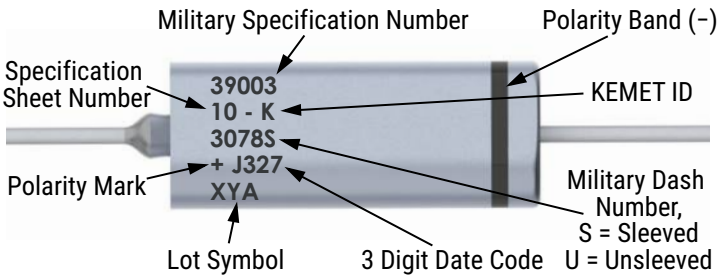


Construction

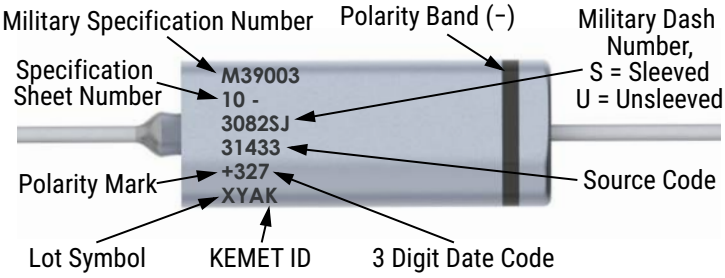


Capacitor Marking

A Case

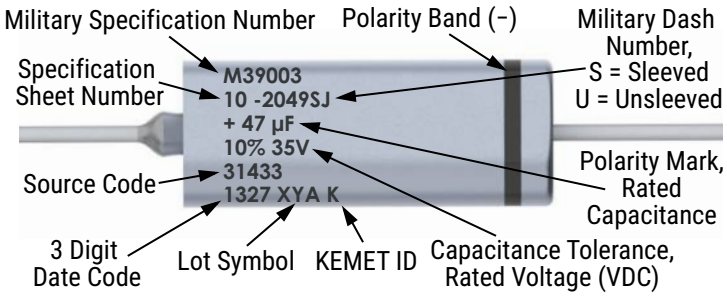


B Case



Date Code	3 Digit	4 Digit
Year	5 = 2015 6 = 2016 7 = 2017 8 = 2018 9 = 2019	15 = 2015 16 = 2016 17 = 2017 18 = 2018 19 = 2019
Week	01 = 1st week of the year to 52 = 52nd week of the year	

C & D Case



Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS-296.

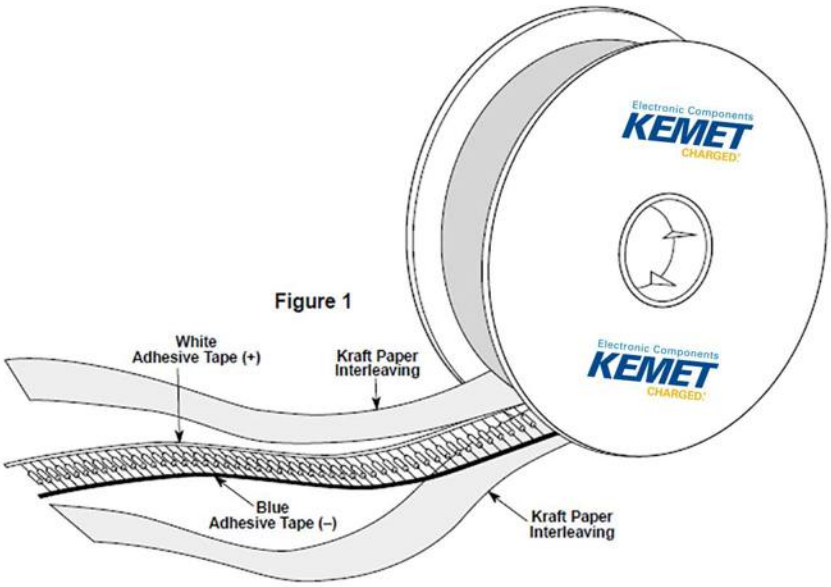


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec
A	40/Tray	3,500	C–7200
B	30/Tray	2,500	C–7200
C	20/Tray	500	C–7200
D	20/Tray	400	C–7200

Figure 2

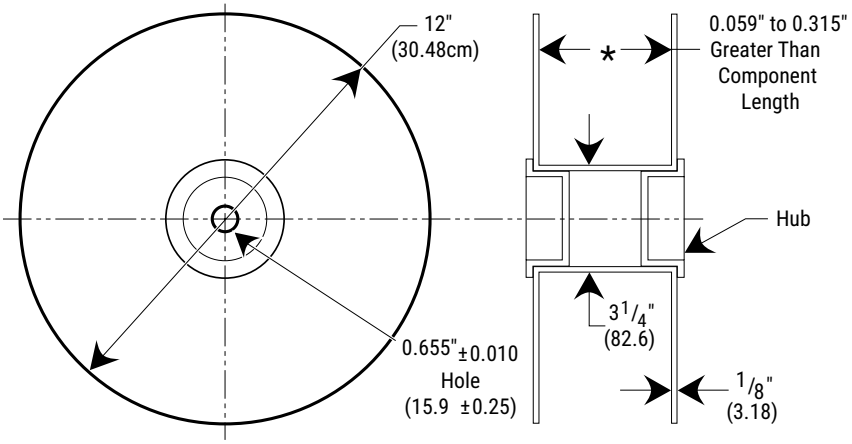


Figure 3

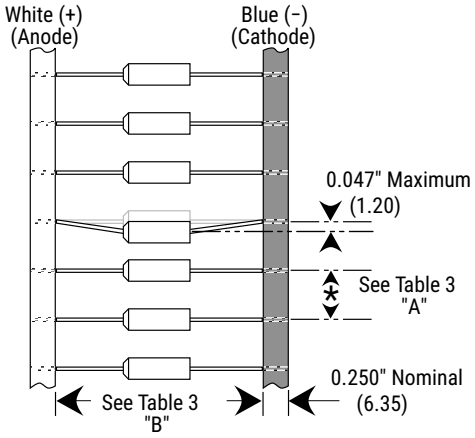


Table 3 – Tape Dimensions

Dimensions in Inches (& Millimeters)

BODY DIAMETER	A PITCH ±0.020 (0.5)	B INSIDE TAPE SPACING
≤ 0.197 (5.0)	0.200 (5.0)	2.063 (52.4) +0.079, −0.039 (+2.0, −1.0)
0.198 (5.0) to 0.394 (10.0)	0.400 or (10.0)	2.874 (73) +/0.059

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50 lbs. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lbs. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center.

Figures 1 and 2 show the KEMET standard chipboard tape reel.

A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors.

Universal splicing clips are used to connect the tape.

T322 & T323 MIL-PRF-49137/1 and /5 (CX01 & CX05 Style)

Overview

The T322 and T323 (CX01 and CX05) capacitors are a complete line of extended range molded solid tantalum capacitors designed specifically for high-speed automatic insertion applications. These capacitors offer an extremely high capacitance-to-volume ratio while still maintaining excellent performance characteristics. Supplied in six axial lead tubular case sizes, these capacitors are idealy suited for use in printed wiring boards and all applications requiring a high degree of packaging density.

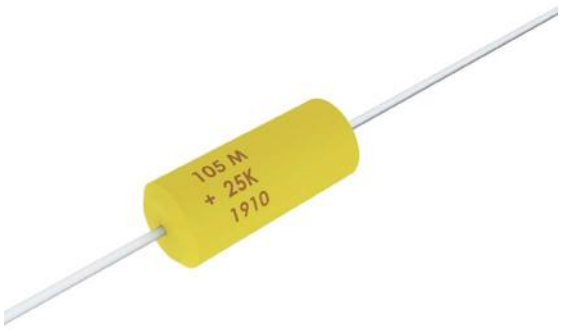
These capacitors can be supplied in bulk packaging or lead-taped on reels. The T322/T323 capacitor dimensions and tight lead wire-to-body concentricity permit installation by the same automatic insertion equipment used for diodes and resistors.The gold-colored epoxy permits laser marking with outstanding permanency and legibility. T323 capacitors are qualified under MIL-PRF-49137/1 and 5 as Military Style CX01 and CX05.

Benefits

- Taped and reeled per EIA Specification RS–296
- Laser-marked case
- Qualified to MIL–PRF–49137/1 and 5 (CX01 and CX05 Style)
- Capacitance values of 0.1 to 330 µF
- Tolerances of ±5%, ±10% and ±20% (M and K only tolerances available for T323 Series)
- Voltage rating of 2 – 50 VDC
- Operating temperature range of −55°C to +85°C
- Case sizes: A, B, C, D, E, F

Applications

Typical applications include decoupling, blocking, bypassing and filtering in commercial computers, data processing, communications, and other electronic equipment. This product is well-suited for decoupling required by high speed computers due to its low ESR/impedance at high frequencies.



Ordering Information

T	32X	A	105	M	035	A	T	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Military Product	Termination Finish	Packaging
T = Tantalum	Axial Molded Polar Solid Tantalum. Insert appropriate number to replace letter "X" 322 = Commercial Grade Series 323 = Qualified under MIL-PRF-49137/1 and 5 (CX01/CX05 Style)	A B C D E F	First two digits represent significant figures. Third digit specifies number of zeros to follow.	J = ±5%* K = ±10% M = ±20%	002 = 2 004 = 4 006 = 6 010 = 10 015 = 15 020 = 20 025 = 25 035 = 35 050 = 50	Not Applicable	S = Standard (solder-coated nickel) T = 100% tin (Sn)- plated	Blank = Bulk 7200 = Reel

** J Tolerance available in T322 series only*

MIL–PRF–49137/1/5 (CX01 and CX05 Style)

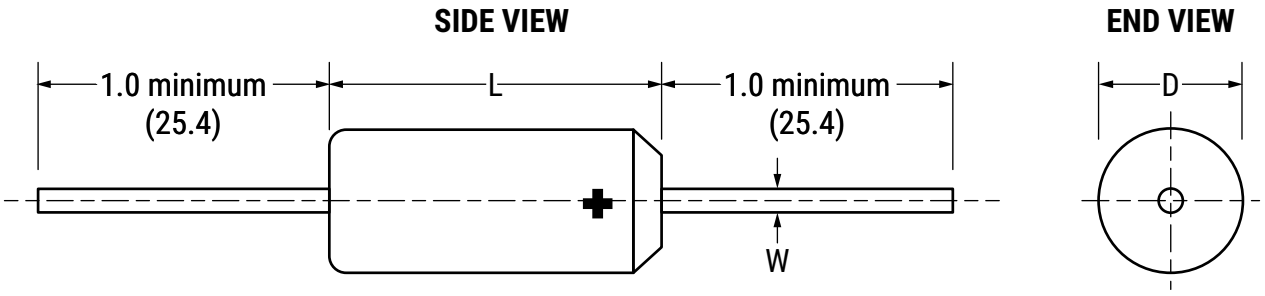
CX01	D	475	K
Style	Rated Voltage (VDC)	Capacitance Code (pF)	Capacitance Tolerance
CX = Capacitors, Solid Electrolyte,Tantalum, Polar, Molded, Nonhermetically Sealed. 01 / 05 = Style	D = 6 F = 10 H = 15 J = 20 K = 25 M = 35 N = 50	First two digits represent significant figures. Third digit specifies number of zeros to follow.	K = ±10% M = ±20%

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 330 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	2 – 50 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table (for reference only)
Leakage Current	Refer to Part Number Electrical Specification Table (rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)

Dimensions – Inches (Millimeters)

Metric will govern



Case Size	D Maximum	L Maximum	W
A	0.095 (2.41)	0.260 (6.60)	0.020 (0.51)
B	0.110 (2.79)	0.290 (7.37)	0.020 (0.51)
C	0.180 (4.57)	0.345 (8.76)	0.020 (0.51)
D	0.180 (4.57)	0.420 (10.67)	0.020 (0.51)
E	0.280 (7.11)	0.530 (13.46)	0.025 (0.64)
F	0.300 (7.62)	0.710 (18.03)	0.025 (0.64)

CX Style

KEMET Case Size	Style	MIL Case Size	Dimensions		
			D	L	W
A	CX01 / CX05	A	0.085 ±0.015 (2.16±0.38)	0.250 ±0.020 (6.35±0.51)	0.020 ±0.002 (0.51 ±.050)
B		A*1/B	0.100 ±0.015 (2.54±0.38)	0.280 ±0.020 (7.11±0.51)	0.020 ±0.002 (0.51 ±.050)
C		C	0.170 ±0.015 (4.32±0.38)	0.335 ±0.020 (8.51±0.51)	0.020 ±0.002 (0.51 ±.050)
D		D	0.170 ±0.015 (4.32±0.38)	0.410 ±0.020 (10.41±0.51)	0.020 ±0.002 (0.51 ±.050)

**1 There may be a disconnect between the Case Size Designator in MIL-PRF-49137/1 for the CX01 Style but dimensionally, the KEMET Case Size meets the dimensional requirements of the MIL-PRF.*

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	CX01 & CX05 Capacitors per MIL–PRF–49137/1 & 5	
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minimum	% at 25°C 120 Hz Maximum	Military Part Number	KEMET Part Number
2	6.8	A	T322A685(1)002A(2)	0.5	10		
2	8.2	A	T322A825(1)002A(2)	0.5	10		
2	10.0	A	T322A106(1)002A(2)	0.5	10		
2	12.0	B	T322B126(1)002A(2)	0.5	10		
2	15.0	B	T322B156(1)002A(2)	0.5	10		
2	18.0	B	T322B186(1)002A(2)	0.5	10		
2	22.0	B	T322B226(1)002A(2)	0.5	10		
2	27.0	B	T322B276(1)002A(2)	0.5	10		
2	33.0	B	T322B336(1)002A(2)	0.5	10		
2	39.0	C	T322C396(1)002A(2)	0.6	10		
2	47.0	C	T322C476(1)002A(2)	0.8	10		
2	56.0	C	T322C566(1)002A(2)	0.9	10		
2	68.0	C	T322C686(1)002A(2)	1.1	10		
4	4.7	A	T322A475(1)004A(2)	0.5	8		
4	5.6	A	T322A565(1)004A(2)	0.5	8		
4	6.8	A	T322A685(1)002A(2)	0.5	8		
4	8.2	B	T322B825(1)004A(2)	0.5	8		
4	10.0	B	T322B106(1)004A(2)	0.5	8		
4	12.0	B	T322B126(1)004A(2)	0.5	8		
4	15.0	B	T322B156(1)004A(2)	0.5	8		
4	18.0	B	T322B186(1)004A(2)	0.6	8		
4	22.0	B	T322B226(1)004A(2)	0.7	8		
4	27.0	C	T322C276(1)004A(2)	0.9	8		
4	33.0	C	T322C336(1)004A(2)	1.1	8		
4	39.0	C	T322C396(1)004A(2)	1.2	8		
4	47.0	C	T322C476(1)004A(2)	1.5	8		
4	56.0	D	T322D566(1)004A(2)	1.8	8		
4	68.0	D	T322D686(1)004A(2)	2.2	8		
6	3.3	A	T322A335(1)006A(2)	0.5	4		
6	3.9	A	T322A395(1)006A(2)	0.5	4		
6	3.9	B	T322B395(1)006A(2)	1.0	6	CX01D395(3)	T323B395(3)006AS
6	4.7	A	T322A475(1)006A(2)	0.5	4	CX05D475(3)	T323A475(3)006AS
6	4.7	B	T322B475(1)006A(2)	1.0	6	CX01D475(3)	T323B475(3)006AS
6	5.6	B	T322B565(1)006A(2)	1	6	CX01D565(3)	T323B565(3)006AS
6	6.8	B	T322B685(1)006A(2)	1	6	CX01D685(3)	T323B685(3)006AS
6	8.2	B	T322B825(1)006A(2)	1	8	CX01D825(3)	T323B825(3)006AS
6	10.0	B	T322B106(1)006A(2)	1	8	CX01D106(3)	T323B106(3)006AS
6	12.0	B	T322B126(1)006A(2)	1	8	CX01D126(3)	T323B126(3)006AS
6	15.0	B	T322B156(1)006A(2)	1	8	CX05D156(3)	T323B156(3)006AS
6	18.0	C	T322C186(1)006A(2)	0.9	6		
6	22.0	C	T322C226(1)006A(2)	1.1	6		
6	27.0	C	T322C276(1)006A(2)	1.3	6		
6	33.0	C	T322C336(1)006A(2)	1.5	8	CX05D336(3)	T323C336(3)006AS
6	39.0	D	T322D396(1)006A(2)	1.9	6		
6	47.0	D	T322D476(1)006A(2)	3	8	CX05D476(3)	T323D476(3)006AS
6	56.0	D	T322D566(1)006A(2)	2.7	6		
6	68.0	D	T322D686(1)006A(2)	3.3	6		
6	82.0	E	T322E826(1)006A(2)	3.9	8		
6	100.0	E	T322E107(1)006A(2)	4.8	8		
6	120.0	E	T322E127(1)006A(2)	5.0	8		
(V) 85°C	µF	Case Code/ Case Size	(see below for part options)	µA at 25°C Max/5 Minimum	% at 25°C 120 Hz Maximum	Military Part Number	KEMET Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF	CX01 & CX05 Capacitors per MIL–PRF–49137/1 & 5	

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
(3) To complete MIL-PRF part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(4) To complete MIL-PRF part number, insert 01 for specification sheet /1 or 05 for specification sheet /5.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	CX01 & CX05 Capacitors per MIL–PRF–49137/1 & 5	
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minimum	% at 25°C 120 Hz Maximum	Military Part Number	KEMET Part Number
6	150.0	E	T322E157(1)006A(2)	5.0	8		
6	180.0	E	T322E187(1)006A(2)	8.6	8		
6	220.0	E	T322E227(1)006A(2)	10.0	8		
6	270.0	F	T322F277(1)006A(2)	10.0	8		
6	330.0	F	T322F337(1)006A(2)	10.0	8		
10	2.2	A	T322A225(1)010A(2)	0.5	4		
10	2.7	A	T322A275(1)010A(2)	0.5	4		
10	2.7	B	T322B275(1)010A(2)	1.0	6	CX01F275(3)	T323B275(3)010AS
10	3.3	A	T322A335(1)010A(2)	1.0	6	CX05F335(3)	T323A335(3)010AS
10	3.3	B	T322B335(1)010A(2)	1.0	6	CX01F335(3)	T323B335(3)010AS
10	3.9	B	T322B395(1)010A(2)	0.5	4		
10	4.7	B	T322B475(1)010A(2)	0.5	4		
10	5.6	B	T322B565(1)010A(2)	0.5	4		
10	6.8	B	T322B685(1)010A(2)	0.5	6		
10	8.2	B	T322B825(1)010A(2)	0.7	6		
10	10.0	B	T322B106(1)010A(2)	1.0	8	CX05F106(3)	T323B106(3)010AS
10	12.0	C	T322C126(1)010A(2)	1.0	6		
10	15.0	C	T322C156(1)010A(2)	1.2	6		
10	18.0	C	T322C186(1)010A(2)	1.4	6		
10	22.0	C	T322C226(1)010A(2)	1.5	8	CX05F226(3)	T323C226(3)010AS
10	27.0	D	T322D276(1)010A(2)	2.0	8	CX05F276(3)	T323D276(3)010AS
10	33.0	D	T322D336(1)010A(2)	3	8	CX05F336(3)	T323D336(3)010AS
10	39.0	D	T322D396(1)010A(2)	5	8	CX05F396(3)	T323D396(3)010AS
10	47.0	D	T322D476(1)010A(2)	5	8	CX05F476(3)	T323D476(3)010AS
10	56.0	E	T322E566(1)010A(2)	4.4	6		
10	68.0	E	T322E686(1)010A(2)	5.0	6		
10	82.0	E	T322E826(1)010A(2)	5.0	8		
10	100.0	E	T322E107(1)010A(2)	8.0	8		
10	120.0	E	T322E127(1)010A(2)	9.6	8		
10	150.0	E	T322E157(1)010A(2)	10.0	8		
10	180.0	F	T322F187(1)010A(2)	10.0	8		
10	220.0	F	T322F227(1)010A(2)	10.0	8		
15	1.5	A	T322A155(1)015A(2)	0.5	4		
15	1.8	A	T322A185(1)015A(2)	0.5	4		
15	2.2	A	T322A225(1)015A(2)	1.0	6	CX05H225(3)	T323A225(3)015AS
15	2.7	B	T322B275(1)015A(2)	0.5	4		
15	3.3	B	T322B335(1)015A(2)	0.5	4		
15	3.9	B	T322B395(1)015A(2)	0.5	4		
15	4.7	B	T322B475(1)015A(2)	0.6	4		
15	5.6	B	T322B565(1)015A(2)	0.7	4		
15	6.8	B	T322B685(1)015A(2)	1.0	6	CX05H685(3)	T323B685(3)015AS
15	8.2	C	T322C825(1)015A(2)	1.0	6		
15	10.0	C	T322C106(1)015A(2)	1.2	6		
15	12.0	C	T322C126(1)015A(2)	1.4	6		
15	15.0	C	T322C156(1)015A(2)	1.5	8	CX05H156(3)	T323C156(3)015AS
15	18.0	D	T322D186(1)015A(2)	2.2	6		
15	22.0	D	T322D226(1)015A(2)	3.0	8	CX05H226(3)	T323D226(3)015AS
15	27.0	D	T322D276(1)015A(2)	3.2	6		
15	33.0	D	T322D336(1)015A(2)	5.0	8	CX05H336(3)	T323D336(3)015AS
15	39.0	E	T322E396(1)015A(2)	4.7	6		
(V) 85°C	µF	Case Code/ Case Size	(see below for part options)	µA at 25°C Max/5 Minimum	% at 25°C 120 Hz Maximum	Military Part Number	KEMET Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF	CX01 & CX05 Capacitors per MIL–PRF–49137/1 & 5	

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
(3) To complete MIL-PRF part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(4) To complete MIL-PRF part number, insert 01 for specification sheet /1 or 05 for specification sheet /5.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	CX01 & CX05 Capacitors per MIL–PRF–49137/1 & 5	
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minimum	% at 25°C 120 Hz Maximum	Military Part Number	KEMET Part Number
15	47.0	E	T322E476(1)015A(2)	5.0	6		
15	56.0	E	T322E566(1)015A(2)	6.7	6		
15	68.0	E	T322E686(1)015A(2)	8.2	6		
15	82.0	E	T322E826(1)015A(2)	9.8	8		
15	100.0	E	T322E107(1)015A(2)	10.0	8		
15	120.0	F	T322F127(1)015A(2)	10.0	8		
15	150.0	F	T322F157(1)015A(2)	10.0	8		
20	1.0	A	T322A105(1)020A(2)	0.5	4		
20	1.2	A	T322A125(1)020A(2)	0.5	4		
20	1.5	A	T322A155(1)020A(2)	1	6	CX05J155(3)	T323A155(3)020AS
20	1.8	B	T322B185(1)020A(2)	0.5	4		
20	2.2	B	T322B225(1)020A(2)	0.5	4		
20	2.7	B	T322B275(1)020A(2)	0.5	4		
20	3.3	B	T322B335(1)020A(2)	0.5	4		
20	3.9	B	T322B395(1)020A(2)	0.6	4		
20	4.7	B	T322B475(1)020A(2)	1	6	CX05J475(3)	T323B475(3)020AS
20	5.6	C	T322C565(1)020A(2)	0.9	4		
20	6.8	C	T322C685(1)020A(2)	1.1	6		
20	8.2	C	T322C825(1)020A(2)	1.3	6		
20	10.0	C	T322C106(1)020A(2)	1.6	6		
20	12.0	D	T322D126(1)020A(2)	1	8	CX05J126(3)	T323D126(3)020AS
20	15.0	D	T322D156(1)020A(2)	3	8	CX05J156(3)	T323D156(3)020AS
20	18.0	D	T322D186(1)020A(2)	2.9	6		
20	22.0	D	T322D226(1)020A(2)	3.5	6		
20	27.0	E	T322E276(1)020A(2)	4.3	6		
20	33.0	E	T322E336(1)020A(2)	5.0	6		
20	39.0	E	T322E396(1)020A(2)	6.2	6		
20	47.0	E	T322E476(1)020A(2)	7.5	6		
20	56.0	E	T322E566(1)020A(2)	8.9	6		
20	68.0	E	T322E686(1)020A(2)	10.0	6		
20	82.0	F	T322F826(1)020A(2)	10.0	8		
20	100.0	F	T322F107(1)020A(2)	10.0	8		
20	120.0	F	T322F127(1)020A(2)	10.0	8		
25	0.47	A	T322A474(1)025A(2)	0.5	3		
25	0.56	A	T322A564(1)025A(2)	0.5	3		
25	0.68	A	T322A684(1)025A(2)	0.5	3		
25	0.82	A	T322A824(1)025A(2)	0.5	3		
25	1.0	A	T322A105(1)025A(2)	1.0	4	CX05K105(3)	T323A105(3)025AS
25	1.2	B	T322B125(1)025A(2)	0.5	3		
25	1.5	B	T322B155(1)025A(2)	1.0	6	CX01K155(3)	T323B155(3)025AS
25	1.8	B	T322B185(1)025A(2)	1.0	6	CX01K185(3)	T323B185(3)025AS
25	2.2	B	T322B225(1)025A(2)	1.0	6	CX(4)K225(3)	T323B225(3)025AS
25	2.7	B	T322B275(1)025A(2)	0.5	3		
25	3.3	B	T322B335(1)025A(2)	1.0	6	CX05K335(3)	T323B335(3)025AS
25	3.9	C	T322C395(1)025A(2)	0.8	3		
25	4.7	C	T322C475(1)025A(2)	0.9	4		
25	5.6	C	T322C565(1)025A(2)	1.1	4		
25	6.8	C	T322C685(1)025A(2)	1.5	6	CX05K685(3)	T323C685(3)025AS
25	8.2	C	T322C825(1)025A(2)	1.4	4		
25	10.0	C	T322C106(1)025A(2)	1.5	8	CX05K106(3)	T323C106(3)025AS
(V) 85°C	µF	Case Code/ Case Size	(see below for part options)	µA at 25°C Max/5 Minimum	% at 25°C 120 Hz Maximum	Military Part Number	KEMET Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF	CX01 & CX05 Capacitors per MIL–PRF–49137/1 & 5	

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
(3) To complete MIL-PRF part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(4) To complete MIL-PRF part number, insert 01 for specification sheet /1 or 05 for specification sheet /5.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	CX01 & CX05 Capacitors per MIL–PRF–49137/1 & 5	
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minimum	% at 25°C 120 Hz Maximum	Military Part Number	KEMET Part Number
25	12.0	D	T322D126(1)025A(2)	2.4	4		
25	15.0	D	T322D156(1)025A(2)	3.0	4		
25	18.0	E	T322E186(1)025A(2)	3.6	6		
25	22.0	E	T322E226(1)025A(2)	4.4	6		
25	27.0	E	T322E276(1)025A(2)	5.4	6		
25	33.0	E	T322E336(1)025A(2)	6.6	6		
25	39.0	E	T322E396(1)025A(2)	7.9	6		
25	47.0	E	T322E476(1)025A(2)	9.4	6		
25	56.0	F	T322F566(1)025A(2)	10.0	6		
25	68.0	F	T322F686(1)025A(2)	10.0	6		
35	0.1	A	T322A104(1)035A(2)	0.5	3		
35	0.12	A	T322A124(1)035A(2)	0.5	3		
35	0.15	A	T322A154(1)035A(2)	0.5	3		
35	0.18	A	T322A184(1)035A(2)	0.5	3		
35	0.22	A	T322A224(1)035A(2)	0.5	3		
35	0.27	A	T322A274(1)035A(2)	0.5	3		
35	0.33	A	T322A334(1)035A(2)	1.0	4	CX05M334(3)	T323A334(3)035AS
35	0.39	A	T322A394(1)035A(2)	0.5	3		
35	0.47	A	T322A474(1)035A(2)	1.0	4	CX05M474(3)	T323A474(3)035AS
35	0.47	B	T322B474(1)035A(2)	1.0	4	CX01M474(3)	T323B474(3)035AS
35	0.56	B	T322B564(1)035A(2)	1.0	4	CX01M564(3)	T323B564(3)035AS
35	0.68	B	T322B684(1)035A(2)	1	4	CX01M684(3)	T323B684(3)035AS
35	0.82	B	T322B824(1)035A(2)	1	4	CX01M824(3)	T323B824(3)035AS
35	1.0	B	T322B105(1)035A(2)	1	6	CX01M105(3)	T323B105(3)035AS
35	1.2	B	T322B125(1)035A(2)	1	6	CX01M125(3)	T323B125(3)035AS
35	1.5	B	T322B155(1)035A(2)	1	6	CX05M155(3)	T323B155(3)035AS
35	1.8	C	T322C185(1)035A(2)	0.5	3		
35	2.2	C	T322C225(1)035A(2)	0.6	3		
35	2.7	C	T322C275(1)035A(2)	0.8	3		
35	3.3	C	T322C335(1)035A(2)	1.5	6	CX05M335(3)	T323C335(3)035AS
35	3.9	C	T322C395(1)035A(2)	1.5	6	CX05M395(3)	T323C395(3)035AS
35	4.7	C	T322C475(1)035A(2)	1.5	6	CX05M475(3)	T323C475(3)035AS
35	5.6	D	T322C565M035A(2)	1.6	4		
35	6.8	D	T322D685(1)035A(2)	3	6	CX05M685(3)	T323D685(3)035AS
35	8.2	D	T322D825(1)035A(2)	2.3	4		
35	10.0	D	T322D106(1)035A(2)	5	8	CX05M106(3)	T323D106(3)035AS
35	12.0	E	T322E126(1)035A(2)	3.3	4		
35	15.0	E	T322E156(1)035A(2)	4.2	6		
35	18.0	E	T322E186(1)035A(2)	5.0	6		
35	22.0	E	T322E226(1)035A(2)	6.2	6		
35	27.0	E	T322E276(1)035A(2)	7.5	6		
35	33.0	E	T322E336(1)035A(2)	9.2	6		
35	39.0	F	T322F396(1)035A(2)	10.0	6		
35	47.0	F	T322F476(1)035A(2)	10.0	6		
50	0.1	A	T322A104(1)050A(2)	1.0	4	CX05N104(3)	T323A104(3)050AS
50	0.1	B	T322B104(1)050A(2)	1.0	4	CX01N104(3)	T323B104(3)050AS
50	0.12	A	T322A124(1)050A(2)	0.5	3		
50	0.12	B	T322B124(1)050A(2)	1.0	4	CX01N124(3)	T323B124(3)050AS
50	0.15	A	T322A154(1)050A(2)	1.0	4	CX05N154(3)	T323A154(3)050AS
50	0.15	B	T322B154(1)050A(2)	1.0	4	CX01N154(3)	T323B154(3)050AS
(V) 85°C	µF	Case Code/ Case Size	(see below for part options)	µA at 25°C Max/5 Minimum	% at 25°C 120 Hz Maximum	Military Part Number	KEMET Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF	CX01 & CX05 Capacitors per MIL–PRF–49137/1 & 5	

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
(3) To complete MIL-PRF part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(4) To complete MIL-PRF part number, insert 01 for specification sheet /1 or 05 for specification sheet /5.

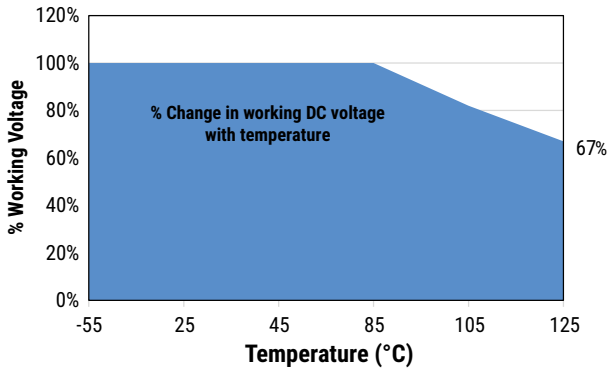
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	CX01 & CX05 Capacitors per MIL–PRF–49137/1 & 5	
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minimum	% at 25°C 120 Hz Maximum	Military Part Number	KEMET Part Number
50	0.18	A	T322A184(1)050A(2)	0.5	3		
50	0.18	B	T322B184(1)050A(2)	1.0	4	CX01N184(3)	T323B184(3)050AS
50	0.22	A	T322A224(1)050A(2)	1.0	4	CX05N224(3)	T323A224(3)050AS
50	0.22	B	T322B224(1)050A(2)	1.0	4	CX01N224(3)	T323B224(3)050AS
50	0.27	A	T322A274(1)050A(2)	0.5	3		
50	0.27	B	T322B274(1)050A(2)	1.0	4	CX01N274(3)	T323B274(3)050AS
50	0.33	B	T322B334(1)050A(2)	1.0	4	CX(4)N334(3)	T323B334(3)050AS
50	0.39	B	T322B394(1)050A(2)	1.0	4	CX01N394(3)	T323B394(3)050AS
50	0.47	B	T322B474(1)050A(2)	1.0	4	CX05N474(3)	T323B474(3)050AS
50	0.56	B	T322B564(1)050A(2)	0.5	3		
50	0.68	B	T322B684(1)050A(2)	1	4	CX05N684(3)	T323B684(3)050AS
50	0.82	B	T322B824(1)050A(2)	0.5	3		
50	1.0	B	T322B105(1)050A(2)	1	4	CX05N105(3)	T323B105(3)050AS
50	1.2	C	T322C125(1)050A(2)	0.5	3		
50	1.5	C	T322C155(1)050A(2)	1.5	6	CX05N155(3)	T323C155(3)050AS
50	1.8	C	T322C185(1)050A(2)	0.7	4		
50	2.2	C	T322C225(1)050A(2)	1.5	6	CX05N225(3)	T323C225(3)050AS
50	2.7	D	T322D275(1)050A(2)	1.1	4		
50	3.3	D	T322D335(1)050A(2)	2	6	CX05N335(3)	T323D335(3)050AS
50	3.9	D	T322D395(1)050A(2)	1.6	4		
50	4.7	D	T322D475(1)050A(2)	3	6	CX05N475(3)	T323D475(3)050AS
50	5.6	E	T322E565(1)050A(2)	2.2	4		
50	6.8	E	T322E685(1)050A(2)	2.7	4		
50	8.2	E	T322E825(1)050A(2)	3.2	4		
50	10.0	E	T322E106(1)050A(2)	4.0	6		
50	12.0	F	T322F126(1)050A(2)	4.8	6		
50	15.0	F	T322F156(1)050A(2)	6.0	6		
50	18.0	F	T322F186(1)050A(2)	7.2	6		
50	22.0	F	T322F226(1)050A(2)	8.8	6		
50	27.0	F	T322F276M050A(2)	8	6		
(V) 85°C	µF	Case Code/ Case Size	(see below for part options)	µA at 25°C Max/5 Minimum	% at 25°C 120 Hz Maximum	Military Part Number	KEMET Part Number
Rated Voltage	Rated Cap		KEMET Part Number	DC Leakage	DF	CX01 & CX05 Capacitors per MIL–PRF–49137/1 & 5	

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
(3) To complete MIL-PRF part number, insert M for ± 20%, K for ± 10%. Designates Capacitance tolerance.
(4) To complete MIL-PRF part number, insert 01 for specification sheet /1 or 05 for specification sheet /5.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	66% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage that may be applied is limited by following criteria:

1. Dissipated power must not exceed the limits specified for the Series.
2. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
3. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage.

Thermal capacities for the various case sizes have been determined empirically and are listed below. The "ripple voltage" permissible may be calculated from the impedance and ESR data shown in the respective product section.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

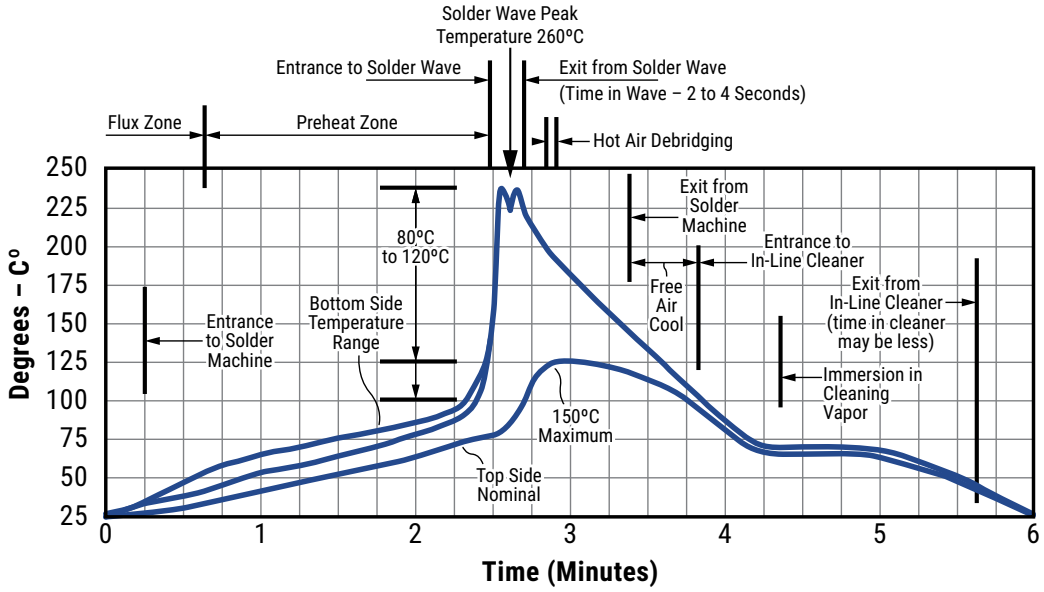
Case Size	Maximum Power Dissipation (Pmax) Watts at 25°C
A	0.060
B	0.070
C	0.080
D	0.090
E	0.100
F	0.110

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Optimum Solder Wave Profile

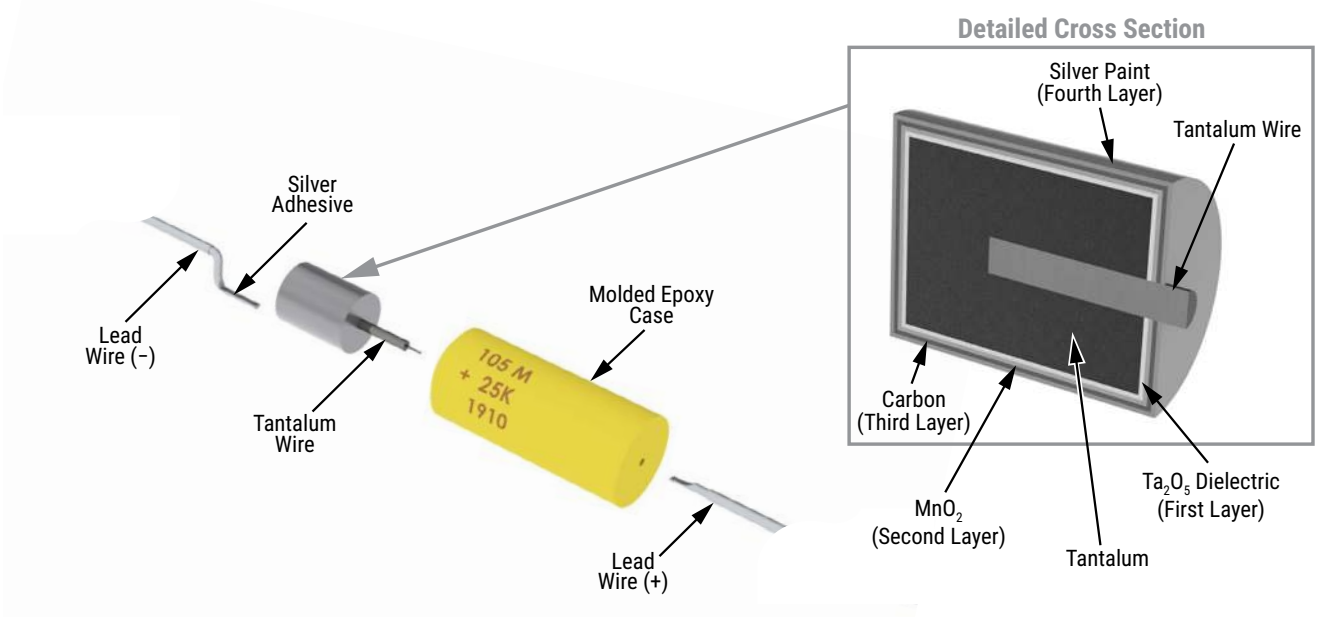


Reverse Voltage

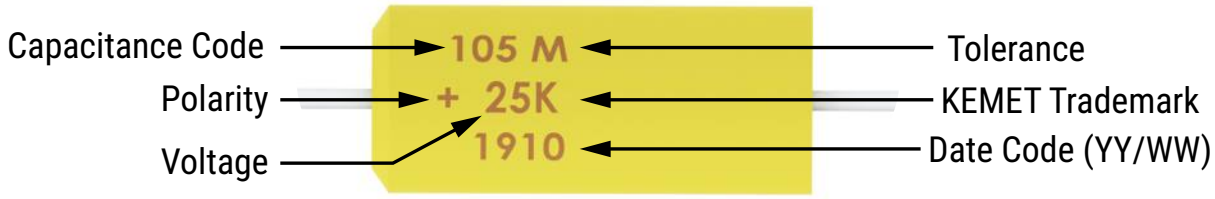
Although these are polar capacitors, some degree of transient voltage reversal is permissible, as seen below. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature (°C)	Pecentage of Rated Voltage
+25	15
+85	5
+125	1

Construction



Capacitor Marking



Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS–296.

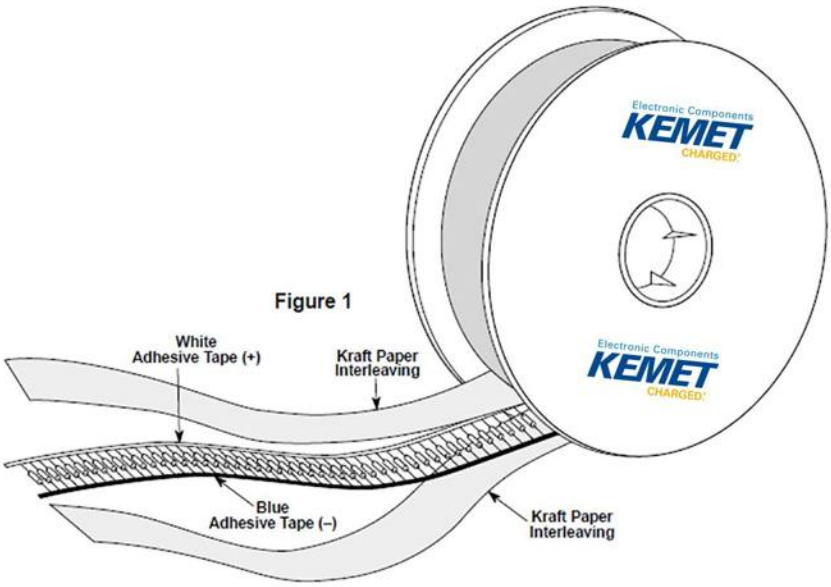


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity	Ammo Pack C-Spec
A	300	4,500	C–7200	2,000	C–7293
B	250	4,000		2,000	Class I
C	100	2,500		1,000	C–7442
D	100	2,500		1,000	Class II
E	100	500		250	C–7443
F	100	500		250	Class III

Figure 2

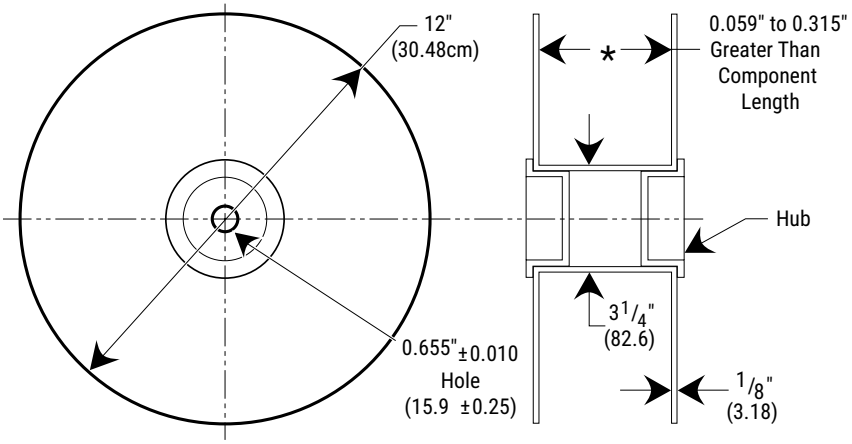


Figure 3

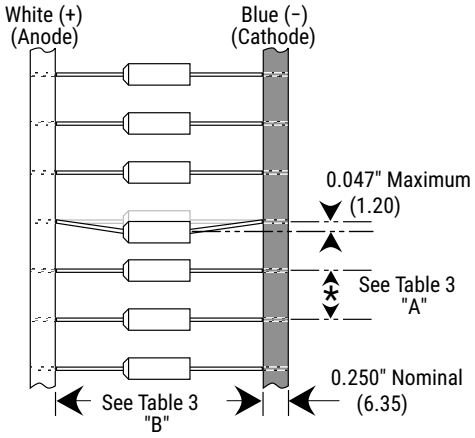


Table 3 – Tape Dimensions

Dimensions in Inches (& Millimeters)

BODY DIAMETER	A PITCH ±0.020 (0.5)	B INSIDE TAPE SPACING
≤ 0.197 (5.0)	0.200 (5.0)	2.063 (52.4) +0.079, −0.039 (+2.0, −1.0)
0.198 (5.0) to 0.394 (10.0)	0.400 or (10.0)	2.874 (73) +/0.059

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50 lbs. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lbs. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center.

Figures 1 and 2 show the KEMET standard chipboard tape reel.

A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors.

Universal splicing clips are used to connect the tape.

T330 Molded Radial

Overview

The KEMET T330 polar-type, radial lead, rectangular Precision Molded Tantalum (PMT) capacitors are primarily designed for applications that demand full use of the premium space available in printed circuitry and high density packaging. Compact, space saving T330 capacitors provide superior packing factor and space utilization as compared with tubular units of the same microcoulomb (CV) rating.

T330 capacitors employ a rectangular sintered, dry tantalum anode, transfer molded in precision, with a high impact resistant plastic for excellent electrical, physical and moisture resistant properties. All cases are constructed with a gold color plastic which permits laser marking with outstanding permanency and legibility. The polarity is indicated by a + sign permanently marked on the case. The radius on the two vertical edges at the positive end of B, C, and D cases can be used as a sensing dimension for automatic insertion processes. The location of the standoffs may serve a similar sensing function for the A case. These standoffs, located in the base of all case sizes, provide vents for air circulation and also allow easy removal of flux residues from leadwire and circuit board solder joints.

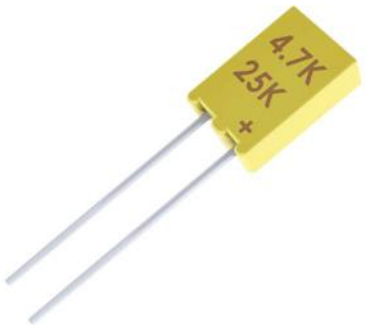
T330 capacitors are highly reliable and exhibit performance characteristics typical of military test standards. They are available in capacitance values ranging from 0.1 to 220 µF, in ±20%, ±10%, and ±5% tolerance levels and in working voltages from 6 to 50 VDC. The capacitors will operate continuously at full rated voltage at 85°C and are rated to 125°C when operated at 2/3 of nameplate voltage. In addition, the T330 features exceptionally low DC leakage and dissipation factor characteristics. These parts are ideal for bypass, coupling, and timing applications in computers, military ordinance, industrial, entertainment and consumer electronic equipment.

Benefits

- Taped and reeled per EIA Specification RS–468
- Laser-marked case
- Capacitance values of 0.1 µF to 330 µF
- Tolerances of ±20% standard, ±5% and ±10% special order
- Voltage rating of 6 – 50 VDC
- Operating temperature range of −55°C to +125°C
- Case sizes: A, B, C, D

Applications

Typical applications include bypassing, coupling, and timing applications in computers, military ordinance, industrial, entertainment, and consumer electronic equipment.



Ordering Information

T	330	B	104	M	035	A	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate	Termination Finish	Packaging
T = Tantalum	Radial Lead Precision Molded Polar Solid Tantalum	A B C D	First two digits represent significant figures. Third digit specifies number of zeros to follow.	K = ±10% M = ±20% J = ±5% (available on request)	006 = 6 010 = 10 015 = 15 020 = 20 025 = 25 035 = 35 050 = 50	Not Applicable	S = Standard (steel - copper) T = 100% tin (Sn)-plated	Blank = Bulk 7301 = Tape & Reel

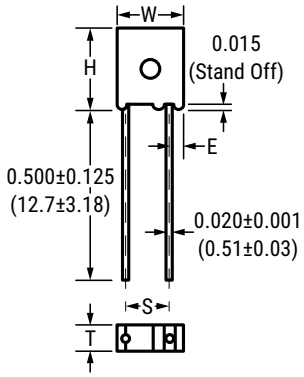
Performance Characteristics

Item	Performance Characteristics
Operating Temperature	–55°C to 125°C
Rated Capacitance Range	0.1 – 220 µF at 120 Hz/25°C
Capacitance Tolerance	M tolerance (20%) standard, K tolerance (10%), J tolerance (5%) special order
Rated Voltage Range	6 – 50 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table (for reference only)
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)

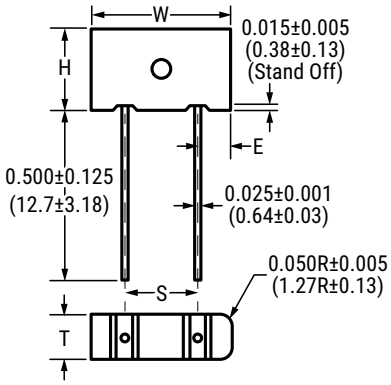
Dimensions – Millimeters (Inches)

Metric will govern

A CASE



B, C, & D CASES



Note: On the "B" case size the stand off appears only between the two leads

Case Size	H Case Height	W Case Width	T Case Thickness	E Case to Wire	S Lead Spacing
A	0.345 ±0.008 (8.76 ±0.203)	0.230 ±0.005 (5.84 ±0.127)	0.105 ±0.005 (2.67 ±0.127)	0.050 ±0.010 (1.27 ±0.25)	0.125 ±0.005 (3.18 ±0.127)
B	0.225 ±0.015 (5.71 ±0.38)	0.285 ±0.015 (7.24 ±0.38)	0.170 ±0.015 (4.32 ±0.38)	0.042 ±0.010 (1.07 ±0.25)	0.200 ±0.005 (5.08 ±0.127)
C	0.325 ±0.015 (8.26 ±0.38)	0.325 ±0.015 (8.26 ±0.38)	0.170 ±0.015 (4.32 ±0.38)	0.062 ±0.010 (1.57 ±0.25)	0.200 ±0.005 (5.08 ±0127)
D	0.375 ±0.015 (9.53 ±0.38)	0.600 ±0.015 (15.24 ±0.38)	0.195 ±0.015 (4.95 ±0.38)	0.200 ±0.010 (5.08 ±0.25)	0.200 ±0.005 (5.08 ±0.127)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF
(V) 85°C	µF		(See below for part options)	µA @ 25°C Maximum/5 Minutes	% @ 25°C 120 Hz Maximum
6	18.0	A	T330A186(1)006A(2)	1.0	6
6	22.0	A	T330A226(1)006A(2)	1.0	6
6	10.0	B	T330B106(1)006A(2)	1.0	6
6	12.0	B	T330B126(1)006A(2)	1.0	6
6	15.0	B	T330B156(1)006A(2)	1.0	6
6	18.0	B	T330B186(1)006A(2)	1.0	6
6	22.0	B	T330B226(1)006A(2)	1.0	6
6	27.0	C	T330C276(1)006A(2)	1.0	6
6	33.0	C	T330C336(1)006A(2)	1.0	6
6	39.0	C	T330C396(1)006A(2)	1.0	6
6	47.0	C	T330C476(1)006A(2)	2.0	6
6	56.0	C	T330C566(1)006A(2)	5.0	6
6	68.0	C	T330C686(1)006A(2)	5.0	6
6	82.0	D	T330D826(1)006A(2)	5.0	6
6	100.0	D	T330D107(1)006A(2)	5.0	6
6	120.0	D	T330D127(1)006A(2)	5.0	6
6	150.0	D	T330D157(1)006A(2)	5.0	6
6	180.0	D	T330D187(1)006A(2)	10.0	6
6	220.0	D	T330D227(1)006A(2)	10.0	8
10	10.0	A	T330A106(1)010A(2)	1.0	6
10	12.0	A	T330A126(1)010A(2)	1.0	6
10	15.0	A	T330A156(1)010A(2)	1.0	6
10	5.6	B	T330B565(1)010A(2)	1.0	6
10	6.8	B	T330B685(1)010A(2)	1.0	6
10	8.2	B	T330B825(1)010A(2)	1.0	6
10	10.0	B	T330B106(1)010A(2)	1.0	6
10	12.0	B	T330B126(1)010A(2)	1.0	6
10	15.0	B	T330B156(1)010A(2)	1.0	6
10	18.0	B	T330B186(1)010A(2)	1.0	6
10	22.0	B	T330B226(1)010A(2)	2.0	6
10	18.0	C	T330C186(1)010A(2)	1.0	6
10	22.0	C	T330C226(1)010A(2)	2.0	6
10	27.0	C	T330C276(1)010A(2)	2.0	6
10	33.0	C	T330C336(1)010A(2)	2.0	6
10	39.0	C	T330C396(1)010A(2)	5.0	6
10	47.0	D	T330D476(1)010A(2)	5.0	6
10	56.0	D	T330D566(1)010A(2)	5.0	6
10	68.0	D	T330D686(1)010A(2)	5.0	6
10	82.0	D	T330D826(1)010A(2)	5.0	6
10	100.0	D	T330D107(1)010A(2)	10.0	6
10	120.0	D	T330D127(1)010A(2)	10.0	6
10	150.0	D	T330D157(1)010A(2)	10.0	6
15	8.2	A	T330A825(1)015A(2)	1.0	6
15	3.9	B	T330B395(1)015A(2)	1.0	6
15	4.7	B	T330B475(1)015A(2)	1.0	6
15	5.6	B	T330B565(1)015A(2)	1.0	6
15	6.8	B	T330B685(1)015A(2)	1.0	6
15	8.2	B	T330B825(1)015A(2)	1.0	6
15	10.0	C	T330C106(1)015A(2)	1.0	6
15	12.0	C	T330C126(1)015A(2)	1.0	6
15	15.0	C	T330C156(1)015A(2)	2.0	6
15	18.0	C	T330C186(1)015A(2)	5.0	6
15	22.0	C	T330C226(1)015A(2)	5.0	6
(V) 85°C	µF		(see below for part options)	µA @ 25°C Maximum/5 Minutes	% @ 25°C 120 Hz Maximum
Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
Higher voltage and better capacitance tolerance products may be substituted for an order within the same case size at KEMET's option.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF
(V) 85°C	µF		(See below for part options)	µA @ 25°C Maximum/5 Minutes	% @ 25°C 120 Hz Maximum
15	27.0	C	T330C276(1)015A(2)	5.0	6
15	33.0	C	T330C336(1)015A(2)	5.0	6
15	39.0	D	T330D396(1)015A(2)	10.0	6
15	47.0	D	T330D476(1)015A(2)	10.0	6
15	56.0	D	T330D566(1)015A(2)	10.0	6
15	68.0	D	T330D686(1)015A(2)	10.0	6
15	82.0	D	T330D826(1)015A(2)	10.0	6
20	5.6	A	T330A565(1)020A(2)	1.0	6
20	6.8	A	T330A685(1)020A(2)	1.0	6
25	3.3	A	T330A335(1)025A(2)	1.0	4
25	3.9	A	T330A395(1)025A(2)	1.0	4
25	4.7	A	T330A475(1)025A(2)	1.0	4
25	2.7	B	T330B275(1)025A(2)	1.0	6
25	3.3	B	T330B335(1)025A(2)	1.0	6
25	3.9	B	T330B395(1)025A(2)	1.0	6
25	4.7	B	T330B475(1)025A(2)	1.0	6
25	5.6	C	T330C565(1)025A(2)	1.0	6
25	6.8	C	T330C685(1)025A(2)	1.0	6
25	8.2	C	T330C825(1)025A(2)	1.0	6
25	10.0	C	T330C106(1)025A(2)	1.0	6
25	12.0	C	T330C126(1)025A(2)	1.0	6
25	15.0	C	T330C156(1)025A(2)	2.0	6
25	18.0	D	T330D186(1)025A(2)	5.0	6
25	22.0	D	T330D226(1)025A(2)	5.0	6
25	27.0	D	T330D276(1)025A(2)	5.0	6
25	33.0	D	T330D336(1)025A(2)	5.0	6
25	39.0	D	T330D396(1)025A(2)	10.0	6
25	47.0	D	T330D476(1)025A(2)	10.0	6
35	0.1	A	T330A104(1)035A(2)	1.0	3
35	0.12	A	T330A124(1)035A(2)	1.0	3
35	0.15	A	T330A154(1)035A(2)	1.0	3
35	0.18	A	T330A184(1)035A(2)	1.0	3
35	0.22	A	T330A224(1)035A(2)	1.0	3
35	0.27	A	T330A274(1)035A(2)	1.0	3
35	0.33	A	T330A334(1)035A(2)	1.0	3
35	0.39	A	T330A394(1)035A(2)	1.0	3
35	0.47	A	T330A474(1)035A(2)	1.0	3
35	0.56	A	T330A564(1)035A(2)	1.0	3
35	0.68	A	T330A684(1)035A(2)	1.0	3
35	0.82	A	T330A824(1)035A(2)	1.0	3
35	1.0	A	T330A105(1)035A(2)	1.0	3
35	1.2	A	T330A125(1)035A(2)	1.0	4
35	1.5	A	T330A155(1)035A(2)	1.0	4
35	1.8	A	T330A185(1)035A(2)	1.0	4
35	2.2	A	T330A225(1)035A(2)	1.0	4
35	2.7	A	T330A275(1)035A(2)	1.0	4
35	0.10	B	T330B104(1)035A(2)	1.0	6
35	0.12	B	T330B124(1)035A(2)	1.0	6
35	0.15	B	T330B154(1)035A(2)	1.0	6
35	0.18	B	T330B184(1)035A(2)	1.0	6
35	0.22	B	T330B224(1)035A(2)	1.0	6
35	0.27	B	T330B274(1)035A(2)	1.0	6
35	0.33	B	T330B334(1)035A(2)	1.0	6
(V) 85°C	µF		(see below for part options)	µA @ 25°C Maximum/5 Minutes	% @ 25°C 120 Hz Maximum
Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
Higher voltage and better capacitance tolerance products may be substituted for an order within the same case size at KEMET's option.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF
(V) 85°C	µF		(See below for part options)	µA @ 25°C Maximum/5 Minutes	% @ 25°C 120 Hz Maximum
35	0.39	B	T330B394(1)035A(2)	1.0	6
35	0.47	B	T330B474(1)035A(2)	1.0	6
35	0.56	B	T330B564(1)035A(2)	1.0	6
35	0.68	B	T330B684(1)035A(2)	1.0	6
35	0.82	B	T330B824(1)035A(2)	1.0	6
35	1.0	B	T330B105(1)035A(2)	1.0	6
35	1.2	B	T330B125(1)035A(2)	1.0	6
35	1.5	B	T330B155(1)035A(2)	1.0	6
35	1.8	B	T330B185(1)035A(2)	1.0	6
35	2.2	B	T330B225(1)035A(2)	1.0	6
35	2.7	B	T330B275(1)035A(2)	1.0	6
35	3.3	B	T330B335(1)035A(2)	1.0	6
35	3.9	C	T330C395(1)035A(2)	1.0	6
35	4.7	C	T330C475(1)035A(2)	1.0	6
35	5.6	C	T330C565(1)035A(2)	1.0	6
35	6.8	C	T330C685(1)035A(2)	2.0	6
35	8.2	C	T330C825(1)035A(2)	5.0	6
35	10.0	C	T330C106(1)035A(2)	5.0	6
35	12.0	D	T330D126(1)035A(2)	5.0	6
35	15.0	D	T330D156(1)035A(2)	5.0	6
35	18.0	D	T330D186(1)035A(2)	10.0	6
35	22.0	D	T330D226(1)035A(2)	10.0	6
35	27.0	D	T330D276(1)035A(2)	10.0	6
35	33.0	D	T330D336(1)035A(2)	10.0	6
50	0.10	A	T330A104(1)050A(2)	1.0	3
50	0.12	A	T330A124(1)050A(2)	1.0	3
50	0.15	A	T330A154(1)050A(2)	1.0	3
50	0.18	A	T330A184(1)050A(2)	1.0	3
50	0.22	A	T330A224(1)050A(2)	1.0	3
50	0.27	A	T330A274(1)050A(2)	1.0	3
50	0.33	A	T330A334(1)050A(2)	1.0	3
50	0.39	A	T330A394(1)050A(2)	1.0	3
50	0.47	A	T330A474(1)050A(2)	1.0	3
50	0.56	A	T330A564(1)050A(2)	1.0	3
50	0.68	A	T330A684(1)050A(2)	1.0	3
50	0.82	A	T330A824(1)050A(2)	1.0	4
50	1.0	A	T330A105(1)050A(2)	1.0	4
50	1.2	A	T330A125(1)050A(2)	1.0	4
50	1.5	A	T330A155(1)050A(2)	1.0	4
50	0.10	B	T330B104(1)050A(2)	1.0	6
50	0.12	B	T330B124(1)050A(2)	1.0	6
50	0.15	B	T330B154(1)050A(2)	1.0	6
50	0.18	B	T330B184(1)050A(2)	1.0	6
50	0.22	B	T330B224(1)050A(2)	1.0	6
50	0.27	B	T330B274(1)050A(2)	1.0	6
50	0.33	B	T330B334(1)050A(2)	1.0	6
50	0.39	B	T330B394(1)050A(2)	1.0	6
50	0.47	B	T330B474(1)050A(2)	1.0	6
50	0.56	B	T330B564(1)050A(2)	1.0	6
50	0.68	B	T330B684(1)050A(2)	1.0	6
50	0.82	B	T330B824(1)050A(2)	1.0	6
50	1.0	B	T330B105(1)050A(2)	1.0	6
50	1.2	B	T330B125(1)050A(2)	1.0	6
(V) 85°C	µF		(see below for part options)	µA @ 25°C Maximum/5 Minutes	% @ 25°C 120 Hz Maximum
Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
Higher voltage and better capacitance tolerance products may be substituted for an order within the same case size at KEMET's option.

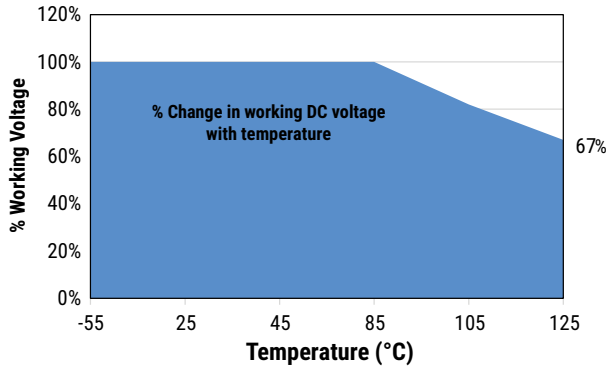
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF
(V) 85°C	µF		(See below for part options)	µA @ 25°C Maximum/5 Minutes	% @ 25°C 120 Hz Maximum
50	1.5	B	T330B155(1)050A(2)	1.0	6
50	1.8	B	T330B185(1)050A(2)	1.0	6
50	2.2	B	T330B225(1)050A(2)	1.0	6
50	2.7	C	T330C275(1)050A(2)	1.0	6
50	3.3	C	T330C335(1)050A(2)	2.0	6
50	3.9	C	T330C395(1)050A(2)	5.0	6
50	4.7	C	T330C475(1)050A(2)	5.0	6
50	5.6	C	T330C565(1)050A(2)	5.0	6
50	6.8	D	T330D685(1)050A(2)	5.0	6
50	8.2	D	T330D825(1)050A(2)	5.0	6
50	10.0	D	T330D106(1)050A(2)	5.0	6
50	12.0	D	T330D126(1)050A(2)	5.0	6
50	15.0	D	T330D156(1)050A(2)	10.0	6
50	18.0	D	T330D186(1)050A(2)	10.0	6
(V) 85°C	µF		(see below for part options)	µA @ 25°C Maximum/5 Minutes	% @ 25°C 120 Hz Maximum
Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF

((1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
Higher voltage and better capacitance tolerance products may be substituted for an order within the same case size at KEMET's option.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 105°C
% Change in working DC voltage with temperature	V_R	66% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage that may be applied is limited by following criteria:

1. Dissipated power must not exceed the limits specified for the Series.
2. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
3. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage.

Thermal capacities for the various case sizes have been determined empirically and are listed below. The "ripple voltage" permissible may be calculated from the impedance and ESR data shown in the respective product section.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Maximum allowable rms ripple voltage or current may be determined as follows:

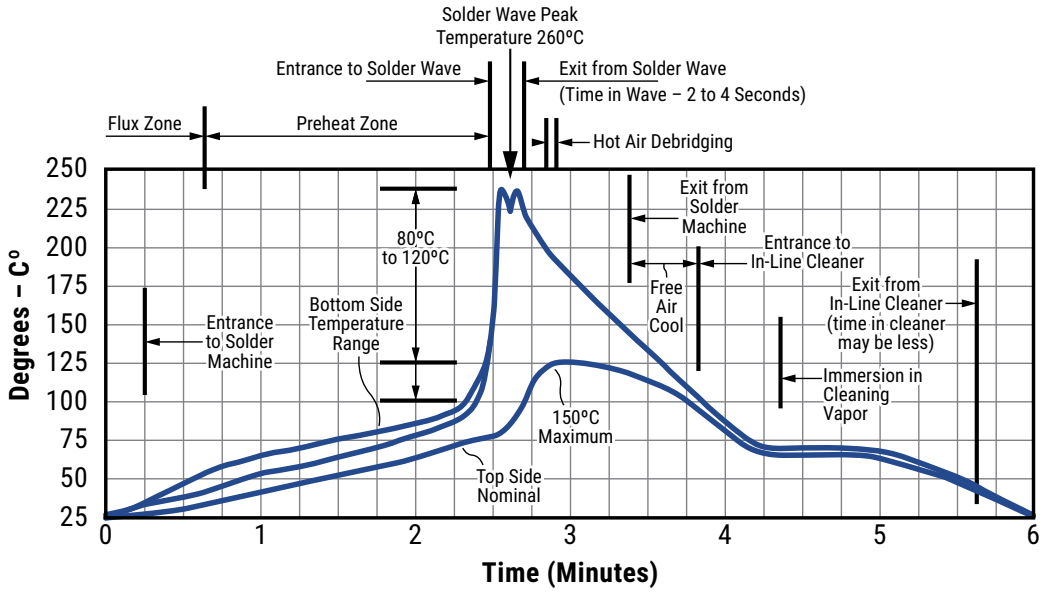
$I(max) = \sqrt{P\ max/R}$

$E(max) = \sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = Maximum power dissipation (watts)
R = ESR at specified frequency (ohms)

Case Size	Maximum Power Dissipation (Pmax) Watts at 25°C
A	0.09
B	0.09
C	0.100
D/F	0.125

Optimum Solder Wave Profile



Reverse Voltage

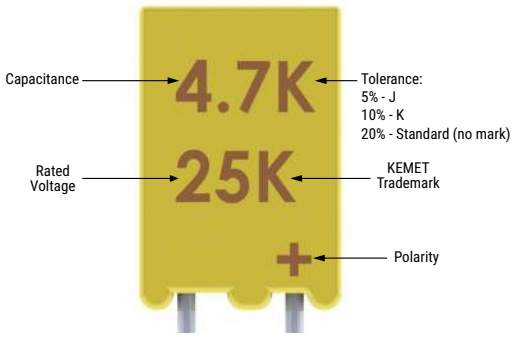
Although these are polar capacitors, some degree of transient voltage reversal is permissible, as seen below. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Pecentage of Rated Voltage
+25°C	15
+85°C	5
+125°C	1

Mounting

All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Capacitor Marking

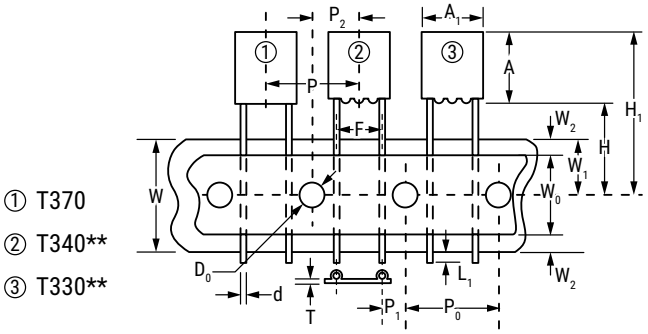


Storage

Tantalum molded radial/axial capacitors should be stored in normal working environments. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60°C RH. Storage at high temperature may cause a small, temporary increase in leakage current (measured under standard conditions), but the original value is usually restored within a few minutes after application of rated voltage. Storage at high humidity may increase capacitance and dissipation factor. Solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers solid tantalum capacitors fully compatible for use with automatic insertion machines for radial-lead components. Aris Reeling meets all requirements of EIA Standard RS-468. KEMET capacitors are wound on a precision made ARIS Reel Package. ARIS Ammo Package is also available.



Dimension	Symbol	Nominal mm (inch)		Tolerance mm (inch)	
Body Height (1)	A	10.50 (0.413)		±0.38 (±0.015) Maximum	
Body Width (1)	A_1	15.24 (0.600)		±0.38 (±0.015) Maximum	
Sprocket Hole Diameter	D_0	4.0 (0.157)		±0.3 (±0.012)	
Lead Diameter	d	0.51 (0.020)	0.64 (0.025)	±0.05 (±0.001)	±0.03
Lead Center (5)	F	5.0 (0.197)	2.5 (0.098)	+0.8 (+0.032)	−0.2 (−0.008)
Component Base to Tape Center (2) (4) (6)	H	16.0 – 21.0 (0.630 – 0.827)		Reference Only	
Lead Standoff Height	H_0	N/A			
Component Height Above Tape Center	H_1	32.25 (1.270)		Maximum	
Component Alignment Front to Rear	ΔH	0		±2.0 (±0.079)	
Cut Out Length	L	11.0 (0.433)		Maximum	
Lead Protrusion	L_1	2.0 (0.079)		Maximum	
Component Pitch (5)	P	12.7 (0.500)		±1.0 (±0.039)	
Sprocket Hole Pitch (3)	P_0	12.7 (0.500)		±0.03 (±0.012)	
Sprocket Hole Center to Lead Center (4) (5)	P_1	3.85 (0.152)	4.76 (0.188)	5.1 (0.201)	±0.7 (±0.028)
Sprocket Hole Center to Component Center	P_2	6.35 (0.250)		±1.31 (±0.051)	
Body Thickness	T_0	6.35 (0.250)		±1.3 Maximum	
Total Tape Thickness	T	0.7 (0.28)		±0.02(±0.008)	
Carrier Tape Width	W	18.0 (0.709)		+1.0/−0.5 (+0.039/−0.020)	
Hold-Down Tape Width	W_0	15 (0.561)	6 (0.236)	+1.0/−0.8 (+0.039/−0.031	
Sprocket Hole Location	W_1	9.0 (0.354)		+0.075/−0.5 (+0.030/−0.020)	
Hold-Down Tape Location	W_2	3.0 (0.118)	12.0 (0.472)	Maximum	

Notes:
(1) See Dimensions table for specific values per case size.
(2) Reference only.
(3) Cumulative pitch error ±1.0 mm (0.039") maximum in 20 consecutive sprocket hole locations.
(4) Measured at bottom of standoff.
(5) P, P1 and F measured at egress from carrier tape.
(6) H dimensions for T370 D and E 16.5mm ±0.5mm (0.650" ±0.020")
On polar devices, the positive (+) lead exits from container first.
** Lead spacings are 2.5 mm (0.098") center-to center.*
*** Lead spacings are 5.0 mm (0.197") center-to-center.*

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity
A	400	1,000	C-7301	1,600
B	300	1,000	C-7301	1,200
C	200	1,000	C-7301	1,200
D	100	N/A	N/A	N/A

T340 Molded Radial

Overview

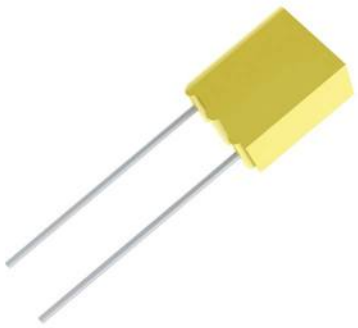
The compact, space-saving T340 is transfer molded in precision, with a high impact-resistant plastic that has excellent electrical, physical and moisture-resistant properties. The gold color plastic case permits laser marking with outstanding permanency and legibility. Marking is provided on the top of the case to allow visual inspection for proper polarity and placement after insertion. In addition, positive polarity identification is achieved by an easily recognized molded radius on the positive end of the case. Additionally, this physical polarity identification is readily observed after capacitor placement as a further aid in the prevention of possible reverse insertion. Standoffs, located in the base of all case sizes, provide vents for air circulation and also to allow easy removal of flux residues from leadwire and circuit board solder joints. With very low impedance and ESR values, the T340 features exceptionally low DC leakage and DF characteristics. The T340 is available in standard ±20%, ±10%, and ±5% (special order) capacitance tolerance. T340 capacitors are highly reliable and exhibit performance characteristics typical of military test standards.

Benefits

- Taped and reeled per EIA Specification RS-468
- Laser-marked case
- Capacitance values of 0.1 µF – 330 µF
- Tolerances of ±20% standard, ± 5% and ±10% special order
- Voltage rating of 3 – 50 VDC
- Case sizes: A, B, C, D, E, F

Applications

Typical applications include bypassing, coupling, and timing applications in computers, military ordinance, industrial, entertainment, and consumer electronic equipment.



Ordering Information

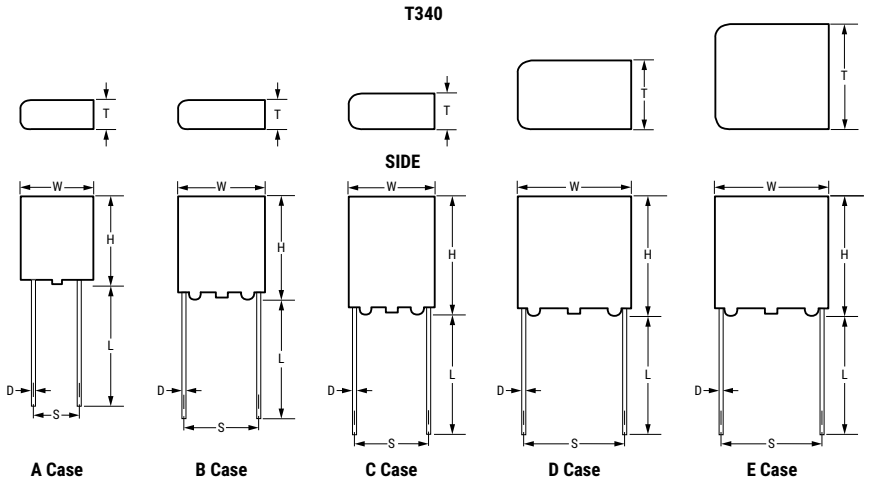
T	340	A	105	M	035	A	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate	Termination Finish	Packaging
T = Tantalum	Radial Lead Precision Molded Polar Solid Tantalum	A, B, C, D, E, F	First two digits represent significant figures. Third digit specifies number of zeros to follow.	M = ±20% (standard K = ±10% J = ±5% (available on request)	003 = 3 006 = 6 010 = 10 015 = 15/16 020 = 20 025 = 25 035 = 35 040 = 40 050 = 50	Not Applicable	S = Standard (solder-coated copperweld) T = 100% tin (Sn)-plated	Blank = Bulk 7301 = Tape & Reel 7305 = Ammo 7317 = Ammo

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 330 µF at 120 Hz/25°C
Capacitance Tolerance	M tolerance (20%) standard, J tolerance (5%), K tolerance (10%) special order
Rated Voltage Range	3 –50 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table (for reference only)
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)

Dimensions – Millimeters (Inches)

Metric will govern



F case size is the same as D, but with 0.200" (5.0 mm) lead spacing. Specify T340F when ordering this spacing.

Case Size	H** (MAXIMUM)	W (MAXIMUM)	T (MAXIMUM)	Lead Spacing S	Lead Length L	Lead Diameter D
A	0.287 (7.3)	0.185 (4.7)	0.165 (4.2)	0.100 ±0.020 (2.5 ±0.5)	0.600±0.078 (15.0±2.0)	0.020±0.001 (0.50±0.03)
B	0.327 (8.3)	0.283 (7.2)	0.157 (4.0)	0.200±0.020 (5.0±0.5)	0.600±0.078 (15.0±2.0)	0.020±0.001 (0.50±0.03)
C	0.413 (10.5)	0.287 (7.3)	0.169 (4.3)	0.200±0.020 (5.0±0.5)	0.600±0.078 (15.0±2.0)	0.020±0.001 (0.50±0.03)
D	0.413 (10.5)	0.484 (12.3)	0.287 (7.3)	0.400±0.020 (10.0±0.5)	0.600±0.078 (15.0±2.0)	0.025±0.001 (0.64±0.03)
E	0.413 (10.5)	0.484 (12.3)	0.484 (12.3)	0.400±0.020 (10.0±0.5)	0.600±0.078 (15.0±2.0)	0.025±0.001 (0.64±0.03)
F	0.413 (10.5)	0.484 (12.3)	0.287 (7.3)	0.200±0.020 (5.0±0.5)	0.600±0.078 (15.0±2.0)	0.025±0.001 (0.64±0.03)

***Includes Standoff Height of 0.015±0.005" (0.38±0.13 mm) for All Case Sizes.*

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF	IMP Ω
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	% at 25°C 120 Hz Maximum	at 10 kHz Maximum
3	10.0	A	T340A106(1)003A(3)	1.0	6	6.0
3	15.0	A	T340A156(1)003A(3)	1.0	6	3.2
3	33.0	B	T340B336(1)003A(3)	1.5	6	2.1
3	47.0	B	T340B476(1)003A(3)	3.0	6	1.8
3	68.0	C	T340C686(1)003A(3)	4.0	6	1.5
3	100.0	C	T340C107(1)003A(3)	5.0	6	1.2
6	6.8	A	T340A685(1)006A(3)	1.0	6	6.0
6	10.0	B	T340B106(1)006A(3)	1.0	6	
6	12.0	B	T340B126(1)006A(3)	1.0	6	
6	15.0	B	T340B156(1)006A(3)	1.0	6	
6	18.0	B	T340B186(1)006A(3)	1.0	6	
6	22.0	B	T340B226(1)006A(3)	2.5	6	2.1
6	27.0	C	T340C276(1)006A(3)	2.5	6	
6	33.0	C	T340C336(1)006A(3)	2.5	6	
6	39.0	C	T340C396(1)006A(3)	2.5	6	
6	47.0	C	T340C476(1)006A(3)	3.0	6	1.5
6	56.0	C	T340C566(1)006A(3)	5.0	6	
6	68.0	C	T340C686(1)006A(3)	5.0	6	
6	82.0	D/F	T340(2)826(1)006A(3)	5.0	6	
6	100.0	D/F	T340(2)107(1)006A(3)	5.0	6	
6	120.0	D/F	T340(2)127(1)006A(3)	5.0	6	
6	150.0	D/F	T340(2)157(1)006A(3)	8.0	6	0.8
6	180.0	D/F	T340(2)187(1)006A(3)	10.0	6	
6	220.0	D/F	T340(2)227(1)006A(3)	10.0	6	
6	330.0	E	T340E337(1)006A(3)	10.0	8	0.5
10	4.7	A	T340A475(1)010A(3)	1.0	6	7.5
10	5.6	B	T340B565(1)010A(3)	1.0	6	
10	6.8	B	T340B685(1)010A(3)	1.0	6	
10	8.2	B	T340B825(1)010A(3)	1.0	6	
10	10.0	B	T340B106(1)010A(3)	1.0	6	
10	12.0	B	T340B126(1)010A(3)	1.0	6	
10	15.0	B	T340B156(1)010A(3)	3.0	6	2.5
10	18.0	C	T340C186(1)010A(3)	3.0	6	
10	22.0	C	T340C226(1)010A(3)	3.0	6	
10	27.0	C	T340C276(1)010A(3)	3.0	6	
10	33.0	C	T340C336(1)010A(3)	5.0	6	1.7
10	39.0	C	T340C396(1)010A(3)	5.0	6	
10	47.0	D/F	T340(2)476(1)010A(3)	5.0	6	
10	56.0	D/F	T340(2)566(1)010A(3)	5.0	6	
10	68.0	D/F	T340(2)686(1)010A(3)	5.0	6	
10	82.0	D/F	T340(2)826(1)010A(3)	8.0	6	
10	100.0	D/F	T340(2)107(1)010A(3)	10.0	6	1.0
10	120.0	D/F	T340(2)127(1)010A(3)	10.0	6	
10	150.0	D/F	T340(2)157(1)010A(3)	10.0	6	
10	220.0	E	T340E227(1)010A(3)	10.0	6	0.5
15	3.3	A	T340A335(1)015A(3)	1.0	6	9.0
15	3.9	B	T340B395(1)015A(3)	1.0	6	
15	4.7	B	T340B475(1)015A(3)	1.0	6	
15	5.6	B	T340B565(1)015A(3)	1.0	6	
15	6.8	B	T340B685(1)015A(3)	1.0	6	
15	8.2	B	T340B825(1)015A(3)	1.0	6	
15	10.0	B	T340B106(1)015A(3)	3.0	6	3.2
15	12.0	C	T340C126(1)015A(3)	3.0	6	
(V) 85°C	µF		(see below for part options)	µA at 25°C Maximum/5 Minutes	% at 25°C 120 Hz Maximum	at 10 kHz Maximum
Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF	IMP Ω

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert letter "D" for 10.0 mm (0.394) lead spacing or letter "F" for 5.0 mm (0.197) lead spacing. Designates Lead spacing.
(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
Higher voltage and better capacitance tolerance products may be substitued for an order within the same case size at KEMET's option.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF	IMP Ω
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	% at 25°C 120 Hz Maximum	at 10 kHz Maximum
15	15.0	C	T340C156(1)015A(3)	3.5	6	2.5
15	18.0	C	T340C186(1)015A(3)	4.0	6	
15	22.0	C	T340C226(1)015A(3)	4.0	6	2.1
15	27.0	C	T340C276(1)015A(3)	5.0	6	
15	33.0	C	T340C336(1)015A(3)	5.0	6	
15	39.0	D/F	T340(2)396(1)015A(3)	7.0	6	
15	47.0	D/F	T340(2)476(1)015A(3)	7.0	6	1.3
15	56.0	D/F	T340(2)566(1)015A(3)	8.0	6	
15	68.0	D/F	T340(2)686(1)015A(3)	9.0	6	1.1
15	82.0	D/F	T340(2)826(1)015A(3)	10.0	6	
15	100.0	E	T340E107(1)015A(3)	10.0	6	0.8
15	150.0	E	T340E157(1)015A(3)	10.0	6	0.6
20	2.2	A	T340A225(1)020A(3)	1.0	6	12.0
20	3.3	B	T340B335(1)020A(3)	1.0	6	8.0
20	4.7	B	T340B475(1)020A(3)	1.5	6	5.5
20	6.8	B	T340B685(1)020A(3)	2.5	6	4.2
20	15.0	C	T340C156(1)020A(3)	5.0	6	2.5
20	47.0	D	T340D476(1)020A(3)	9.0	6	1.3
20	100.0	E	T340E107(1)020A(3)	10.0	6	0.8
25	1.5	A	T340A155(1)025A(3)	1.0	6	17.0
25	2.7	B	T340B275(1)025A(3)	1.0	6	
25	3.3	B	T340B335(1)025A(3)	1.0	6	
25	3.9	B	T340B395(1)025A(3)	1.0	6	
25	4.7	B	T340B475(1)025A(3)	2.0	6	5.5
25	5.6	C	T340C565(1)025A(3)	2.0	6	
25	6.8	C	T340C685(1)025A(3)	3.0	6	4.2
25	8.2	C	T340C825(1)025A(3)	3.0	6	
25	10.0	C	T340C106(1)025A(3)	3.5	6	3.0
25	12.0	C	T340C126(1)025A(3)	3.5	6	
25	15.0	C	T340C156(1)025A(3)	4.0	6	
25	18.0	D/F	T340(2)186(1)025A(3)	5.0	6	
25	22.0	D/F	T340(2)226(1)025A(3)	5.5	6	2.0
25	27.0	D/F	T340(2)276(1)025A(3)	7.0	6	
25	33.0	D/F	T340(2)336(1)025A(3)	8.0	6	1.5
25	39.0	D/F	T340(2)396(1)025A(3)	10.0	6	
25	47.0	D/E/F	T340(2)476(1)025A(3)	10.0	6	1.3
25	68.0	E	T340E686(1)025A(3)	10.0	6	0.9
35	0.10	A	T340A104(1)035A(3)	1.0	6	220.0
35	0.15	A	T340A154(1)035A(3)	1.0	6	150.0
35	0.22	A	T340A224(1)035A(3)	1.0	6	100.0
35	0.33	A	T340A334(1)035A(3)	1.0	6	75.0
35	0.47	A	T340A474(1)035A(3)	1.0	6	50.0
35	0.68	A	T340A684(1)035A(3)	1.0	6	36.0
35	1.0	A	T340A105(1)035A(3)	1.0	6	25.0
35	1.2	B	T340B125(1)035A(3)	1.0	6	15.0
35	1.5	B	T340B155(1)035A(3)	1.0	6	
35	1.8	B	T340B185(1)035A(3)	1.0	6	
35	2.2	B	T340B225(1)035A(3)	1.0	6	11.0
35	2.7	B	T340B275(1)035A(3)	1.0	6	
35	3.3	B/C	T340(2)335(1)035A(3)	1.0	6	7.5
35	3.9	C	T340C395(1)035A(3)	1.0	6	
35	4.7	C	T340C475(1)035A(3)	2.5	6	5.5
35	5.6	C	T340C565(1)035A(3)	2.5	6	
(V) 85°C	µF		(see below for part options)	µA at 25°C Maximum/5 Minutes	% at 25°C 120 Hz Maximum	at 10 kHz Maximum
Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF	IMP Ω

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert letter "D" for 10.0 mm (0.394) lead spacing or letter "F" for 5.0 mm (0.197) lead spacing. Designates Lead spacing.
(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
Higher voltage and better capacitance tolerance products may be substitued for an order within the same case size at KEMET's option.

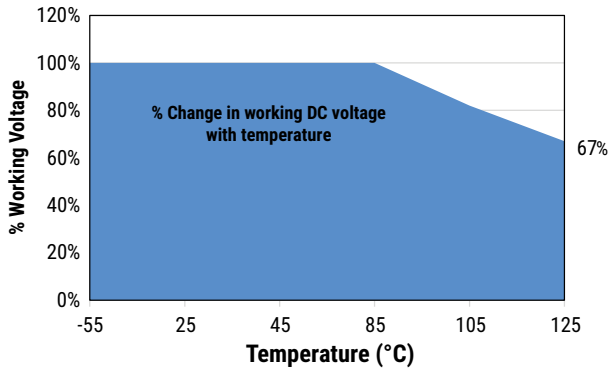
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF	IMP Ω
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	% at 25°C 120 Hz Maximum	at 10 kHz Maximum
35	6.8	C	T340C685(1)035A(3)	3.0	6	4.2
35	8.2	C	T340C825(1)035A(3)	4.0	6	
35	10.0	C/D	T340(2)106(1)035A(3)	4.0	6	2.8
35	12.0	D/F	T340(2)126(1)035A(3)	5.0	6	
35	15.0	D/F	T340(2)156(1)035A(3)	5.0	6	2.2
35	18.0	D/F	T340(2)186(1)035A(3)	8.0	6	
35	22.0	D/F	T340(2)226(1)035A(3)	8.0	6	1.9
35	27.0	D/F	T340(2)276(1)035A(3)	10.0	6	
35	33.0	D/E/F	T340(2)336(1)035A(3)	10.0	6	1.4
35	47.0	E	T340E476(1)035A(3)	10.0	6	1.1
40	0.10	A	T340A104(1)040A(3)	1.0	6	200.0
40	0.15	A	T340A154(1)040A(3)	1.0	6	140.0
40	0.22	A	T340A224(1)040A(3)	1.0	6	95.0
40	0.33	A	T340A334(1)040A(3)	1.0	6	70.0
40	0.47	A	T340A474(1)040A(3)	1.0	6	46.0
40	0.68	A	T340A684(1)040A(3)	1.0	6	34.0
40	1.0	A	T340A105(1)040A(3)	1.0	6	23.0
40	1.5	B	T340B155(1)040A(3)	1.0	6	14.0
40	2.2	B	T340B225(1)040A(3)	1.7	6	10.0
40	3.3	C	T340C335(1)040A(3)	2.3	6	7.0
40	4.7	C	T340C475(1)040A(3)	3.0	6	5.0
40	6.8	C	T340C685(1)040A(3)	3.5	6	3.9
40	10.0	D	T340D106(1)040A(3)	4.5	6	2.6
40	15.0	D	T340D156(1)040A(3)	6.0	6	2.0
40	22.0	D	T340D226(1)040A(3)	9.0	6	1.7
40	33.0	E	T340E336(1)040A(3)	10.0	6	1.3
40	47.0	E	T340E476(1)040A(3)	10.0	6	1.0
50	0.10	A	T340A104(1)050A(3)	1.0	6	220.0
50	0.15	A	T340A154(1)050A(3)	1.0	6	150.0
50	0.22	A	T340A224(1)050A(3)	1.0	6	100.0
50	0.33	A	T340A334(1)050A(3)	1.0	6	75.0
50	0.39	B	T340B394(1)050A(3)	1.0	6	
50	0.47	B	T340B474(1)050A(3)	1.0	6	50.0
50	0.56	B	T340B564(1)050A(3)	1.0	6	
50	0.68	B	T340B684(1)050A(3)	1.0	6	36.0
50	0.82	B	T340B824(1)050A(3)	1.0	6	
50	1.0	B	T340B105(1)050A(3)	1.0	6	25.0
50	1.2	B	T340B125(1)050A(3)	1.0	6	
50	1.5	B/C	T340(2)155(1)050A(3)	1.1	6	15.0
50	1.8	B	T340B185(1)050A(3)	1.1	6	
50	2.2	B/C	T340(2)225(1)050A(3)	1.5	6	11.0
50	2.7	C	T340C275(1)050A(3)	1.5	6	
50	3.3	C/D	T340(2)335(1)050A(3)	2.5	6	7.5
50	3.9	C	T340C395(1)050A(3)	3.0	6	
50	4.7	C/D	T340(2)475(1)050A(3)	3.5	6	5.5
50	5.6	C	T340C565(1)050A(3)	4.0	6	
50	6.8	D/F	T340(2)685(1)050A(3)	5.0	6	4.0
50	8.2	D/F	T340(2)825(1)050A(3)	6.0	6	
50	10.0	D/F	T340(2)106(1)050A(3)	7.0	6	2.8
50	12.0	D/F	T340(2)126(1)050A(3)	8.0	6	
50	15.0	D/F	T340(2)156(1)050A(3)	9.0	6	2.2
50	18.0	D/F	T340(2)186(1)050A(3)	10.0	6	
50	22.0	E	T340E226(1)050A(3)	10.0	6	1.7
(V) 85°C	µF		(see below for part options)	µA at 25°C Maximum/5 Minutes	% at 25°C 120 Hz Maximum	at 10 kHz Maximum
Rated Voltage	Rated Capacitance	Case Code	KEMET Part Number	DC Leakage	DF	IMP Ω

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert letter "D" for 10.0 mm (0.394) lead spacing or letter "F" for 5.0 mm (0.197) lead spacing. Designates Lead spacing.
(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, S = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
Higher voltage and better capacitance tolerance products may be substitued for an order within the same case size at KEMET's option.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	66% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage that may be applied is limited by following criteria:

1. Dissipated power must not exceed the limits specified for the Series.
2. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
3. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage.

Thermal capacities for the various case sizes have been determined empirically and are listed below. The “ripple voltage” permissible may be calculated from the impedance and ESR data shown in the respective product section.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Maximum allowable rms ripple voltage or current may be determined as follows:

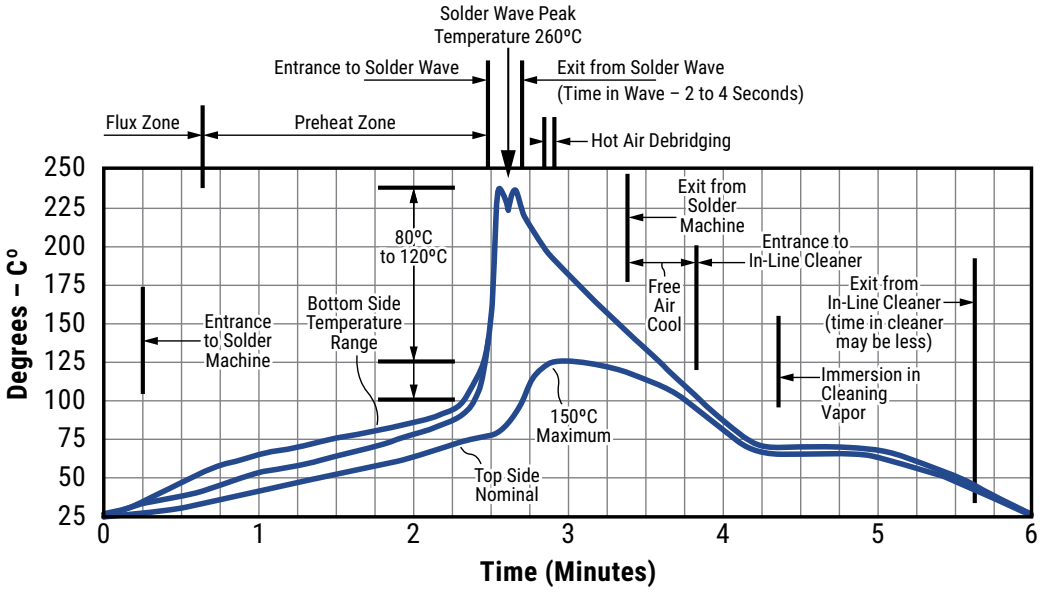
$I(max) = \sqrt{P\ max/R}$

$E(max) = \sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = Maximum power dissipation (watts)
R = ESR at specified frequency (ohms)

Case Size	Maximum Power Dissipation (Pmax) Watts at 25°C
A	0.09
B	0.09
C	0.100
D/F	0.125

Optimum Solder Wave Profile



Reverse Voltage

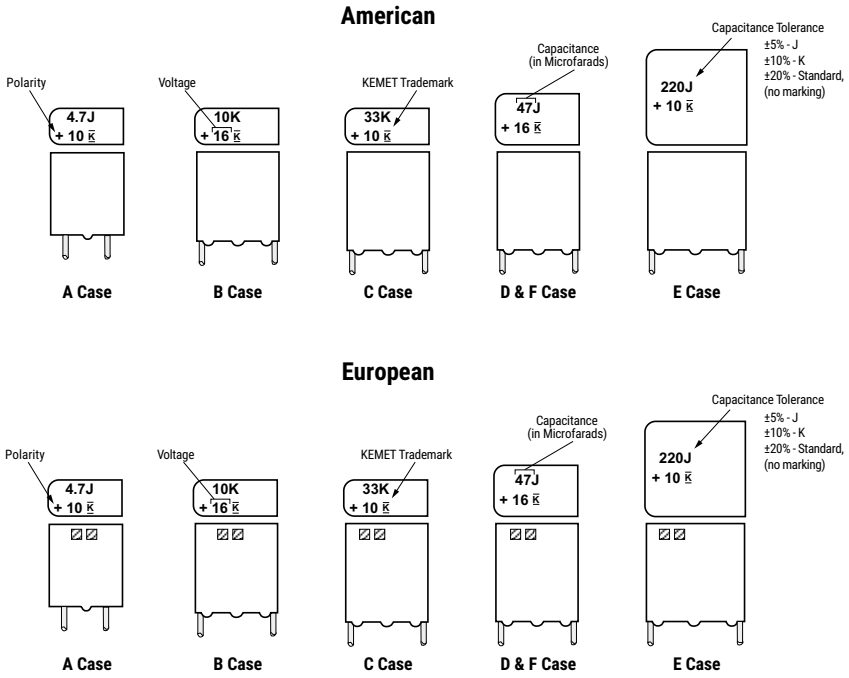
Although these are polar capacitors, some degree of transient voltage reversal is permissible, as seen below. The capacitors should not be operated continuously in reverse mode, even within these limits.

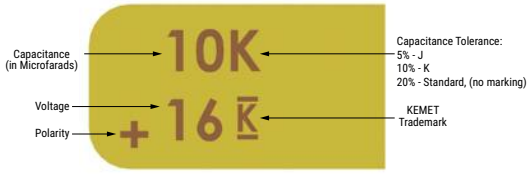
Temperature	Pecentage of Rated Voltage
+25°C	15
+85°C	5
+125°C	1

Mounting

All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Capacitor Marking





Storage

Tantalum molded radial capacitors should be stored in normal working environments. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60°C RH. Storage at high temperature may cause a small, temporary increase in leakage current (measured under standard conditions), but the original value is usually restored within a few minutes after application of rated voltage. Storage at high humidity may increase capacitance and dissipation factor. Solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

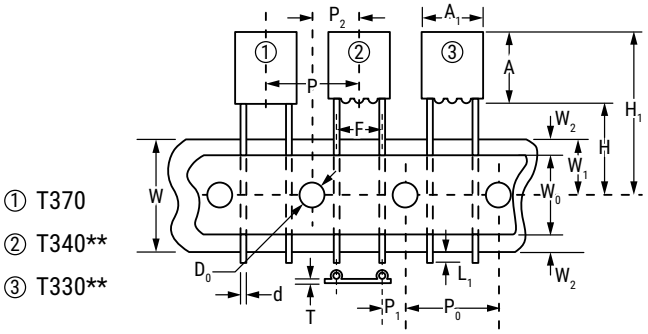
Tape & Reel Packaging Information

KEMET offers Solid Tantalum Capacitors fully compatible for use with automatic insertion machines for radial-lead components. Aris Reeling meets all requirements of EIA Standard RS-468. KEMET capacitors are wound on a precision made ARIS Reel Package. ARIS Ammo Package is also available.

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity
A	300	1,000	C-7301	1,600
B	300	1,000	C-7301	1,500
C	200	1,000	C-7301	1,500
D	100	250	C-7301	450
E	50	150	C-7301	N/A
F	100	N/A	N/A	N/A

Figure 1



Dimension	Symbol	Nominal mm (inch)		Tolerance mm (inch)	
Body Height (1)	A	10.50 (0.413)		±0.38 (±0.015) Maximum	
Body Width (1)	A_1	15.24 (0.600)		±0.38 (±0.015) Maximum	
Sprocket Hole Diameter	D_0	4.0 (0.157)		±0.3 (±0.012)	
Lead Diameter	d	0.51 (0.020) or 0.64 (0.025)		±0.05	±0.03 (±0.001)
Lead Center (5)	F	5.0 (0.197)	2.5 (0.098)	+0.8 (+0.032)	−0.2 (−0.008)
Component Base to Tape Center (2) (4) (6)	H	16.0 – 21.0 (0.630 – 0.827)		Reference Only	
Lead Standoff Height	H_0	N/A			
Component Height Above Tape Center	H_1	32.25 (1.270)		Maximum	
Component Alignment Front to Rear	ΔH	0		±2.0 (±0.079)	
Cut Out Length	L	11.0 (0.433)		Maximum	
Lead Protrusion	L_1	2.0 (0.079)		Maximum	
Component Pitch (5)	P	12.7 (0.500)		±1.0 (±0.039)	
Sprocket Hole Pitch (3)	P_0	12.7 (0.500)		±0.03 (±0.012)	
Sprocket Hole Center to Lead Center (4) (5)	P_1	3.85 (0.152)	4.76 (0.188)	5.1 (0.201)	±0.7 (±0.028)
Sprocket Hole Center to Component Center	P_2	6.35 (0.250)		±1.31 (±0.051)	
Body Thickness	T_0	6.35 (0.250)		±1.3 Maximum	
Total Tape Thickness	T	0.7 (0.28)		±0.02 (±0.008)	
Carrier Tape Width	W	18.0 (0.709)		+1.0/−0.5 (+0.039/−0.020)	
Hold-Down Tape Width	W_0	15 (0.561) or 6 (0.236)		+1.0/−0.8 (+0.039/−0.031	
Sprocket Hole Location	W_1	9.0 (0.354)		+0.075/−0.5 (+0.030/−0.020)	
Hold-Down Tape Location	W_2	3.0 (0.118) or 12.0 (0.472)		Maximum	

Notes:

(1) See Dimensions table for specific values per case size
(2) Reference only
(3) Cumulative pitch error ±1.0 mm (0.039") maximum in 20 consecutive sprocket hole locations.
(4) Measured at bottom of standoff.
(5) P, P1 and F measured at egress from carrier tape.
(6) H dimensions for T370 D and E 16.5 mm ±0.5 mm (0.650"±0.020")

On polar devices, the positive (+) lead exits from container first.
** Lead spacings are 2.5 mm (0.098") center to center*
*** Lead spacings are 5.0 mm (0.197") center to center.*

T370 & T378 MIL-PRF-49137/6 (CX06 Style)

Overview

The T370 and T378 Micron MIL-PRF-49137/6 (CX06 Style) capacitors are available in a variety of case styles and sizes. These capacitors are designed to operate from −55°C to +85°C at full voltage and to +125°C with derating. The KEMET Micron is qualified under MIL-PRF-49137/6 as military styles CX06 (T378).

The T370 capacitor is encapsulated in a molded, gold-colored epoxy. This encasement technique allows maximum utilization of circuit board real estate, with precisely centered leads in a microminiature case.

These molded packages also provide significant improvements in overall dimensional consistency, as well as lead wires precisely spaced to within 0.010 inches (0.25 mm). With KEMET's new molded packaging design, these capacitors can now be marked using a laser printing technique. The KEMET laser marking system ensures legibility and permanency while offering a complete alphanumeric print format. Laser print meets all requirements of the Resistance to Solvents Test, Method 215 of MIL-STD-202.

Benefits

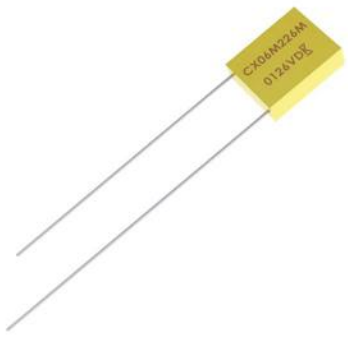
- Taped and reeled per EIA Specification RS-468
- Laser-marked case
- Qualified to MIL-PRF-49137/6, Style CX06 (T378 only)
- T370 capacitance values of 0.68 – 220 µF
- T378 capacitance values of 2.2 – 220 µF
- Tolerances of +40% −20%, ±5%, ±10% and ±20% standard
- Voltage rating of 3 – 35 VDC
- Operating temperature range of −55°C to +85°C at rated voltage and up to 125°C with derating
- Case sizes: C, D, E, F

Applications

Typical applications include use in bypass, coupling, filtering, and timing circuits.

T370

T378



Ordering Information – T370/T378

T	37X	D	475	M	035	A	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate	Termination Finish	Packaging
T = Tantalum	370 378	C, D, E, F	First two digits represent significant figures. Third digit specifies number of zeros to follow.	M = ±20% K = ±10% J = ±5% L = 40%, −20%	003 = 3 004 = 4 006 = 6.3 010 = 10 015 = 15 020 = 20 025 = 25 035 = 35	Not Applicable	S = Standard (solder-coated nickel)	Blank = Bulk 7301 = Tape & Reel 7305 = Ammo 7317 = Ammo

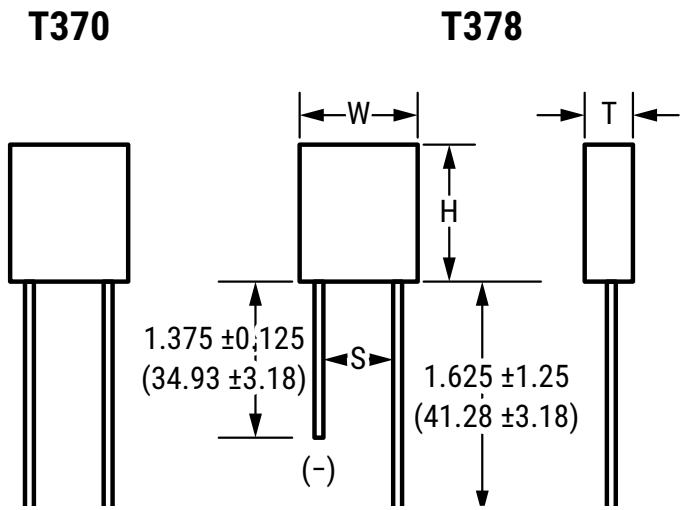
Ordering Information – Defense MIL-PRF-49137/6 (CX06 Style)

CX06	D	335	K
Style	Voltage	Capacitance Code (pF)	Capacitance Tolerance
CX = Capacitors, Fixed, Solid Electrolyte, Tantalum, Polar, nonhermetically sealed. 06 = Style	B = 3 V C = 4 V D = 6 V F = 10 V H = 15 V J = 20 V K = 25 V M = 35 V	First two digits represent significant figures. Third digit specifies number of zeros to follow.	M = ±20% K = ±10%

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	T370: 0.68 – 220 µF at 120 Hz/25°C; T378: 2.2 – 220 µF at 120 Hz/25°C
Capacitance Tolerance	M tolerance ±20% standard, L tolerance + 40%/−20%, J tolerance ±5%, K tolerance ±10%
Rated Voltage Range	3 – 35 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table (rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)

Dimensions – Inches



KEMET Case Size	Style	MIL Case Size	Dimension				
			T	W	H	M	S
			Maximum				Lead Spacing
C	CX06	D	0.075	0.185	0.225	0.010 *1 / 0.016 *2	0.150 ±0.020
D		E	0.110	0.220	0.290	0.016	0.180 ±0.025
E		F	0.130	0.230	0.310	0.016	0.200 ±0.025
F		G	0.150	0.375	0.475	0.016	0.300 ±0.025

**1 Lead Diameter for T378 Series*
**2 Lead Diameter for T370 Series*

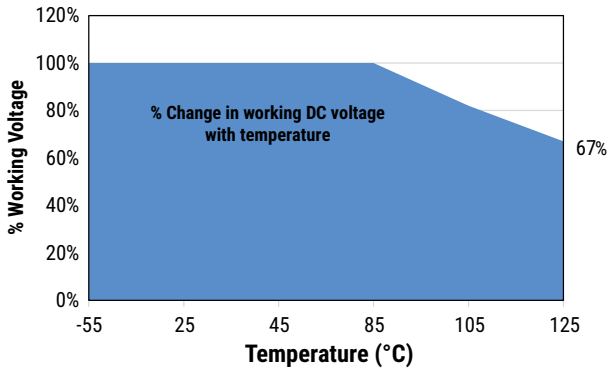
Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C	CX06 CAPACITORS PER MIL-PRF-49137/6	
						CX06 MILITARY PART NUMBER	KEMET MILITARY PART NUMBER
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum		
3	22.0	C	T370C226(1)003AS	1.0	10	CX06B226(2)	T378C226(3)003AS
3	220.0	F	T370F227(1)003AS	9.0	15	CX06B227(2)	T378F227(3)003AS
4	15.0	C	T370C156(1)004AS	1.0	8.0	CX06C156(2)	T378C156(3)004AS
4	47.0	D	T370D476(1)004AS	2.0	8.0	CX06C476(2)	T378D476(3)004AS
4	68.0	E	T370E686(1)004AS	3.0	8.0	CX06C686(2)	T378E686(3)004AS
6	10.0	C	T370C106(1)006AS	1.0	6.0	CX06D106(2)	T378C106(3)006AS
6	33.0	D	T370D336(1)006AS	2.0	6.0	CX06D336(2)	T378D336(3)006AS
6	47.0	E	T370E476(1)006AS	3.0	6.0	CX06D476(2)	T378E476(3)006AS
6	150.0	F	T370F157(1)006AS	9.0	10.0	CX06D157(2)	T378F157(3)006AS
10	6.8	C	T370C685(1)010AS	1.0	6.0	CX06F685(2)	T378C685(3)010AS
10	22.0	D	T370D226(1)010AS	2.0	6.0	CX06F226(2)	T378D226(3)010AS
10	33.0	E	T370E336(1)010AS	3.0	6.0	CX06F336(2)	T378E336(3)010AS
10	100.0	F	T370F107(1)010AS	9.0	8.0	CX06F107(2)	T378F107(3)010AS
15	15.0	D	T370D156(1)015AS	2.0	6.0	CX06H156(2)	T378D156(3)015AS
15	22.0	E	T370E226(1)015AS	3.0	6.0	CX06H226(2)	T378E226(3)015AS
15	68.0	F	T370F686(1)015AS	9.0	8.0	CX06H686(2)	T378F686(3)015AS
20	3.3	C	T370C335(1)020AS	1.0	6.0	CX06J335(2)	T378C335(3)020AS
20	4.7	C	T370C475(1)020AS	1.0	6.0	CX06J475(2)	T378C475(3)020AS
20	10.0	D	T370D106(1)020AS	2.0	6.0	CX06J106(2)	T378D106(3)020AS
20	15.0	E	T370E156(1)020AS	3.0	6.0	CX06J156(2)	T378E156(3)020AS
20	47.0	F	T370F476(1)020AS	9.0	8.0	CX06J476(2)	T378F476(3)020AS
25	2.2	C	T370C225(1)025AS	1.0	6.0	CX06K225(2)	T378C225(3)025AS
25	6.8	D	T370D685(1)025AS	2.0	6.0	CX06K685(2)	T378D685(3)025AS
25	10.0	E	T370E106(1)025AS	3.0	6.0	CX06K106(2)	T378E106(3)025AS
25	33.0	F	T370F336(1)025AS	9.0	6.0	CX06K336(2)	T378F336(3)025AS
35	0.68	C	T370C684(1)035AS	1.0	6.0	CX06M684(2)	T378C684(3)035AS
35	1.0	C	T370C105(1)035AS	1.0	6.0	CX06M105(2)	T378C105(3)035AS
35	1.5	C	T370C155(1)035AS	1.0	6.0	CX06M155(2)	T378C155(3)035AS
35	2.2	D	T370D225(1)035AS	2.0	6.0	CX06M225(2)	T378D225(3)035AS
35	3.3	D	T370D335(1)035AS	2.0	6.0	CX06M335(2)	T378D335(3)035AS
35	4.7	D	T370D475(1)035AS	2.0	6.0	CX06M475(2)	T378D475(3)035AS
35	6.8	E	T370E685(1)035AS	3.0	6.0	CX06M685(2)	T378E685(3)035AS
35	10.0	F	T370F106(1)035AS	9.0	6.0	CX06M106(2)	T378F106(3)035AS
35	15.0	F	T370F156(1)035AS	9.0	6.0	CX06M156(2)	T378F156(3)035AS
35	22.0	F	T370F226(1)035AS	9.0	6.0	CX06M226(2)	T378F226(3)035AS
(V) 85°C	µF	Case Size Code	µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)
Rated Voltage	Rated Capacitance		DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS13 Style)	

(1) To complete KEMET part number, insert L - +40%, –20%; M - 20%; K - ±10%; J - ±5%. Designates Capacitance tolerance.
(2) To complete miitary part number, insert M - ±20%, K - ±10%. Designates Capacitance tolerance.
(3) To complete KEMET part number, insert M - ±20%, K - ±10%. Designates Capacitance tolerance.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	66% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage that may be applied is limited by following criteria:

1. Dissipated power must not exceed the limits specified for the Series.
2. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
3. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage.

Thermal capacities for the various case sizes have been determined empirically and are listed below. The "ripple voltage" permissible may be calculated from the impedance and ESR data shown in the respective product section.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

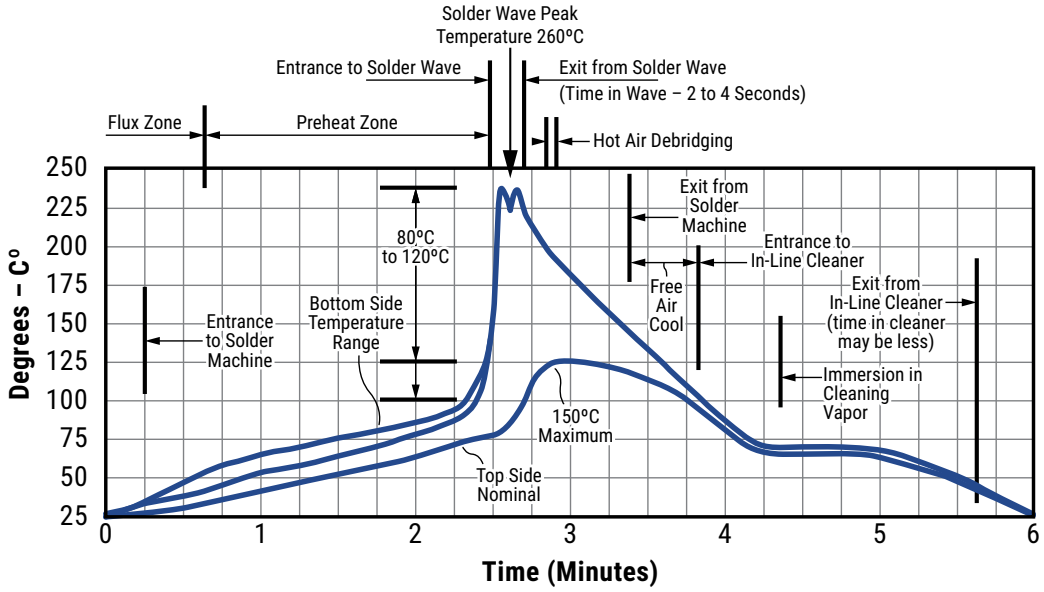
Case Size	Maximum Power Dissipation (P_{max}) Watts at 25°C
C	0.070
D	0.080
E	0.090
F	0.100

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Optimum Solder Wave Profile



Reverse Voltage

Although these are polar capacitors, some degree of transient voltage reversal is permissible, as seen below. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Pecentage of Rated Voltage
+25°C	15
+85°C	5
+125°C	1

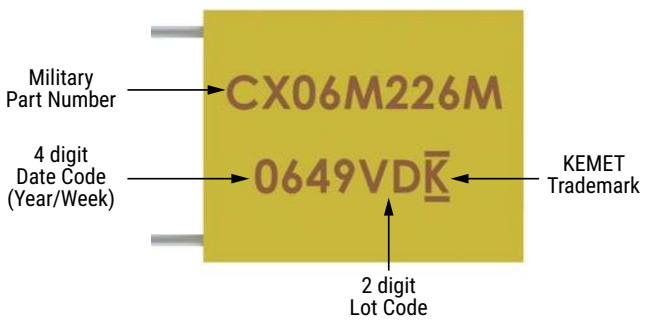
Mounting

All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Capacitor Marking

T370

T378



Storage

Tantalum molded radial/axial capacitors should be stored in normal working environments. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60°C RH. Storage at high temperature may cause a small, temporary increase in leakage current (measured under standard conditions), but the original value is usually restored within a few minutes after application of rated voltage. Storage at high humidity may increase capacitance and dissipation factor. Solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers Solid Tantalum Capacitors fully compatible for use with automatic insertion machines for radial-lead components. Aris Reeling meets all requirements of EIA Standard RS-468. KEMET capacitors are wound on a precision made ARIS Reel Package. ARIS Ammo Package is also available.

Table 2 – Packaging Quantity

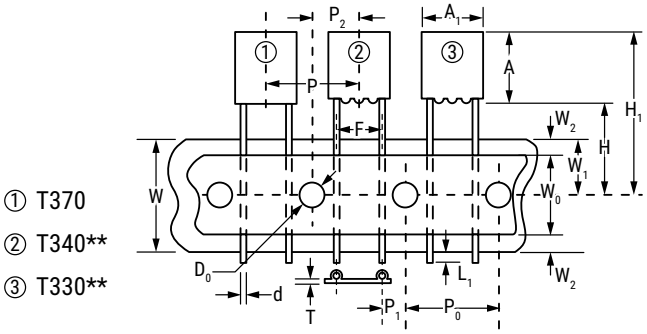
T370

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec
C	500	N/A	N/A
D	500	1,000	C-7301
E	500	1,000	C-7301
F	250	N/A	N/A

T378

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec
C	200	N/A	N/A
D	200	1,000	C-7301
E	180	1,000	C-7301
F	50	N/A	N/A

Figure 1



Dimension	Symbol	Nominal mm (inch)		Tolerance mm (inch)	
Body Height (1)	A	10.50 (0.413)		±0.38 (±0.015) Maximum	
Body Width (1)	A_1	15.24 (0.600)		±0.38 (±0.015) Maximum	
Sprocket Hole Diameter	D_0	4.0 (0.157)		±0.3 (±0.012)	
Lead Diameter	d	0.51 (0.020)	0.64 (0.025)	±0.05 (±0.001)	±0.03
Lead Center (5)	F	5.0 (0.197)	2.5 (0.098)	+0.8 (+0.032)	−0.2 (−0.008)
Component Base to Tape Center (2) (4) (6)	H	16.0 – 21.0 (0.630 – 0.827)		Reference Only	
Lead Standoff Height	H_0	N/A			
Component Height Above Tape Center	H_1	32.25 (1.270)		Maximum	
Component Alignment Front to Rear	ΔH	0		±2.0 (±0.079)	
Cut Out Length	L	11.0 (0.433)		Maximum	
Lead Protrusion	L_1	2.0 (0.079)		Maximum	
Component Pitch (5)	P	12.7 (0.500)		±1.0 (±0.039)	
Sprocket Hole Pitch (3)	P_0	12.7 (0.500)		±0.03 (±0.012)	
Sprocket Hole Center to Lead Center (4) (5)	P_1	3.85 (0.152)	4.76 (0.188)	5.1 (0.201)	±0.7 (±0.028)
Sprocket Hole Center to Component Center	P_2	6.35 (0.250)		±1.31 (±0.051)	
Body Thickness	T_0	6.35 (0.250)		±1.3 Maximum	
Total Tape Thickness	T	0.7 (0.28)		±0.02 (±0.008)	
Carrier Tape Width	W	18.0 (0.709)		+1.0/−0.5 (+0.039/−0.020)	
Hold-Down Tape Width	W_0	15 (0.561)	6 (0.236)	+1.0/−0.8 (+0.039/−0.031	
Sprocket Hole Location	W_1	9.0 (0.354)		+0.075/−0.5 (+0.030/−0.020)	
Hold-Down Tape Location	W_2	3.0 (0.118)	12.0 (0.472)	Maximum	

Notes:

(1) See Dimensions table for specific values per case size
(2) Reference only
(3) Cumulative pitch error ±1.0 mm (0.039") maximum in 20 consecutive sprocket hole locations.
(4) Measured at bottom of standoff.
(5) P, P1 and F measured at egress from carrier tape.
(6) H dimensions for T370 D and E 16.5mm ±0.5 mm (0.650" ±0.020")

On polar devices, the positive (+) lead exits from container first.
** Lead spacings are 2.5mm (0.098") center to center*
*** Lead spacings are 5.0mm (0.197") center to center.*

T350, T351, T352, T353, T354, T355 & T356
UltraDip II Polar

Overview

The KEMET UltraDip II offers quality instrument and entertainment system designs that are widely recognized and advantages inherent to solid tantalum capacitors at competitive prices. These capacitors are miniature, dipped, solid tantalum capacitors that provide the designer with the advantages of compactness, low leakage and low DF performance characteristics for filtering, bypassing, coupling, blocking and RC timing circuits. This series features a capacitance range from 0.1 to 680 µF at voltages from 3 to 50 VDC.

UltraDip II capacitors utilize the same sophisticated materials and processes that have positioned KEMET as the leading manufacturer of solid tantalum capacitors. The plastic case provides a tough barrier coating and maintains precision of lead wire spacing within ±0.015 inch. The gold color epoxy utilized permits laser marking with outstanding permanency and legibility. All case sizes are printed with capacitance, voltage, polarity and vendor identification. Solid tantalum devices exhibit no degradation failure mode during shelf storage and show a constantly decreasing failure rate (i.e., absence of wearout mechanism) during life tests. Self-insulating cases are resistant to shock and vibration. T35X also exhibits low DC leakage, ESR and impedance, and maintains excellent temperature stability.

Benefits

- Taped and reeled per EIA Specification RS-468
- Laser-marked case
- Capacitance values of 0.1 to 680 µF
- Tolerances of ± 5% (special order), ±10% and ±20%
- Voltage rating of 3 – 50 VDC
- Case sizes: A, B, C, D, E, F, G, H, J, K, L, and M

Applications

Typical applications include filtering, bypassing, coupling, blocking and RC timing circuits or other applications that can benefit from compactness.

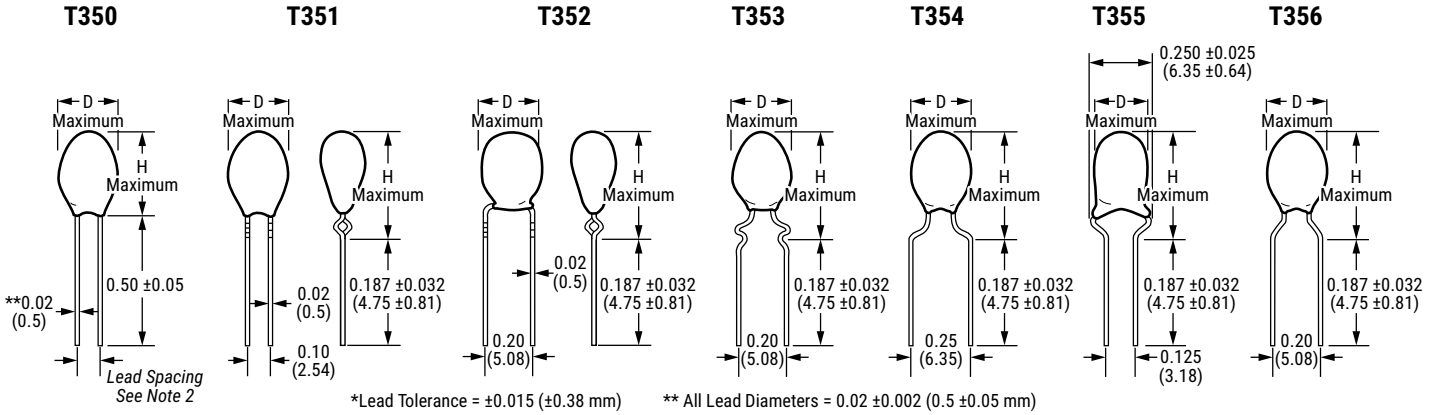
Ordering Information

T	35X	A	105	M	035	A	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate	Termination Finish	Packaging
T = Tantalum	350 351 352 353 354 355 356	A, B, C, D, E, F, G, H, J, K, L, M	First two digits represent significant figures. Third digit specifies number of zeros to follow.	M = ±20% K = ±10% J = ±5% (Available on special order)	003 = 3 006 = 6 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	Not Applicable	S = Standard T =100% Sn (tin)	Blank = Bulk 7301 = Tape & Reel 7303 = Tape & Reel 7305 = Ammo 7317 = Ammo

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 680 µF at 120 Hz/25°C
Capacitance Tolerance	M tolerance ±20%, K tolerance ±10%
Rated Voltage Range	3 – 50 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)

Dimensions – Millimeters (Inches)



Case Size	All	T350	T351	T352	T353	T354	T355	T356
	D Maximum Diamenter	H* Maximum Height	H* Maximum Height	H* Maximum Height	H* Maximum Height	H* Maximum Height	H* Maximum Height	H* Maximum Height
A	0.175 (4.5)	0.280 (7.1)	0.380 (9.6)	0.400 (10.2)	0.400 (10.2)	0.340 (8.6)	0.340 (8.6)	0.340 (8.6)
B	0.175 (4.5)	0.300 (7/6)	0.390 (9.9)	0.410 (10.4)	0.410 (10.4)	0.350 (8.9)	0.350 (8.9)	0.350 (8.9)
C	0.196 (5.0)	0.330 (8.4)	0.420 (10.7)	0.440 (11.2)	0.440 (11.2)	0.380 (9.6)	0.380 (9.6)	0.380 (9.6)
D	0.196 (5.0)	0.340 (8.6)	0.430 (10.7)	0.450 (11.4)	0.450 (11.4)	0.390 (9.9)	0.390 (9.9)	0.390 (9.9)
E	0.216 (5.5)	0.350 (8.9)	0.440 (11.2)	0.460 (11.7)	0.460 (11.7	0.400 (10.2)	0.400 (10.2)	0.400 (10.2)
F	0.236 (6.0)	0.390 (9.9)	0.480 (12.2)	0.500 (12.7)	0.500 (12.7)	0.440 (11.2)	0.440 (11.2)	0.440 (11.2)
G	0.250 (6.3)	0.400 (10.2)	0.490 (12.4)	0.510 (13.0)	0.510 (13.0)	0.450 (11.4)	0.450 (11.4)	0.450 (11.4)
H	0.300 (7.6)	0.400 (10.2)	0.500 (12.7)	0.520 (13.2)	0.520 (13.2)	0.470 (11.9)	0.470 (11.9)	0.470 (11.9)
J**	0.330 (8.4)	0.500 (12.7)	***	***	0.580 (14.7)	0.550 (14.0)	***	0.550 (14.0)
K**	0.350 (8.9)	0.530 (13.5)	***	***	0.630 (16.0)	0.610 (15.5)	***	0.610 (15.5)
L**	0.350 (8.9)	0.630 (16.0)	***	***	0.730 (18.5)	0.710 (18.1)	***	0.710 (18.1)
M**	0.400 (10.2)	0.670 (17.0)	***	***	0.760 (19.3)	0.740 (18.8)	***	0.740 (18.8)

**All "H" Dimensions are from Capacitor seating plane to top of Capacitor.*
***On T350, case sizes A-H are supplied with 0.100" (2.54) lead spacing and case sizes J-M are supplied with 0.200" (5.08) lead spacing.*
****These case sizes are not available for T351, T352 and T355 capacitors.*

Table 1 - Ratings and Part Number Reference

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum
3	4.7	A	T35(1)A475(3)003A(4)	0.5	5
3	5.6	A	T35(1)A565(3)003A(4)	0.5	5
3	6.8	A	T35(1)A685(3)003A(4)	0.5	5
3	8.2	A	T35(1)A825(3)003A(4)	0.5	6
3	10.0	A	T35(1)A106(3)003A(4)	0.5	6
3	12.0	B	T35(1)B126(3)003A(4)	0.5	6
3	15.0	B	T35(1)B156(3)003A(4)	0.5	6
3	18.0	C	T35(1)C186(3)003A(4)	0.5	6
3	22.0	C	T35(1)C226(3)003A(4)	0.5	6
3	27.0	D	T35(1)D276(3)003A(4)	0.6	6
3	33.0	D	T35(1)C336(3)003A(4)	0.8	6
3	39.0	E	T35(1)E396(3)003A(4)	0.9	6
3	47.0	E	T35(1)E476(3)003A(4)	1.1	6
3	56.0	F	T35(1)F566(3)003A(4)	1.3	6
3	68.0	F	T35(1)F686(3)003A(4)	1.6	6
3	82.0	G	T35(1)G826(3)003A(4)	2.0	8
3	100.0	G	T35(1)G107(3)003A(4)	2.4	8
3	120.0	H	T35(1)H127(3)003A(4)	2.9	8
3	150.0	H	T35(1)H157(3)003A(4)	3.6	8
3	180.0	J	T35(2)J187(3)003A(4)	4.3	8
3	220.0	J	T35(2)J227(3)003A(4)	5.3	8
3	270.0	K	T35(2)K277(3)003A(4)	6.5	8
3	330.0	K	T35(2)K337(3)003A(4)	7.9	8
3	390.0	L	T35(2)L397(3)003A(4)	9.4	9
3	470.0	L	T35(2)L477(3)003A(4)	10.0	9
3	560.0	M	T35(2)M567(3)003A(4)	10.0	9
3	680.0	M	T35(2)M687(3)003A(4)	10.0	9
6	3.3	A	T35(1)A335(3)006A(4)	0.5	5
6	3.9	A	T35(1)A395(3)006A(4)	0.5	5
6	4.7	A	T35(1)A475(3)006A(4)	0.5	5
6	5.6	A	T35(1)A565(3)006A(4)	0.5	5
6	6.8	A	T35(1)A685(3)006A(4)	0.5	5
6	8.2	B	T35(1)B825(3)006A(4)	0.5	6
6	10.0	B	T35(1)B106(3)006A(4)	0.5	6
6	12.0	C	T35(1)C126(3)006A(4)	0.6	6
6	15.0	C	T35(1)C156(3)006A(4)	0.7	6
6	18.0	D	T35(1)D186(3)006A(4)	0.9	6
6	22.0	D	T35(1)D226(3)006A(4)	1.1	6
6	27.0	E	T35(1)E276(3)006A(4)	1.3	6
6	33.0	E	T35(1)E336(3)006A(4)	1.6	6
6	39.0	F	T35(1)F396(3)006A(4)	1.9	6
6	47.0	F	T35(1)F476(3)006A(4)	2.3	6
6	56.0	G	T35(1)G566(3)006A(4)	2.7	6
6	68.0	G	T35(1)G686(3)006A(4)	3.3	6
6	82.0	H	T35(1)H826(3)006A(4)	3.9	8
6	100.0	H	T35(1)H107(3)006A(4)	4.8	8
6	120.0	J	T35(2)J127(3)006A(4)	5.8	8
(V) 85°C	µF	Case Code Case Size	KEMET Part Number	µA at 25°C Maximum/5 Minutes	120 Hz Maximum
Rated Voltage	Rated Capacitance			DC Leakage	DF % at 25°C

(1) To complete KEMET Part Number, insert Series Designation as follows: "0 = T350, "1" = T351, "2" = T352, "3" = T353, "4" = T354, "5" = T355, "6" = T356.

(2) To complete KEMET Part Number, insert only Series Designation as follows: "0 = T350, "3" = T353, "4" = T354, "6" = T356.

(3) To complete KEMET part number, insert M - 20%, K - ±10%, J - ± 5%. Designates Capacitance tolerance.

(4) To complete KEMET part number, insert S = Standard coated or T=100% Sn (tin). Designates termination finish.

Higher voltage and better capacitance tolerance products may be substitued for an order within the same case size at KEMET's option.

Table 1 - Ratings and Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum
6	150.0	J	T35(2)J157(3)006A(4)	7.2	8
6	180.0	K	T35(2)K187(3)006A(4)	8.6	8
6	220.0	K	T35(2)K227(3)006A(4)	10.0	8
6	270.0	L	T35(2)L227(3)006A(4)	10.0	8
6	330.0	L	T35(2)L337(3)006A(4)	10.0	8
10	2.2	A	T35(1)A225(3)010A(4)	0.5	5
10	2.7	A	T35(1)A275(3)010A(4)	0.5	5
10	3.3	A	T35(1)A335(3)010A(4)	0.5	5
10	3.9	A	T35(1)A395(3)010A(4)	0.5	5
10	4.7	A	T35(1)A475(3)010A(4)	0.5	5
10	5.6	B	T35(1)B565(3)010A(4)	0.5	5
10	6.8	B	T35(1)B685(3)010A(4)	0.5	5
10	8.2	C	T35(1)C825(3)010A(4)	0.7	6
10	10.0	C	T35(1)C106(3)010A(4)	0.8	6
10	12.0	E	T35(1)E126(3)010A(4)	1.0	6
10	15.0	E	T35(1)E156(3)010A(4)	1.2	6
10	18.0	E	T35(1)E186(3)010A(4)	1.4	6
10	22.0	E	T35(1)E226(3)010A(4)	1.8	6
10	27.0	F	T35(1)F276(3)010A(4)	2.2	6
10	33.0	F	T35(1)F336(3)010A(4)	2.6	6
10	39.0	G	T35(1)G396(3)010A(4)	3.1	6
10	47.0	H	T35(1)H476(3)010A(4)	3.8	6
10	56.0	H	T35(1)H566(3)010A(4)	4.5	6
10	68.0	H	T35(1)H686(3)010A(4)	5.4	6
10	82.0	J	T35(1)J826(3)010A(4)	6.6	8
10	100.0	J	T35(1)J107(3)010A(4)	8.0	8
10	120.0	K	T35(2)K127(3)010A(4)	9.6	8
10	150.0	K	T35(2)K157(3)010A(4)	10.0	8
10	180.0	L	T35(2)L187(3)010A(4)	10.0	8
10	220.0	L	T35(2)L227(3)010A(4)	10.0	8
16	1.5	A	T35(1)A155(3)016A(4)	0.5	5
16	1.8	A	T35(1)A185(3)016A(4)	0.5	5
16	2.2	A	T35(1)A225(3)016A(4)	0.5	5
16	2.7	A	T35(1)A275(3)016A(4)	0.5	5
16	3.3	A	T35(1)A335(3)016A(4)	0.5	5
16	3.9	B	T35(1)B395(3)016A(4)	0.5	5
16	4.7	B	T35(1)B475(3)016A(4)	0.6	5
16	5.6	C	T35(1)C565(3)016A(4)	0.7	5
16	6.8	C	T35(1)C685(3)016A(4)	0.9	5
16	8.2	E	T35(1)E825(3)016A(4)	1.0	6
16	10.0	E	T35(1)E106(3)016A(4)	1.3	6
16	12.0	E	T35(1)E126(3)016A(4)	1.5	6
16	15.0	E	T35(1)E156(3)016A(4)	1.8	6
16	18.0	F	T35(1)F186(3)016A(4)	2.2	6
16	22.0	F	T35(1)F226(3)016A(4)	2.6	6
16	27.0	H	T35(1)H276(3)016A(4)	3.2	6
16	33.0	H	T35(1)H336(3)016A(4)	4.0	6
(V) 85°C	µF	Case Code Case Size	KEMET Part Number	µA at 25°C Maximum/5 Minutes	120 Hz Maximum
Rated Voltage	Rated Capacitance			DC Leakage	DF % at 25°C

(1) To complete KEMET Part Number, insert Series Designation as follows: "0 = T350, "1" = T351, "2" = T352, "3" = T353, "4" = T354, "5" = T355, "6" = T356.

(2) To complete KEMET Part Number, insert only Series Designation as follows: "0 = T350, "3" = T353, "4" = T354, "6" = T356.

(3) To complete KEMET part number, insert M - 20%, K - ±10%, J - ± 5%. Designates Capacitance tolerance.

(4) To complete KEMET part number, insert S = Standard coated or T=100% Sn (tin). Designates termination finish.

Higher voltage and better capacitance tolerance products may be substitued for an order within the same case size at KEMET's option.

Table 1 - Ratings and Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum
16	39.0	J	T35(2)J396(3)016A(4)	4.7	6
16	47.0	J	T35(2)J476(3)016A(4)	5.6	6
16	56.0	K	T35(2)K566(3)016A(4)	6.8	6
16	68.0	K	T35(2)K686(3)016A(4)	8.2	6
16	82.0	L	T35(2)L826(3)016A(4)	9.8	8
16	100.0	L	T35(2)L107(3)016A(4)	10.0	8
16	120.0	M	T35(2)M127(3)016A(4)	10.0	8
16	150.0	M	T35(2)M157(3)016A(4)	10.0	8
20	1.0	A	T35(1)A105(3)020A(4)	0.5	3
20	1.2	A	T35(1)A125(3)020A(4)	0.5	5
20	1.5	A	T35(1)A155(3)020A(4)	0.5	5
20	1.8	A	T35(1)A185(3)020A(4)	0.5	5
20	2.2	A	T35(1)A225(3)020A(4)	0.5	5
20	2.7	B	T35(1)B275(3)020A(4)	0.5	5
20	3.3	B	T35(1)B335(3)020A(4)	0.5	5
20	3.9	C	T35(1)C395(3)020A(4)	0.6	5
20	4.7	C	T35(1)C475(3)020A(4)	0.8	5
20	5.6	D	T35(1)D565(3)020A(4)	0.9	5
20	6.8	D	T35(1)D685(3)020A(4)	1.1	5
20	8.2	E	T35(1)E825(3)020A(4)	1.3	6
20	10.0	E	T35(1)E106(3)020A(4)	1.6	6
20	12.0	F	T35(1)F126(3)020A(4)	1.9	6
20	15.0	F	T35(1)F156(3)020A(4)	2.4	6
25	1.0	A	T35(1)A105(3)025A(4)	0.5	3
25	1.2	A	T35(1)A125(3)025A(4)	0.5	5
25	1.5	A	T35(1)A155(3)025A(4)	0.5	5
25	1.8	A	T35(1)A185(3)025A(4)	0.5	5
25	2.2	B	T35(1)B225(3)025A(4)	0.5	5
25	2.7	B	T35(1)B275(3)025A(4)	0.5	5
25	3.3	B	T35(1)B335(3)025A(4)	0.7	5
25	3.9	C	T35(1)C395(3)025A(4)	0.8	5
25	4.7	C	T35(1)C475(3)025A(4)	0.9	5
25	5.6	E	T35(1)E565(3)025A(4)	1.1	5
25	6.8	E	T35(1)E685(3)025A(4)	1.4	5
25	8.2	E	T35(1)E825(3)025A(4)	1.6	6
25	10.0	E	T35(1)E106(3)025A(4)	2.0	6
25	12.0	G	T35(1)G126(3)025A(4)	2.4	6
25	15.0	G	T35(1)G156(3)025A(4)	3.0	6
25	18.0	H	T35(1)H186(3)025A(4)	3.6	6
25	22.0	H	T35(1)H226(3)025A(4)	4.4	6
25	27.0	J	T35(2)J276(3)025A(4)	5.4	6
25	33.0	J	T35(2)J336(3)025A(4)	6.6	6
25	39.0	K	T35(2)K396(3)025A(4)	7.8	6
25	47.0	K	T35(2)K476(3)025A(4)	9.4	6
25	56.0	L	T35(2)L566(3)025A(4)	10.0	6
25	68.0	L	T35(2)L686(3)025A(4)	10.0	6
35	0.10	A	T35(1)A104(3)035A(4)	0.5	3
(V) 85°C	µF	Case Code Case Size	KEMET Part Number	µA at 25°C Maximum/5 Minutes	120 Hz Maximum
Rated Voltage	Rated Capacitance			DC Leakage	DF % at 25°C

(1) To complete KEMET Part Number, insert Series Designation as follows: "0 = T350, "1" = T351, "2" = T352, "3" = T353, "4" = T354, "5" = T355, "6" = T356.

(2) To complete KEMET Part Number, insert only Series Designation as follows: "0 = T350, "3" = T353, "4" = T354, "6" = T356.

(3) To complete KEMET part number, insert M - 20%, K - ±10%, J - ± 5%. Designates Capacitance tolerance.

(4) To complete KEMET part number, insert S = Standard coated or T=100% Sn (tin). Designates termination finish.

Higher voltage and better capacitance tolerance products may be substitued for an order within the same case size at KEMET's option.

Table 1 - Ratings and Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum
35	0.12	A	T35(1)A124(3)035A(4)	0.5	3
35	0.15	A	T35(1)A154(3)035A(4)	0.5	3
35	0.18	A	T35(1)A184(3)035A(4)	0.5	3
35	0.22	A	T35(1)A224(3)035A(4)	0.5	3
35	0.27	A	T35(1)A274(3)035A(4)	0.5	3
35	0.33	A	T35(1)A334(3)035A(4)	0.5	3
35	0.39	A	T35(1)A394(3)035A(4)	0.5	3
35	0.47	A	T35(1)A474(3)035A(4)	0.5	3
35	0.56	A	T35(1)A564(3)035A(4)	0.5	3
35	0.68	A	T35(1)A684(3)035A(4)	0.5	3
35	0.82	A	T35(1)A824(3)035A(4)	0.5	3
35	1.0	A	T35(1)A105(3)035A(4)	0.5	3
35	1.2	B	T35(1)B125(3)035A(4)	0.5	5
35	1.5	B	T35(1)B155(3)035A(4)	0.5	5
35	1.8	C	T35(1)C185(3)035A(4)	0.5	5
35	2.2	C	T35(1)C225(3)035A(4)	0.6	5
35	2.7	D	T35(1)D275(3)035A(4)	0.7	5
35	3.3	D	T35(1)D335(3)035A(4)	0.9	5
35	3.9	E	T35(1)E395(3)035A(4)	1.0	5
35	4.7	E	T35(1)E475(3)035A(4)	1.3	5
35	5.6	F	T35(1)F565(3)035A(4)	1.6	5
35	6.8	F	T35(1)F685(3)035A(4)	1.9	5
35	8.2	G	T35(1)G825(3)035A(4)	2.3	6
35	10.0	G	T35(1)G106(3)035A(4)	2.8	6
35	12.0	J	T35(2)J126(3)035A(4)	3.4	6
35	15.0	J	T35(2)J156(3)035A(4)	4.2	6
35	18.0	K	T35(2)K186(3)035A(4)	5.0	6
35	22.0	K	T35(2)K226(3)035A(4)	6.2	6
35	27.0	L	T35(2)L276(3)035A(4)	7.6	6
35	33.0	L	T35(2)L336(3)035A(4)	9.2	6
35	39.0	M	T35(2)M396(3)035A(4)	10.0	6
35	47.0	M	T35(2)M476(3)035A(4)	10.0	6
50	0.10	A	T35(1)A104(3)050A(4)	0.5	3
50	0.12	A	T35(1)A124(3)050A(4)	0.5	3
50	0.15	A	T35(1)A154(3)050A(4)	0.5	3
50	0.18	A	T35(1)A184(3)050A(4)	0.5	3
50	0.22	A	T35(1)A224(3)050A(4)	0.5	3
50	0.27	A	T35(1)A274(3)050A(4)	0.5	3
50	0.33	A	T35(1)A334(3)050A(4)	0.5	3
50	0.39	B	T35(1)B394(3)050A(4)	0.5	3
50	0.47	B	T35(1)B474(3)050A(4)	0.5	3
50	0.56	B	T35(1)B564(3)050A(4)	0.5	3
50	0.68	B	T35(1)B684(3)050A(4)	0.5	3
50	0.82	B	T35(1)B824(3)050A(4)	0.5	3
50	1.0	B	T35(1)B105(3)050A(4)	0.5	3
50	1.2	D	T35(1)D125(3)050A(4)	0.5	5
50	1.5	E	T35(1)E155(3)050A(4)	0.6	5
(V) 85°C	µF	Case Code Case Size	KEMET Part Number	µA at 25°C Maximum/5 Minutes	120 Hz Maximum
Rated Voltage	Rated Capacitance			DC Leakage	DF % at 25°C

(1) To complete KEMET Part Number, insert Series Designation as follows: "0 = T350, "1" = T351, "2" = T352, "3" = T353, "4" = T354, "5" = T355, "6" = T356.

(2) To complete KEMET Part Number, insert only Series Designation as follows: "0 = T350, "3" = T353, "4" = T354, "6" = T356.

(3) To complete KEMET part number, insert M - 20%, K - ±10%, J - ± 5%. Designates Capacitance tolerance.

(4) To complete KEMET part number, insert S = Standard coated or T=100% Sn (tin). Designates termination finish.

Higher voltage and better capacitance tolerance products may be substitued for an order within the same case size at KEMET's option.

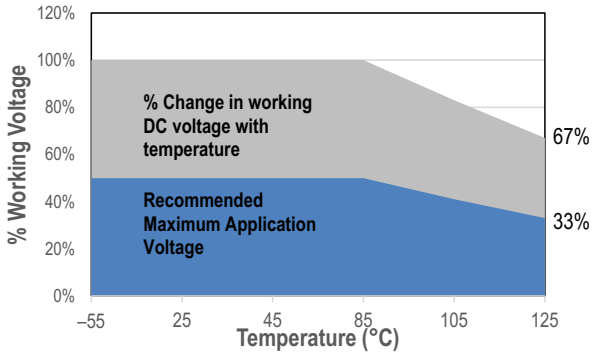
Table 1 - Ratings and Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum
50	1.8	E	T35(1)E185(3)050A(4)	0.7	5
50	2.2	E	T35(1)E225(3)050A(4)	0.9	5
50	2.7	F	T35(1)F275(3)050A(4)	1.1	5
50	3.3	F	T35(1)F335(3)050A(4)	1.3	5
50	3.9	G	T35(1)G395(3)050A(4)	1.6	5
50	4.7	G	T35(1)G475(3)050A(4)	1.9	5
50	5.6	H	T35(1)H565(3)050A(4)	2.2	5
50	6.8	J	T35(2)J685(3)050A(4)	2.7	5
50	8.2	J	T35(2)J825(3)050A(4)	3.3	6
50	10.0	K	T35(2)K106(3)050A(4)	4.0	6
50	12.0	K	T35(2)K126(3)050A(4)	4.8	6
50	15.0	L	T35(2)L156(3)050A(4)	6.0	6
50	18.0	L	T35(2)L186(3)050A(4)	7.2	6
50	22.0	M	T35(2)M226(3)050A(4)	8.8	0
(V) 85°C	µF	Case Code Case Size	KEMET Part Number	µA at 25°C Maximum/5 Minutes	120 Hz Maximum
Rated Voltage	Rated Capacitance			DC Leakage	DF % at 25°C

(1) To complete KEMET Part Number, insert Series Designation as follows: "0 = T350, "1" = T351, "2" = T352, "3" = T353, "4" = T354, "5" = T355, "6" = T356.
(2) To complete KEMET Part Number, insert only Series Designation as follows: "0 = T350, "3" = T353, "4" = T354, "6" = T356.
(3) To complete KEMET part number, insert M - 20%, K - ±10%, J - ± 5%. Designates Capacitance tolerance.
(4) To complete KEMET part number, insert S = Standard coated or T=100% Sn (tin). Designates termination finish.
Higher voltage and better capacitance tolerance products may be substituted for an order within the same case size at KEMET's option.

Recommended Voltage Derating Guidelines

	–55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	66% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage that may be applied is limited by following criteria:

1. Dissipated power must not exceed the limits specified for the Series.
2. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
3. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage.

Thermal capacities for the various case sizes have been determined empirically and are listed below. The "ripple voltage" permissible may be calculated from the impedance and ESR data shown in the respective product section.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

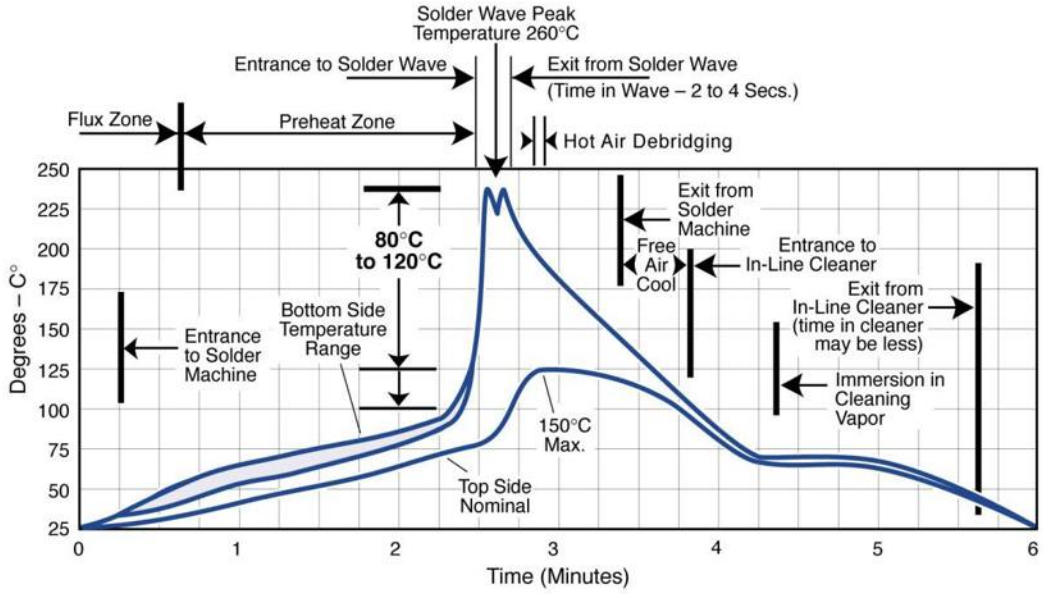
Case Size	Maximum Power Dissipation (Pmax) Watts at 25°C
A	0.040
B	0.050
C	0.060
D	0.065
E	0.070
F	0.080
G	0.090
H	0.100
J	0.110
K	0.120
L	0.130
M	0.140

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

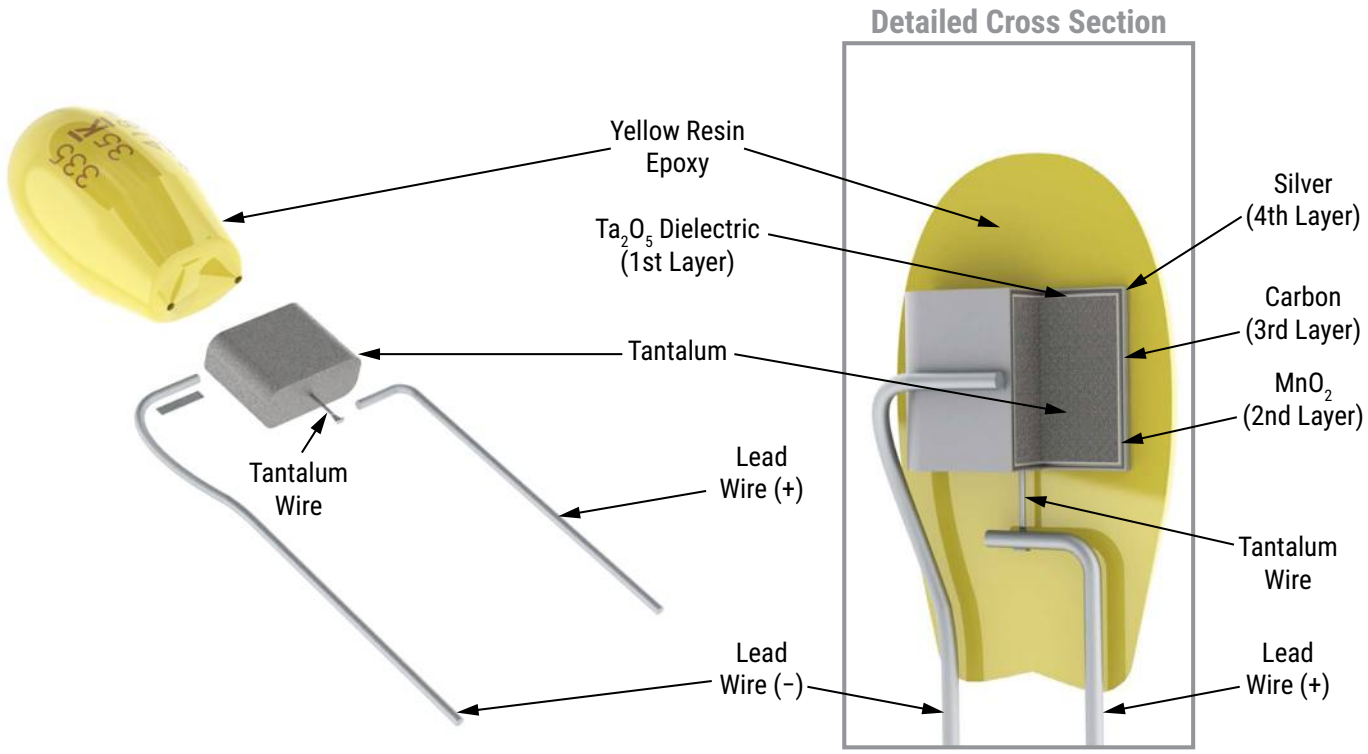
Optimum Solder Wave Profile



Mounting

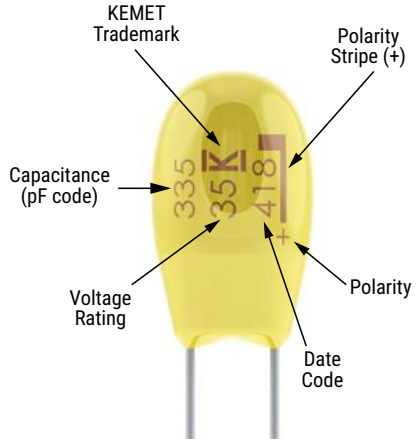
All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Construction



This drawing is for reference only, Tantalum anode shape represents typical product , this may vary to squared between the different offerings.

Capacitor Marking



Storage

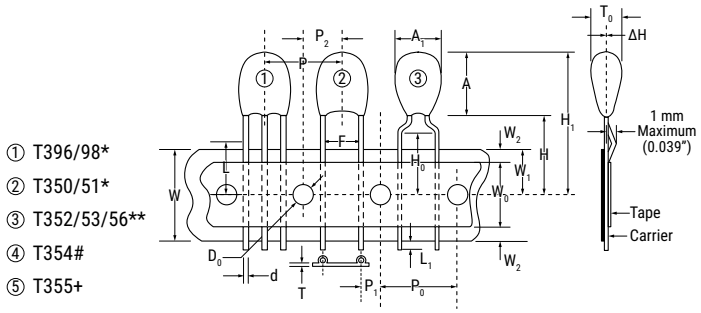
Tantalum molded radial/axial capacitors should be stored in normal working environments. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60°C RH. Storage at high temperature may cause a small, temporary increase in leakage current (measured under standard conditions), but the original value is usually restored within a few minutes after application of rated voltage. Storage at high humidity may increase capacitance and dissipation factor. Solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity
A	1,000	1,500	C-7301/7303	2,500
B	1,000	1,500		2,500
C	1,000	1,500		2,500
D	1,000	1,000		2,000
E	1,000	1,000		2,000
F	500	1,000		1,500
G	500	1,000		1,500
H	500	800		1,500
J	100	800		800
K	100	500		800
L, M	100	500	Pending	500

Figure 1



Dimension	Symbol	Nominal mm (inch)		Tolerance mm (inch)	
Body Height (1)	A	17.0 (0.67)		Maximum	
Body Width (1)	A_1	15.24 (0.600)		Maximum	
Sprocket Hole Diameter	D_0	4.0 (0.157)		±0.3 (±0.012)	
Lead Diameter	d	0.51 (0.020)	0.64 (0.025)	±0.05 (±0.002)	
Lead Center (4)	F	See Note Below			
Component Base to Tape Center (4)	H	C-7301 16.0 (0.630)	C-7303 18.0 (0.709)	C-7301 ±0.5 (±0.02)	C-7303 Minimum
Lead Standoff Height	H_0	C-7301 16.0 (0.630)	C-7303 18.0 (0.709)	C-7301 ±0.5 (±0.02)	C-7303 Minimum
Component Height Above Tape Center	H_1	32.25 (1.270)		Maximum	
Component Alignment Front to Rear	ΔH	0		1.0 (0.039)	
Cut Out Length	L	11.0 (0.433)		Maximum	
Lead Protrusion	L_1	1.0 (0.039)		Maximum	
Component Pitch (5)	P	12.7 (0.500)		±1.0 (±0.039)	
Sprocket Hole Pitch (2)	P_0	12.7 (0.500)		±0.03 (±0.012)	
Sprocket Hole Center to Lead Center (3) (4)	P_1	See Note Below		±0.7 (±0.028)	
Sprocket Hole Center to Component Center (5)	P_2	See Note Below			
Body Thickness	T_0	10.2 (0.400)		Maximum	
Total Tape Thickness	T	0.7 (0.28)		±0.02 (±0.008)	
Carrier Tape Width	W	18.0 (0.709)		+1.0/−0.5 (+0.039/−0.020)	
Hold-Down Tape Width	W_0	15 mm (0.561)	6 mm (0.236)	+1.0/−0.8 (+0.039/−0.031	
Sprocket Hole Location	W_1	9.0 (0.354)		+0.075/−0.5 (+0.030/−0.020)	
Hold-Down Tape Location	W_2	12.0 (0.472)		Maximum	

Notes:

(1) See Dimensions table for specific values per case size.
(2) Cumulative pitch error ± 1.0 mm (0.039) maximum in 20 consecutive sprocket hole locations.
(3) Measured at bottom of standoff.
(4) P_1 and F measured at egress from carrier tape.
(5) P and P2 measured at egress from carrier tape.

** Lead spacings are 2.5 mm (0.098") center to center (T350 A-H)*
*** Lead spacings are 5.0 mm (0.197") center to center*
 # Lead spacings are 6.35 mm (0.25") center to center
+ Lead spacings are 3.18 mm (0.125") center to center

F Dimensions:	P_1 Dimensions:
0.100" ±0.015	Lead Spacing
0.125" ±0.015	0.100" – 0.200 ±0.028"
0.200" ±0.015	0.125" – 0.187 ±0.028"
0.250" ±0.015"	0.200" – 0.150 ±0.028"
0.100" ±0.015 (3 leaded)	0.250" – 0.125 ±0.028"
	0.100" – 0.100 ±0.028" (3 leaded)

T363 & T369 MIL-PRF-49137/2 (CX02 & CX12 Style)

Overview

The T363 and T369 capacitors are manufactured to fulfill the requirements of MIL–PRF–49137, while maintaining all performance characteristics of the UltraDip II capacitors. Performance characteristics meet or exceed the requirements of MIL–PRF–49137. In addition to the standard UltraDip II process testing, all products supplied to MIL–PRF–49137 are sampled on a lot-by-lot basis for Group A and Group B inspection to ensure compliance. Products supplied per MIL-PRF-49137 also receives an additional post-process burn-in for at least two hours under accelerated voltage stress in excess of 125% of DC rated voltage. This post-process burn-in is equivalent to 200 hours under rated conditions.

Benefits

- Tape & Reel packaging per EIA Specification RS–468
- Laser-marked case
- Qualified to MIL–PRF–49137
- Capacitance values of 0.1 – 330 µF
- Tolerances of ±10% and ±20%
- Voltage rating of 6 – 50 VDC
- T363 case sizes: A, B, C, D
- T369 case sizes: A, B

Applications

Typical applications include filtering, bypassing, coupling, blocking, and RC timing circuits, or other applications that can benefit from compactness.

T363

T369

Ordering Information

T	36X	A	105	M	035	A	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate	Termination Finish	Packaging
T = Tantalum	363 369	A, B, C, D	First two digits represent significant figures. Third digit specifies number of zeros to follow.	M = ±20% K = ±10%	006 = 6 010 = 10 015 = 15 020 = 20 025 = 25 035 = 35 050 = 50	Not Applicable	S = Standard	Blank = Bulk 7301 = Tape & Reel 7303 = Tape & Reel 7305 = Ammo 7317 = Ammo

Ordering Information – Defense MIL-PRF-49137/2 (CX02 and CX12 Style)

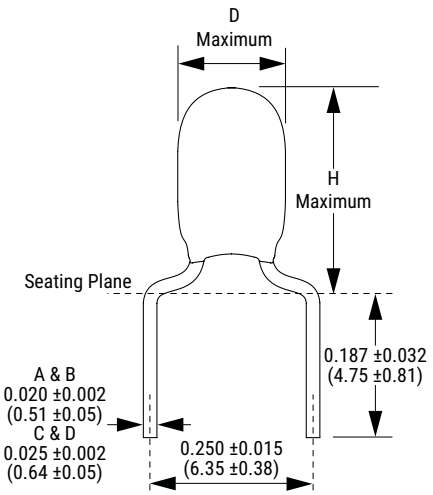
CX	J	225	K
Style	Voltage	Capacitance Code (pF)	Capacitance Tolerance
CX = Capacitors, Fixed, Solid Electrolyte, Tantalum,Polar, Conformal Coated, Nonhermetically Sealed. 02 /12 = Style	D = 6 V F = 10 V H = 15 V J = 20 V K = 25 V M = 35 V N = 50 V	First two digits represent significant figures. Third digit specifies number of zeros to follow.	M = ±20% K = ±10%

Performance Characteristics

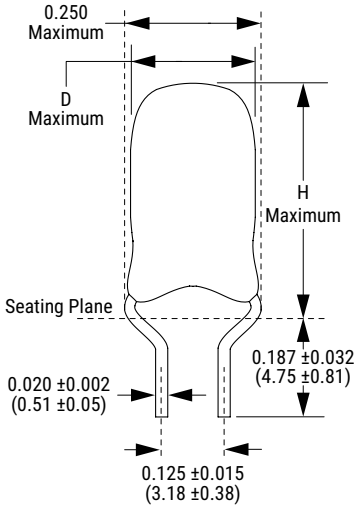
Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 330 µF at 120 Hz/25°C
Capacitance Tolerance	M tolerance ±20%, K tolerance ±10%
Rated Voltage Range	6 – 50 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table (rated voltage up to 85°C)

Dimensions – Inches (Millimeters)

T363 (CX02)



T369 (CX12)



KEMET Case Size	Style	MIL Case Size	D Maximum Diameter	H Maximum Height	Lead Size Diameter
A	CX02	A	0.175 (4.45)	0.425 (10.80)	0.020
B		B	0.250 (6.35)	0.500 (12.70)	0.020
C		C	0.350 (8.89)	0.650 (16.51)	0.025
D		D	0.400 (10.16)	0.750 (19.05)	0.025
A	CX12	E	0.175 (4.45)	0.350 (8.89)	0.020
B		F	0.250 (6.35)	0.500 (12.70)	0.020

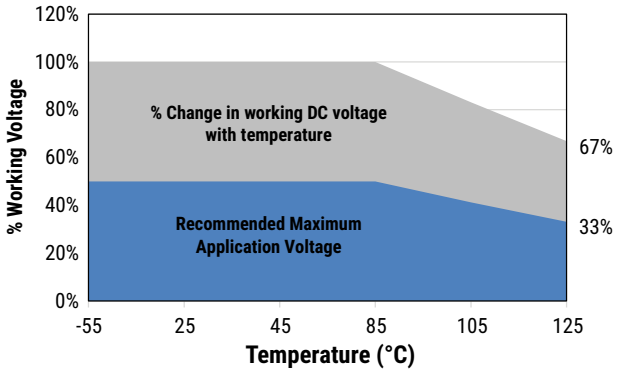
Table 1 - Ratings and Part Number Reference

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C	Military Part Number Per MIL-PRF-49137/2	
						CX02 (T363)	CX12 (T369)
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum		
6	6.8	A	T36(1)A685(2)006AS	0.5	6.0	CX02D685(2)	CX12D685(2)
6	47.0	B	T36(1)B476(2)006AS	2.3	6.0	CX02D476(2)	CX12D476(2)
6	68.0	B	T36(1)B686(2)006AS	3.3	6.0	CX02D686(2)	CX12D686(2)
6	150.0	C	T363C157(2)006AS	7.2	8.0	CX02D157(2)	
6	330.0	D	T363D337(2)006AS	10.0	8.0	CX02D337(2)	
10	4.7	A	T36(1)A475(2)010AS	0.5	5.0	CX02F475(2)	CX12F475(2)
10	33.0	B	T36(1)B336(2)010AS	2.6	6.0	CX02F336(2)	CX12F336(2)
10	100.0	C	T363C107(2)010AS	8.0	8.0	CX02F107(2)	
10	220.0	D	T363D227(2)010AS	10.0	8.0	CX02F227(2)	
15	3.3	A	T36(1)A335(2)015AS	0.5	5.0	CX02H335(2)	CX12H335(2)
15	22.0	B	T36(1)B226(2)015AS	2.6	6.0	CX02H226(2)	CX12H225(2)
15	68.0	C	T363C686(2)015AS	8.2	6.0	CX02H686(2)	
15	150.0	D	T363D157(2)015AS	10.0	8.0	CX02H157(2)	
20	2.2	A	T36(1)A225(2)020AS	0.5	5.0	CX02J225(2)	CX12J225(2)
20	15.0	B	T36(1)B156(2)020AS	2.4	6.0	CX02J156(2)	CX12J156(2)
20	47.0	C	T363C476(2)020AS	7.5	6.0	CX02J476(2)	
20	100.0	D	T363D107(2)020AS	10.0	8.0	CX02J107(2)	
25	1.5	A	T36(1)A155(2)025AS	0.5	5.0	CX02K155(2)	CX12K155(2)
25	10.0	B	T36(1)B106(2)025AS	2.0	6.0	CX02K106(2)	CX12K106(2)
25	33.0	C	T363C336(2)025AS	6.6	6.0	CX02K336(2)	
25	68.0	D	T363D686(2)025AS	10.0	6.0	CX02K686(2)	
35	6.8	B	T36(1)B685(2)035AS	1.9	5.0	CX02M685(2)	CX12M685(2)
35	22.0	C	T363C226(2)035AS	6.2	6.0	CX02M226(2)	
35	33.0	D	T363D336(2)035AS	9.2	6.0	CX02M236(2)	
35	47.0	D	T363D476(2)035AS	10.0	6.0	CX02M476(2)	
50	0.1	A	T36(1)A104(2)050AS	0.5	3.0	CX02N104(2)	CX12N104(2)
50	0.15	A	T36(1)A154(2)050AS	0.5	3.0	CX02N154(2)	CX12N154(2)
50	0.22	A	T36(1)A224(2)050AS	0.5	3.0	CX02N224(2)	CX12N224(2)
50	0.33	A	T36(1)A334(2)050AS	0.5	3.0	CX02N334(2)	CX12N334(2)
50	0.47	A	T36(1)A474(2)050AS	0.5	3.0	CX02N474(2)	CX12N474(2)
50	0.68	A	T36(1)A684(2)050AS	0.5	3.0	CX02N684(2)	CX12N684(2)
50	1.0	A	T36(1)A105(2)050AS	0.5	3.0	CX02N105(2)	CX12N105(2)
50	1.5	B	T36(1)B155(2)050AS	0.6	5.0	CX02N155(2)	CX12N155(2)
50	2.2	B	T36(1)B225(2)050AS	0.9	5.0	CX02N225(2)	CX12N225(2)
50	3.3	B	T36(1)B335(2)050AS	1.3	5.0	CX02N335(2)	CX12N335(2)
50	4.7	B	T36(1)B475(2)050AS	1.9	5.0	CX02N475(2)	CX12N475(2)
50	6.8	C	T363B685(2)050AS	2.7	5.0	CX02N685(2)	
50	10.0	C	T363C106(2)050AS	4.0	6.0	CX02N106(2)	
50	15.0	C	T363C156(2)050AS	6.0	6.0	CX02N156(2)	
50	22.0	D	T363D226(2)050AS	8.8	6.0	CX02N226(2)	
(V) 85°C	µF	Case Size Code	µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	CX02 (T363)	CX12 (T369)
Rated Voltage	Rated Capacitance		DC Leakage	DF % at 25°C	ESR	Military Part Number Per MIL-PRF-49137/2	

(1) To complete KEMET Part Number, insert Series Designation as follows: "3" - T363 (CX02); "9" - T369 (CX12)
(2) To complete KEMET or military part number, insert M - 20%, K - ±10%. Designates Capacitance tolerance.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	66% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage that may be applied is limited by following criteria:

1. Dissipated power must not exceed the limits specified for the Series.
2. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
3. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage.

Thermal capacities for the various case sizes have been determined empirically and are listed below. The “ripple voltage” permissible may be calculated from the impedance and ESR data shown in the respective product section.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

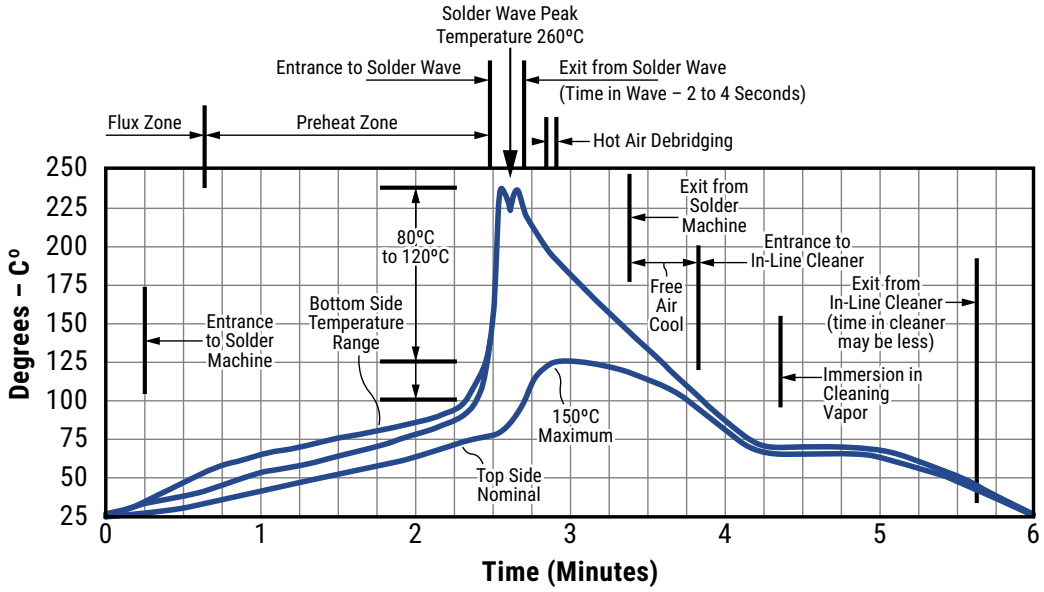
Case Size	Maximum Power Dissipation (Pmax) Watts at 25°C
A	0.050
B	0.075
C	0.090
D	0.135

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)Soldering Process

Optimum Solder Wave Profile



Reverse Voltage

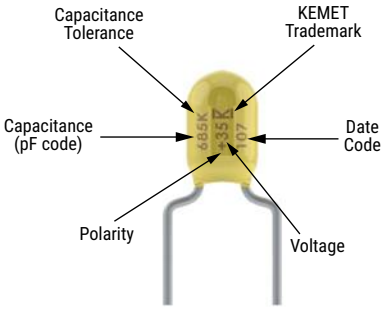
Although these are polar capacitors, some degree of transient voltage reversal is permissible, as seen below. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Pecentage of Rated Voltage
+25°C	15
+85°C	5
+125°C	1

Mounting

All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.Table 2 – Performance & Reliability: Test Methods and Conditions

Capacitor Marking



Storage

Tantalum molded radial/axial capacitors should be stored in normal working environments. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60°C RH. Storage at high temperature may cause a small, temporary increase in leakage current (measured under standard conditions), but the original value is usually restored within a few minutes after application of rated voltage. Storage at high humidity may increase capacitance and dissipation factor. Solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

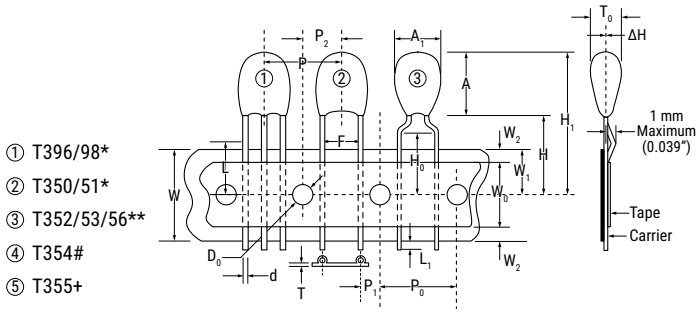
Tape & Reel Packaging Information

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity
A	1,000	1,500	C-7301/7303	2,500
B	1,000	1,500		2,000
C	500	500		800
D	500	500	Pending	800

T363 A - D cases.
T369 A and B cases only.

Figure 1



Dimension	Symbol	Nominal mm (inch)		Tolerance mm (inch)	
Body Height (1)	A	17.0 (0.67)		Maximum	
Body Width (1)	A_1	15.24 (0.600)		Maximum	
Sprocket Hole Diameter	D_0	4.0 (0.157)		±0.3 (±0.012)	
Lead Diameter	d	0.51 (0.020)	0.64 (0.025)	±0.05 (±0.002)	
Lead Center (4)	F	See Note Below			
Component Base to Tape Center (4)	H	C-7301 16.0 (0.630)	C-7303 18.0 (0.709)	C-7301 ±0.5 (±0.02)	C-7303 Minimum
Lead Standoff Height	H_0	C-7301 16.0 (0.630)	C-7303 18.0 (0.709)	C-7301 ±0.5 (±0.02)	C-7303 Minimum
Component Height Above Tape Center	H_1	32.25 (1.270)		Maximum	
Component Alignment Front to Rear	ΔH	0		1.0 (0.039)	
Cut Out Length	L	11.0 (0.433)		Maximum	
Lead Protrusion	L_1	1.0 (0.039)		Maximum	
Component Pitch (5)	P	12.7 (0.500)		±1.0 (±0.039)	
Sprocket Hole Pitch (2)	P_0	12.7 (0.500)		±0.03 (±0.012)	
Sprocket Hole Center to Lead Center (3) (4)	P_1	See Note Below		±0.7 (±0.028)	
Sprocket Hole Center to Component Center (5)	P_2	See Note Below			
Body Thickness	T_0	10.2 (0.400)		Maximum	
Total Tape Thickness	T	0.7 (0.28)		±0.02 (±0.008)	
Carrier Tape Width	W	18.0 (0.709)		+1.0/−0.5 (+0.039/−0.020)	
Hold-Down Tape Width	W_0	15 mm (0.561)	6 mm (0.236)	+1.0/−0.8 (+0.039/−0.031	
Sprocket Hole Location	W_1	9.0 (0.354)		+0.075/−0.5 (+0.030/−0.020)	
Hold-Down Tape Location	W_2	12.0 (0.472)		Maximum	

Notes:

(1) See Dimensions table for specific values per case size.
(2) Cumulative pitch error ±1.0 mm (0.039) maximum in 20 consecutive sprocket hole locations.
(3) Measured at bottom of standoff.
(4) P_1 and F measured at egress from carrier tape.
(5) P and P2 measured at egress from carrier tape.

** Lead spacings are 2.5 mm (0.098") center to center (T350 A-H)*
*** Lead spacings are 5.0 mm (0.197") center to center*
 # Lead spacings are 6.35 mm (0.25") center to center
+ Lead spacings are 3.18 mm (0.125") center to center

F Dimensions:	P_1 Dimensions:
0.100" ±0.015	Lead Spacing
0.125" ±0.015	0.100" – 0.200 ±0.028"
0.200" ±0.015	0.125" – 0.187 ±0.028"
0.250" ±0.015"	0.200" – 0.150 ±0.028"
0.100" ±0.015 (3 leaded)	0.250" – 0.125 ±0.028"
	0.100" – 0.100 ±0.028" (3 leaded)

T368 UltraDip II

Overview

The KEMET T368 is manufactured according to the requiarements of MIL-PRF-49137, while maintaining all the performance characteristics of the UltraDip II. Performance characteristics meet or exceed the requirements of MIL-PRF-49137. In addition to the standard UltraDip II process testing, all products supplied to MIL-PRF-49137 are sampled on a lot-by-lot basis for Group A and Group B inspection to ensure compliance. Product supplied per MIL-PRF-49137 also receives an additional post-process burn-in for at least two hours under accelerated voltage stress in excess of 125% of DC rated voltage. This post-process burn-in is equivalent to 200 hours under rated conditions.

Benefits

- Taped and reeled per EIA Specification RS-468
- Laser-marked case
- Qualified to MIL-PRF-49137
- Capacitance values of 5.6 to 330 µF
- Tolerances of ±10% and ±20%
- Voltage rating of 6 – 50 VDC
- Case sizes: C, D

Applications

Typical applications include filtering, bypassing, coupling, blocking and RC timing circuits or other applications that can benefit from compactness.

Ordering Information

T	368	C	106	M	035	A	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate	Termination Finish	Packaging
T = Tantalum	T368	C, D	First two digits represent significant figures. Third digit specifies number of zeros to follow.	M = ±20% K = ±10%	006 = 6 010 = 10 015 = 15 020 = 20 025 = 25 035 = 35 050 = 50	Not Applicable	S = Standard T = 100% Sn (tin)	Blank = Bulk 7301 = Tape & Reel 7303 = Tape & Reel 7305 = Ammo 7317 = Ammo

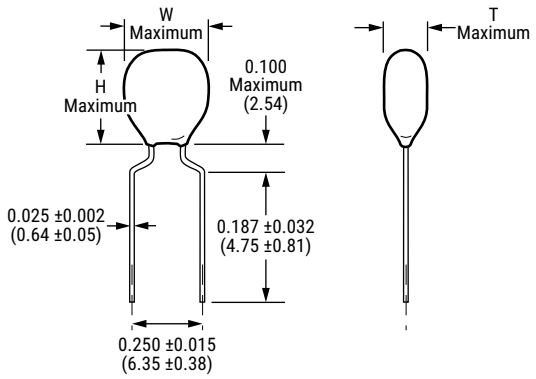
Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	5.6 – 330 µF at 120 Hz/25°C
Capacitance Tolerance	M tolerance ±20%, K tolerance ±10%
Rated Voltage Range	6 – 50 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table at rated voltage up to 85°C

Dimensions – Millimeters (Inches)

T368

C & D CASES



Case Size	T Maximum	W Maximum	H Maximum
C	0.250 (6.35)	0.400 (10.16)	0.420 (10.67)
D	0.250 (6.35)	0.460 (11.68)	0.520 (13.20)

Table 1 - Ratings and Part Number Reference

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum
6	82.0	C	T368C826(1)006A(2)	3.9	8
6	100.0	C	T368C107(1)006A(2)	4.8	8
6	120.0	C	T368C127(1)006A(2)	5.8	8
6	150.0	C	T368C157(1)006A(2)	7.2	8
6	180.0	D	T368D187(1)006A(2)	8.6	8
6	220.0	D	T368D227(1)006A(2)	10.0	8
6	270.0	D	T368D277(1)006A(2)	10.0	8
6	330.0	D	T368D337(1)006A(2)	10.0	8
10	47.0	C	T368C476(1)010A(2)	3.8	6
10	56.0	C	T368C566(1)010A(2)	4.4	6
10	68.0	C	T368C686(1)010A(2)	5.4	6
10	82.0	C	T368C826(1)010A(2)	6.5	8
10	100.0	C	T368C107(1)010A(2)	8.0	8
10	120.0	D	T368D127(1)010A(2)	9.6	8
10	150.0	D	T368D157(1)010A(2)	10.0	8
10	180.0	D	T368D187(1)010A(2)	10.0	8
10	220.0	D	T368D227(1)010A(2)	10.0	8
15	27.0	C	T368C276(1)015A(2)	3.2	6
15	33.0	C	T368C336(1)015A(2)	4.0	6
15	39.0	C	T368C396(1)015A(2)	4.7	6
15	47.0	C	T368C476(1)015A(2)	5.6	6
15	56.0	C	T368C566(1)015A(2)	6.8	6
15	68.0	C	T368C686(1)015A(2)	8.2	6
15	82.0	D	T368D826(1)015A(2)	9.8	8
15	100.0	D	T368D107(1)015A(2)	10.0	8
15	120.0	D	T368D127(1)015A(2)	10.0	8
15	150.0	D	T368D157(1)015A(2)	10.0	8
20	18.0	C	T368C186(1)020A(2)	2.8	6
20	22.0	C	T368C226(1)020A(2)	3.5	6
20	27.0	C	T368C276(1)020A(2)	4.3	6
20	33.0	C	T368C336(1)020A(2)	5.3	6
20	39.0	C	T368C396(1)020A(2)	6.2	6
20	47.0	C	T368C476(1)020A(2)	7.5	6
20	56.0	D	T368D566(1)020A(2)	8.9	6
20	68.0	D	T368D686(1)020A(2)	10.0	6
20	82.0	D	T368D826(1)020A(2)	10.0	8
20	100.0	D	T368D107(1)020A(2)	10.0	8
25	12.0	C	T368C126(1)025A(2)	2.4	6
25	15.0	C	T368C156(1)025A(2)	3.0	6
25	18.0	C	T368C186(1)025A(2)	3.6	6
25	22.0	C	T368C226(1)025A(2)	4.4	6
25	27.0	C	T368C276(1)025A(2)	5.4	6
25	33.0	C	T368C336(1)025A(2)	6.6	6
25	39.0	D	T368D396(1)025A(2)	7.8	6
25	47.0	D	T368D476(1)025A(2)	9.4	6
25	56.0	D	T368D566(1)025A(2)	10.0	6
25	68.0	D	T368D686(1)025A(2)	10.0	6
35	8.2	C	T368C825(1)035A(2)	2.3	6
35	10.0	C	T368C106(1)035A(2)	2.8	6
35	12.0	C	T368C126(1)035A(2)	3.3	6
35	15.0	C	T368C156(1)035A(2)	4.2	6
35	18.0	C	T368C186(1)035A(2)	5.0	6
35	22.0	C	T368C226(1)035A(2)	6.2	6
35	27.0	D	T368D276(1)035A(2)	7.5	6
35	33.0	D	T368D336(1)035A(2)	9.2	6
(V) 85°C	µF	Case Code Case Size	KEMET Part Number	µA at 25°C Maximum/5 Minutes	120 Hz Maximum
Rated Voltage	Rated Capacitance			DC Leakage	DF % at 25°C

(1) To complete KEMET or military part number, insert M - 20%, K - ±10% or J - ±5% (Available on special order). Designates Capacitance tolerance.
(2) To complete KEMET part number, insert S = Standard coated or T=100% Sn (tin). Designates termination finish.

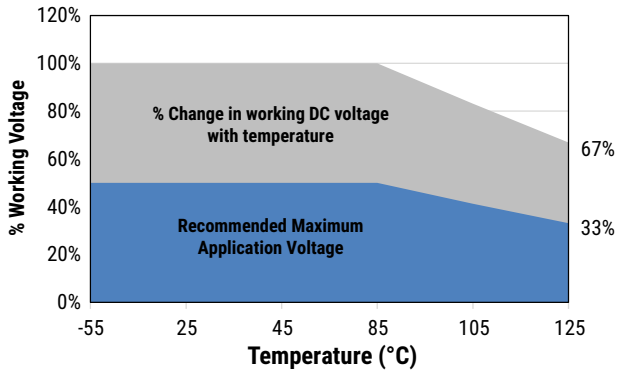
Table 1 - Ratings and Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum
35	39.0	D	T368D396(1)035A(2)	10.0	6
35	47.0	D	T368D476(1)035A(2)	10.0	6
50	5.6	C	T368C565(10050A(2)	2.2	5
50	6.8	C	T368C685(10050A(2)	2.7	5
50	8.2	C	T368C825(1)050A(2)	3.2	6
50	10.0	C	T368C106(1)050A(2)	4.0	6
50	12.0	C	T368C126(1)050A(2)	4.8	6
50	15.0	C	T368C156(1)050A(2)	6.0	6
50	18.0	D	T368D186(1)050A(2)	7.2	6
50	22.0	D	T368D226(1)050A(2)	8.8	6
(V) 85°C	µF	Case Code Case Size	KEMET Part Number	µA at 25°C Maximum/5 Minutes	120 Hz Maximum
Rated Voltage	Rated Capacitance			DC Leakage	DF % at 25°C

(1) To complete KEMET or military part number, insert M - 20%, K - ±10% or J - ±5% (Available on special order). Designates Capacitance tolerance.
(2) To complete KEMET part number, insert S = Standard coated or T=100% Sn (tin). Designates termination finish.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	66% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage that may be applied is limited by following criteria:

1. Dissipated power must not exceed the limits specified for the Series.
2. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
3. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage.

Thermal capacities for the various case sizes have been determined empirically and are listed below. The "ripple voltage" permissible may be calculated from the impedance and ESR data shown in the respective product section.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

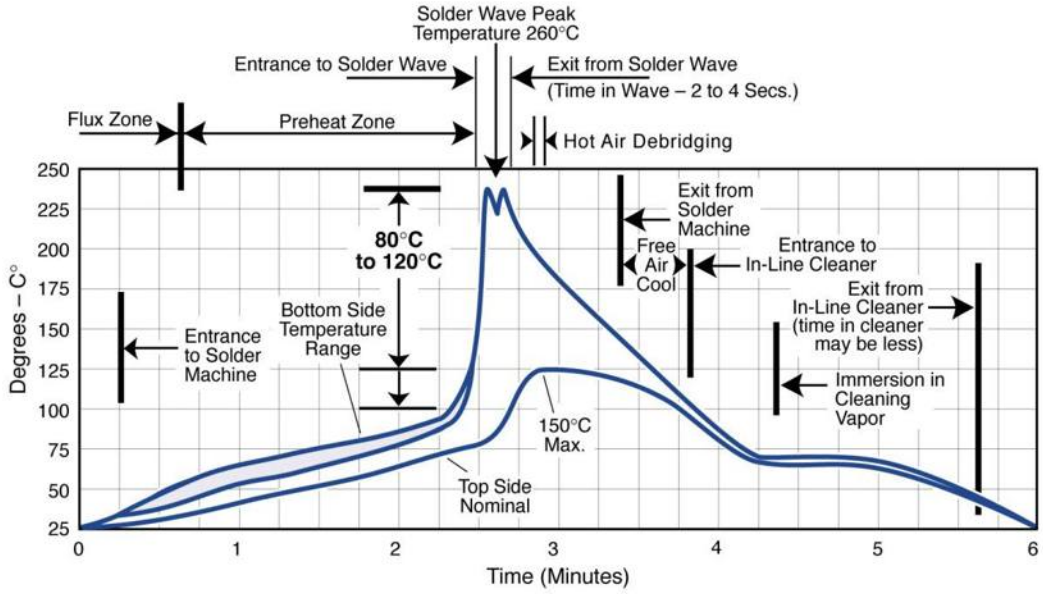
Case Size	Maximum Power Dissipation (Pmax) Watts at 25°C
C	0.090
D	0.135

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

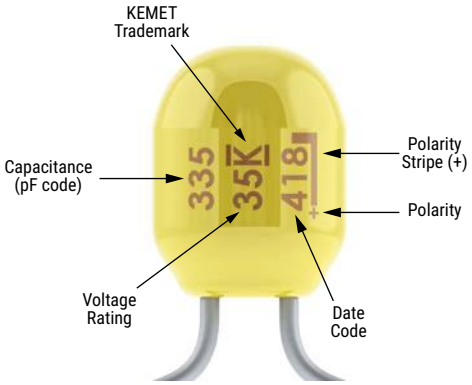
Optimum Solder Wave Profile



Mounting

All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Capacitor Marking



Storage

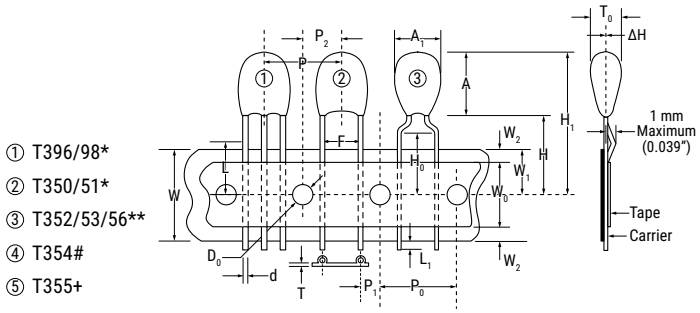
Tantalum molded radial/axial capacitors should be stored in normal working environments. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60°C RH. Storage at high temperature may cause a small, temporary increase in leakage current (measured under standard conditions), but the original value is usually restored within a few minutes after application of rated voltage. Storage at high humidity may increase capacitance and dissipation factor. Solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity
C	500	500	C-7301/7303	800
D	500	500	C-7301/7303	800

Figure 1



Dimension	Symbol	Nominal mm (inch)		Tolerance mm (inch)	
Body Height (1)	A	17.0 (0.67)		Maximum	
Body Width (1)	A_1	15.24 (0.600)		Maximum	
Sprocket Hole Diameter	D_0	4.0 (0.157)		±0.3 (±0.012)	
Lead Diameter	d	0.51 (0.020)	0.64 (0.025)	±0.05 (±0.002)	
Lead Center (4)	F	See Note Below			
Component Base to Tape Center (4)	H	C-7301 16.0 (0.630)	C-7303 18.0 (0.709)	C-7301 ±0.5 (±0.02)	C-7303 Minimum
Lead Standoff Height	H_0	C-7301 16.0 (0.630)	C-7303 18.0 (0.709)	C-7301 ±0.5 (±0.02)	C-7303 Minimum
Component Height Above Tape Center	H_1	32.25 (1.270)		Maximum	
Component Alignment Front to Rear	ΔH	0		1.0 (0.039)	
Cut Out Length	L	11.0 (0.433)		Maximum	
Lead Protrusion	L_1	1.0 (0.039)		Maximum	
Component Pitch (5)	P	12.7 (0.500)		±1.0 (±0.039)	
Sprocket Hole Pitch (2)	P_0	12.7 (0.500)		±0.03 (±0.012)	
Sprocket Hole Center to Lead Center (3) (4)	P_1	See Note Below		±0.7 (±0.028)	
Sprocket Hole Center to Component Center (5)	P_2	See Note Below			
Body Thickness	T_0	10.2 (0.400)		Maximum	
Total Tape Thickness	T	0.7 (0.28)		±0.02 (±0.008)	
Carrier Tape Width	W	18.0 (0.709)		+1.0/−0.5 (+0.039/−0.020)	
Hold-Down Tape Width	W_0	15 mm (0.561)	6 mm (0.236)	+1.0/−0.8 (+0.039/−0.031	
Sprocket Hole Location	W_1	9.0 (0.354)		+0.075/−0.5 (+0.030/−0.020)	
Hold-Down Tape Location	W_2	12.0 (0.472)		Maximum	

Notes:

(1) See Dimensions table for specific values per case size.
(2) Cumulative pitch error ±1.0 mm (0.039) maximum in 20 consecutive sprocket hole locations.
(3) Measured at bottom of standoff.
(4) P_1 and F measured at egress from carrier tape.
(5) P and P2 measured at egress from carrier tape.

** Lead spacings are 2.5 mm (0.098") center to center (T350 A-H)*
*** Lead spacings are 5.0 mm (0.197") center to center*
 # Lead spacings are 6.35 mm (0.25") center to center
+ Lead spacings are 3.18 mm (0.125") center to center

F Dimensions:	P_1 Dimensions:
0.100" ±0.015	Lead Spacing
0.125" ±0.015	0.100" – 0.200 ±0.028"
0.200" ±0.015	0.125" – 0.187 ±0.028"
0.250" ±0.015"	0.200" – 0.150 ±0.028"
0.100" ±0.015 (3 leaded)	0.250" – 0.125 ±0.028"
	0.100" – 0.100 ±0.028" (3 leaded)

T396 & T398 UltraDip III (3 Leaded)

Overview

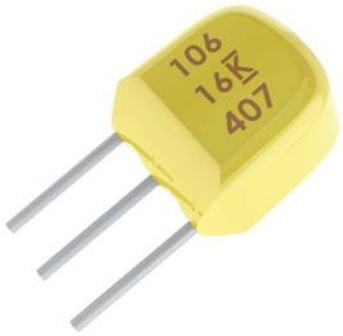
The KEMET UltraDip III capacitors offer the advantages of solid tantalum construction and a "fail-safe" insertion mechanism. The three-leaded design (the anode is in the center) enables operators to insert the capacitors into printed circuit boards correctly without having to visually determine polarity. This time-saving device also eliminates board damage that may result from incorrect insertion. The UltraDip III features a capacitance range of 0.1 to 680 µF at 3 to 50 VDC. These miniature, dipped solid tantalum capacitors are encased in a tough plastic barrier coating that maintains the precise lead wire spacing within ±0.015 inch. The gold color epoxy permits laser markings with outstanding permanency and legibility. All case sizes are printed with capacitance, voltage and vendor identification. The UltraDip III exhibits low DC leakage, ESR and impedance and mainttian excellent temperature stability. These capacitors may be ordered with precut leads (see drawing for lengths) or in KEMET capacitor ARIS packaging (leads taped and on reels) for high speed automatic insertion equipment.

Benefits

- Taped and reeled per EIA Specification RS-468
- Laser-marked case
- Capacitance values of 0.1 – 680 µF
- Tolerances of ±20% and ±10% (special order only)
- Voltage rating of 3 – 50 VDC
- Case sizes: A, B, C, D, E, F, G, H, J, K, L, M

Applications

Typical applications include filtering, bypassing, coupling, blocking, and RC timing circuits or other applications that can benefit from compactness.



Ordering Information

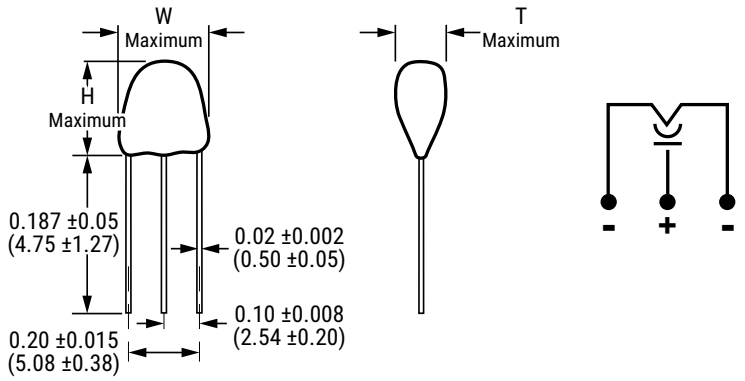
T	39X	A	105	M	035	A	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate	Termination Finish	Packaging
T = Tantalum	T396 Straight Leads T398 Lead Standoff	A, B, C, D, E, F, G, H, J, K, L, M	First two digits represent significant figures. Third digit specifies number of zeros to follow.	M = ±20% K = ±10% (Special order only)	003 = 3 006 = 6 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	Not Applicable	S = Standard T = 100% Sn (tin)	Blank = Bulk 7301 = Tape & Reel 7305 = Ammo

Performance Characteristics

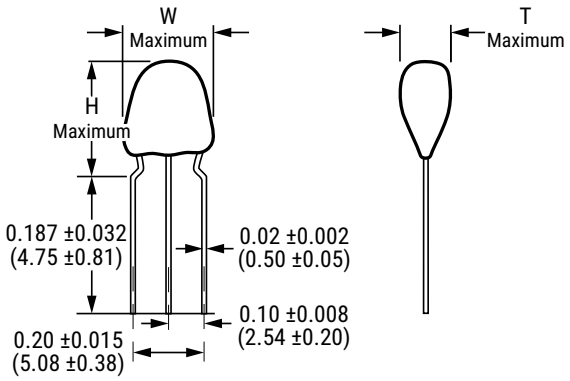
Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.1 – 680 µF at 120 Hz/25°C
Capacitance Tolerance	M tolerance ±20% (standard), K tolerance ±10% (special order only)
Rated Voltage Range	3 – 50 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table at rated voltage up to 85°C

Dimensions – Millimeters (Inches)

T396



T398



Case Size	Both		T396	T398
	W Width	T Thickness	H Height	H Height
A	0.280 (7.1)	0.190 (4.8)	0.310 (7.9)	0.355 (9.0)
B	0.280 (7.1)	0.190 (4.8)	0.320 (8.1)	0.365 (9.3)
C	0.280 (7.1)	0.200 (5.1)	0.360 (9.1)	0.390 (9.9)
D	0.280 (7.1)	0.200 (5.1)	0.370 (9.4)	0.390 (9.9)
E	0.280 (7.1)	0.230 (5.8)	0.380 (9.7)	0.415 (10.5)
F	0.280 (7.1)	0.240 (6.1)	0.410 (10.4)	0.430 (10.9)
G	0.280 (7.1)	0.250 (6.3)	0.420 (10.7)	0.440 (11.2)
H	0.280 (7.1)	0.270 (6.9)	0.420 (10.7)	0.440 (11.2)
J	0.300 (7.6)	0.300 (7.6)	0.460 (11.7)	0.480 (12.2)
K	0.340 (8.6)	0.340 (8.6)	0.500 (12.7)	0.500 (12.7)
L	0.340 (8.6)	0.340 (8.6)	0.560 (14.2)	0.560 (14.2)
M	0.360 (9.1)	0.360 (9.1)	0.620 (15.7)	0.620 (15.7)

Table 1 - Ratings and Part Number Reference

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum
3	4.7	A	T39(1)A475(2)003A(3)	0.5	5
3	6.8	A	T39(1)A685(2)003A(3)	0.5	5
3	10.0	A	T39(1)A106(2)003A(3)	0.5	6
3	15.0	B	T39(1)B156(2)003A(3)	0.5	6
3	22.0	C	T39(1)C226(2)003A(3)	0.5	6
3	33.0	D	T39(1)D336(2)003A(3)	0.8	6
3	47.0	E	T39(1)E476(2)003A(3)	1.1	6
3	68.0	F	T39(1)F686(2)003A(3)	1.6	6
3	100.0	G	T39(1)G107(2)003A(3)	2.4	8
3	150.0	H	T39(1)H157(2)003A(3)	3.6	8
3	220.0	J	T39(1)J227(2)003A(3)	5.3	8
3	330.0	K	T39(1)K337(2)003A(3)	7.9	8
3	470.0	L	T39(1)L477(2)003A(3)	10.0	9
3	680.0	M	T39(1)M687(2)003A(3)	10.0	9
6	3.3	A	T39(1)A335(2)006A(3)	0.5	5
6	4.7	A	T39(1)A475(2)006A(3)	0.5	5
6	6.8	A	T39(1)A685(2)006A(3)	0.5	5
6	10.0	B	T39(1)B106(2)006A(3)	0.5	6
6	15.0	C	T39(1)C156(2)006A(3)	0.7	6
6	22.0	D	T39(1)D226(2)006A(3)	1.1	6
6	33.0	E	T39(1)E336(2)006A(3)	1.6	6
6	47.0	F	T39(1)F476(2)006A(3)	2.3	6
6	68.0	G	T39(1)G686(2)006A(3)	3.3	6
6	100.0	H	T39(1)H107(2)006A(3)	4.8	8
6	150.0	J	T39(1)J157(2)006A(3)	7.2	8
6	220.0	K	T39(1)K227(2)006A(3)	10.0	8
6	330.0	L	T39(1)L337(2)006A(3)	10.0	8
10	2.2	A	T39(1)A225(2)010A(3)	0.5	5
10	3.3	A	T39(1)A335(2)010A(3)	0.5	5
10	4.7	A	T39(1)A475(2)010A(3)	0.5	5
10	6.8	B	T39(1)B685(2)010A(3)	0.5	5
10	10.0	C	T39(1)C106(2)010A(3)	0.8	6
10	15.0	E	T39(1)E156(2)010A(3)	1.2	6
10	22.0	E	T39(1)E226(2)010A(3)	1.8	6
10	33.0	F	T39(1)F336(2)010A(3)	2.6	6
10	47.0	H	T39(1)H476(2)010A(3)	3.8	6
10	68.0	H	T39(1)H686(2)010A(3)	5.4	6
10	100.0	J	T39(1)J107(2)010A(3)	8.0	8
10	150.0	K	T39(1)K157(2)010A(3)	10.0	8
10	220.0	L	T39(1)L227(2)010A(3)	10.0	8
16	1.5	A	T39(1)A155(2)016A(3)	0.5	5
16	2.2	A	T39(1)A225(2)016A(3)	0.5	5
16	3.3	A	T39(1)A335(2)016A(3)	0.5	5
16	4.7	B	T39(1)B475(2)010A(3)	0.6	5
16	6.8	C	T39(1)C685(2)016A(3)	0.9	5
(V) 85°C	µF	Case Code Case Size	KEMET Part Number	µA at 25°C Maximum/5 Minutes	120 Hz Maximum
Rated Voltage	Rated Capacitance			DC Leakage	DF % at 25°C

(1) To complete KEMET Part Number, insert Series Designation as follows: "6" - T396, "8" - T398.
(2) To complete KEMET or military part number, insert M - 20%, K - ±10%. Designates Capacitance tolerance.
(3) To complete KEMET part number, insert S = Standard coated or T=100% Sn (tin). Designates termination finish.
Higher voltage/tighter capacitance tolerance products may be substitued for an order within the same case size at KEMET's option.

Table 1 - Ratings and Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum
16	10.0	E	T39(1)E106(2)016A(3)	1.3	6
16	15.0	E	T39(1)E156(2)016A(3)	1.8	6
16	22.0	F	T39(1)F226(2)016A(3)	2.6	6
16	33.0	H	T39(1)H336(2)016A(3)	4.0	6
16	47.0	J	T39(1)J476(2)016A(3)	5.6	6
16	68.0	K	T39(1)K686(2)016A(3)	8.2	6
16	100.0	L	T39(1)L107(2)016A(3)	10.0	8
16	150.0	M	T39(1)M157(2)016A(3)	10.0	8
20	1.0	A	T39(1)A105(2)020A(3)	0.5	3
20	1.5	A	T39(1)A155(2)020A(3)	0.5	5
20	2.2	A	T39(1)A225(2)020A(3)	0.5	5
20	3.3	B	T39(1)B335(2)020A(3)	0.5	5
20	4.7	C	T39(1)C475(2)020A(3)	0.8	5
20	6.8	D	T39(1)D685(2)020A(3)	1.1	5
20	10.0	E	T39(1)E106(2)020A(3)	1.6	6
20	15.0	F	T39(1)F156(2)020A(3)	2.4	6
20	22.0	G	T39(1)G226(2)020A(3)	3.5	6
20	33.0	J	T39(1)J336(2)020A(3)	5.3	6
20	47.0	K	T39(1)K476(2)020A(3)	7.5	6
20	68.0	L	T39(1)L686(2)020A(3)	10.0	6
20	100.0	M	T39(1)M107(2)020A(3)	10.0	8
25	1.0	A	T39(1)A105(2)025A(3)	0.5	3
25	1.5	A	T39(1)A155(2)025A(3)	0.5	5
25	2.2	B	T39(1)B225(2)025A(3)	0.5	5
25	3.3	B	T39(1)B335(2)025A(3)	0.7	5
25	4.7	C	T39(1)C475(2)025A(3)	0.9	5
25	6.8	E	T39(1)E685(2)025A(3)	1.4	5
25	10.0	E	T39(1)E106(2)025A(3)	2.0	6
25	15.0	G	T39(1)G156(2)025A(3)	3.0	6
25	22.0	H	T39(1)H226(2)025A(3)	4.4	6
25	33.0	J	T39(1)J336(2)025A(3)	6.6	6
25	47.0	K	T39(1)K476(2)025A(3)	9.4	6
25	68.0	L	T39(1)L686(2)025A(3)	10.0	6
35	0.10	A	T39(1)A104(2)035A(3)	0.5	3
35	0.15	A	T39(1)A154(2)035A(3)	0.5	3
35	0.22	A	T39(1)A224(2)035A(3)	0.5	3
35	0.33	A	T39(1)A334(2)035A(3)	0.5	3
35	0.47	A	T39(1)A474(2)035A(3)	0.5	3
35	0.68	A	T39(1)A684(2)035A(3)	0.5	3
35	1.0	A	T39(1)A105(2)035A(3)	0.5	3
35	1.5	B	T39(1)B155(2)035A(3)	0.5	5
35	2.2	C	T39(1)C225(2)035A(3)	0.6	5
35	3.3	D	T39(1)D335(2)035A(3)	0.9	5
35	4.7	E	T39(1)E475(2)035A(3)	1.3	5
35	6.8	F	T39(1)F685(2)035A(3)	1.9	5
(V) 85°C	µF	Case Code Case Size	KEMET Part Number	µA at 25°C Maximum/5 Minutes	120 Hz Maximum
Rated Voltage	Rated Capacitance			DC Leakage	DF % at 25°C

(1) To complete KEMET Part Number, insert Series Designation as follows: "6" - T396, "8" - T398.
(2) To complete KEMET or military part number, insert M - 20%, K - ±10%. Designates Capacitance tolerance.
(3) To complete KEMET part number, insert S = Standard coated or T=100% Sn (tin). Designates termination finish.
Higher voltage/tighter capacitance tolerance products may be substitued for an order within the same case size at KEMET's option.

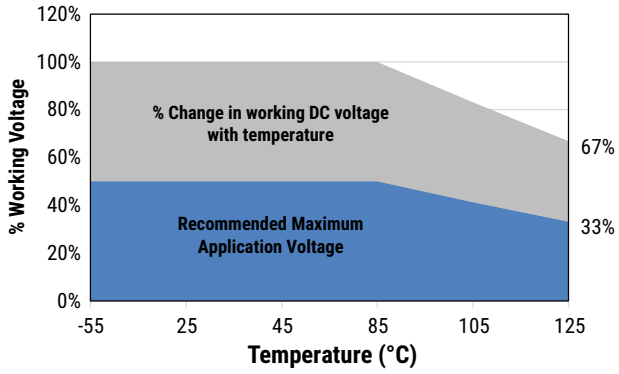
Table 1 - Ratings and Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum
35	10.0	G	T39(1)G106(2)035A(3)	2.8	6
35	15.0	J	T39(1)J156(2)035A(3)	4.2	6
35	22.0	K	T39(1)K226(2)035A(3)	6.2	6
35	33.0	L	T39(1)L336(2)035A(3)	9.2	6
35	47.0	M	T39(1)M476(2)035A(3)	10.0	6
50	0.10	A	T39(1)A104(2)050A(3)	0.5	3
50	0.15	A	T39(1)A154(2)050A(3)	0.5	3
50	0.22	A	T39(1)A224(2)050A(3)	0.5	3
50	0.33	A	T39(1)A334(2)050A(3)	0.5	3
50	0.47	B	T39(1)B474(2)050A(3)	0.5	3
50	0.68	B	T39(1)B684(2)050A(3)	0.5	3
50	1.0	B	T39(1)B105(2)050A(3)	0.5	3
50	1.5	E	T39(1(E155(2)050A(3)	0.6	5
50	2.2	E	T39(1)E225(2)050A(3)	0.9	5
50	3.3	F	T39(1)F335(2)050A(3)	1.3	5
50	4.7	G	T39(1)G475(2)050A(3)	1.9	5
50	6.8	J	T39(1)J685(2)050A(3)	2.7	5
50	10.0	K	T39(1)K106(2)050A(3)	4.0	6
50	15.0	L	T39(1)L156(2)050A(3)	6.0	6
50	22.0	M	T39(1)M226(2)050A(3)	8.8	6
(V) 85°C	µF	Case Code Case Size	KEMET Part Number	µA at 25°C Maximum/5 Minutes	120 Hz Maximum
Rated Voltage	Rated Capacitance			DC Leakage	DF % at 25°C

(1) To complete KEMET Part Number, insert Series Designation as follows: "6" - T396, "8" - T398.
(2) To complete KEMET or military part number, insert M - 20%, K - ±10%. Designates Capacitance tolerance.
(3) To complete KEMET part number, insert S = Standard coated or T=100% Sn (tin). Designates termination finish.
Higher voltage/tighter capacitance tolerance products may be substituted for an order within the same case size at KEMET's option.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	66% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage that may be applied is limited by following criteria:

1. Dissipated power must not exceed the limits specified for the Series.
2. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
3. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage.

Thermal capacities for the various case sizes have been determined empirically and are listed below. The “ripple voltage” permissible may be calculated from the impedance and ESR data shown in the respective product section.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

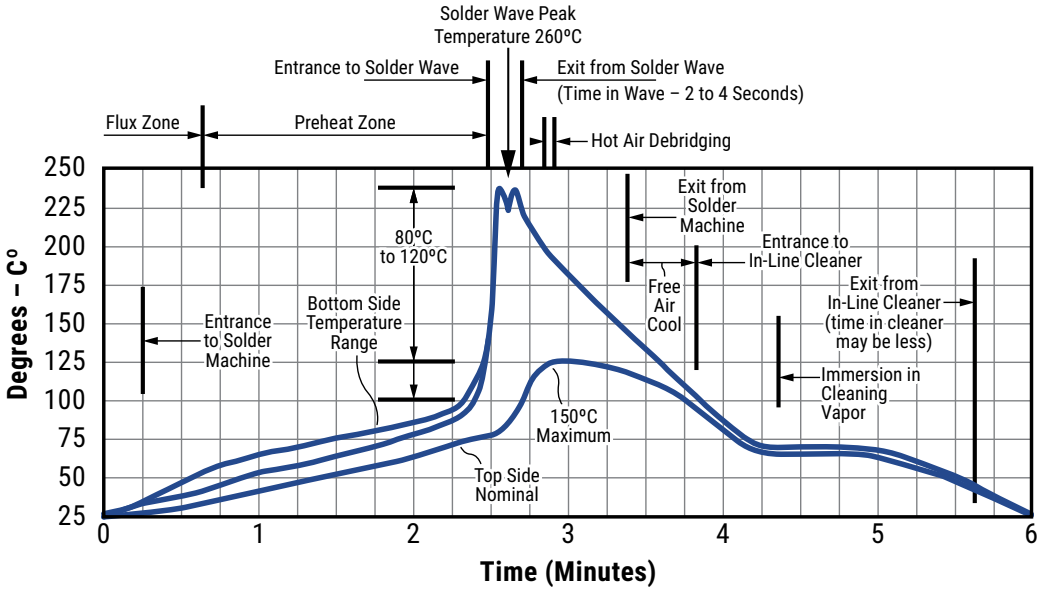
Case Size	Maximum Power Dissipation (Pmax) Watts at 25°C
A	0.040
B	0.050
C	0.060
D	0.065
E	0.070
F	0.080
G	0.090
H	0.100
J	0.110
K	0.120
L	0.130
M	0.140

Using the Pmax of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
Pmax = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

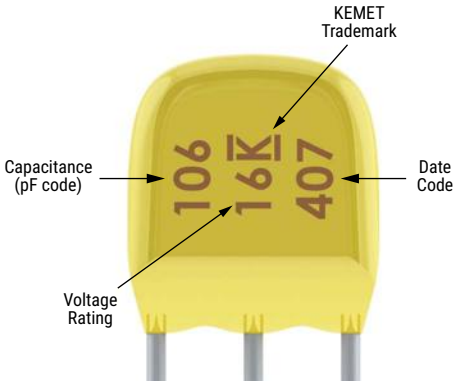
Optimum Solder Wave Profile



Mounting

All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.Table 2 – Performance & Reliability: Test Methods and Conditions

Capacitor Marking



Storage

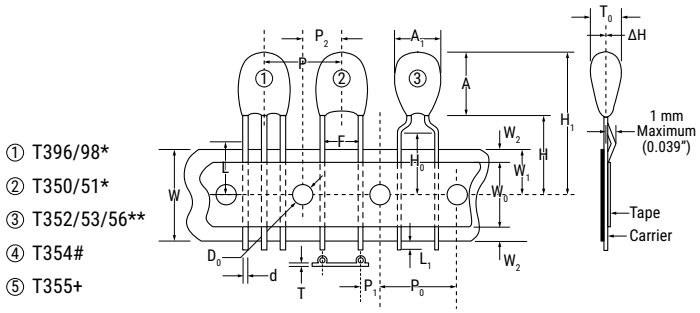
Tantalum molded radial/axial capacitors should be stored in normal working environments. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60°C RH. Storage at high temperature may cause a small, temporary increase in leakage current (measured under standard conditions), but the original value is usually restored within a few minutes after application of rated voltage. Storage at high humidity may increase capacitance and dissipation factor. Solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity
A/B	1,000	1,500	C-7301/7303	2,000
C	500	1,500	C-7301/7303	2,000
D/E/F	500	1,000	C-7301/7303	1,500
G	500	1,000	C-7301/7303	2,000
H	500	800	C-7301/7303	2,000
J	250	800	C-7301/7303	1,600
K	250	500	C-7301/7303	800
L/M	250	500	C-7301/7303	500

Figure 1



Dimension	Symbol	Nominal mm (inch)		Tolerance mm (inch)	
Body Height (1)	A	17.0 (0.67)		Maximum	
Body Width (1)	A_1	10.2 (0.40)		Maximum	
Sprocket Hole Diameter	D_0	4.0 (0.157)		±0.3 (±0.012)	
Lead Diameter	d	0.51 (0.020) or 0.64 (0.025)		±0.05 (±0.002)	
Lead Center (4)	F	See Note Below			
Component Base to Tape Center (4)	H	C-7301 16.0 (0.630)	C-7303 18.0 (0.709)	C-7301 ±0.5 (±0.02)	C-7303 Minimum
Lead Standoff Height	H_0	C-7301 16.0 (0.630)	C-7303 18.0 (0.709)	C-7301 ±0.5 (±0.02)	C-7303 Minimum
Component Height Above Tape Center	H_1	32.25 (1.270)		Maximum	
Component Alignment Front to Rear	ΔH	0		±2.0 (0.079)	
Cut Out Length	L	11.0 (0.433)		Maximum	
Lead Protrusion	L_1	2.0 (0.079)		Maximum	
Component Pitch (5)	P	12.7 (0.500)		±1.0 (±0.039)	
Sprocket Hole Pitch (2)	P_0	12.7 (0.500)		±0.03 (±0.012)	
Sprocket Hole Center to Lead Center (3) (4)	P_1	See Note Below		±0.7 (±0.028)	
Sprocket Hole Center to Component Center (5)	P_2	See Note Below			
Body Thickness	T_0	10.2 (0.400)		Maximum	
Total Tape Thickness	T	0.7 (0.28)		±0.02 (±0.008)	
Carrier Tape Width	W	18.0 (0.709)		+1.0/−0.5 (+0.039/−0.020)	
Hold-Down Tape Width	W_0	15 mm (0.561) or 6 mm (0.236)		+1.0/−0.8 (+0.039/−0.031	
Sprocket Hole Location	W_1	9.0 (0.354)		+0.075/−0.5 (+0.030/−0.020)	
Hold-Down Tape Location	W_2	12.0 (0.472)		Maximum	

Notes:

(1) See Dimensions table for specific values per case size.
(2) Cumulative pitch error ±1.0 mm (0.039) maximum in 20 consecutive sprocket hole locations.
(3) Measured at bottom of standoff.
(4) P_1 and F measured at egress from carrier tape.
(5) P and P2 measured at egress from carrier tape.

** Lead spacings are 2.5 mm (0.098") center to center (T350 A-H)*
*** Lead spacings are 5.0 mm (0.197") center to center*
 # Lead spacings are 6.35 mm (0.25") center to center
+ Lead spacings are 3.18 mm (0.125") center to center

F Dimensions:	P_1 Dimensions:
0.100" ±0.015	Lead Spacing
0.125" ±0.015	0.100" – 0.200 ±0.028"
0.200" ±0.015	0.125" – 0.187 ±0.028"
0.250" ±0.015"	0.200" – 0.150 ±0.028"
0.100" ±0.015 (3 leaded)	0.250" – 0.125 ±0.028"
	0.100" – 0.100 ±0.028" (3 leaded)

GR500/T210 Series High Reliability

Overview

The solid tantalum capacitor is an essential device in circuits requiring high capacitance voltage product and extended environmental capability. The KEMET GR500 Graded Reliability concept produces state-of-the-art devices, providing maximum assurance of meeting system reliability goals. All Graded Reliability capacitors receive meticulous attention from raw material selection through manufacture, final inspecton and shipping. Having survived a very stringent quality control program, the resulting capacitors meet or exceed the most critical requirements of space, satellite, missile and medical applications where failure is, at best, expensive, and at worst, fatal. KEMET is, therefore, committed to the principle of the hightest possible reliability in the manufacture and grading of its GR500 Series capacitors. The KEMET GR500 High Reliability concept disallows grouping of diverse ratings and production batches to determine average failure rates. Instead, data from each and every capacitor batch are statistically fitted to determine failure rate on the basis of 100% life testing. Each homogeneous production batch is "graded" as a single inspection lot, and documented evidence of failure rate achieved is supplied with the parts, providing assurance of the most sophisticated and accurate reliability measurement of method in the industry.

Benefits

- 100% Thermal Shock (−65°C to +125°C) prior to electrical testing
- 100% Surge Current testing.
- 100% Weibull Grading
- 100% X-ray examined
- Hermeticity testing per MIL–STD–202
- Optional Special testing
- Packaged in individual container compartments
- Marking per MIL–STD–1285
- Capacitance values of 0.0047 µF to 330 µF
- Tolerances of ±5%, ±10% and ±20%
- Voltage rating of 6– 100 VDC
- Case sizes: A, B, C, D

Applications

Typical applications include coupling, bypass, filtering, and RC timing circuits in miniaturized circuitry.

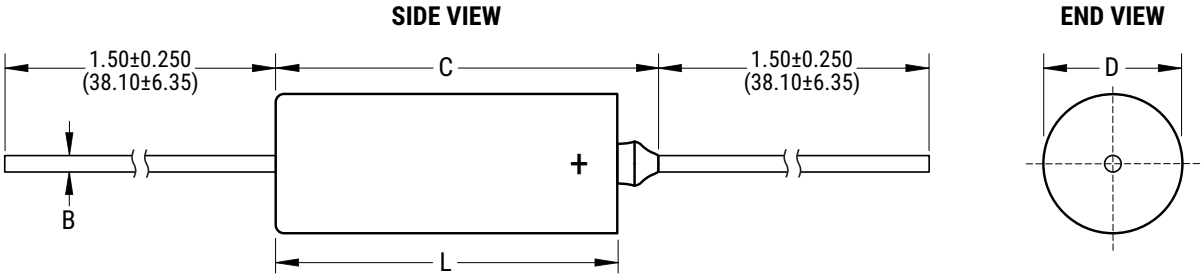
Ordering Information

T	210	A	105	K	050	R	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate	Termination Finish	Packaging
T = Tantalum	210 = GR500/J (KEMET) High reliability, solid electrolyte, graded, hermetic seal, axial lead, polar	A B C D	First two digits represent significant figures. Third digit specifies number of zeros to follow.	J = ±5% K = ±10% M = ±20%	006 = 6.3 010 = 10 015 = 15 020 = 20 025 = 25 035 = 35 050 = 50 075 = 75 100 = 100	M = 1%/k hours P = 0.1/k hours R = 0.01%/k hours S = 0.001%/k hours	S = Standard (Solder-coated nickel)	Blank = Bulk 7200 = Tape & Reel All capacitors are sleeved unless specified.

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.0047 – 330 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6 – 100 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)
Failure Rate	M – 1%/k hours, P – 0.1%/k hours, R – 0.01%/k hours, S – 0.001%/k hours

Dimensions – Inches (Millimeters)



Case Size	Uninsulated		Insulated			
	D ±0.005 ±(0.13)	L ±0.031 ±(0.79)	D ±0.010 ±(0.25)	L ±0.031 ±(0.79)	B ±0.002 ±(0.05)	C Maximum
A	0.125 (3.18)	0.250 (6.35)	0.135 (3.43)	0.286 (7.26)	0.020 (0.51)	0.422 (10.72)
B	0.175 (4.45)	0.438 (11.13)	0.185 (4.70)	0.474 (12.04)	0.020 (0.51)	0.610 (15.49)
C	0.279 (7.09)	0.650 (16.51)	0.289 (7.34)	0.686 (17.42)	0.025 (0.64)	0.822 (20.88)
D	0.341 (8.66)	0.750 (19.05)	0.351 (8.92)	0.786 (19.96)	0.025 (0.64)	0.922 (23.42)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	Graded Failure Rate	Maximum Leakage Current at Rated Voltage			Maximum DF (%) at 120 Hz		ESR Maximum Ohms 100 kHz +25°C
V	µF				+25°C (µA)	+85°C (µA)	+125°C (µA)	-55 +25°C	+85 +125°C	
6	3.9	A	T210A395(1)006(2)S	R,S	0.1	1.0	1.25	4.0	4.0	1.00
6	4.7	A	T210A475(1)006(2)S	R,S	0.1	1.0	1.25	4.0	4.0	0.90
6	5.6	A	T210A565(1)006(2)S	R,S	0.1	1.0	1.25	4.0	4.0	0.90
6	6.8	A	T210A685(1)006(2)S	R,S	0.1	1.0	1.25	4.0	6.0	0.80
6	27.0	B	T210B276(1)006(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.25
6	33.0	B	T210B336(1)006(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.24
6	39.0	B	T210B396(1)006(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.24
6	47.0	B	T210B476(1)006(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.24
6	56.0	B	T210B566(1)006(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.24
6	82.0	C	T210C826(1)006(2)S	R,S	1.5	15.0	18.75	5.0	8.0	0.12
6	100	C	T210C107(1)006(2)S	R,S	1.5	15.0	18.75	5.0	8.0	0.11
6	120	C	T210C127(1)006(2)S	R,S	1.5	15.0	18.75	5.0	8.0	0.10
6	150	C	T210C157(1)006(2)S	R,S	1.5	15.0	18.75	5.0	8.0	0.09
6	180	C	T210C187(1)006(2)S	R,S	1.5	15.0	18.75	5.0	8.0	0.08
6	220	D	T210D227(1)006(2)S	R,S	2.0	20.0	25.00	6.0	8.0	0.07
6	270	D	T210D277(1)006(2)S	R,S	2.0	20.0	25.00	6.0	8.0	0.07
6	330	D	T210D337(1)006(2)S	R,S	3.0	30.0	39.50	6.0	8.0	0.06
10	2.7	A	T210A275(1)010(2)S	R,S	0.1	1.0	1.25	4.0	4.0	1.20
10	3.3	A	T210A335(1)010(2)S	R,S	0.1	1.0	1.25	4.0	4.0	1.00
10	3.9	A	T210A395(1)010(2)S	R,S	0.1	1.0	1.25	4.0	4.0	1.00
10	4.7	A	T210A475(1)010(2)S	R,S	0.1	1.0	1.25	4.0	4.0	0.90
10	12.0	B	T210B126(1)010(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.32
10	15.0	B	T210B156(1)010(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.29
10	18.0	B	T210B186(1)010(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.27
10	22.0	B	T210B226(1)010(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.26
10	27.0	B	T210B276(1)010(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.25
10	33.0	B	T210B336(1)010(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.24
10	39.0	B	T210B396(1)010(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.24
10	47.0	C	T210C476(1)010(2)S	R,S	1.5	15.0	18.75	5.0	6.0	0.16
10	56.0	C	T210C566(1)010(2)S	R,S	1.5	15.0	18.75	5.0	6.0	0.15
10	68.0	C	T210C686(1)010(2)S	R,S	1.5	15.0	18.75	5.0	6.0	0.13
10	82.0	C	T210C826(1)010(2)S	R,S	1.5	15.0	18.75	5.0	6.0	0.12
10	100.0	C	T210C107(1)010(2)S	R,S	1.5	15.0	18.75	5.0	8.0	0.11
10	120.0	C	T210C127(1)010(2)S	R,S	1.5	15.0	18.75	5.0	8.0	0.10
10	150.0	D	T210D157(1)010(2)S	R,S	2.0	20.0	25.00	5.0	8.0	0.09
10	180.0	D	T210D187(1)010(2)S	R,S	2.0	20.0	25.00	5.0	8.0	0.08
10	220.0	D	T210D227(1)010(2)S	R,S	3.0	30.0	37.50	5.0	8.0	0.07
15	1.2	A	T210A125(1)015(2)S	R,S	0.25	2.5	3.13	3.0	4.0	1.40
15	1.5	A	T210A155(1)015(2)S	R,S	0.25	2.5	3.13	3.0	4.0	1.30
15	1.8	A	T210A185(1)015(2)S	R,S	0.25	2.5	3.13	3.0	4.0	1.25
15	2.2	A	T210A225(1)015(2)S	R,S	0.25	2.5	3.13	3.0	4.0	1.20
15	2.7	A	T210A275(1)015(2)S	P,R	0.25	2.5	3.13	3.0	4.0	1.20
15	3.3	A	T210A335(1)015(2)S	P,R	0.25	2.5	3.13	3.0	4.0	1.00
15	5.6	B	T210B565(1)015(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.47
15	6.8	B	T210B685(1)015(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.43
15	8.2	B	T210B825(1)015(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.39
15	10.0	B	T210B106(1)015(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.35
15	12.0	B	T210B126(1)015(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.32
15	15.0	B	T210B156(1)015(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.29
15	18.0	B	T210B186(1)015(2)S	P,R	0.5	5.0	6.25	4.0	6.0	0.27
15	22.0	B	T210B226(1)015(2)S	P,R	0.5	5.0	6.25	4.0	6.0	0.26
15	27.0	C	T210C276(1)015(2)S	R,S	1.5	15.0	18.75	4.0	6.0	0.21
15	33.0	C	T210C336(1)015(2)S	R,S	1.5	15.0	18.75	4.0	6.0	0.19
15	39.0	C	T210C396(1)015(2)S	P,R	1.5	15.0	18.75	4.0	6.0	0.17
V	µF				+25°C (µA)	+85°C (µA)	+125°C (µA)	-55 +25°C	+85 +125°C	
Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	Graded Failure Rate	Maximum Leakage Current at Rated Voltage			Maximum DF (%) at 120 Hz		ESR Maximum Ohms 100 kHz +25°C

(1) To complete KEMET part number, insert M - ±20%, K - ±10%, J - ±5%. Designates Capacitance tolerance.
(2) To complete KEMET Part Number (T210), insert Graded failure rate - M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	Graded Failure Rate	Maximum Leakage Current at Rated Voltage			Maximum DF (%) at 120 Hz		ESR Maximum Ohms 100 kHz +25°C
V	µF				+25°C (µA)	+85°C (µA)	+125°C (µA)	-55 +25°C	+85 +125°C	
15	47.0	C	T210C476(1)015(2)S	P,R	1.5	15.0	18.75	4.0	6.0	0.16
15	56.0	C	T210C566(1)015(2)S	P,R	1.5	15.0	18.75	4.0	6.0	0.15
15	68.0	C	T210C686(1)015(2)S	P,R	1.5	15.0	18.75	4.0	6.0	0.13
15	82.0	D	T210D826(1)015(2)S	P,R	2.0	20.0	25.00	5.0	8.0	0.11
15	100.0	D	T210D107(1)015(2)S	P,R	2.0	20.0	25.00	5.0	8.0	0.10
15	120.0	D	T210D127(1)015(2)S	P,R	2.0	20.0	25.00	5.0	8.0	0.09
15	150.0	D	T210D157(1)015(2)S	P,R	3.0	30.0	37.50	5.0	8.0	0.09
20	1.2	A	T210A125(1)020(2)S	P,R	0.25	2.5	3.13	3.0	4.0	1.40
20	1.5	A	T210A155(1)020(2)S	P,R	0.25	2.5	3.13	3.0	4.0	1.30
20	1.8	A	T210A185(1)020(2)S	P,R	0.25	2.5	3.13	3.0	4.0	1.25
20	2.2	A	T210A225(1)020(2)S	P,R	0.25	2.5	3.13	3.0	4.0	1.20
20	4.7	B	T210B475(1)020(2)S	R,S	0.5	5.0	6.25	4.0	6.0	0.51
20	5.6	B	T210B565(1)020(2)S	P,R	0.5	5.0	6.25	4.0	6.0	0.47
20	6.8	B	T210B685(1)020(2)S	P,R	0.5	5.0	6.25	4.0	6.0	0.43
20	8.2	B	T210B825(1)020(2)S	P,R	0.5	5.0	6.25	4.0	6.0	0.39
20	10.0	B	T210B106(1)020(2)S	P,R	0.5	5.0	6.25	4.0	6.0	0.35
20	12.0	B	T210B126(1)020(2)S	P,R	0.5	5.0	6.25	4.0	6.0	0.32
20	15.0	B	T210B156(1)020(2)S	P,R	0.5	5.0	6.25	4.0	6.0	0.29
20	18.0	C	T210C186(1)020(2)S	R,S	1.0	10.0	12.50	4.0	6.0	0.25
20	22.0	C	T210C226(1)020(2)S	R,S	1.0	10.0	12.50	4.0	6.0	0.25
20	27.0	C	T210C276(1)020(2)S	P,R	1.5	15.0	18.75	4.0	6.0	0.21
20	33.0	C	T210C336(1)020(2)S	P,R	1.5	15.0	18.75	4.0	6.0	0.19
20	39.0	C	T210C396(1)020(2)S	P,R	1.5	15.0	18.75	4.0	6.0	0.17
20	47.0	C	T210C476(1)020(2)S	P,R	1.5	15.0	18.75	4.0	6.0	0.16
20	56.0	D	T210D566(1)020(2)S	M,P	2.0	20.0	25.00	4.0	6.0	0.13
20	68.0	D	T210D686(1)020(2)S	M,P	2.0	20.0	25.00	4.0	6.0	0.12
20	82.0	D	T210D826(1)020(2)S	M,P	3.0	30.0	37.50	4.0	6.0	0.11
20	100	D	T210D107(1)020(2)S	M,P	3.0	30.0	37.50	4.0	6.0	0.10
35	0.82	A	T210A824(1)035(2)S	R,S	0.1	1.0	1.25	2.0	4.0	1.60
35	1.00	A	T210A105(1)035(2)S	R,S	0.1	1.0	1.25	2.0	4.0	1.40
35	2.70	B	T210B275(1)035(2)S	R,S	0.25	2.5	3.13	3.0	4.0	0.68
35	3.30	B	T210B335(1)035(2)S	R,S	0.5	5.0	6.25	3.0	4.0	0.62
35	3.90	B	T210B395(1)035(2)S	R,S	0.5	5.0	6.25	3.0	4.0	0.56
35	4.70	B	T210B475(1)035(2)S	R,S	0.5	5.0	6.25	3.0	4.0	0.51
35	5.60	B	T210B565(1)035(2)S	M,P	0.5	5.0	6.25	3.0	4.0	0.47
35	6.80	B	T210B685(1)035(2)S	M,P	0.5	5.0	6.25	3.0	4.0	0.43
35	8.20	C	T210C825(1)035(2)S	R,S	1.0	10.0	12.50	3.0	5.0	0.36
35	10.0	C	T210C106(1)035(2)S	R,S	1.0	10.0	12.50	3.0	5.0	0.33
35	12.0	C	T210C126(1)035(2)S	P,R	1.0	10.0	12.50	3.0	5.0	0.30
35	15.0	C	T210C156(1)035(2)S	P,R	1.0	10.0	12.50	3.0	5.0	0.27
35	18.0	C	T210C186(1)035(2)S	P,R	1.0	10.0	12.50	3.0	5.0	0.25
35	22.0	C	T210C226(1)035(2)S	M,P	1.0	10.0	12.50	3.0	5.0	0.25
35	27.0	D	T210D276(1)035(2)S	M,P	2.0	20.0	25.00	3.0	5.0	0.18
35	33.0	D	T210D336(1)035(2)S	M,P	2.0	20.0	25.00	3.0	5.0	0.17
35	39.0	D	T210D396(1)035(2)S	M,P	2.0	20.0	25.00	4.0	6.0	0.15
35	47.0	D	T210D476(1)035(2)S	M,P	3.0	30.0	37.50	4.0	6.0	0.14
50	0.0047	A	T210A472(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	30.00
50	0.0056	A	T210A562(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	28.00
50	0.0068	A	T210A682(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	26.00
50	0.0082	A	T210A822(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	24.00
50	0.01	A	T210A103(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	22.00
50	0.012	A	T210A123(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	20.00
50	0.015	A	T210A153(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	18.00
50	0.018	A	T210A183(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	16.00
V	µF				+25°C (µA)	+85°C (µA)	+125°C (µA)	-55 +25°C	+85 +125°C	
Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	Graded Failure Rate	Maximum Leakage Current at Rated Voltage			Maximum DF (%) at 120 Hz		ESR Maximum Ohms 100 kHz +25°C

(1) To complete KEMET part number, insert M - ±20%, K - ±10%, J - ±5%. Designates Capacitance tolerance.
(2) To complete KEMET Part Number (T210), insert Graded failure rate - M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	Graded Failure Rate	Maximum Leakage Current at Rated Voltage			Maximum DF (%) at 120 Hz		ESR Maximum Ohms 100 kHz +25°C
V	µF				+25°C (µA)	+85°C (µA)	+125°C (µA)	-55 +25°C	+85 +125°C	
50	0.022	A	T210A223(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	14.00
50	0.027	A	T210A273(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	13.00
50	0.033	A	T210A333(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	12.00
50	0.039	A	T210A393(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	11.00
50	0.047	A	T210A473(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	10.00
50	0.056	A	T210A563(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	9.00
50	0.068	A	T210A683(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	8.00
50	0.082	A	T210A823(1)050(2)S	R,S	0.05	0.5	0.63	2.0	4.0	7.50
50	0.1	A	T210A104(1)050(2)S	R,S	0.1	1.0	1.25	2.0	4.0	7.00
50	0.12	A	T210A124(1)050(2)S	R,S	0.1	1.0	1.25	2.0	4.0	6.50
50	0.15	A	T210A154(1)050(2)S	R,S	0.1	1.0	1.25	2.0	4.0	5.50
50	0.18	A	T210A184(1)050(2)S	R,S	0.1	1.0	1.25	2.0	4.0	5.00
50	0.22	A	T210A224(1)050(2)S	R,S	0.1	1.0	1.25	2.0	4.0	4.00
50	0.27	A	T210A274(1)050(2)S	R,S	0.1	1.0	1.25	2.0	4.0	3.50
50	0.33	A	T210A334(1)050(2)S	R,S	0.1	1.0	1.25	2.0	4.0	3.30
50	0.39	A	T210A394(1)050(2)S	R,S	0.1	1.0	1.25	2.0	4.0	3.30
50	0.47	A	T210A474(1)050(2)S	R,S	0.1	1.0	1.25	2.0	4.0	3.00
50	0.56	A	T210A564(1)050(2)S	R,S	0.1	1.0	1.25	2.0	4.0	2.50
50	0.68	A	T210A684(1)050(2)S	R,S	0.1	1.0	1.25	2.0	4.0	1.80
50	0.82	A	T210A824(1)050(2)S	P,R	0.1	1.0	1.25	2.0	4.0	1.60
50	1.00	A	T210A105(1)050(2)S	P,R	0.1	1.0	1.25	2.0	4.0	1.40
50	1.20	B	T210B125(1)050(2)S	R,S	0.25	2.5	3.13	2.0	4.0	1.20
50	1.50	B	T210B155(1)050(2)S	R,S	0.25	2.5	3.13	2.0	4.0	1.10
50	1.80	B	T210B185(1)050(2)S	R,S	0.25	2.5	3.13	2.0	4.0	0.92
50	2.20	B	T210B225(1)050(2)S	R,S	0.25	2.5	3.13	2.0	4.0	0.80
50	2.70	B	T210B275(1)050(2)S	P,R	0.25	2.5	3.13	2.0	4.0	0.68
50	3.30	B	T210B335(1)050(2)S	P,R	0.5	5.0	6.25	2.0	4.0	0.62
50	3.90	B	T210B395(1)050(2)S	P,R	0.5	5.0	6.25	2.0	4.0	0.56
50	4.70	B	T210B475(1)050(2)S	M,P	0.5	5.0	6.25	2.0	4.0	0.51
50	5.60	C	T210C565(1)050(2)S	P,R	1.5	15.0	18.75	3.0	4.0	0.44
50	6.80	C	T210C685(1)050(2)S	P,R	1.5	15.0	18.75	3.0	5.0	0.40
50	8.20	C	T210C825(1)050(2)S	P,R	1.5	15.0	18.75	3.0	5.0	0.36
50	10.0	C	T210C106(1)050(2)S	P,R	1.5	15.0	18.75	3.0	5.0	0.33
50	12.0	C	T210C126(1)050(2)S	M,P	1.5	15.0	18.75	3.0	5.0	0.30
50	15.0	C	T210C156(1)050(2)S	M,P	1.5	15.0	18.75	3.0	5.0	0.27
50	18.0	C	T210C186(1)050(2)S	M,P	1.5	15.0	18.75	3.0	5.0	0.25
50	22.0	D	T210D226(1)050(2)S	M,P	2.0	20.0	25.00	3.0	5.0	0.20
75	0.0047	A	T210A472(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	30.00
75	0.0056	A	T210A562(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	28.00
75	0.0068	A	T210A682(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	26.00
75	0.0082	A	T210A822(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	24.00
75	0.01	A	T210A103(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	22.00
75	0.012	A	T210A123(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	20.00
75	0.015	A	T210A153(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	18.00
75	0.018	A	T210A183(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	16.00
75	0.022	A	T210A223(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	14.00
75	0.027	A	T210A273(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	13.00
75	0.033	A	T210A333(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	12.00
75	0.039	A	T210A393(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	11.00
75	0.047	A	T210A473(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	10.00
75	0.056	A	T210A563(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	9.00
75	0.068	A	T210A683(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	8.00
75	0.082	A	T210A823(1)075(2)S	P,R	0.1	1.0	1.25	2.0	4.0	7.50
75	0.1	A	T210A104(1)075(2)S	P,R	0.25	2.5	3.13	2.0	4.0	7.00
V	µF				+25°C (µA)	+85°C (µA)	+125°C (µA)	-55 +25°C	+85 +125°C	
Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	Graded Failure Rate	Maximum Leakage Current at Rated Voltage			Maximum DF (%) at 120 Hz		ESR Maximum Ohms 100 kHz +25°C

(1) To complete KEMET part number, insert M - ±20%, K - ±10%, J - ±5%. Designates Capacitance tolerance.
(2) To complete KEMET Part Number (T210), insert Graded failure rate - M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	Graded Failure Rate	Maximum Leakage Current at Rated Voltage			Maximum DF (%) at 120 Hz		ESR Maximum Ohms 100 kHz +25°C
V	µF				+25°C (µA)	+85°C (µA)	+125°C (µA)	-55 +25°C	+85 +125°C	
75	0.12	A	T210A124(1)075(2)S	P,R	0.25	2.5	3.13	2.0	4.0	6.50
75	0.15	A	T210A154(1)075(2)S	P,R	0.25	2.5	3.13	2.0	4.0	4.40
75	0.18	A	T210A184(1)075(2)S	P,R	0.25	2.5	3.13	2.0	4.0	4.00
75	0.22	A	T210A224(1)075(2)S	P,R	0.25	2.5	3.13	2.0	4.0	3.50
75	0.27	A	T210A274(1)075(2)S	P,R	0.25	2.5	3.13	2.0	4.0	3.10
75	0.33	A	T210A334(1)075(2)S	P,R	0.25	2.5	3.13	2.0	4.0	2.80
75	0.39	A	T210A394(1)075(2)S	P,R	0.25	2.5	3.13	2.0	4.0	2.60
75	0.47	A	T210A474(1)075(2)S	P,R	0.25	2.5	3.13	2.0	4.0	2.40
75	0.56	A	T210A564(1)075(2)S	P,R	0.25	2.5	3.13	2.0	4.0	2.25
75	0.68	A	T210A684(1)075(2)S	M,P	0.25	2.5	3.13	2.0	4.0	2.10
75	1.8	B	T210B185(1)075(2)S	P,R	0.5	5.0	6.25	2.0	4.0	0.92
75	2.2	B	T210B225(1)075(2)S	P,R	0.5	5.0	6.25	2.0	4.0	0.80
75	2.7	B	T210B275(1)075(2)S	M,P	0.5	5.0	6.25	2.0	4.0	0.68
75	3.3	B	T210B335(1)075(2)S	M,P	0.75	7.5	9.40	2.0	4.0	0.62
75	3.9	B	T210B395(1)075(2)S	M,P	0.75	7.5	9.40	2.0	4.0	0.56
75	4.7	C	T210C475(1)075(2)S	P,R	1.5	15.0	18.75	3.0	4.0	0.47
75	5.6	C	T210C565(1)075(2)S	P,R	1.5	15.0	18.75	3.0	4.0	0.44
75	6.8	C	T210C685(1)075(2)S	M,P	2.0	20.0	25.00	3.0	4.0	0.44
75	8.2	C	T210C825(1)075(2)S	M,P	2.0	20.0	25.00	3.0	5.0	0.36
75	10.0	C	T210C106(1)075(2)S	M,P	2.0	20.0	25.00	3.0	5.0	0.33
75	12.0	D	T210D126(1)075(2)S	M,P	2.5	25.0	31.25	3.0	5.0	0.26
75	15.0	D	T210D156(1)075(2)S	M,P	2.5	25.0	31.25	3.0	5.0	0.23
100	0.0047	A	T210A472(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	30.00
100	0.0056	A	T210A562(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	28.00
100	0.0068	A	T210A682(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	26.00
100	0.0082	A	T210A822(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	24.00
100	0.01	A	T210A103(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	22.00
100	0.012	A	T210A123(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	20.00
100	0.015	A	T210A153(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	18.00
100	0.018	A	T210A183(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	16.00
100	0.022	A	T210A223(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	14.00
100	0.027	A	T210A273(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	13.00
100	0.033	A	T210A333(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	12.00
100	0.039	A	T210A393(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	11.00
100	0.047	A	T210A473(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	10.00
100	0.056	A	T210A563(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	9.00
100	0.068	A	T210A683(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	8.00
100	0.082	A	T210A823(1)100(2)S	M,P	0.1	1.0	1.25	2.0	4.0	7.50
100	0.1	A	T210A104(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	7.00
100	0.12	A	T210A124(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	6.50
100	0.15	A	T210A154(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	4.40
100	0.18	A	T210A184(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	4.00
100	0.22	A	T210A224(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	3.50
100	0.27	A	T2l0A274(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	3.10
100	0.33	A	T210A334(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	2.80
100	0.39	A	T210A394(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	2.60
100	0.47	A	T210A474(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	2.40
100	0.56	A	T210A564(1)100(2)S	M.P	0.25	2.5	3.13	2.0	4.0	2.25
100	0.68	B	T210B684(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	2.10
100	0.82	B	T210B824(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	1.47
100	1	B	T210B105(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	1.40
100	1.2	B	T210B125(1)100(2)S	M,P	0.25	2.5	3.13	2.0	4.0	1.33
100	1.5	B	T210B155(1)100(2)S	M,P	0.5	5.0	6.25	2.0	4.0	1.06
100	1.8	B	T210B185(1)100(2)S	M,P	0.5	5.0	6.25	2.0	4.0	0.92
V	µF				+25°C (µA)	+85°C (µA)	+125°C (µA)	-55 +25°C	+85 +125°C	
Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	Graded Failure Rate	Maximum Leakage Current at Rated Voltage			Maximum DF (%) at 120 Hz		ESR Maximum Ohms 100 kHz +25°C

(1) To complete KEMET part number, insert M - ±20%, K - ±10%, J - ±5%. Designates Capacitance tolerance.
(2) To complete KEMET Part Number (T210), insert Graded failure rate - M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	Graded Failure Rate	Maximum Leakage Current at Rated Voltage			Maximum DF (%) at 120 Hz		ESR Maximum Ohms 100 kHz +25°C
V	µF				+25°C (µA)	+85°C (µA)	+125°C (µA)	-55 +25°C	+85 +125°C	
100	2.2	B	T210B225(1)100(2)S	M,P	0.5	5.0	6.25	2.0	4.0	0.80
100	2.7	B	T210B275(1)100(2)S	M,P	0.5	5.0	6.25	2.0	4.0	0.68
100	3.3	C	T210C335(1)100(2)S	M,P	2.0	20.0	25.00	3.0	5.0	0.62
100	3.9	C	T210C395(1)100(2)S	M,P	2.0	20.0	25.00	3.0	5.0	0.56
100	4.7	C	T210C475(1)100(2)S	M,P	2.0	20.0	25.00	3.0	5.0	0.47
100	5.6	C	T210C565(1)100(2)S	M,P	2.0	20.0	25.00	3.0	5.0	0.44
100	6.8	C	T210C685(1)100(2)S	M	2.0	20.0	25.00	3.0	5.0	0.40
100	8.2	D	T210D825(1)100(2)S	M	2.5	25.0	31.25	3.0	5.0	0.36
100	10.0	D	T210D106(1)100(2)S	M	2.5	25.0	31.25	3.0	5.0	0.33
V	µF				+25°C (µA)	+85°C (µA)	+125°C (µA)	-55 +25°C	+85 +125°C	
Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	Graded Failure Rate	Maximum Leakage Current at Rated Voltage			Maximum DF (%) at 120 Hz		ESR Maximum Ohms 100 kHz +25°C

(1) To complete KEMET part number, insert M - ±20%, K - ±10%, J - ±5%. Designates Capacitance tolerance.
(2) To complete KEMET Part Number (T210), insert Graded failure rate - M for 1%/k hours, P for 0.1%/k hours, R for 0.01%/k hours, or S for 0.001%/k hours. Designates Reliability Level.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

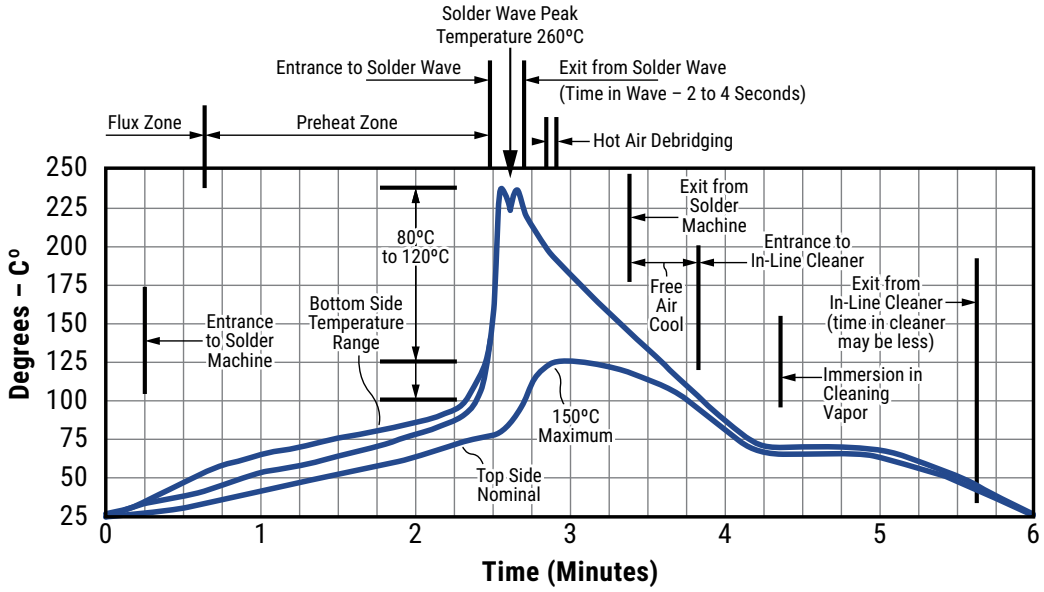
Permissible AC ripple current can be determined by the following:
$I(max) = Z \sqrt{P\ max/R}$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

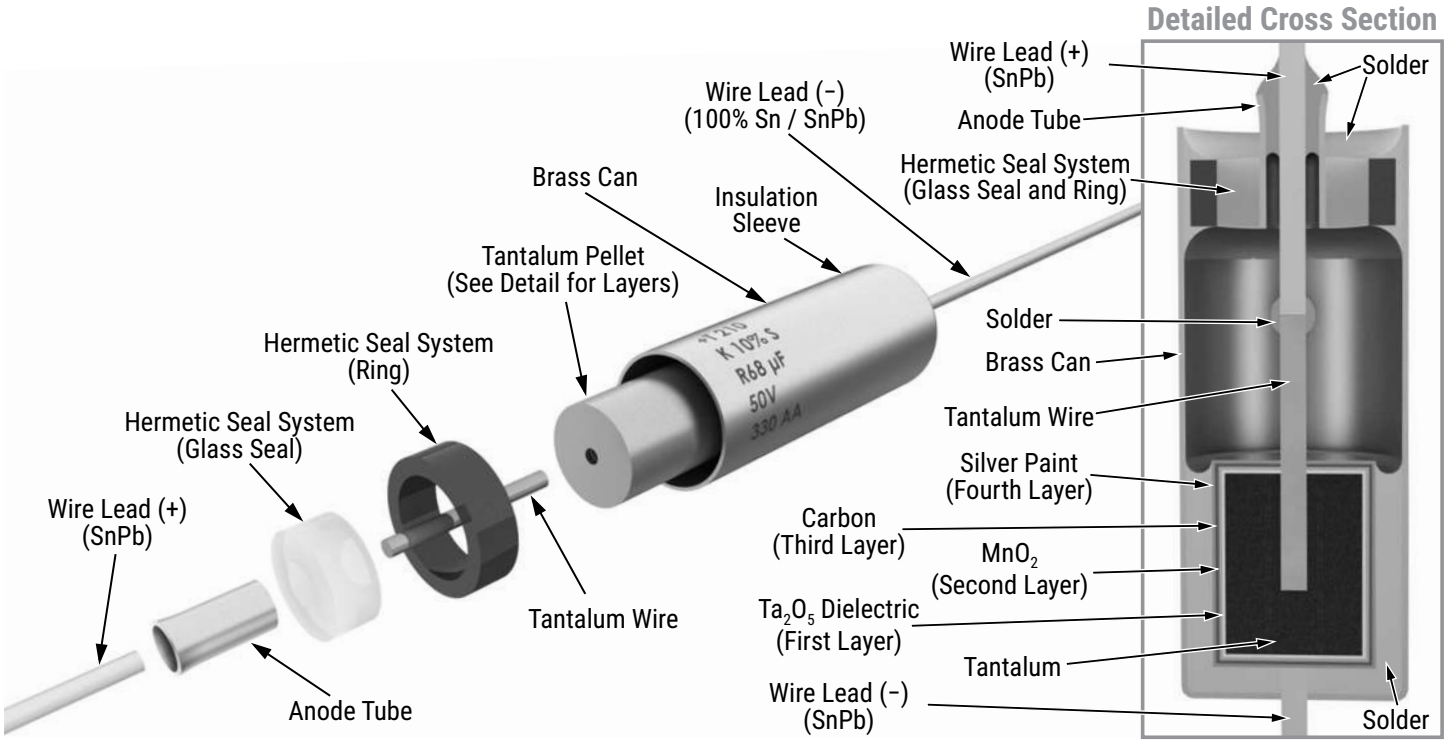
Optimum Solder Wave Profile



Mounting

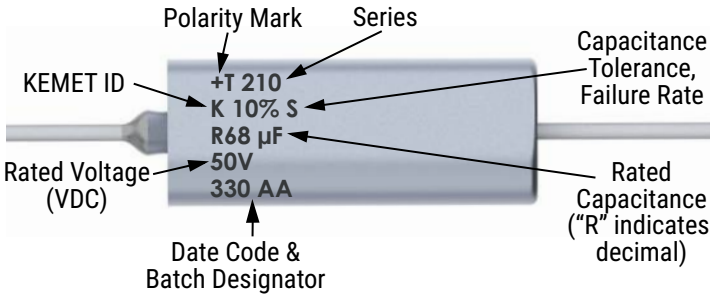
All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Construction

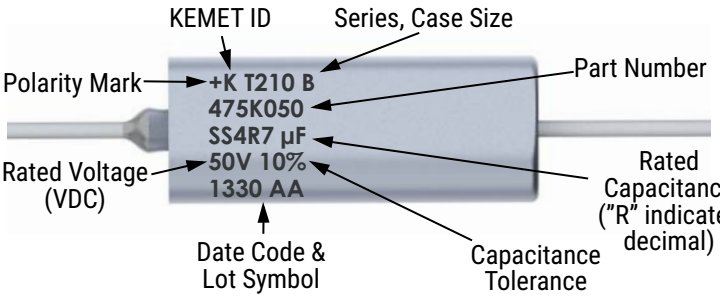


Capacitor Marking

A Case

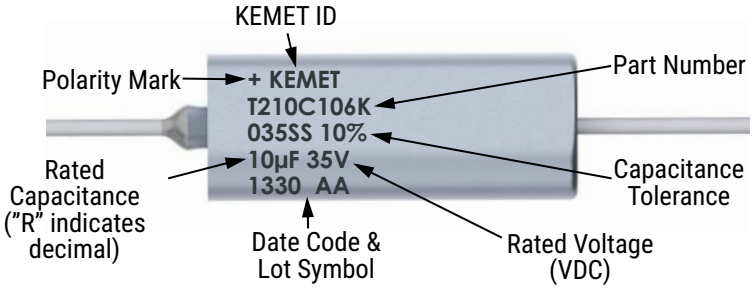


B Case



Date Code	3 Digit	4 Digit
Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023	19 = 2019 20 = 2020 21 = 2021 22 = 2022 23 = 2023
Week	01 = 1st week of the year to 52 = 52nd week of the year	

C & D Case



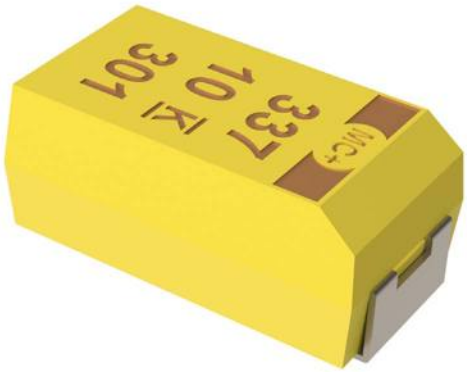
T513 High Reliability Series (HRA), Multiple Anode Low ESR MnO_2

Overview

The KEMET T513 Surface Mount Capacitors are suitable for the High Reliability Series (HRA) requirements of industrial, telecom, defense, and aerospace markets. This surface mount series offers very low ESR and surge robustness designed for applications that require high surge current and high ripple current capability. These benefits are achieved via a multiple anode construction similar to KEMET's T510 Series. The T513 HRA Series also offers various options including Weibull Grading, termination finish, and surge current.

Benefits

- Meets or exceeds EIA Standard 535BAAC
- Taped & Reel standard packaging per EIA 481
- High surge current capability
- Termination options B, C, H, K, and T
- High ripple current capability
- Surge testing options
- 100% steady-state accelerated aging
- ESR as low as 10 mΩ



Applications

The T513 Series is suitable for the industrial, telecom, defense, and aerospace markets. Typical applications include decoupling and filtering in radar, sonar, power supply, guidance systems, and other high reliability applications.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder or gold-plated.
- Halogen-free
- Epoxy compliant with UL94 V–0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	513	X	108	K	004	B	H	61	10	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Surge	ESR	Packaging (C-Spec)
T = Tantalum	Multiple anode COTS	D E X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35	A = N/A B = 0.1%/ 1,000 hours C = 0.01%/ 1,000 hours	C = Hot solder dipped H = Standard solder-coated (SnPb 5% Pb minimum) B = Gold-Plated K = Solder fused T = 100% Tin	61 = None 62 = 10 cycles, 25°C after Weibull 63 = 10 cycles, −55°C and 85°C after Weibull 64 = 10 cycles, −55°C and 85°C before Weibull	10 = Standard ESR 20 = Low ESR 30 = Ultra-low ESR	Blank = 7" Reel 7280 = 13" Reel 7610 = Bulk bag 7640 = Bulk plastic box WAFL = Waffle pack

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	15 – 1,000 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 35 VDC
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

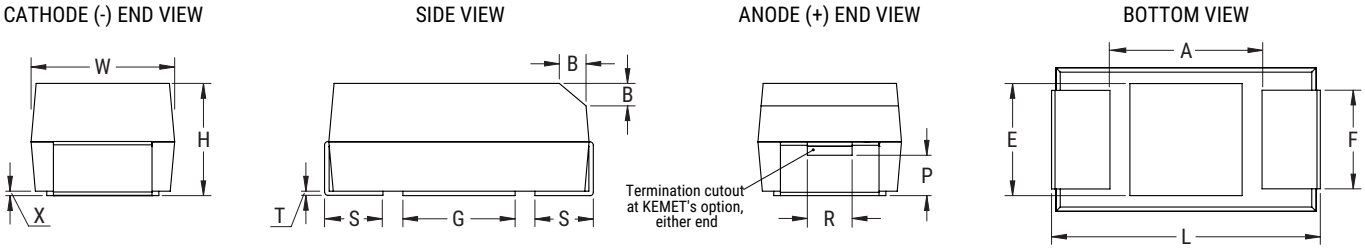
Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	n/a	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10 of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Additional Qualification Tests per MIL–PRF–55365/8	Please contact KEMET for more information.					

**IL = Initial limit*

Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component													Typical Weight
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S ±0.3 ±(0.012)	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)	(mg)
D	7343-31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.095)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	349.43
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	430.15
E	7360–38	7.3±0.3 (0.287±0.012)	6.0±0.3 (0.236±0.012)	3.6±0.2 (0.142±0.008)	4.1 (0.161)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	500.73

Notes: (Ref) – Dimensions provided for reference only.
These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative.

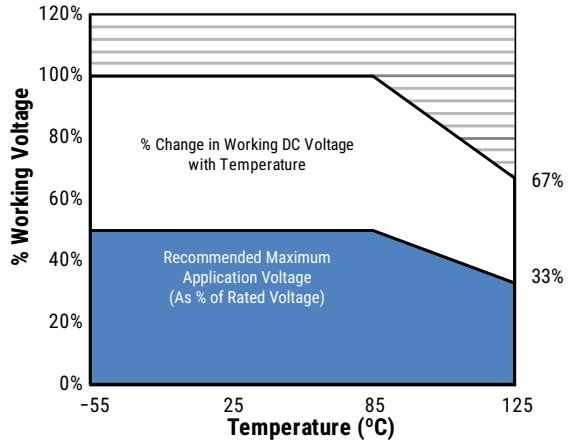
Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp.
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max./5 Min.	% at +25°C 120 Hz Max.	mΩ at +25°C 100 kHz Max.	mΩ at +25°C 100 kHz Max.	mΩ at +25°C 100 kHz Max.	(mA) 100 kHz , 25°C	(mA) 100 kHz , 25°C	(mA) 100 kHz , 25°C	°C
4	680	X/7343-43	T513X687(1)004(2)(3)(4)10	27.2	6.0	30	N/A	N/A	2340	N/A	N/A	125
4	1000	X/7343-43	T513X108(1)004(2)(3)(4)(5)	40.0	6.0	23	18	N/A	2680	3030	N/A	125
4	1000	E/7360-38	T513E108(1)004(6)(3)(4)(5)	40.0	6.0	18	10	N/A	3333	4470	N/A	125
6.3	470	X/7343-43	T513X477(1)006(2)(3)(4)10	29.6	6.0	30	N/A	N/A	2340	N/A	N/A	125
6.3	680	X/7343-43	T513X687(1)006(2)(3)(4)(5)	42.8	6.0	45	23	N/A	1920	2680	N/A	125
6.3	680	E/7360-38	T513E687(1)006(6)(3)(4)(5)	42.8	6.0	23	12	N/A	2950	4080	N/A	125
10	330	X/7343-43	T513X337(1)010(6)(3)(4)10	33.0	6.0	35	N/A	N/A	2170	N/A	N/A	125
16	100	D/7343-31	T513D107(1)016(2)(3)(4)10	16.0	6.0	75	N/A	N/A	1190	N/A	N/A	125
16	150	X/7343-43	T513X157(1)016(2)(3)(4)(5)	24.0	6.0	40	30	N/A	2030	2340	N/A	125
16	220	X/7343-43	T513X227(1)016(2)(3)(4)(5)	35.2	10.0	40	25	N/A	2030	2570	N/A	125
20	100	X/7343-43	T513X107(1)020(6)(3)(4)(5)	20.0	8.0	45	40	35	1920	2030	2170	125
25	68	X/7343-43	T513X686(1)025(2)(3)(4)10	17.0	8.0	45	N/A	N/A	1920	N/A	N/A	125
25	100	E/7360-38	T513E107(1)025(2)(3)(4)10	25.0	8.0	50	N/A	N/A	2000	N/A	N/A	125
35	15	D/7343-31	T513D156(1)035(2)(3)(4)10	5.3	6.0	100	N/A	N/A	1225	N/A	N/A	125
35	22	X/7343-43	T513X226(1)035(6)(3)(4)10	7.7	6.0	100	N/A	N/A	1290	N/A	N/A	125
35	33	X/7343-43	T513X336(1)035(2)(3)(4)(5)	11.6	6.0	65	55	N/A	1590	1730	N/A	125
35	47	X/7343-43	T513X476(1)035(2)(3)(4)(5)	16.5	8.0	65	55	N/A	1590	1730	N/A	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max./5 Min.	% at +25°C 120 Hz Max.	mΩ at +25°C 100 kHz Max.	mΩ at +25°C 100 kHz Max.	mΩ at +25°C 100 kHz Max.	(mA) 100 kHz , 25°C	(mA) 100 kHz , 25°C	(mA) 100 kHz , 25°C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Ripple Current Ultra-low ESR (rms)	Maximum Operating Temp.

(1) To complete KEMET part number, insert M for ±20%, K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold-plated, C = Hot solder dipped, H = Solder-plated, K = Solder Fused or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull or 64 = 10 cycles −55°C +85°C before Weibull. Designates Surge current option.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
(6) To complete KEMET part number, insert C (0.01%/1,000 hours), B (0.1%/1,000 hours), or A = N/A. Designates Reliability Level.
Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the Pmax of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
Pmax = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

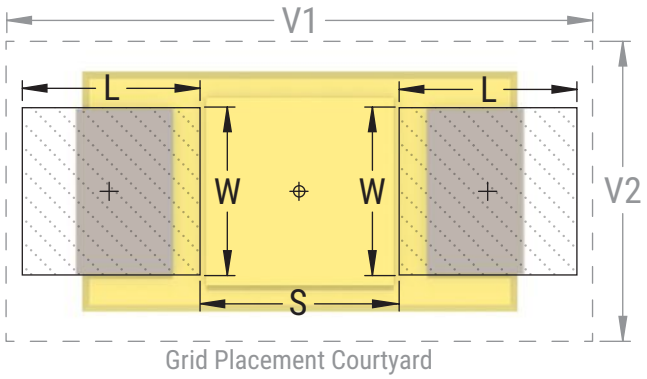
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe, plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the below table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
E[1]	7360–38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

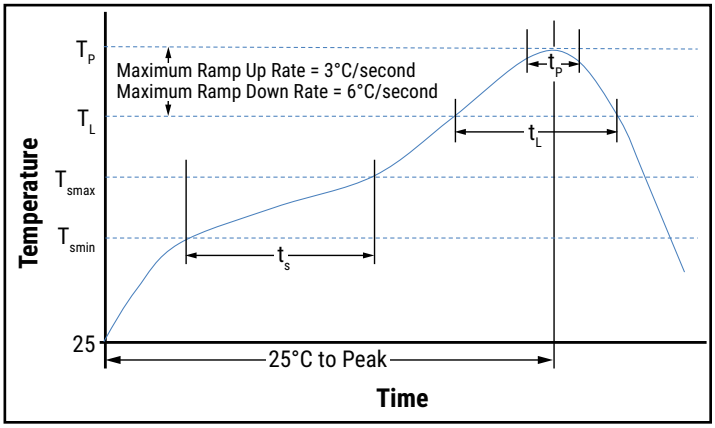
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/seconds maximum	3°C/seconds maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

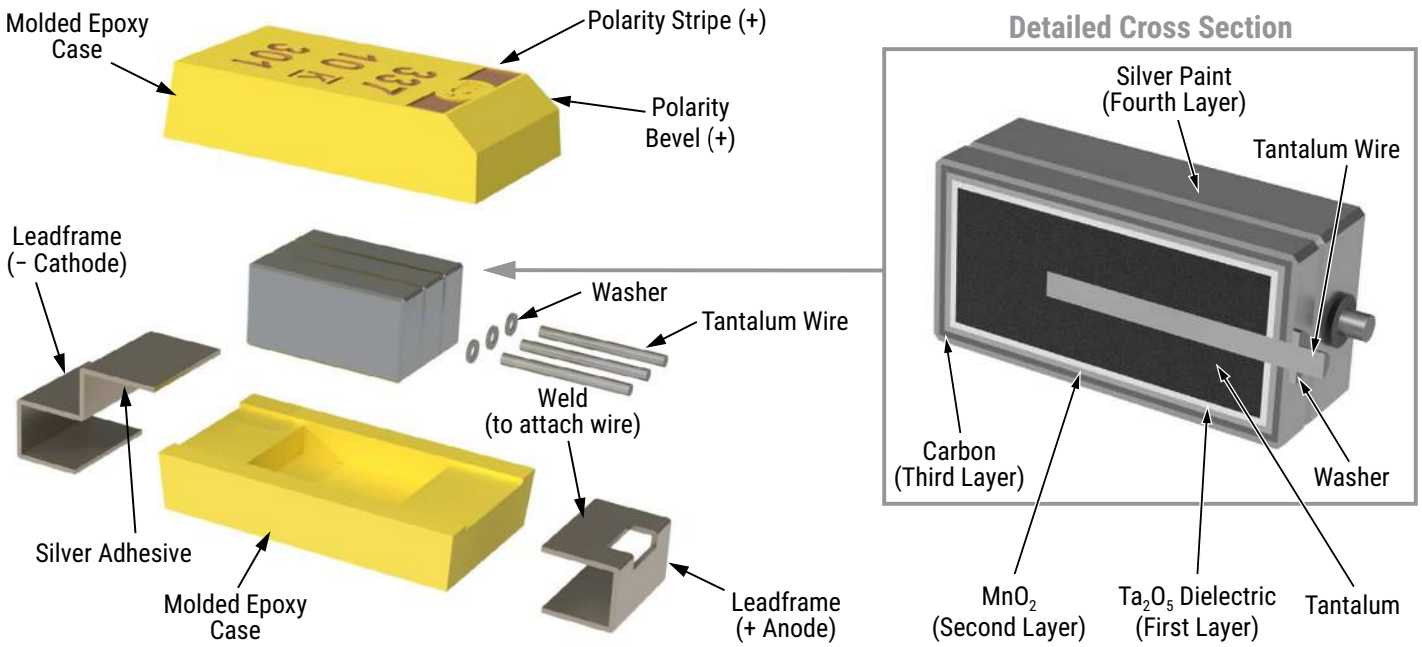
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



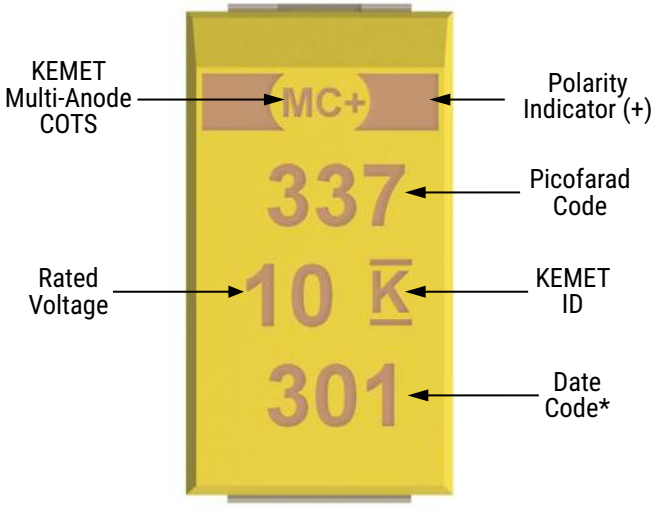
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = Last number of Year	0 = 2020 1 = 2021 2 = 2022 3 = 2023 4 = 2024
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

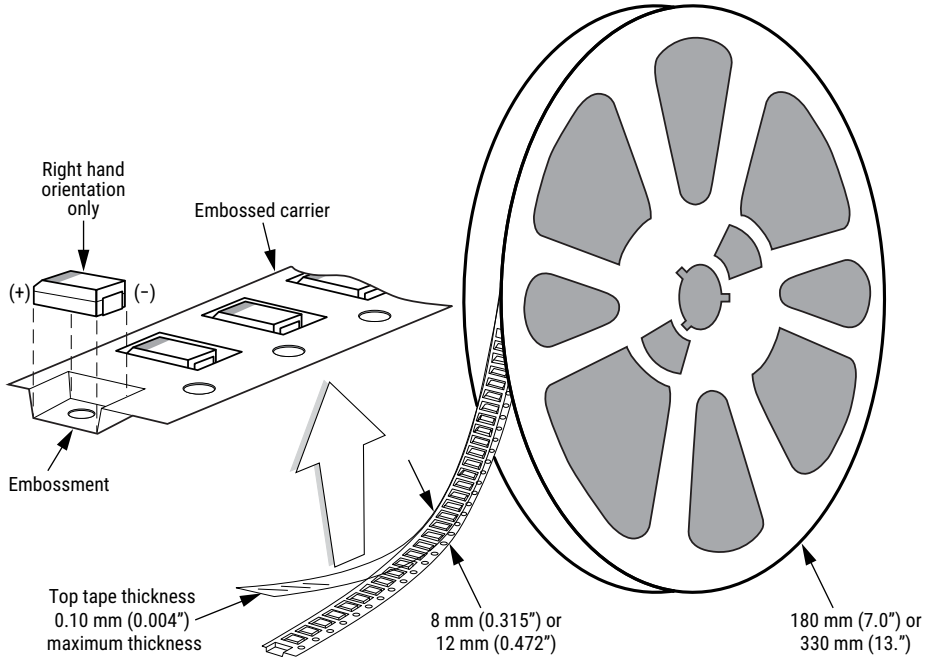


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

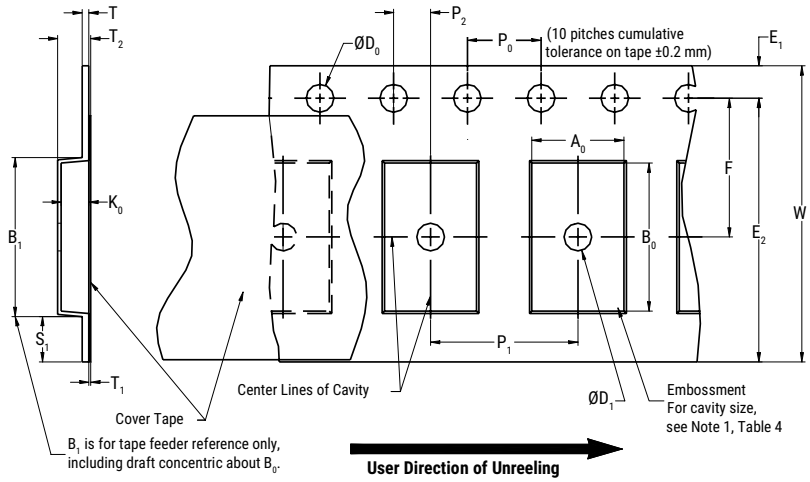


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

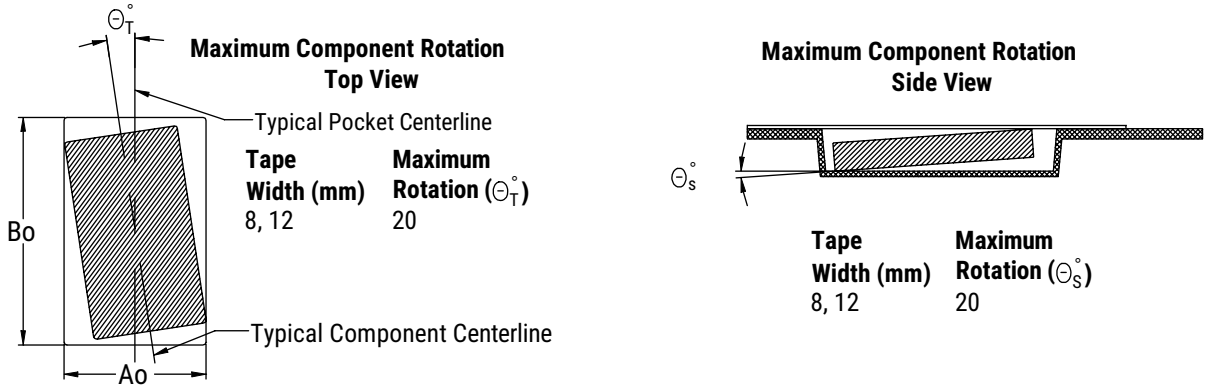


Figure 3 – Maximum Lateral Movement

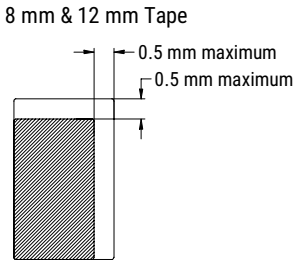


Figure 4 – Bending Radius

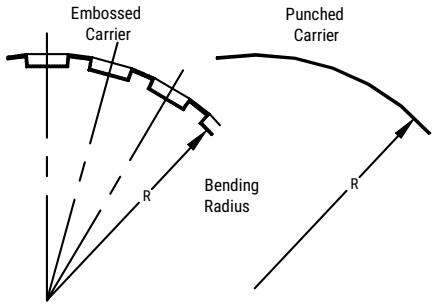
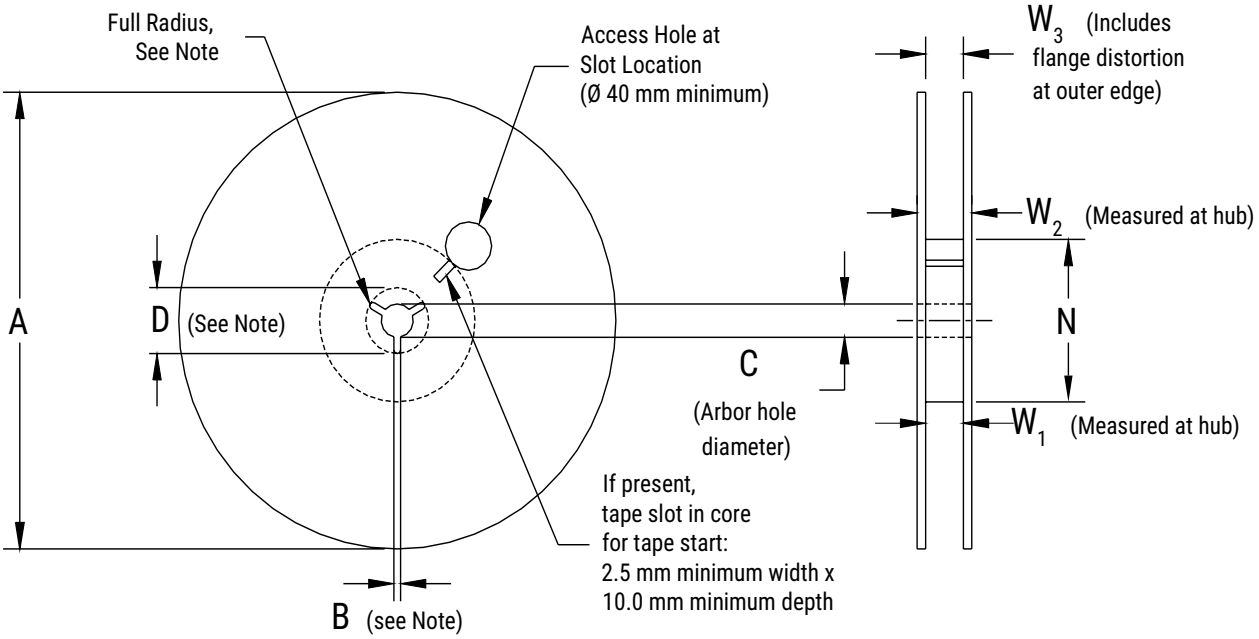


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

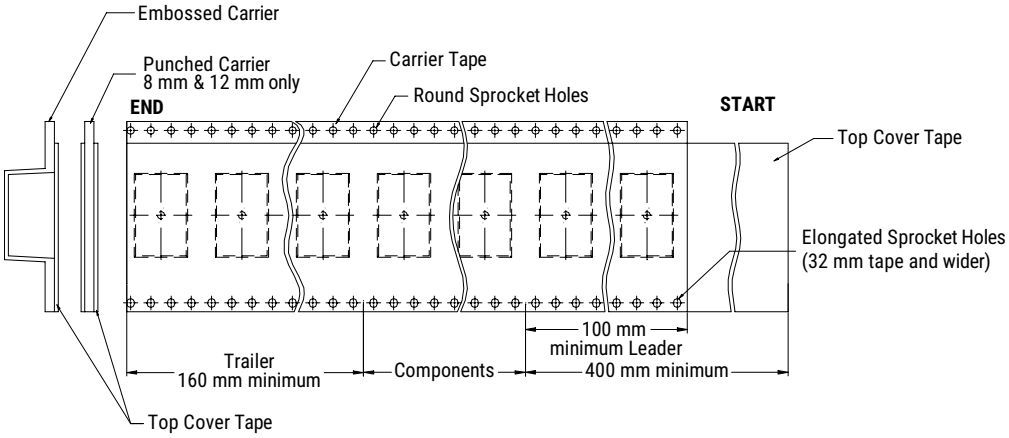
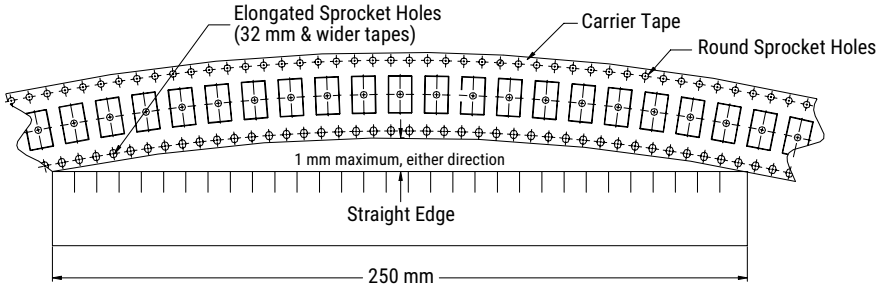


Figure 7 – Maximum Camber



T491 Automotive/Industrial Grade MnO_2

Overview

The KEMET T491, designed specifically for today's highly automated surface mount processes and equipment, is the leading choice for surface mount designs. The T491 combines KEMET's proven solid tantalum technology, acclaimed and respected throughout the world, with the latest in materials, processes, and automation, resulting in unsurpassed total performance and value. This product meets or exceeds the requirements of EIA standard 535BAAC. The physical outline and dimensions of T491 conform to this global standard. Low profile case sizes are available. This series is classified as moisture sensitivity level (MSL) 1 under J STD 020, with unlimited floor life time at ≤ 30°C / 85% RH. The T491 standard terminations are available in 100% matte tin and provide excellent wetting characteristics and compatibility with today's surface mount solder systems. Tin/lead (Sn/Pb) terminations are available upon request for any part number. Gold-plated terminations are also available for use with conductive epoxy attachment processes. The symmetrical terminations offer total compliancy to provide the thermal and mechanical stress relief required for today's technology. Standard packaging of these devices is Tape & Reel in accordance with EIA 481. This system provides perfect compatibility with all tape-fed placement units.

Benefits

- Meets or exceeds EIA standard 535BAAC
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Optional gold-plated terminations
- Laser-marked case
- 100% surge current test
- Extended range values
- Low profile case sizes

Applications

Typical applications include decoupling and filtering in automotive end applications such as DC/DC converters, portable electronics, telecommunications, and control units.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder, Gold-plated or Non-magnetic 100% Sn solder.

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	491	X	157	K	020	A	T	AUTO	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	C-Spec 1	Packaging (C-Spec)
T = Tantalum	Industrial	A B C D E S T U V X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	2R5 = 2.5 003 = 3 004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte tin (Sn)-plated H = Standard solder coated (SnPb 5% Pb minimum) G = Gold-plated (A, B, C, D, X only) N = Non-magnetic 100% tin (Sn) M = Non-magnetic (SnPb)	AUTO = Automotive grade AUTO = AEC–Q200 certification	Blank = 7" reel 7280 = 13" reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	–55°C to 125°C
Rated Capacitance Range	0.1 – 470 µF at 120 Hz/25°C
Capacitance Tolerance	K tolerance (10%), M tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55°C to 125° C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C.			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage).		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

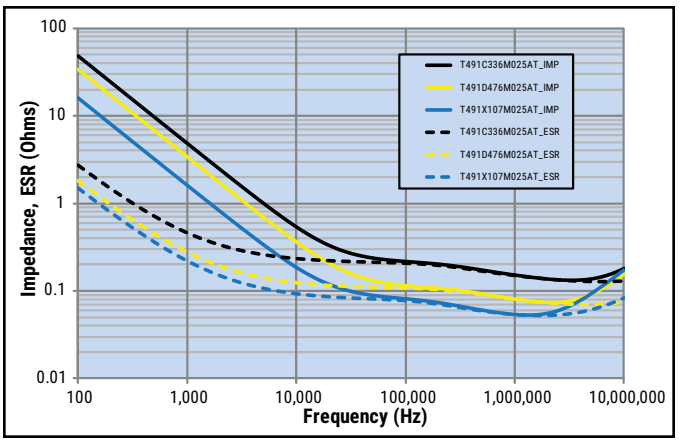
**IL = Initial limit*

Certification

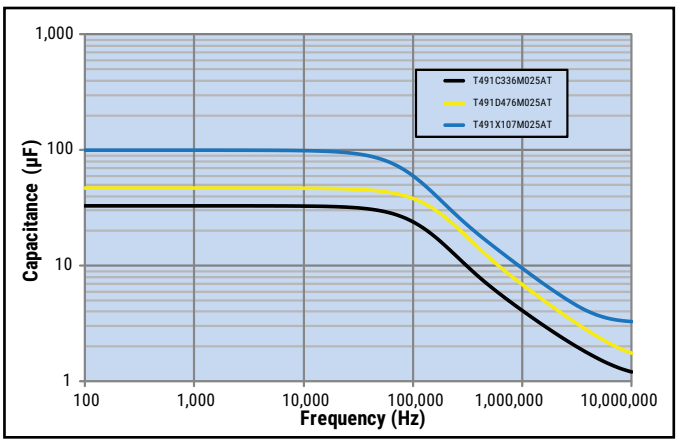
KEMET's Internal Qualification Plan for this Tantalum series of capacitors follows AEC–Q200 guidelines. Standard catalog part types ordered without a specific automotive designator, i.e., suffix AUTO or four digit customer specific designator (C-Spec), are not considered KEMET automotive grade tantalum capacitors.

Electrical Characteristics

ESR vs. Frequency



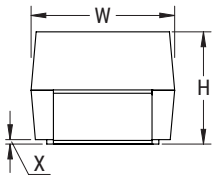
Capacitance vs. Frequency



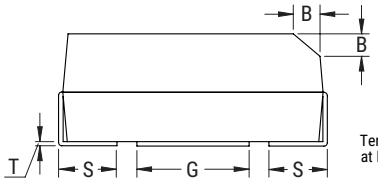
Dimensions – Millimeters (Inches)

Metric will govern

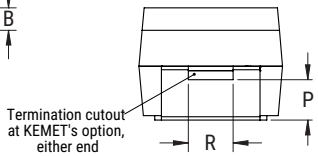
CATHODE (-) END VIEW



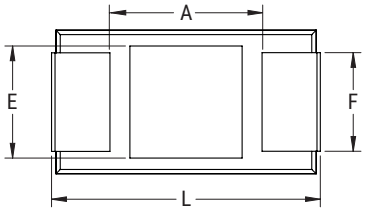
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component												
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216–18	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	1.2 (0.047)	0.80 (0.032) +0.2 (0.008)/−0.3(0.011)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9±0.2 (0.075±0.008)	2.2 (0.087)	0.80 (0.032) +0.1 (0.004)/−0.3(0.011)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	2.2 (0.087)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.9 (0.114)	2.8 (0.110)	2.4 (0.094)
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
E	7360-38	7.3±0.3 (0.287±0.012)	6.0±0.3 (0.236±0.012)	3.6±0.2 (0.142±0.008)	4.1 (0.161)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
V	7343-20	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	1.8 ±0.2 (0.071 ± 0.008)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)

Notes: (Ref) – Dimensions provided for reference only. For low profile cases, no dimensions are provided for B, P or R because these cases do not have a bevel or a notch.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current	Maximum Operating Temp
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Maximum/5 Min	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	(mA) 100 kHz, 25°C	°C
4	4.7	A/3216-18	T491A475(1)004A(2)AUTO	0.5	6	8	97	125
4	10	A/3216-18	T491A106(1)004A(2)AUTO	0.5	6	4.5	129	125
4	33	B/3528-21	T491B336(1)004A(2)AUTO	1.3	6	2.5	184	125
4	47	A/3216-18	T491A476(1)004A(2)AUTO	1.9	10	2.5	173	125
4	47	C/6032-28	T491C476(1)004A(2)AUTO	1.9	6	1.6	262	125
4	68	C/6032-28	T491C686(1)004A(2)AUTO	2.7	6	1.5	271	125
4	100	A/3216-18	T491A107M004A(2)AUTO	4.0	30	4.0	137	125
4	150	A/3216-18	T491A157(1)004A(2)AUTO	6.0	12	2.0	194	125
6.3	2.2	A/3216-18	T491A225(1)006A(2)AUTO	0.5	6	8	97	125
6.3	3.3	A/3216-18	T491A335(1)006A(2)AUTO	0.5	6	7	104	125
6.3	4.7	A/3216-18	T491A475(1)006A(2)AUTO	0.5	6	5.5	117	125
6.3	6.8	A/3216-18	T491A685(1)006A(2)AUTO	0.5	6	6.0	112	125
6.3	6.8	B/3528-21	T491B685(1)006A(2)AUTO	0.5	6	3.5	156	125
6.3	10	A/3216-18	T491A106(1)006A(2)AUTO	0.6	6	4	137	125
6.3	10	B/3528-21	T491B106(1)006A(2)AUTO	0.6	6	3.5	156	125
6.3	15	A/3216-18	T491A156(1)006A(2)AUTO	0.9	6	3.5	146	125
6.3	15	B/3528-21	T491B156(1)006A(2)AUTO	0.9	6	3	168	125
6.3	15	C/6032-28	T491C156(1)006A(2)AUTO	0.9	6	1.8	247	125
6.3	22	A/3216-18	T491A226(1)006A(2)AUTO	1.4	6	4	137	125
6.3	22	B/3528-21	T491B226(1)006A(2)AUTO	1.4	6	2.5	184	125
6.3	22	C/6032-28	T491C226(1)006A(2)AUTO	1.4	6	1.8	247	125
6.3	33	A/3216-18	T491A336(1)006A(2)AUTO	2.1	12	2.5	173	125
6.3	33	B/3528-21	T491B336(1)006A(2)AUTO	2.1	6	2.2	197	125
6.3	33	C/6032-28	T491C336(1)006A(2)AUTO	2.1	6	1.6	262	125
6.3	47	A/3216-18	T491A476(M)006A(2)AUTO	3.0	12	3.5	146	125
6.3	47	B/3528-21	T491B476(1)006A(2)AUTO	3.0	6	2	206	125
6.3	47	C/6032-28	T491C476(1)006A(2)AUTO	3.0	6	1.5	271	125
6.3	47	D/7343-31	T491D476(1)006A(2)AUTO	3.0	6	0.8	433	125
6.3	68	A/3216-18	T491A686(1)006A(2)AUTO	4.3	30	4	137	125
6.3	68	B/3528-21	T491B686(1)006A(2)AUTO	4.3	8	0.9	307	125
6.3	68	C/6032-28	T491C686(1)006A(2)AUTO	4.3	6	1.2	303	125
6.3	68	D/7343-31	T491D686(1)006A(2)AUTO	4.3	6	0.8	433	125
6.3	100	B/3528-21	T491B107(1)006A(2)AUTO	6.3	15	3.0	168	125
6.3	100	C/6032-28	T491C107(1)006A(2)AUTO	6.3	8	0.9	350	125
6.3	100	D/7343-31	T491D107(1)006A(2)AUTO	6.3	8	0.8	433	125
6.3	150	C/6032-28	T491C157(1)006A(2)AUTO	9.5	8	1.2	303	125
6.3	150	D/7343-31	T491D157(1)006A(2)AUTO	9.5	8	0.7	463	125
6.3	220	C/6032-28	T491C227(1)006A(2)AUTO	14	10	1	332	125
6.3	220	D/7343-31	T491D227(1)006A(2)AUTO	14	8	0.7	463	125
6.3	220	X/7343-43	T491X227(1)006A(2)AUTO	14	8	0.7	486	125
6.3	330	D/7343-31	T491D337(1)006A(2)AUTO	20.8	8	0.4	612	125
6.3	330	X/7343-43	T491X337(1)006A(2)AUTO	20.8	8	0.4	642	125
6.3	330	E/7360-38	T491E337(1)006A(2)AUTO	20.8	8	0.5	632	125
6.3	470	X/7343-43	T491X477(1)006A(2)AUTO	29.6	10	0.4	642	125
6.3	470	E/7360-38	T491E477(1)006A(2)AUTO	29.6	10	0.4	707	125
10	1	A/3216-18	T491A105(1)010A(2)AUTO	0.5	4	10	87	125
10	1.5	A/3216-18	T491A155(1)010A(2)AUTO	0.5	6	8	97	125
10	2.2	A/3216-18	T491A225(1)010A(2)AUTO	0.5	6	7	104	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Maximum/5 Min	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	(mA) 100 kHz, 25°C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current	Maximum Operating Temp

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current	Maximum Operating Temp
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Maximum/5 Min	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	(mA) 100 kHz, 25°C	°C
10	2.2	B/3528-21	T491B225(1)010A(2)AUTO	0.5	6	3.5	156	125
10	3.3	A/3216-18	T491A335(1)010A(2)AUTO	0.5	6	5.5	117	125
10	4.7	A/3216-18	T491A475(1)010A(2)AUTO	0.5	6	5.0	122	125
10	4.7	B/3528-21	T491B475(1)010A(2)AUTO	0.5	6	3.5	156	125
10	6.8	A/3216-18	T491A685(1)010A(2)AUTO	0.7	6	4	137	125
10	6.8	B/3528-21	T491B685(1)010A(2)AUTO	0.7	6	3.5	156	125
10	10	A/3216-18	T491A106(1)010A(2)AUTO	1.0	6	3.8	140	125
10	10	B/3528-21	T491B106(1)010A(2)AUTO	1.0	6	3	168	125
10	10	C/6032-28	T491C106(1)010A(2)AUTO	1.0	6	1.8	247	125
10	15	A/3216-18	T491A156(1)010A(2)AUTO	1.5	8	6	112	125
10	15	B/3528-21	T491B156(1)010A(2)AUTO	1.5	6	2.5	184	125
10	15	C/6032-28	T491C156(1)010A(2)AUTO	1.5	6	1.8	247	125
10	22	A/3216-18	T491A226(1)010A(2)AUTO	2.2	8	3.2	153	125
10	22	B/3528-21	T491B226(1)010A(2)AUTO	2.2	6	2.3	192	125
10	22	C/6032-28	T491C226(1)010A(2)AUTO	2.2	6	1.6	262	125
10	33	B/3528-21	T491B336(1)010A(2)AUTO	3.3	6	1.8	217	125
10	33	C/6032-28	T491C336(1)010A(2)AUTO	3.3	6	1.5	271	125
10	33	D/7343-31	T491D336(1)010A(2)AUTO	3.3	6	0.8	433	125
10	47	B/3528-21	T491B476(1)010A(2)AUTO	4.7	8	1	292	125
10	47	C/6032-28	T491C476(1)010A(2)AUTO	4.7	6	1.2	303	125
10	47	D/7343-31	T491D476(1)010A(2)AUTO	4.7	6	0.8	433	125
10	68	B/3528-21	T491B686(1)010A(2)AUTO	6.8	8	1.0	292	125
10	68	C/6032-28	T491C686(1)010A(2)AUTO	6.8	6	1.2	303	125
10	68	D/7343-31	T491D686(1)010A(2)AUTO	6.8	6	0.8	433	125
10	100	B/3528-21	T491B107(1)010A(2)AUTO	10.0	15	1.2	266	125
10	100	C/6032-28	T491C107(1)010A(2)AUTO	10.0	8	1.2	303	125
10	100	D/7343-31	T491D107(1)010A(2)AUTO	10.0	8	0.7	463	125
10	150	C/6032-28	T491C157(1)010A(2)AUTO	15.0	10	0.9	350	125
10	150	D/7343-31	T491D157(1)010A(2)AUTO	15.0	8	0.7	463	125
10	150	X/7343-43	T491X157(1)010A(2)AUTO	15.0	8	0.7	486	125
10	220	D/7343-31	T491D227(1)010A(2)AUTO	22.0	8	0.5	548	125
10	220	X/7343-43	T491X227(1)010A(2)AUTO	22.0	8	0.5	574	125
10	330	D/7343-31	T491D337(1)010A(2)AUTO	33	10	0.5	548	125
10	330	X/7343-43	T491X337(1)010A(2)AUTO	33	10	0.5	574	125
10	330	E/7360-38	T491E337(1)010A(2)AUTO	33	10	0.5	632	125
10	470	X/7343-43	T491X477(1)010A(2)AUTO	47	10	0.2	908	125
16	1	A/3216-18	T491A105(1)016A(2)AUTO	0.5	4	10	87	125
16	1.5	A/3216-18	T491A155(1)016A(2)AUTO	0.5	6	8	97	125
16	2.2	A/3216-18	T491A225(1)016A(2)AUTO	0.5	6	6	112	125
16	3.3	A/3216-18	T491A335(1)016A(2)AUTO	0.5	6	5	122	125
16	3.3	B/3528-21	T491B335(1)016A(2)AUTO	0.5	6	3.5	156	125
16	4.7	A/3216-18	T491A475(1)016A(2)AUTO	0.8	6	4	137	125
16	4.7	B/3528-21	T491B475(1)016A(2)AUTO	0.8	6	3.5	156	125
16	4.7	C/6032-28	T491C475(1)016A(2)AUTO	0.8	6	2.4	214	125
16	6.8	A/3216-18	T491A685(1)016A(2)AUTO	1.1	6	3.5	146	125
16	6.8	B/3528-21	T491B685(1)016A(2)AUTO	1.1	6	2.5	184	125
16	6.8	C/6032-28	T491C685(1)016A(2)AUTO	1.1	6	1.9	241	125
16	10	A/3216-18	T491A106(1)016A(2)AUTO	1.6	8	7	104	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Maximum/5 Min	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	(mA) 100 kHz, 25°C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current	Maximum Operating Temp

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current	Maximum Operating Temp
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Maximum/5 Min	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	(mA) 100 kHz, 25°C	°C
16	10	B/3528-21	T491B106(1)016A(2)AUTO	1.6	6	2.5	184	125
16	10	C/6032-28	T491C106(1)016A(2)AUTO	1.6	6	1.8	247	125
16	15	B/3528-21	T491B156(1)016A(2)AUTO	2.4	6	2	206	125
16	15	C/6032-28	T491C156(1)016A(2)AUTO	2.4	6	1.6	262	125
16	22	B/3528-21	T491B226(1)016A(2)AUTO	3.5	6	2.2	197	125
16	22	C/6032-28	T491C226(1)016A(2)AUTO	3.5	6	1.5	271	125
16	22	D/7343-31	T491D226(1)016A(2)AUTO	3.5	6	0.8	433	125
16	33	B/3528-21	T491B336(1)016A(2)AUTO	5.3	6	2	206	125
16	33	C/6032-28	T491C336(1)016A(2)AUTO	5.3	6	1.2	303	125
16	33	D/7343-31	T491D336(1)016A(2)AUTO	5.3	6	0.8	433	125
16	47	C/6032-28	T491C476(1)016A(2)AUTO	7.5	6	1.2	303	125
16	47	D/7343-31	T491D476(1)016A(2)AUTO	7.5	6	0.8	433	125
16	68	C/6032-28	T491C686(1)016A(2)AUTO	11	6	1	332	125
16	68	D/7343-31	T491D686(1)016A(2)AUTO	11	6	0.7	463	125
16	100	C/6032-28	T491C107(1)016A(2)AUTO	16.0	10	1.0	332	125
16	100	D/7343-31	T491D107(1)016A(2)AUTO	16.0	8	0.7	463	125
16	100	X/7343-43	T491X107(1)016A(2)AUTO	16.0	8	0.7	486	125
16	150	X/7343-43	T491X157(1)016A(2)AUTO	24.0	8	0.5	574	125
20	0.68	A/3216-18	T491A684(1)020A(2)AUTO	0.5	4	12	79	125
20	1	A/3216-18	T491A105(1)020A(2)AUTO	0.5	4	9	91	125
20	1.5	A/3216-18	T491A155(1)020A(2)AUTO	0.5	6	6.5	107	125
20	2.2	A/3216-18	T491A225(1)020A(2)AUTO	0.5	6	6	112	125
20	2.2	B/3528-21	T491B225(1)020A(2)AUTO	0.5	6	3.5	156	125
20	3.3	A/3216-18	T491A335(1)020A(2)AUTO	0.7	6	4	137	125
20	3.3	B/3528-21	T491B335(1)020A(2)AUTO	0.7	6	3	168	125
20	4.7	A/3216-18	T491A475(1)020A(2)AUTO	0.9	6	4	137	125
20	4.7	B/3528-21	T491B475(1)020A(2)AUTO	0.9	6	3	168	125
20	4.7	C/6032-28	T491C475(1)020A(2)AUTO	0.9	6	2.4	214	125
20	6.8	A/3216-18	T491A685(1)020A(2)AUTO	1.4	8	6	112	125
20	6.8	B/3528-21	T491B685(1)020A(2)AUTO	1.4	6	2.5	184	125
20	6.8	C/6032-28	T491C685(1)020A(2)AUTO	1.4	6	1.9	241	125
20	10	B/3528-21	T491B106(1)020A(2)AUTO	2.0	6	2	206	125
20	10	C/6032-28	T491C106(1)020A(2)AUTO	2.0	6	1.6	262	125
20	15	C/6032-28	T491C156(1)020A(2)AUTO	3.0	6	1.7	254	125
20	15	D/7343-31	T491D156(1)020A(2)AUTO	3.0	6	1	387	125
20	22	D/7343-31	T491D226(1)020A(2)AUTO	4.4	6	0.8	433	125
20	33	C/6032-28	T491C336(1)020A(2)AUTO	6.6	6	1.2	303	125
20	33	D/7343-31	T491D336(1)020A(2)AUTO	6.6	6	0.8	433	125
20	47	C/6032-28	T491C476(1)020A(2)AUTO	9.4	6	0.9	350	125
20	47	D/7343-31	T491D476(1)020A(2)AUTO	9.4	6	0.7	463	125
20	47	X/7343-43	T491X476(1)020A(2)AUTO	9.4	6	0.8	454	125
20	68	X/7343-43	T491X686(1)020A(2)AUTO	13.6	6	0.7	486	125
20	100	E/7360-38	T491E107(1)020A(2)AUTO	20.0	8	0.5	632	125
25	0.33	A/3216-18	T491A334(1)025A(2)AUTO	0.5	4	15	71	125
25	0.47	A/3216-18	T491A474(1)025A(2)AUTO	0.5	4	13	76	125
25	0.68	A/3216-18	T491A684(1)025A(2)AUTO	0.5	4	10	87	125
25	1	A/3216-18	T491A105(1)025A(2)AUTO	0.5	4	8	97	125
25	1	B/3528-21	T491B105(1)025A(2)AUTO	0.5	4	5	130	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Maximum/5 Min	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	(mA) 100 kHz, 25°C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current	Maximum Operating Temp

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current	Maximum Operating Temp
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Maximum/5 Min	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	(mA) 100 kHz, 25°C	°C
25	1.5	A/3216-18	T491A155(1)025A(2)AUTO	0.5	6	7	104	125
25	1.5	B/3528-21	T491B155(1)025A(2)AUTO	0.5	6	5	130	125
25	2.2	A/3216-18	T491A225(1)025A(2)AUTO	0.6	6	7	104	125
25	2.2	B/3528-21	T491B225(1)025A(2)AUTO	0.6	6	4.5	137	125
25	2.2	C/6032-28	T491C225(1)025A(2)AUTO	0.6	6	3.5	177	125
25	3.3	A/3216-18	T491A335(1)025A(2)AUTO	0.8	6	7	104	125
25	3.3	B/3528-21	T491B335(1)025A(2)AUTO	0.8	6	3.5	156	125
25	3.3	C/6032-28	T491C335(1)025A(2)AUTO	0.8	6	2.5	210	125
25	4.7	C/6032-28	T491C475(1)025A(2)AUTO	1.2	6	2.3	219	125
25	6.8	B/3528-21	T491B685(1)025A(2)AUTO	1.7	6	2.8	174	125
25	6.8	C/6032-28	T491C685(1)025A(2)AUTO	1.7	6	1.9	241	125
25	6.8	D/7343-31	T491D685(1)025A(2)AUTO	1.7	6	1.2	354	125
25	10	C/6032-28	T491C106(1)025A(2)AUTO	2.5	6	1.5	271	125
25	10	D/7343-31	T491D106(1)025A(2)AUTO	2.5	6	1	387	125
25	15	C/6032-28	T491C156(1)025A(2)AUTO	3.8	6	1.5	271	125
25	15	D/7343-31	T491D156(1)025A(2)AUTO	3.8	6	1	387	125
25	22	C/6032-28	T491C226(1)025A(2)AUTO	5.5	6	1	332	125
25	22	D/7343-31	T491D226(1)025A(2)AUTO	5.5	6	0.8	433	125
25	33	C/6032-28	T491C336(1)025A(2)AUTO	8.3	6	0.9	350	125
25	33	D/7343-31	T491D336(1)025A(2)AUTO	8.3	6	0.7	463	125
25	33	X/7343-43	T491X336(1)025A(2)AUTO	8.3	6	0.7	486	125
25	47	D/7343-31	T491D476(1)025A(2)AUTO	11.8	6	0.7	463	125
25	47	X/7343-43	T491X476(1)025A(2)AUTO	11.8	6	0.7	486	125
25	68	X/7343-43	T491X686(1)025A(2)AUTO	17.0	6	0.7	486	125
35	0.1	A/3216-18	T491A104(1)035A(2)AUTO	0.5	4	20	61	125
35	0.15	A/3216-18	T491A154(1)035A(2)AUTO	0.5	4	19	63	125
35	0.22	A/3216-18	T491A224(1)035A(2)AUTO	0.5	4	18	65	125
35	0.33	A/3216-18	T491A334(1)035A(2)AUTO	0.5	4	15	71	125
35	0.47	A/3216-18	T491A474(1)035A(2)AUTO	0.5	4	11	83	125
35	0.47	B/3528-21	T491B474(1)035A(2)AUTO	0.5	4	8	103	125
35	0.68	A/3216-18	T491A684(1)035A(2)AUTO	0.5	4	8	97	125
35	0.68	B/3528-21	T491B684(1)035A(2)AUTO	0.5	4	6.5	114	125
35	1	A/3216-18	T491A105(1)035A(2)AUTO	0.5	4	7	104	125
35	1	B/3528-21	T491B105(1)035A(2)AUTO	0.5	4	5	130	125
35	1.5	B/3528-21	T491B155(1)035A(2)AUTO	0.5	6	5	130	125
35	1.5	C/6032-28	T491C155(1)035A(2)AUTO	0.5	6	4.5	156	125
35	2.2	A/3216-18	T491A225(1)035A(2)AUTO	0.8	6	4.0	137	125
35	2.2	B/3528-21	T491B225(1)035A(2)AUTO	0.8	6	4.0	146	125
35	2.2	C/6032-28	T491C225(1)035A(2)AUTO	0.8	6	3.2	185	125
35	3.3	B/3528-21	T491B335(1)035A(2)AUTO	1.2	6	3.5	156	125
35	3.3	C/6032-28	T491C335(1)035A(2)AUTO	1.2	6	2.4	214	125
35	4.7	B/3528-21	T491B475(1)035A(2)AUTO	1.6	6	3	168	125
35	4.7	C/6032-28	T491C475(1)035A(2)AUTO	1.6	6	2	235	125
35	4.7	D/7343-31	T491D475(1)035A(2)AUTO	1.6	6	1.5	316	125
35	6.8	D/7343-31	T491D685(1)035A(2)AUTO	2.4	6	1.2	354	125
35	6.8	V/7343-20	T491V685(1)035A(2)AUTO	2.4	6	1.2	104	125
35	10	C/6032-28	T491C106(1)035A(2)AUTO	3.5	6	1.6	262	125
35	10	D/7343-31	T491D106(1)035A(2)AUTO	3.5	6	1	387	125
35	10	V/7343-20	T491V106(1)035A(2)AUTO	3.5	6	1	354	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Maximum/5 Min	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	(mA) 100 kHz, 25°C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current	Maximum Operating Temp

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

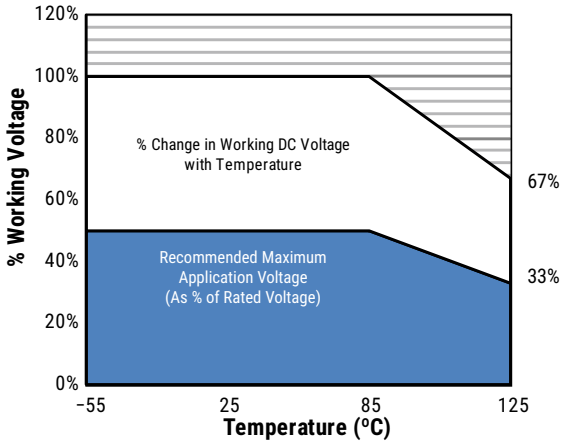
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current	Maximum Operating Temp
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Maximum/5 Min	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	(mA) 100 kHz, 25°C	°C
35	15	D/7343-31	T491D156(1)035A(2)AUTO	5.3	6	0.8	433	125
35	15	X/7343-43	T491X156(1)035A(2)AUTO	5.3	6	0.9	428	125
35	22	D/7343-31	T491D226(1)035A(2)AUTO	7.7	6	0.7	463	125
35	22	X/7343-43	T491X226(1)035A(2)AUTO	7.7	6	0.7	486	125
35	33	D/7343-31	T491D336(1)035A(2)AUTO	11.6	6	0.6	500	125
35	33	X/7343-43	T491X336(1)035A(2)AUTO	11.6	6	0.6	524	125
35	47	X/7343-43	T491X476(1)035A(2)AUTO	16.5	6	0.6	524	125
35	47	E/7360-38	T491E476(1)035A(2)AUTO	16.5	10	0.5	632	125
50	0.1	A/3216-18	T491A104(1)050A(2)AUTO	0.5	4	20	61	125
50	0.15	A/3216-18	T491A154(1)050A(2)AUTO	0.5	4	15	71	125
50	0.15	B/3528-21	T491B154(1)050A(2)AUTO	0.5	4	16	73	125
50	0.22	A/3216-18	T491A224(1)050A(2)AUTO	0.5	4	18	65	125
50	0.22	B/3528-21	T491B224(1)050A(2)AUTO	0.5	4	14	78	125
50	0.33	B/3528-21	T491B334(1)050A(2)AUTO	0.5	4	10	92	125
50	0.47	B/3528-21	T491B474(1)050A(2)AUTO	0.5	4	9	97	125
50	0.47	C/6032-28	T491C474(1)050A(2)AUTO	0.5	4	7.2	124	125
50	0.68	B/3528-21	T491B684(1)050A(2)AUTO	0.5	4	8	103	125
50	0.68	C/6032-28	T491C684(1)050A(2)AUTO	0.5	4	6.4	131	125
50	1	C/6032-28	T491C105(1)050A(2)AUTO	0.5	4	4.8	151	125
50	1.5	C/6032-28	T491C155(1)050A(2)AUTO	0.8	6	4.4	158	125
50	1.5	D/7343-31	T491D155(1)050A(2)AUTO	0.8	6	3.5	207	125
50	2.2	D/7343-31	T491D225(1)050A(2)AUTO	1.1	6	2.5	245	125
50	3.3	D/7343-31	T491D335(1)050A(2)AUTO	1.7	6	1.6	306	125
50	4.7	D/7343-31	T491D475(1)050A(2)AUTO	2.4	6	1.2	354	125
50	6.8	D/7343-31	T491D685(1)050A(2)AUTO	3.4	6	0.8	433	125
50	6.8	X/7343-43	T491X685(1)050A(2)AUTO	3.4	6	0.8	454	125
50	10	X/7343-43	T491X106(1)050A(2)AUTO	5.0	6	0.7	486	125
50	22	X/7343-43	T491X226(1)050A(2)AUTO	11.0	10	0.6	524	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA +25°C Maximum/5 Min	% at +25°C 120 Hz Maximum	Ω at 25°C 100 kHz Maximum	(mA) 100 kHz, 25°C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Ripple Current	Maximum Operating Temp

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	67% of V_R
Recommended maximum application voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

KEMET Series and Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Using the Pmax of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
Pmax = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

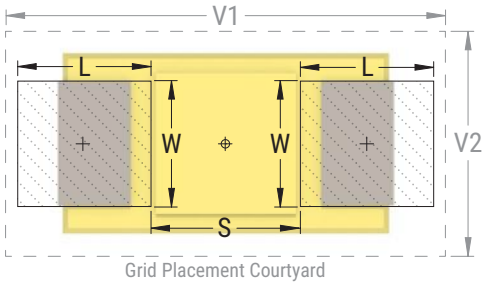
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
E[1]	7360–38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
S[2]	3216–12	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
T	3528–12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
U	6032–15	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
V	7343–21	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

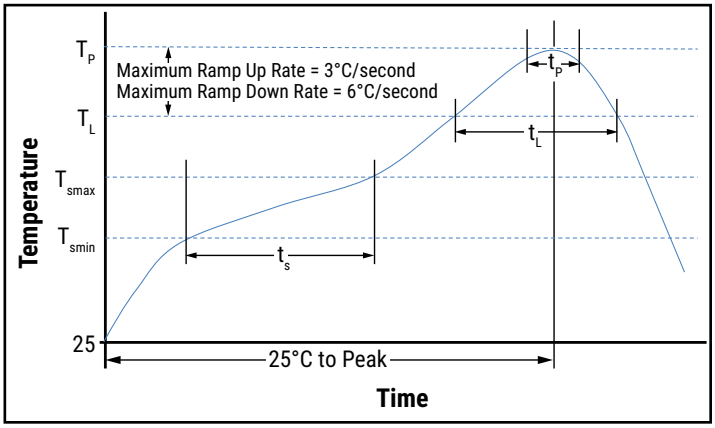
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

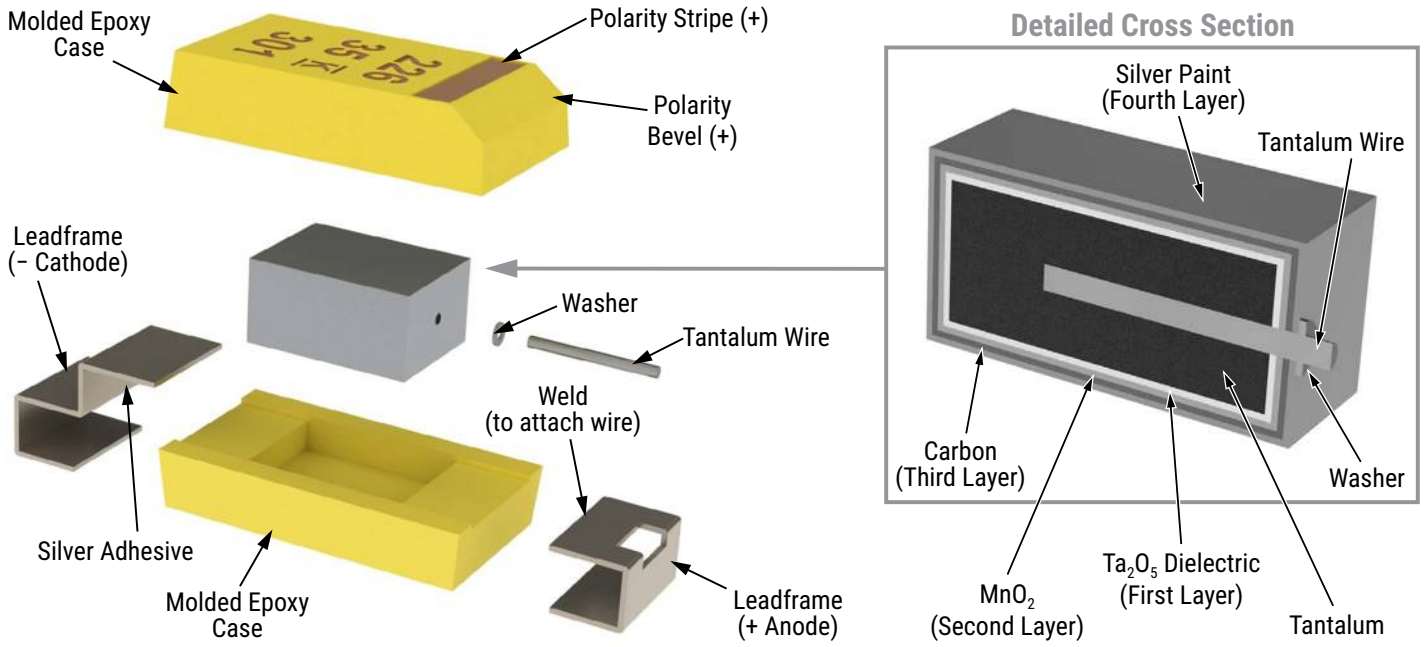
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



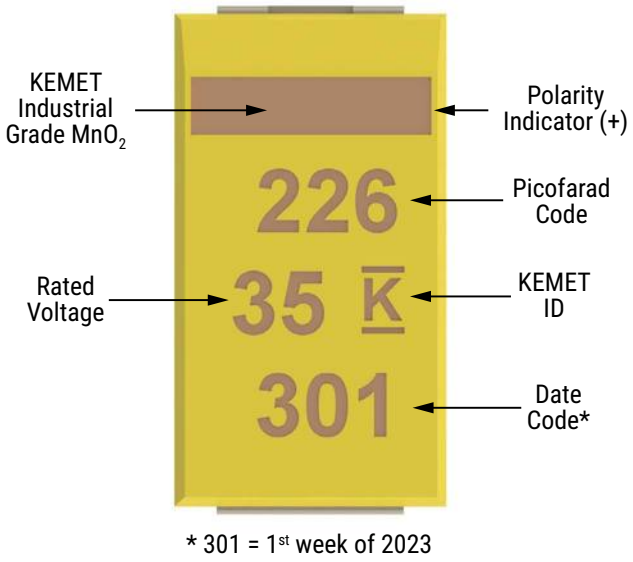
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = last number of year	8 = 2018 9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

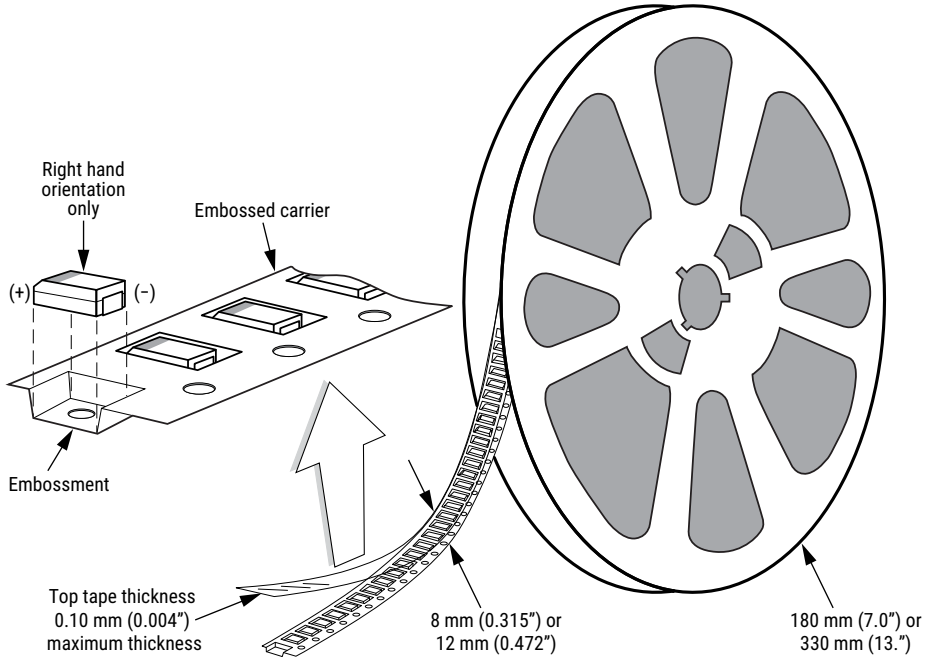


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

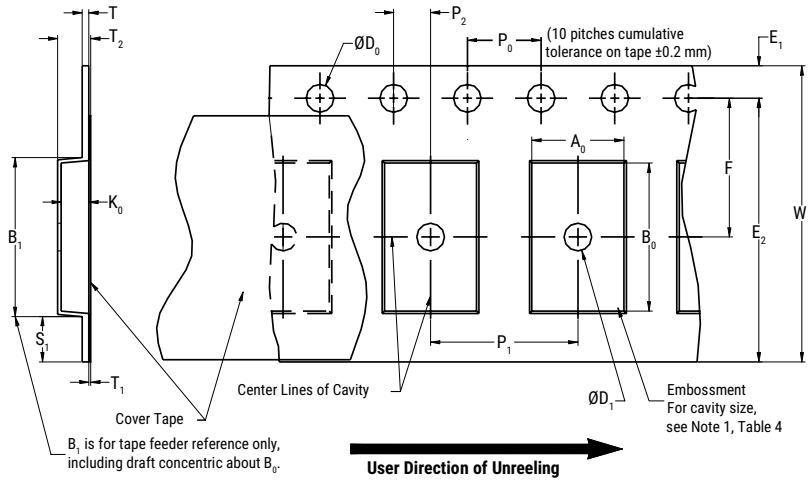


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

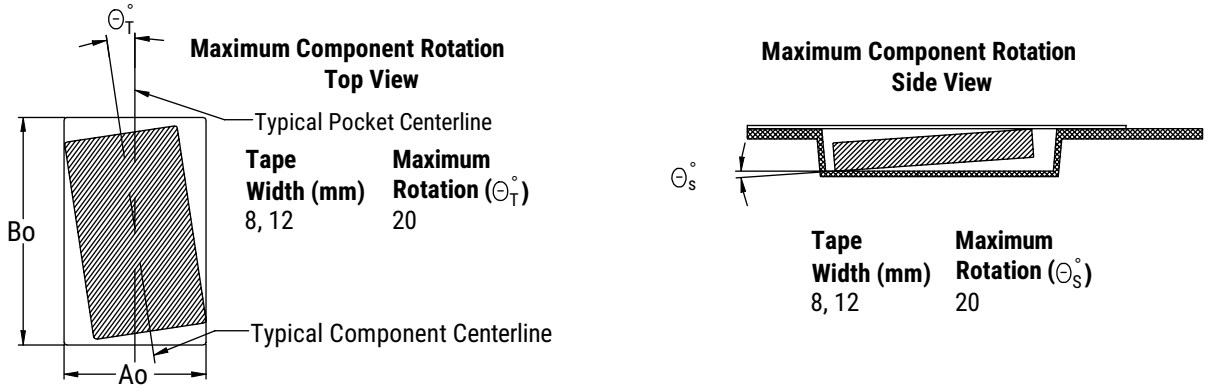


Figure 3 – Maximum Lateral Movement

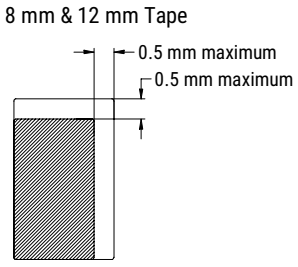


Figure 4 – Bending Radius

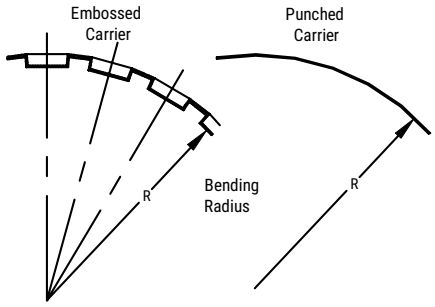
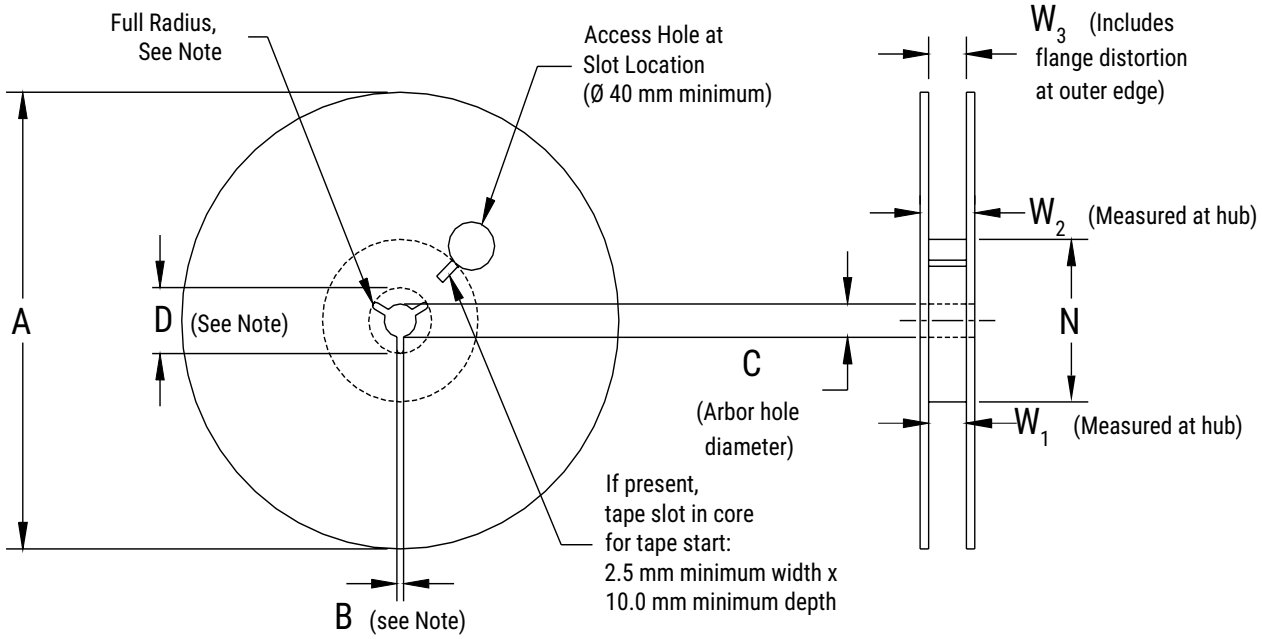


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

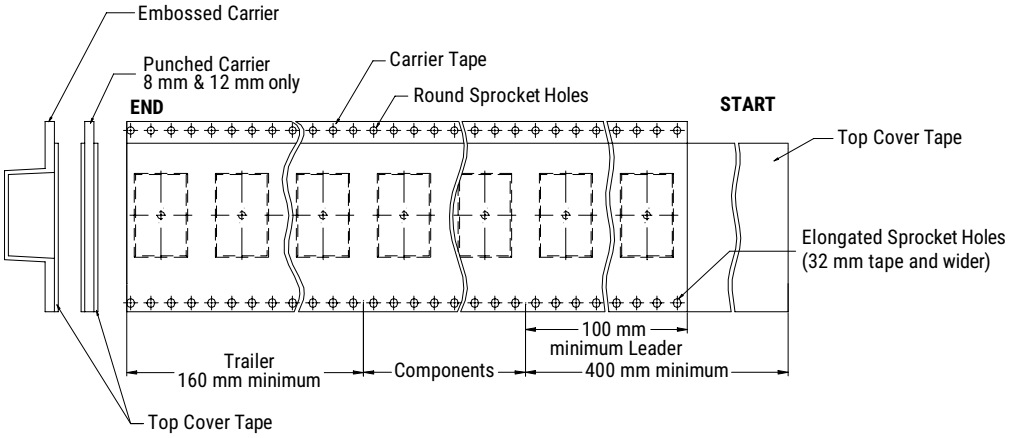
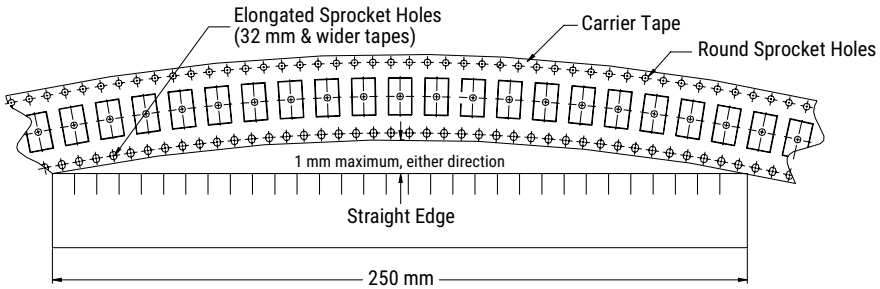


Figure 7 – Maximum Camber



T494 Automotive/Industrial Grade Low ESR MnO_2

Overview

The KEMET T494 is a lower ESR version of the popular T491, designed specifically for today's highly automated surface mount processes and equipment. The T494 combines KEMET's proven solid tantalum technology, acclaimed and respected throughout the world, with the latest in materials, processes and automation, resulting in unsurpassed total performance and value. This product meets or exceeds the requirements of EIA standard 535BAAC. The T494 is classified as MSL (Moisture Sensitivity Level) 1 under J STD 020: unlimited floorlife time at ≤ 30°C/85% RH. The T494 standard terminations are available in 100% matte tin and provide excellent wetting characteristics and compatibility with today's surface mount solder systems. Tin/lead (Sn/Pb) terminations are available upon request for any part number. Gold-plated terminations are also available for use with conductive epoxy attachment processes. Standard packaging of these devices is tape-and-reel in accordance with EIA 481. This system provides perfect compatibility with all tape-fed placement units.

Benefits

- Meets or exceeds EIA standard 535BAAC
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Optional gold-plated terminations
- Laser-marked case
- 100% surge current test
- Extended range values
- Low profile case sizes

Applications

Typical applications include decoupling and filtering in industrial and automotive end applications, such as DC/DC converters, portable electronics, telecommunications, and control units.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder, Gold-plated or Non-magnetic 100% Sn solder.

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	494	T	336	M	004	A	T	AUTO	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	C-Spec 1	Packaging (C-Spec)
T = Tantalum	Industrial – Low ESR	A B C D E S T U V X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	2R5 = 2.5 003 = 3 004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte tin (Sn)-plated H = Standard solder coated (SnPb 5% Pb minimum) G = Gold-plated (A, B, C, D, X only) N = Non-magnetic 100% tin (Sn) M = Non-magnetic (SnPb)	AUTO = Automotive Grade AUTO = AEC–Q200 Certification	Blank = 7" reel 7280 = 13" reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	–55°C to 125°C
Rated Capacitance Range	0.1 – 470 µF at 120 Hz/25°C
Capacitance Tolerance	K tolerance (10%), M tolerance (20%)
Rated Voltage Range	6.3 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55°C to 125° C, 1000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C.			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage).		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

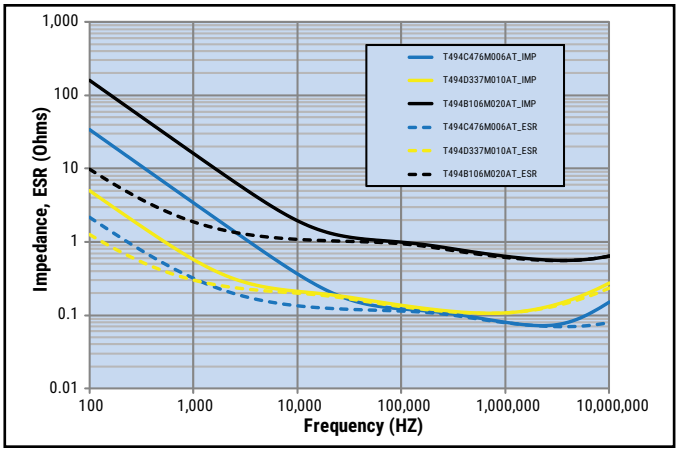
**IL = Initial limit*

Certification

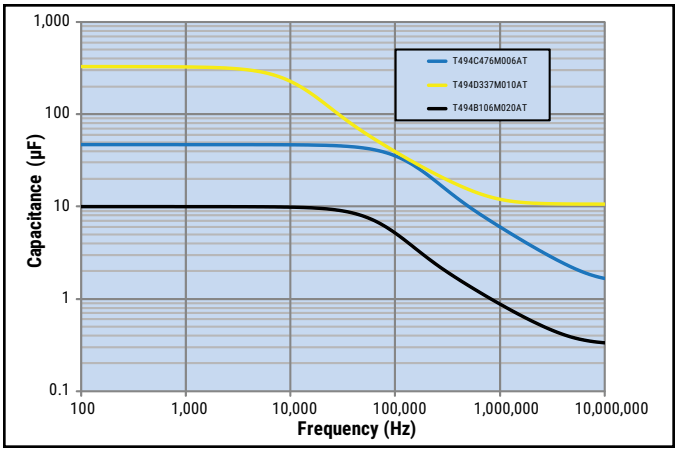
KEMET's Internal Qualification Plan for this Tantalum series of capacitors follows AEC–Q200 guidelines. Standard catalog part types ordered without a specific automotive designator, i.e., suffix AUTO or four digit customer specific designator (C-Spec), are not considered KEMET automotive grade tantalum capacitors.

Electrical Characteristics

ESR vs. Frequency



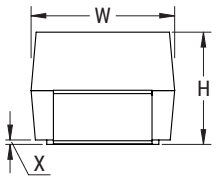
Capacitance vs. Frequency



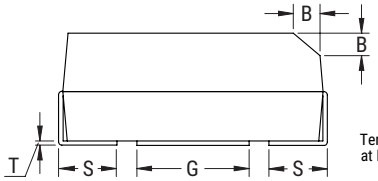
Dimensions – Millimeters (Inches)

Metric will govern

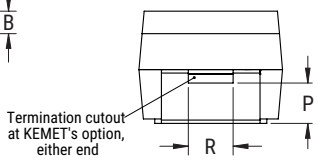
CATHODE (-) END VIEW



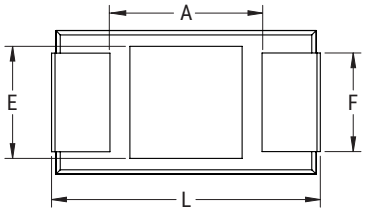
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component												
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216–18	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	1.2 (0.047)	0.80 (0.032) +0.2 (0.008)/−0.3(0.011)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9±0.2 (0.075±0.008)	2.2 (0.087)	0.80 (0.032) +0.1 (0.004)/−0.3(0.011)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	2.2 (0.087)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.9 (0.114)	2.8 (0.110)	2.4 (0.094)
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
E	7360-38	7.3±0.3 (0.287±0.012)	6.0±0.3 (0.236±0.012)	3.6±0.2 (0.142±0.008)	4.1 (0.161)	1.30 (0.051) ±0.3 (0.011)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)
V	7343-20	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	1.8 ±0.2 (0.071 ± 0.008)	2.4 (0.094)	1.30 (0.051) ±0.3 (0.011)	N/A	0.05 (0.002)	N/A	N/A	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)

Notes: (Ref) – Dimensions provided for reference only. For low profile cases, no dimensions are provided for B, P or R because these cases do not have a bevel or a notch.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	°C	Reflow Temp ≤ 260°C
6.3	2.2	A/3216-18	T494A225(1)006A(2)AUTO	0.5	6	6	112	125	1
6.3	3.3	A/3216-18	T494A335(1)006A(2)AUTO	0.5	6	6	112	125	1
6.3	4.7	A/3216-18	T494A475(1)006A(2)AUTO	0.5	6	3.5	146	125	1
6.3	6.8	A/3216-18	T494A685(1)006A(2)AUTO	0.5	6	2	194	125	1
6.3	6.8	B/3528-21	T494B685(1)006A(2)AUTO	0.5	6	1.2	266	125	1
6.3	10	A/3216-18	T494A106(1)006A(2)AUTO	0.6	6	2	194	125	1
6.3	10	B/3528-21	T494B106(1)006A(2)AUTO	0.6	6	1	292	125	1
6.3	15	A/3216-18	T494A156(1)006A(2)AUTO	0.9	6	2	194	125	1
6.3	15	B/3528-21	T494B156(1)006A(2)AUTO	0.9	6	0.7	348	125	1
6.3	15	C/6032-28	T494C156(1)006A(2)AUTO	0.9	6	0.6	428	125	1
6.3	22	A/3216-18	T494A226(1)006A(2)AUTO	1.4	6	3	158	125	1
6.3	22	B/3528-21	T494B226(1)006A(2)AUTO	1.4	6	0.6	376	125	1
6.3	22	C/6032-28	T494C226(1)006A(2)AUTO	1.4	6	0.5	469	125	1
6.3	33	A/3216-18	T494A336(1)006A(2)AUTO	2.1	12	2	194	125	1
6.3	33	B/3528-21	T494B336(1)006A(2)AUTO	2.1	6	0.6	376	125	1
6.3	33	C/6032-28	T494C336(1)006A(2)AUTO	2.1	6	0.3	606	125	1
6.3	47	B/3528-21	T494B476(1)006A(2)AUTO	3.0	6	0.5	412	125	1
6.3	47	C/6032-28	T494C476(1)006A(2)AUTO	3.0	6	0.25	663	125	1
6.3	47	D/7343-31	T494D476(1)006A(2)AUTO	3.0	6	0.22	826	125	1
6.3	68	A/3216-18	T494A686(1)006A(2)AUTO	4.3	30	3	158	125	1
6.3	68	B/3528-21	T494B686(1)006A(2)AUTO	4.3	8	0.65	362	125	1
6.3	68	C/6032-28	T494C686(1)006A(2)AUTO	4.3	6	0.2	742	125	1
6.3	68	D/7343-31	T494D686(1)006A(2)AUTO	4.3	6	0.2	866	125	1
6.3	100	C/6032-28	T494C107(1)006A(2)AUTO	6.3	8	0.3	606	125	1
6.3	100	D/7343-31	T494D107(1)006A(2)AUTO	6.3	8	0.15	1,000	125	1
6.3	150	C/6032-28	T494C157(1)006A(2)AUTO	9.5	8	0.3	606	125	1
6.3	150	D/7343-31	T494D157(1)006A(2)AUTO	9.5	8	0.15	1,000	125	1
6.3	220	D/7343-31	T494D227(1)006A(2)AUTO	13.9	8	0.15	1,000	125	1
6.3	220	X/7343-43	T494X227(1)006A(2)AUTO	13.9	8	0.15	1,049	125	1
6.3	330	D/7343-31	T494D337(1)006A(2)AUTO	20.8	8	0.15	1,000	125	1
6.3	330	X/7343-43	T494X337(1)006A(2)AUTO	20.8	8	0.15	1,049	125	1
6.3	330	E/7360-38	T494E337(1)006A(2)AUTO	20.8	8	0.25	894	125	1
6.3	470	X/7343-43	T494X477(1)006A(2)AUTO	29.6	10	0.1	1,285	125	1
6.3	470	E/7360-38	T494E477(1)006A(2)AUTO	29.6	10	0.2	1,000	125	1
10	1.5	A/3216-18	T494A155(1)010A(2)AUTO	0.5	6	6	112	125	1
10	2.2	A/3216-18	T494A225(1)010A(2)AUTO	0.5	6	6	112	125	1
10	2.2	B/3528-21	T494B225(1)010A(2)AUTO	0.5	6	1.5	238	125	1
10	3.3	A/3216-18	T494A335(1)010A(2)AUTO	0.5	6	4	137	125	1
10	4.7	A/3216-18	T494A475(1)010A(2)AUTO	0.5	6	3	158	125	1
10	4.7	B/3528-21	T494B475(1)010A(2)AUTO	0.5	6	1.5	238	125	1
10	6.8	A/3216-18	T494A685(1)010A(2)AUTO	0.7	6	3	158	125	1
10	6.8	B/3528-21	T494B685(1)010A(2)AUTO	0.7	6	1.2	266	125	1
10	10	A/3216-18	T494A106(1)010A(2)AUTO	1.0	6	1.8	204	125	1
10	10	B/3528-21	T494B106(1)010A(2)AUTO	1.0	6	0.8	326	125	1
10	10	C/6032-28	T494C106(1)010A(2)AUTO	1.0	6	0.6	428	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 20°C Max/5 Min	% at 20°C 120 Hz Max	Ω at 20°C 100 kHz Max	mA at 25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	15	A/3216-18	T494A156(1)010A(2)AUTO	1.5	8	4	137	125	1
10	15	B/3528-21	T494B156(1)010A(2)AUTO	1.5	6	0.7	348	125	1
10	15	C/6032-28	T494C156(1)010A(2)AUTO	1.5	6	0.5	469	125	1
10	22	A/3216-18	T494A226(1)010A(2)AUTO	2.2	8	4	137	125	1
10	22	B/3528-21	T494B226(1)010A(2)AUTO	2.2	6	0.7	348	125	1
10	22	C/6032-28	T494C226(1)010A(2)AUTO	2.2	6	0.4	524	125	1
10	33	B/3528-21	T494B336(1)010A(2)AUTO	3.3	6	1.4	246	125	1
10	33	C/6032-28	T494C336(1)010A(2)AUTO	3.3	6	0.3	606	125	1
10	33	D/7343-31	T494D336(1)010A(2)AUTO	3.3	6	0.25	775	125	1
10	47	B/3528-21	T494B476(1)010A(2)AUTO	4.7	8	0.65	362	125	1
10	47	C/6032-28	T494C476(1)010A(2)AUTO	4.7	6	0.3	606	125	1
10	47	D/7343-31	T494D476(1)010A(2)AUTO	4.7	6	0.22	826	125	1
10	68	C/6032-28	T494C686(1)010A(2)AUTO	6.8	6	0.3	606	125	1
10	68	D/7343-31	T494D686(1)010A(2)AUTO	6.8	6	0.2	866	125	1
10	100	C/6032-28	T494C107(1)010A(2)AUTO	10.0	8	0.2	742	125	1
10	100	D/7343-31	T494D107(1)010A(2)AUTO	10.0	8	0.15	1,000	125	1
10	150	D/7343-31	T494D157(1)010A(2)AUTO	15.0	8	0.15	1,000	125	1
10	150	X/7343-43	T494X157(1)010A(2)AUTO	15.0	8	0.15	1,049	125	1
10	220	D/7343-31	T494D227(1)010A(2)AUTO	22.0	8	0.15	1,000	125	1
10	220	X/7343-43	T494X227(1)010A(2)AUTO	22.0	8	0.15	1,049	125	1
10	330	X/7343-43	T494X337(1)010A(2)AUTO	33.0	10	0.1	1,285	125	1
10	330	E/7360-38	T494E337(1)010A(2)AUTO	33.0	10	0.25	894	125	1
16	1	A/3216-18	T494A105(1)016A(2)AUTO	0.5	4	6	112	125	1
16	1.5	A/3216-18	T494A155(1)016A(2)AUTO	0.5	6	6	112	125	1
16	2.2	A/3216-18	T494A225(1)016A(2)AUTO	0.5	6	4	137	125	1
16	3.3	A/3216-18	T494A335(1)016A(2)AUTO	0.5	6	4	137	125	1
16	3.3	B/3528-21	T494B335(1)016A(2)AUTO	0.5	6	2	206	125	1
16	4.7	A/3216-18	T494A475(1)016A(2)AUTO	0.8	6	3	158	125	1
16	4.7	B/3528-21	T494B475(1)016A(2)AUTO	0.8	6	1.5	238	125	1
16	4.7	C/6032-28	T494C475(1)016A(2)AUTO	0.8	6	1	332	125	1
16	6.8	A/3216-18	T494A685(1)016A(2)AUTO	1.1	6	3	158	125	1
16	6.8	B/3528-21	T494B685(1)016A(2)AUTO	1.1	6	1.2	266	125	1
16	6.8	C/6032-28	T494C685(1)016A(2)AUTO	1.1	6	0.8	371	125	1
16	10	A/3216-18	T494A106(1)016A(2)AUTO	1.6	8	3	158	125	1
16	10	B/3528-21	T494B106(1)016A(2)AUTO	1.6	6	0.8	326	125	1
16	10	C/6032-28	T494C106(1)016A(2)AUTO	1.6	6	0.6	428	125	1
16	15	C/6032-28	T494C156(1)016A(2)AUTO	2.4	6	0.4	524	125	1
16	22	B/3528-21	T494B226(1)016A(2)AUTO	3.5	6	1	292	125	1
16	22	C/6032-28	T494C226(1)016A(2)AUTO	3.5	6	0.35	561	125	1
16	22	D/7343-31	T494D226(1)016A(2)AUTO	3.5	6	0.25	775	125	1
16	33	D/7343-31	T494D336(1)016A(2)AUTO	5.3	6	0.25	775	125	1
16	47	C/6032-28	T494C476(1)016A(2)AUTO	7.5	6	0.5	469	125	1
16	47	D/7343-31	T494D476(1)016A(2)AUTO	7.5	6	0.2	866	125	1
16	68	D/7343-31	T494D686(1)016A(2)AUTO	10.9	6	0.15	1,000	125	1
16	100	D/7343-31	T494D107(1)016A(2)AUTO	16.0	8	0.15	1,000	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 20°C Max/5 Min	% at 20°C 120 Hz Max	Ω at 20°C 100 kHz Max	mA at 25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	°C	Reflow Temp ≤ 260°C
16	100	X/7343-43	T494X107(1)016A(2)AUTO	16.0	8	0.15	1,049	125	1
16	150	X/7343-43	T494X157(1)016A(2)AUTO	24.0	8	0.15	1,049	125	1
20	0.68	A/3216-18	T494A684(1)020A(2)AUTO	0.5	4	8	97	125	1
20	1	A/3216-18	T494A105(1)020A(2)AUTO	0.5	4	5.5	117	125	1
20	1.5	A/3216-18	T494A155(1)020A(2)AUTO	0.5	6	4.5	129	125	1
20	2.2	A/3216-18	T494A225(1)020A(2)AUTO	0.5	6	4	137	125	1
20	2.2	B/3528-21	T494B225(1)020A(2)AUTO	0.5	6	1.5	238	125	1
20	3.3	A/3216-18	T494A335(1)020A(2)AUTO	0.7	6	4	137	125	1
20	3.3	B/3528-21	T494B335(1)020A(2)AUTO	0.7	6	1.3	256	125	1
20	4.7	A/3216-18	T494A475(1)020A(2)AUTO	0.9	6	3	158	125	1
20	4.7	B/3528-21	T494B475(1)020A(2)AUTO	0.9	6	1	292	125	1
20	4.7	C/6032-28	T494C475(1)020A(2)AUTO	0.9	6	0.6	428	125	1
20	6.8	A/3216-18	T494A685(1)020A(2)AUTO	1.4	8	3	158	125	1
20	6.8	B/3528-21	T494B685(1)020A(2)AUTO	1.4	6	1	292	125	1
20	6.8	C/6032-28	T494C685(1)020A(2)AUTO	1.4	6	0.6	428	125	1
20	10	C/6032-28	T494C106(1)020A(2)AUTO	2.0	6	0.5	469	125	1
20	15	C/6032-28	T494C156(1)020A(2)AUTO	3.0	6	0.4	524	125	1
20	15	D/7343-31	T494D156(1)020A(2)AUTO	3.0	6	0.35	655	125	1
20	22	D/7343-31	T494D226(1)020A(2)AUTO	4.4	6	0.3	707	125	1
20	33	D/7343-31	T494D336(1)020A(2)AUTO	6.6	6	0.25	775	125	1
20	47	D/7343-31	T494D476(1)020A(2)AUTO	9.4	6	0.275	739	125	1
20	47	X/7343-43	T494X476(1)020A(2)AUTO	9.4	6	0.175	971	125	1
20	68	X/7343-43	T494X686(1)020A(2)AUTO	13.6	6	0.2	908	125	1
20	100	E/7360-38	T494E107(1)020A(2)AUTO	20.0	8	0.3	816	125	1
25	0.33	A/3216-18	T494A334(1)025A(2)AUTO	0.5	4	10	87	125	1
25	0.47	A/3216-18	T494A474(1)025A(2)AUTO	0.5	4	9	91	125	1
25	0.68	A/3216-18	T494A684(1)025A(2)AUTO	0.5	4	6	112	125	1
25	1	A/3216-18	T494A105(1)025A(2)AUTO	0.5	4	4	137	125	1
25	1	B/3528-21	T494B105(1)025A(2)AUTO	0.5	4	2	206	125	1
25	1.5	A/3216-18	T494A155(1)025A(2)AUTO	0.5	6	3	158	125	1
25	1.5	B/3528-21	T494B155(1)025A(2)AUTO	0.5	6	1.5	238	125	1
25	2.2	A/3216-18	T494A225(1)025A(2)AUTO	0.6	6	3	158	125	1
25	2.2	B/3528-21	T494B225(1)025A(2)AUTO	0.6	6	1.2	266	125	1
25	2.2	C/6032-28	T494C225(1)025A(2)AUTO	0.6	6	2.2	224	125	1
25	3.3	A/3216-18	T494A335(1)025A(2)AUTO	0.8	6	3	158	125	1
25	3.3	B/3528-21	T494B335(1)025A(2)AUTO	0.8	6	2	206	125	1
25	3.3	C/6032-28	T494C335(1)025A(2)AUTO	0.8	6	1.2	303	125	1
25	4.7	C/6032-28	T494C475(1)025A(2)AUTO	1.2	6	0.6	428	125	1
25	6.8	B/3528-21	T494B685(1)025A(2)AUTO	1.7	8	2	206	125	1
25	6.8	C/6032-28	T494C685(1)025A(2)AUTO	1.7	6	0.6	428	125	1
25	6.8	D/7343-31	T494D685(1)025A(2)AUTO	1.7	6	0.45	577	125	1
25	10	C/6032-28	T494C106(1)025A(2)AUTO	2.5	6	0.6	428	125	1
25	10	D/7343-31	T494D106(1)025A(2)AUTO	2.5	6	0.4	612	125	1
25	15	C/6032-28	T494C156(1)025A(2)AUTO	3.8	6	0.9	350	125	1
25	15	D/7343-31	T494D156(1)025A(2)AUTO	3.8	6	0.35	655	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 20°C Max/5 Min	% at 20°C 120 Hz Max	Ω at 20°C 100 kHz Max	mA at 25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	°C	Reflow Temp ≤ 260°C
25	22	C/6032-28	T494C226(1)025A(2)AUTO	5.5	6	1	332	125	1
25	22	D/7343-31	T494D226(1)025A(2)AUTO	5.5	6	0.3	707	125	1
25	33	D/7343-31	T494D336(1)025A(2)AUTO	8.3	6	0.4	612	125	1
25	33	X/7343-43	T494X336(1)025A(2)AUTO	8.3	6	0.3	742	125	1
25	47	D/7343-31	T494D476(1)025A(2)AUTO	11.8	10	0.2	866	125	1
25	47	X/7343-43	T494X476(1)025A(2)AUTO	11.8	6	0.3	742	125	1
25	68	X/7343-43	T494X686(1)025A(2)AUTO	17.0	8	0.3	742	125	1
35	0.1	A/3216-18	T494A104(1)035A(2)AUTO	0.5	4	10	87	125	1
35	0.15	A/3216-18	T494A154(1)035A(2)AUTO	0.5	4	6	112	125	1
35	0.22	A/3216-18	T494A224(1)035A(2)AUTO	0.5	4	6	112	125	1
35	0.33	A/3216-18	T494A334(1)035A(2)AUTO	0.5	4	6	112	125	1
35	0.47	A/3216-18	T494A474(1)035A(2)AUTO	0.5	4	4	137	125	1
35	0.47	B/3528-21	T494B474(1)035A(2)AUTO	0.5	4	2.5	184	125	1
35	0.68	A/3216-18	T494A684(1)035A(2)AUTO	0.5	4	6	112	125	1
35	0.68	B/3528-21	T494B684(1)035A(2)AUTO	0.5	4	2.5	184	125	1
35	1	A/3216-18	T494A105(1)035A(2)AUTO	0.5	4	6	112	125	1
35	1	B/3528-21	T494B105(1)035A(2)AUTO	0.5	4	2	206	125	1
35	1.5	B/3528-21	T494B155(1)035A(2)AUTO	0.5	6	3	168	125	1
35	1.5	C/6032-28	T494C155(1)035A(2)AUTO	0.5	6	2.5	210	125	1
35	2.2	C/6032-28	T494C225(1)035A(2)AUTO	0.8	6	1.5	271	125	1
35	3.3	C/6032-28	T494C335(1)035A(2)AUTO	1.2	6	0.8	371	125	1
35	4.7	C/6032-28	T494C475(1)035A(2)AUTO	1.6	6	0.7	396	125	1
35	4.7	D/7343-31	T494D475(1)035A(2)AUTO	1.6	6	0.7	463	125	1
35	6.8	D/7343-31	T494D685(1)035A(2)AUTO	2.4	6	0.5	548	125	1
35	10	D/7343-31	T494D106(1)035A(2)AUTO	3.5	6	0.4	612	125	1
35	10	V/7343-20	T494V106(1)035A(2)AUTO	3.5	6	0.8	395	125	1
35	15	D/7343-31	T494D156(1)035A(2)AUTO	5.3	6	0.35	655	125	1
35	15	X/7343-43	T494X156(1)035A(2)AUTO	5.3	6	0.3	742	125	1
35	22	X/7343-43	T494X226(1)035A(2)AUTO	7.7	6	0.3	742	125	1
35	33	X/7343-43	T494X336(1)035A(2)AUTO	11.6	6	0.6	524	125	1
35	47	X/7343-43	T494X476(1)035A(2)AUTO	16.5	8	0.5	574	125	1
35	47	E/7360-38	T494E476(1)035A(2)AUTO	16.5	10	0.3	816	125	1
50	0.1	A/3216-18	T494A104(1)050A(2)AUTO	0.5	4	10	87	125	1
50	0.15	A/3216-18	T494A154(1)050A(2)AUTO	0.5	4	10	87	125	1
50	0.15	B/3528-21	T494B154(1)050A(2)AUTO	0.5	4	10	92	125	1
50	0.22	A/3216-18	T494A224(1)050A(2)AUTO	0.5	4	12	79	125	1
50	0.22	B/3528-21	T494B224(1)050A(2)AUTO	0.5	4	10	92	125	1
50	0.33	B/3528-21	T494B334(1)050A(2)AUTO	0.5	4	2.5	184	125	1
50	0.47	B/3528-21	T494B474(1)050A(2)AUTO	0.5	4	2	206	125	1
50	0.47	C/6032-28	T494C474(1)050A(2)AUTO	0.5	4	1.8	247	125	1
50	0.68	B/3528-21	T494B684(1)050A(2)AUTO	0.5	4	3	168	125	1
50	0.68	C/6032-28	T494C684(1)050A(2)AUTO	0.5	4	1.6	262	125	1
50	1	C/6032-28	T494C105(1)050A(2)AUTO	0.5	4	1.6	262	125	1
50	1.5	C/6032-28	T494C155(1)050A(2)AUTO	0.8	6	1.5	271	125	1
50	1.5	D/7343-31	T494D155(1)050A(2)AUTO	0.8	6	1	387	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 20°C Max/5 Min	% at 20°C 120 Hz Max	Ω at 20°C 100 kHz Max	mA at 25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

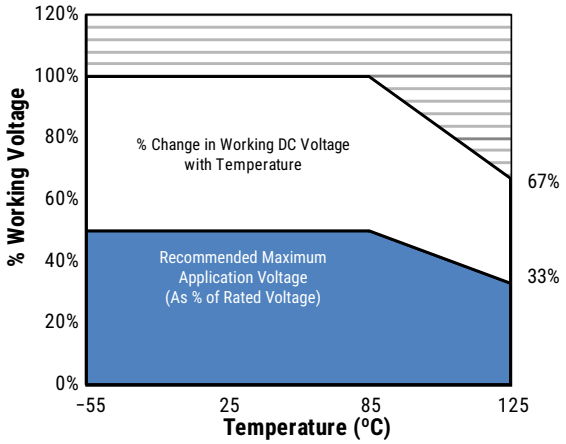
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/5 Min	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at 25°C 100 kHz	°C	Reflow Temp ≤ 260°C
50	2.2	D/7343-31	T494D225(1)050A(2)AUTO	1.1	6	0.8	433	125	1
50	3.3	D/7343-31	T494D335(1)050A(2)AUTO	1.7	6	0.8	433	125	1
50	4.7	D/7343-31	T494D475(1)050A(2)AUTO	2.4	6	0.6	500	125	1
50	6.8	D/7343-31	T494D685(1)050A(2)AUTO	3.4	6	0.7	463	125	1
50	6.8	X/7343-43	T494X685(1)050A(2)AUTO	3.4	6	0.5	574	125	1
50	22	X/7343-43	T494X226(1)050A(2)AUTO	11.0	10	0.5	574	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 20°C Max/5 Min	% at 20°C 120 Hz Max	Ω at 20°C 100 kHz Max	mA at 25°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	67% of V_R
Recommended maximum application voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Series and Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the Pmax of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

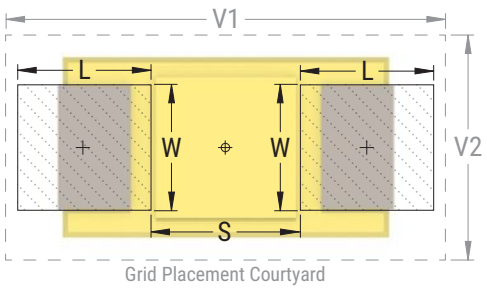
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
S[2]	3216–12	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
T	3528–12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
U	6032–15	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
V	7343–21	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[2] *Land pattern geometry is too small for silkscreen outline.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

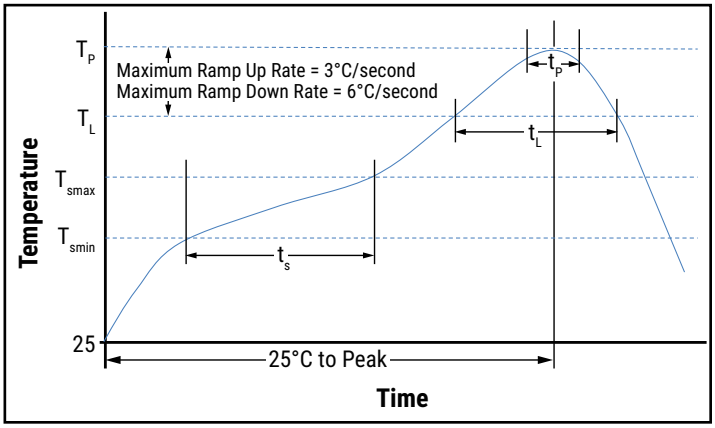
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

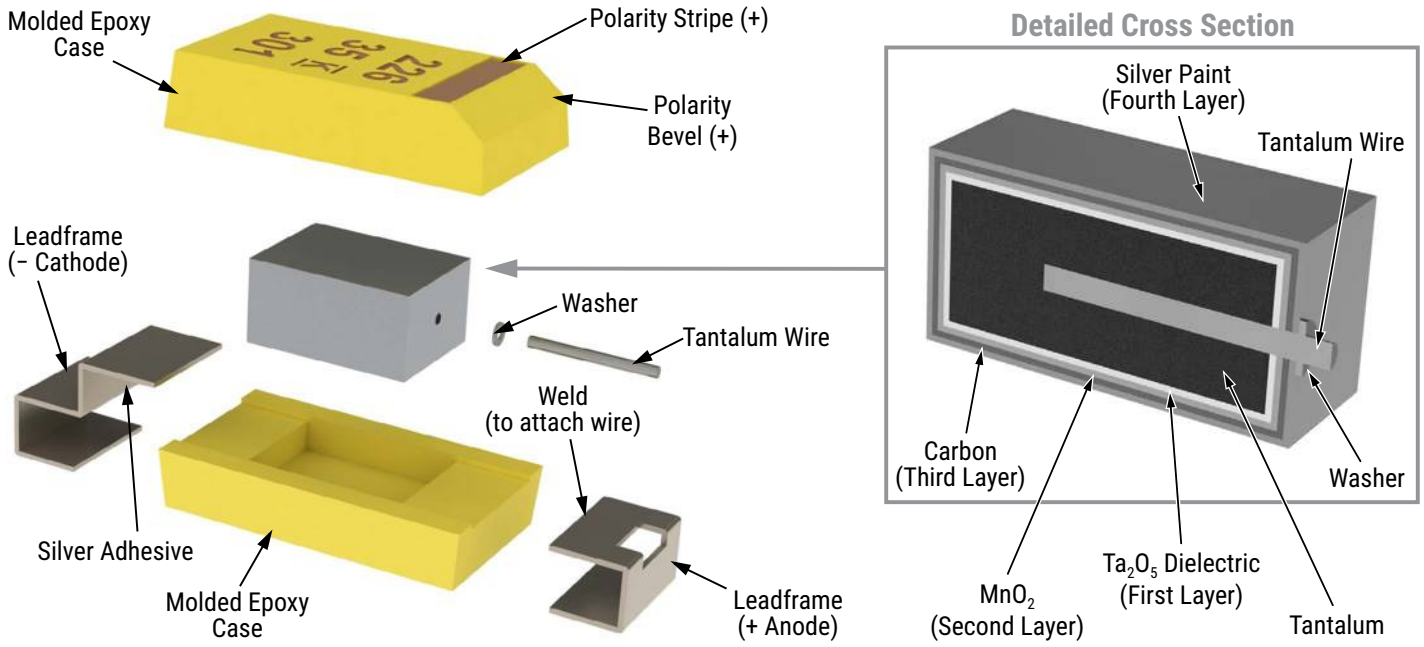
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



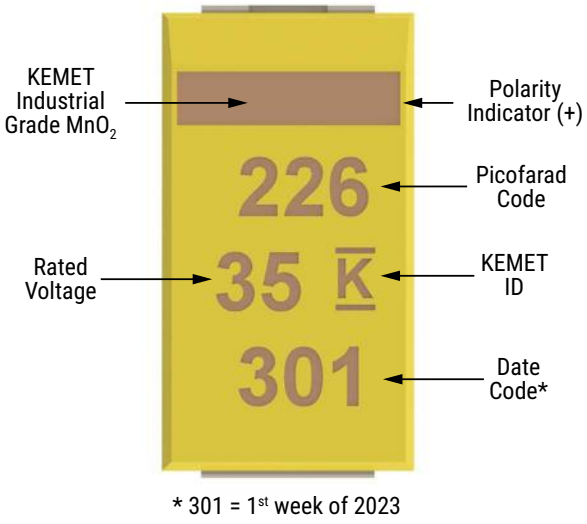
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = last number of year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

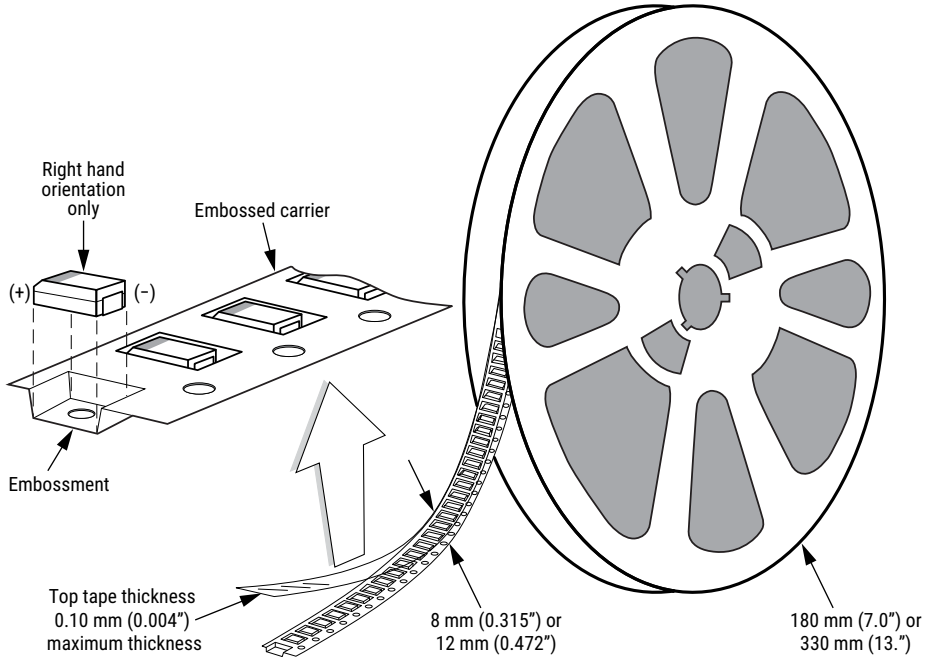


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

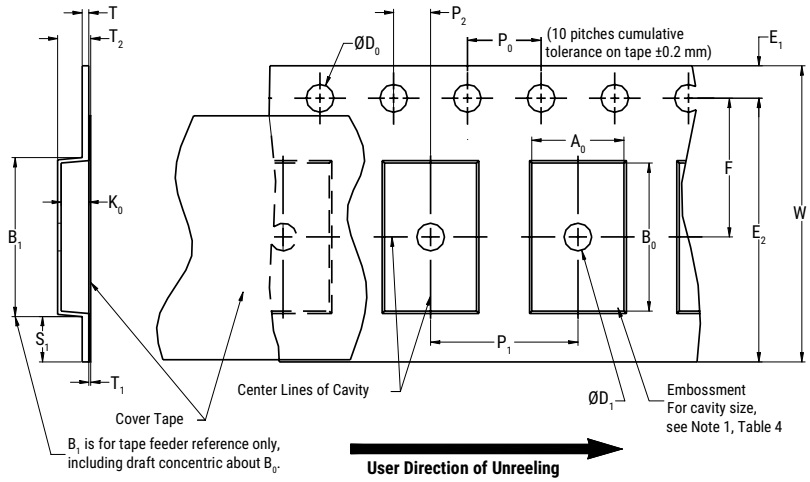


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

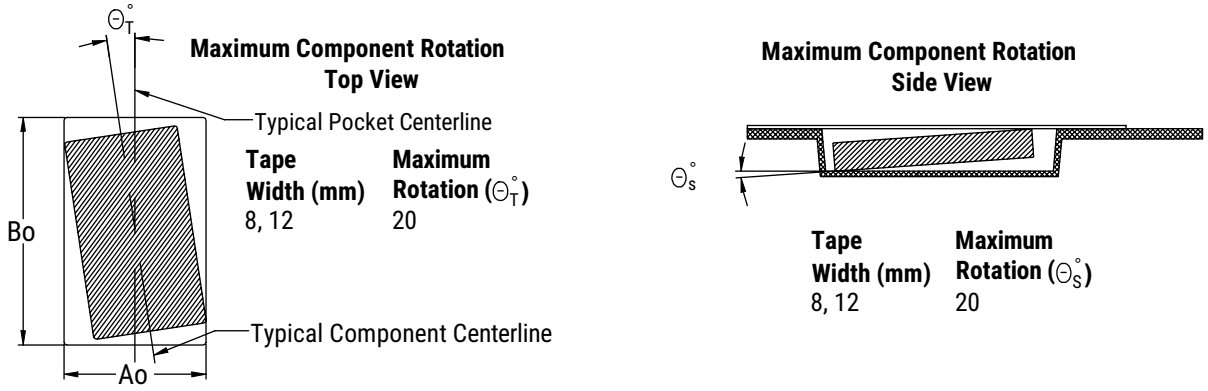


Figure 3 – Maximum Lateral Movement

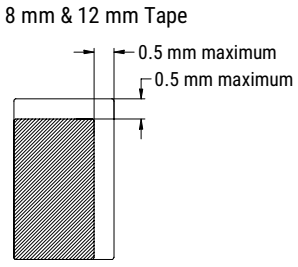


Figure 4 – Bending Radius

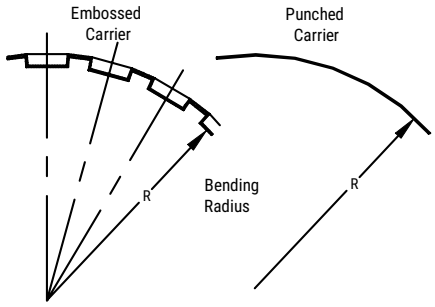
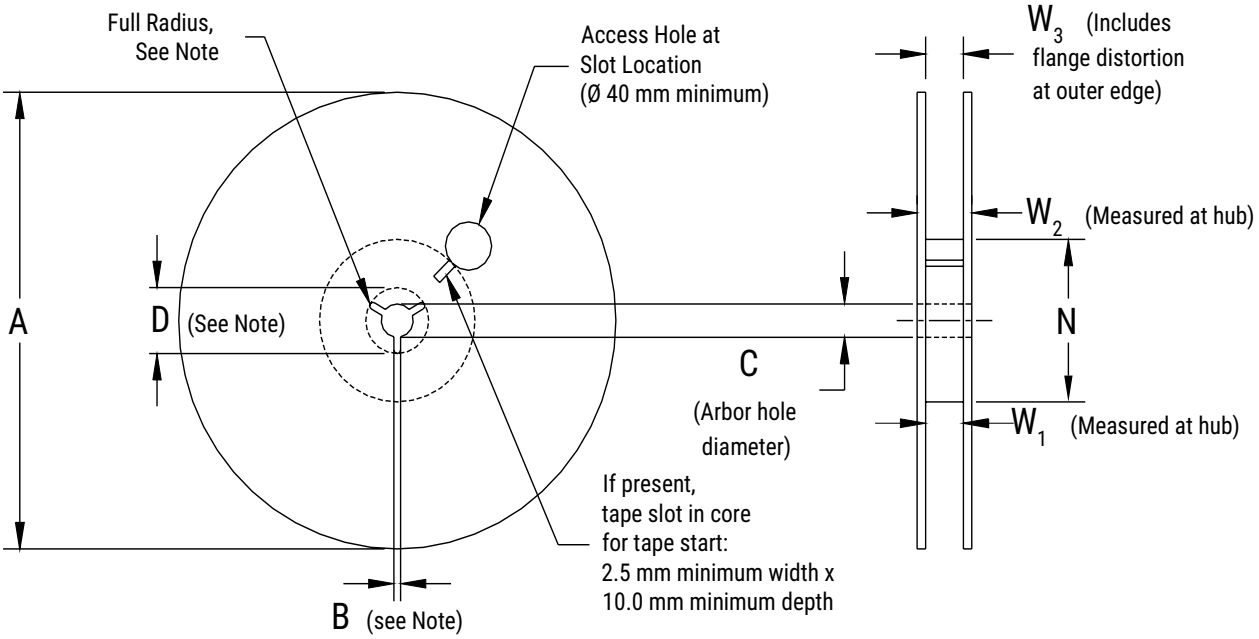


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

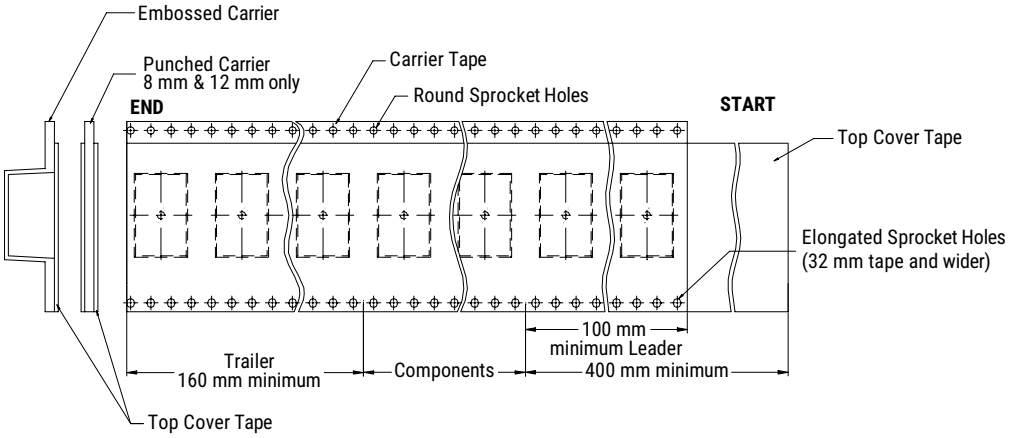
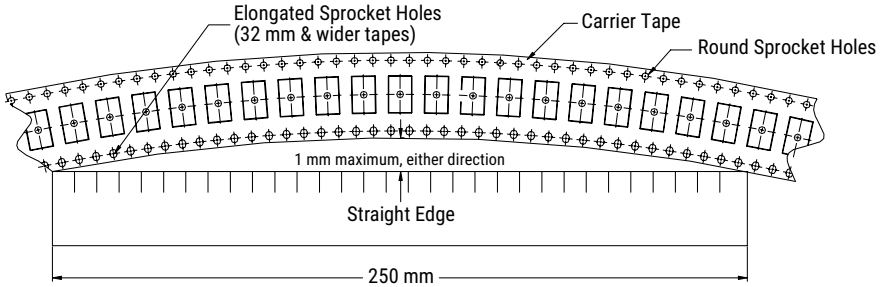


Figure 7 – Maximum Camber



T495 Automotive Grade Surge Robust Low ESR MnO_2

Overview

The low ESR, surge-robust T495 Automotive, is designed for demanding applications that require high surge current and high ripple current capability. The T495 automotive products build upon the proven capabilities of our industrial grade tantalum chip capacitors to offer several advantages such as low ESR, high ripple current capability, excellent capacitance stability, and improved resistance to high in-rush currents. These benefits are achieved through a combination of proprietary design, materials, and process parameters, as well as high-stress, low impedance electrical conditioning performed prior to screening. The T495 automotive is classified as moisture sensitivity level (MSL)1 under J STD 020, with unlimited floorlife time at ≤ 30°C/85% RH.

Benefits

- Comply with the automotive AEC-Q200 certification
- Meets or exceeds EIA standard 535BAAC
- Tape & Reel standard packaging per EIA 481
- High surge current capability
- Optional gold-plated terminations
- High ripple current capability
- 100% surge current test
- 100% steady-state accelerated aging

Applications

Typical applications include decoupling and filtering in automotive end applications, such as DC/DC converters, portable electronics, telecommunications, and control units requiring high ripple current capability.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder, Gold-plated or Non-magnetic 100% Sn solder.

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	495	X	107	M	010	A	T	A080	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	ESR	Packaging (C-Spec)
T = Tantalum	Surge Robust Low ESR	A B C D E T V X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	2R5 = 2.5 004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte tin (Sn)-plated H = Standard solder coated (SnPb 5% Pb minimum) G = Gold-plated (A, B, C, D, X only) N = Non-magnetic 100% tin (Sn) M = Non-magnetic (SnPb)	A = AUTO grade product 080 = Maximum ESR in mΩ at room temperature (80 mΩ)	Blank = 7" reel 7280 = 13" reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.33 – 680 µF at 120 Hz/25°C
Capacitance Tolerance	K tolerance (10%), M tolerance (20%)
Rated Voltage Range	6.3 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55°C to 125° C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C.			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage).		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

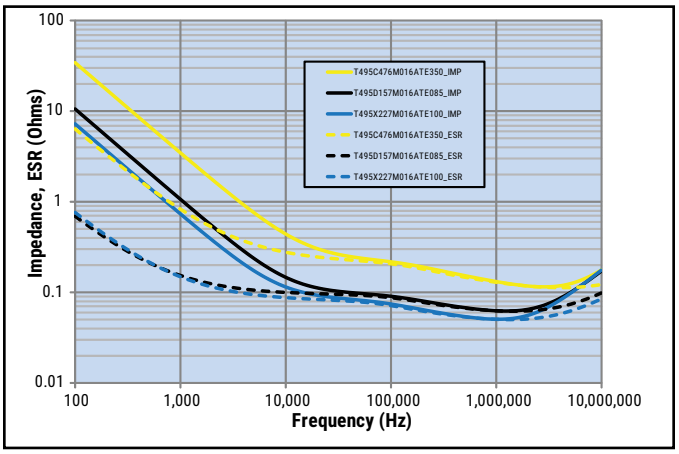
**IL = Initial limit*

Certification

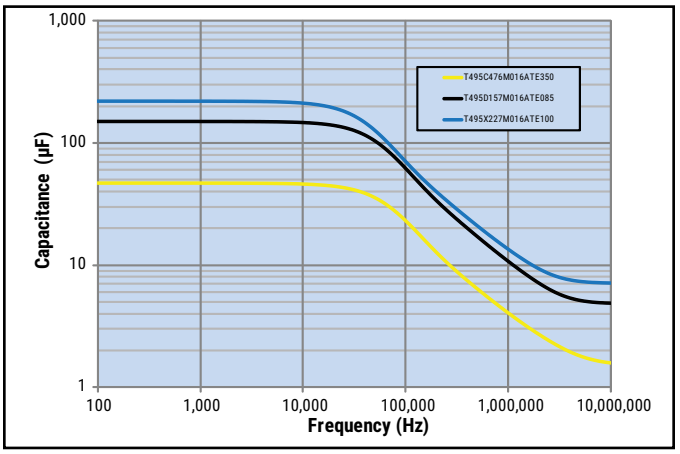
KEMET's Internal Qualification Plan for this Tantalum series of capacitors follows AEC–Q200 guidelines. Standard catalog part types ordered without a specific automotive designator, i.e., suffix AUTO or four digit customer specific designator (C Spec), are not considered KEMET automotive grade tantalum capacitors.

Electrical Characteristics

ESR vs. Frequency



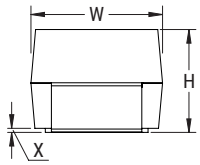
Capacitance vs. Frequency



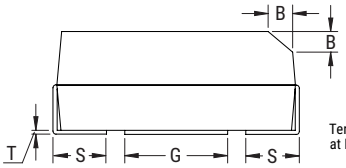
Dimensions – Millimeters (Inches)

Metric will govern

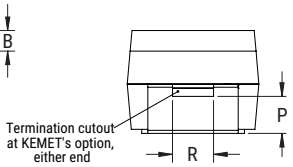
CATHODE (-) END VIEW



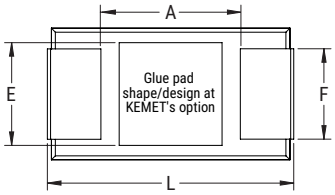
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component													Total Weight
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)	(mg)
A	3216–18	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.2 (0.047)	0.80 (0.032) +0.2 (0.008)/−0.3(0.011)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)	58.60
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9 ±0.2 (0.075 ±0.008)	2.2 (0.087)	0.80 (0.032) +0.1 (0.004)/−0.3(0.011)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)	107.45
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5 ±0.3 (0.098 ±0.012)	2.2 (0.087)	1.3 (0.051) ±0.3 (0.012)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.9 (0.114)	2.8 (0.110)	2.4 (0.094)	224.48
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8 ±0.3 (0.110 ±0.012)	2.4 (0.094)	1.3 (0.051) ±0.3 (0.012)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)	446.84
X	7343-43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (0.094)	1.3 (0.051) ±0.3 (0.012)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.6 (0.142)	3.5 (0.138)	3.5 (0.138)	652.04

Notes: (Ref) – Dimensions provided for reference only. For low profile cases, no dimensions are provided for B, P or R because these cases do not have a bevel or a notch.

These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
6.3	2.2	A/3216-18	T495A225(1)006A(2)A5K0	0.5	6	5,000	122	110	49	125	1
6.3	3.3	A/3216-18	T495A335(1)006A(2)A3K0	0.5	6	3,000	158	142	63	125	1
6.3	4.7	A/3216-18	T495A475(1)006A(2)A3K5	0.5	6	3,500	146	131	58	125	1
6.3	6.8	A/3216-18	T495A685(1)006A(2)A2K0	0.5	6	2,000	194	175	78	125	1
6.3	10	A/3216-18	T495A106(1)006A(2)A2K0	0.6	6	2,000	194	175	78	125	1
6.3	10	A/3216-18	T495A106(1)006A(2)A4K0	0.6	6	4,000	137	130	87	125	1
6.3	10	B/3528-21	T495B106(1)006A(2)A1K0	0.6	6	1,000	292	263	117	125	1
6.3	15	A/3216-18	T495A156(1)006A(2)A2K0	0.9	6	2,000	194	175	78	125	1
6.3	22	A/3216-18	T495A226(1)006A(2)A1K5	1.4	6	1,500	224	202	90	125	1
6.3	22	B/3528-21	T495B226(1)006A(2)A500	1.4	6	500	412	371	165	125	1
6.3	22	C/6032-28	T495C226(1)006A(2)A380	1.4	6	380	538	484	215	125	1
6.3	22	C/6032-28	T495C226(1)006A(2)A2K0	1.4	6	2,000	234	222	148	125	1
6.3	33	A/3216-18	T495A336(1)006A(2)A1K0	2.1	12	1,000	274	247	110	125	1
6.3	33	B/3528-21	T495B336(1)006A(2)A600	2.1	6	600	376	338	150	125	1
6.3	33	C/6032-28	T495C336(1)006A(2)A350	2.1	6	350	561	505	224	125	1
6.3	47	B/3528-21	T495B476(1)006A(2)A500	3.0	6	500	412	371	165	125	1
6.3	68	B/3528-21	T495B686(1)006A(2)A500	4.3	8	500	412	371	165	125	1
6.3	68	C/6032-28	T495C686(1)006A(2)A400	4.3	6	400	524	472	210	125	1
6.3	68	D/7343-31	T495D686(1)006A(2)A180	4.3	4	180	913	822	365	125	1
6.3	100	B/3528-21	T495B107(M)006A(2)A700	6.3	15	700	348	313	139	125	1
6.3	100	C/6032-28	T495C107(1)006A(2)A1K2	6.3	8	1,200	303	287	191	125	1
6.3	100	C/6032-28	T495C107(1)006A(2)A150	6.3	8	150	856	770	342	125	1
6.3	100	D/7343-31	T495D107(1)006A(2)A150	6.3	8	150	1,000	900	400	125	1
6.3	100	D/7343-31	T495D107(1)006A(2)A130	6.3	8	130	1,074	1,019	679	125	1
6.3	150	D/7343-31	T495D157(1)006A(2)A100	9.5	6	100	1,225	1,103	490	125	1
6.3	150	D/7343-31	T495D157(1)006A(2)A125	9.5	6	125	1,095	986	438	125	1
6.3	150	X/7343-43	T495X157(1)006A(2)A100	9.5	6	100	1,285	1,157	514	125	1
6.3	220	C/6032-28	T495C227(1)006A(2)A225	13.9	10	225	699	629	280	125	1
6.3	220	D/7343-31	T495D227(1)006A(2)A100	13.9	8	100	1,225	1,103	490	125	1
6.3	220	D/7343-31	T495D227(1)006A(2)A800	13.9	8	800	433	411	274	125	1
6.3	220	X/7343-43	T495X227(1)006A(2)A100	13.9	8	100	1,285	1,157	514	125	1
6.3	330	D/7343-31	T495D337(1)006A(2)A100	20.8	8	100	1,225	1,103	490	125	1
6.3	330	D/7343-31	T495D337(1)006A(2)A800	20.8	8	800	433	411	274	125	1
6.3	330	X/7343-43	T495X337(1)006A(2)A100	20.8	8	100	1,285	1,157	514	125	1
6.3	470	D/7343-31	T495D477(1)006A(2)A150	29.6	12	150	1,000	900	400	125	1
6.3	470	X/7343-43	T495X477(1)006A(2)A100	29.6	10	100	1,285	1,157	514	125	1
6.3	680	X/7343-43	T495X687(1)006A(2)A100	42.8	12	100	1,285	1,157	514	125	1
10	1.5	A/3216-18	T495A155(1)010A(2)A5K0	0.5	6	5,000	122	110	49	125	1
10	2.2	A/3216-18	T495A225(1)010A(2)A2K0	0.5	6	2,000	194	175	78	125	1
10	3.3	A/3216-18	T495A335(1)010A(2)A5K5	0.5	6	5,500	117	105	47	125	1
10	4.7	A/3216-18	T495A475(1)010A(2)A2K0	0.5	6	2,000	194	175	78	125	1
10	4.7	A/3216-18	T495A475(1)010A(2)A4K5	0.5	6	4,500	129	122	82	125	1
10	4.7	B/3528-21	T495B475(1)010A(2)A1K5	0.5	6	1,500	238	214	95	125	1
10	6.8	A/3216-18	T495A685(1)010A(2)A2K0	0.7	6	1,800	204	184	82	125	1
10	6.8	B/3528-21	T495B685(1)010A(2)A1K2	0.7	6	1,200	266	239	106	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	6.8	B/3528-21	T495B685(1)010A(2)A1K1	0.7	6	1,100	278	264	176	125	1
10	10	A/3216-18	T495A106(1)010A(2)A2K0	1.0	6	2,000	194	175	78	125	1
10	10	B/3528-21	T495B106(1)010A(2)A3K0	1.0	6	3,000	97	88	39	125	1
10	10	B/3528-21	T495B106(1)010A(2)A1K2	1.0	6	1,200	266	239	106	125	1
10	10	C/6032-28	T495C106(1)010A(2)A400	1.0	6	400	524	472	210	125	1
10	15	A/3216-18	T495A156(1)010A(2)A1K8	1.5	6	1,800	204	184	82	125	1
10	15	B/3528-21	T495B156(1)010A(2)A900	1.5	6	900	307	276	123	125	1
10	15	C/6032-28	T495C156(1)010A(2)A475	1.5	6	475	481	433	192	125	1
10	22	A/3216-18	T495A226(1)010A(2)A1K5	2.2	8	1,500	224	202	90	125	1
10	22	B/3528-21	T495B226(1)010A(2)A2K3	2.2	6	2,300	192	173	77	125	1
10	22	B/3528-21	T495B226(1)010A(2)A1K5	2.2	6	1,500	238	226	150	125	1
10	22	C/6032-28	T495C226(1)010A(2)A1K6	2.2	6	1,600	111	100	44	125	1
10	22	C/6032-28	T495C226(1)010A(2)A380	2.2	6	380	538	484	215	125	1
10	22	C/6032-28	T495C226(1)010A(2)A350	2.2	6	350	561	505	224	125	1
10	22	C/6032-28	T495C226(1)010A(2)A245	2.2	6	245	670	636	423	125	1
10	33	B/3528-21	T495B336(1)010A(2)A650	3.3	6	650	362	326	145	125	1
10	33	B/3528-21	T495B336(1)010A(2)A1K5	3.3	6	1,500	111	100	44	125	1
10	33	C/6032-28	T495C336(1)010A(2)A1K5	3.3	6	1,500	271	257	171	125	1
10	33	C/6032-28	T495C336(1)010A(2)A380	3.3	6	380	538	484	215	125	1
10	33	C/6032-28	T495C336(1)010A(2)A300	3.3	6	300	606	545	242	125	1
10	47	B/3528-21	T495B476(1)010A(2)A650	4.7	6	650	362	326	145	125	1
10	47	B/3528-21	T495B476(1)010A(2)A500	4.7	6	500	412	371	165	125	1
10	47	C/6032-28	T495C476(1)010A(2)A1K4	4.7	6	1,400	280	266	177	125	1
10	47	C/6032-28	T495C476(1)010A(2)A300	4.7	6	300	606	545	242	125	1
10	47	D/7343-31	T495D476(1)010A(2)A080	4.7	4	80	1,369	1,232	548	125	1
10	47	D/7343-31	T495D476(1)010A(2)A200	4.7	4	200	866	779	346	125	1
10	68	D/7343-31	T495D686(1)010A(2)A100	6.8	6	100	1,225	1,103	490	125	1
10	68	X/7343-43	T495X686(1)010A(2)A150	6.8	4	150	1,049	944	420	125	1
10	68	B/3528-21	T495B686(1)010A(2)A900	6.8	8	900	307	276	123	125	1
10	68	C/6032-28	T495C686(1)010A(2)A200	6.8	6	200	742	668	297	125	1
10	68	D/7343-31	T495D686(1)010A(2)A080	6.8	6	80	1,369	1232	548	125	1
10	100	C/6032-28	T495C107(1)010A(2)A1K2	10.0	8	1,200	303	287	191	125	1
10	100	D/7343-31	T495D107(1)010A(2)A080	10.0	8	80	1,369	1,232	548	125	1
10	100	D/7343-31	T495D107(1)010A(2)A100	10.0	8	100	1,225	1,103	490	125	1
10	100	D/7343-31	T495D107(1)010A(2)A800	10.0	8	800	433	411	274	125	1
10	100	X/7343-43	T495X107(1)010A(2)A150	10.0	6	150	1,049	944	420	125	1
10	100	X/7343-43	T495X107(1)010A(2)A100	10.0	6	100	1,285	1,157	514	125	1
10	150	D/7343-31	T495D157(1)010A(2)A100	15.0	8	100	1,225	1,103	490	125	1
10	150	X/7343-43	T495X157(1)010A(2)A100	15.0	8	100	1,285	1,157	514	125	1
10	220	D/7343-31	T495D227(1)010A(2)A100	22.0	8	100	1,225	1,103	490	125	1
10	220	D/7343-31	T495D227(1)010A(2)A125	22.0	8	125	1,095	986	438	125	1
10	220	D/7343-31	T495D227(1)010A(2)A800	22.0	10	800	433	411	274	125	1
10	220	X/7343-43	T495X227(1)010A(2)A100	22.0	8	100	1,285	1,157	514	125	1
10	220	X/7343-43	T495X227(1)010A(2)A600	22.0	8	600	524	497	829	125	1
10	330	D/7343-31	T495D337(1)010A(2)A100	33.0	10	100	1,225	1,103	490	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	330	D/7343-31	T495D337(1)010A(2)A125	33.0	10	125	1,095	986	438	125	1
10	330	D/7343-31	T495D337(1)010A(2)A150	33.0	10	150	1,000	900	400	125	1
10	330	X/7343-43	T495X337(1)010A(2)A100	33.0	10	100	1,285	1,157	514	125	1
10	470	X/7343-43	T495X477(1)010A(2)A100	47.0	10	100	1,285	1,157	514	125	1
10	470	X/7343-43	T495X477(1)010A(2)A200	47.0	10	200	908	817	363	125	1
16	1	A/3216-18	T495A105(1)016A(2)A5K0	0.5	6	5,000	122	110	49	125	1
16	1	A/3216-18	T495A105(1)016A(2)A10K	0.5	4	10,000	87	82	55	125	1
16	1.5	A/3216-18	T495A155(1)016A(2)A5K0	0.5	6	5,000	122	110	49	125	1
16	2.2	A/3216-18	T495A225(1)016A(2)A2K5	0.5	6	2,500	173	156	69	125	1
16	2.2	A/3216-18	T495A225(1)016A(2)A6K5	0.5	6	6,500	107	102	68	125	1
16	3.3	A/3216-18	T495A335(1)016A(2)A3K0	0.5	6	3,000	158	142	63	125	1
16	3.3	A/3216-18	T495A335(1)016A(2)A5K0	0.5	6	5,000	122	116	77	125	1
16	3.3	B/3528-21	T495B335(1)016A(2)A2K0	0.5	6	2,000	206	185	82	125	1
16	4.7	A/3216-18	T495A475(1)016A(2)A2K0	0.8	6	2,000	194	175	78	125	1
16	4.7	A/3216-18	T495A475(1)016A(2)A4K0	0.8	6	4,000	137	130	87	125	1
16	4.7	B/3528-21	T495B475(1)016A(2)A1K5	0.8	6	1,500	238	214	95	125	1
16	4.7	B/3528-21	T495B475(1)016A(2)A3K5	0.8	6	3,500	156	148	99	125	1
16	6.8	B/3528-21	T495B685(1)016A(2)A1K2	1.1	6	1,200	266	239	106	125	1
16	10	B/3528-21	T495B106(1)016A(2)A1K6	1.6	6	1,600	230	207	92	125	1
16	10	B/3528-21	T495B106(1)016A(2)A2K5	1.6	6	2,500	184	166	74	125	1
16	10	C/6032-28	T495C106(1)016A(2)A450	1.6	8	450	494	445	198	125	1
16	10	C/6032-28	T495C106(1)016A(2)A2K0	1.6	6	2,000	234	222	148	125	1
16	15	A/3216-18	T495A156(1)016A(2)A2K5	2.4	8	2,500	173	156	69	125	1
16	15	B/3528-21	T495B156(1)016A(2)A800	2.4	6	800	326	293	130	125	1
16	15	C/6032-28	T495C156(1)016A(2)A400	2.4	6	400	524	497	262	125	1
16	22	B/3528-21	T495B226(1)016A(2)A1K8	3.5	6	1,800	217	206	137	125	1
16	22	B/3528-21	T495B226(1)016A(2)A700	3.5	6	700	348	313	139	125	1
16	22	C/6032-28	T495C226(1)016A(2)A1K5	3.5	6	1,500	271	257	171	125	1
16	22	C/6032-28	T495C226(1)016A(2)A350	3.5	6	350	561	505	224	125	1
16	22	D/7343-31	T495D226(1)016A(2)A1K1	3.5	6	1,100	1,000	949	632	125	1
16	33	B/3528-21	T495B336(1)016A(2)A350	5.3	6	350	493	444	197	125	1
16	33	C/6032-28	T495C336(1)016A(2)A1K4	5.3	6	1,400	280	266	177	125	1
16	33	C/6032-28	T495C336(1)016A(2)A300	5.3	6	300	606	545	242	125	1
16	33	D/7343-31	T495D336(1)016A(2)A200	5.3	6	200	866	779	346	125	1
16	33	D/7343-31	T495D336(1)016A(2)A250	5.3	6	250	775	698	310	125	1
16	33	D/7343-31	T495D336(1)016A(2)A1K0	5.3	6	1,000	387	367	245	125	1
16	47	C/6032-28	T495C476(1)016A(2)A1K4	7.5	6	1,400	280	266	177	125	1
16	47	C/6032-28	T495C476(1)016A(2)A350	7.5	6	350	561	505	224	125	1
16	47	D/7343-31	T495D476(1)016A(2)A100	7.5	6	100	1,225	1,162	775	125	1
16	47	D/7343-31	T495D476(1)016A(2)A120	7.5	6	120	1,118	1,006	447	125	1
16	47	D/7343-31	T495D476(1)016A(2)A150	7.5	6	150	1,000	900	400	125	1
16	47	D/7343-31	T495D476(1)016A(2)A180	7.5	6	180	913	822	365	125	1
16	47	D/7343-31	T495D476(1)016A(2)A300	7.5	6	800	433	390	173	125	1
16	68	C/6032-28	T495C686(1)016A(2)A250	10.9	6	250	663	597	265	125	1
16	68	D/7343-31	T495D686(1)016A(2)A150	10.9	6	150	1,000	900	400	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
16	68	X/7343-43	T495X686(1)016A(2)A150	10.9	8	150	1,049	944	420	125	1
16	100	D/7343-31	T495D107(1)016A(2)A100	16.0	8	100	1,225	1,162	775	125	1
16	100	D/7343-31	T495D107(1)016A(2)A130	16.0	8	130	1,074	967	430	125	1
16	100	D/7343-31	T495D107(1)016A(2)A150	16.0	8	150	1,000	900	400	125	1
16	100	X/7343-43	T495X107(1)016A(2)A100	16.0	8	100	1,285	1,157	514	125	1
16	100	X/7343-43	T495X107(1)016A(2)A800	16.0	8	800	454	431	287	125	1
16	150	D/7343-31	T495D157(1)016A(2)A130	24.0	8	130	1,074	967	430	125	1
16	150	D/7343-31	T495D157(1)016A(2)A150	24.0	8	150	1,000	900	400	125	1
16	150	X/7343-43	T495X157(1)016A(2)A100	24.0	8	100	1,285	1,157	514	125	1
16	220	X/7343-43	T495X227(1)016A(2)A100	35.2	8	100	1,285	1,157	514	125	1
20	1	A/3216-18	T495A105(1)020A(2)A5K0	0.5	4	5,000	122	110	49	125	1
20	1.5	A/3216-18	T495A155(1)020A(2)A4K5	0.5	6	4,500	129	116	52	125	1
20	2.2	A/3216-18	T495A225(1)020A(2)A3K0	0.5	6	3,000	158	142	63	125	1
20	2.2	A/3216-18	T495A225(1)020A(2)A6K0	0.5	6	6,000	119	106	71	125	1
20	2.2	B/3528-21	T495B225(1)020A(2)A1K5	0.5	6	1,500	238	214	95	125	1
20	3.3	B/3528-21	T495B335(1)020A(2)A1K5	0.7	6	1,500	238	214	95	125	1
20	4.7	A/3216-18	T495A475(1)020A(2)A2K0	0.9	6	2,000	194	175	78	125	1
20	4.7	B/3528-21	T495B475(1)020A(2)A1K0	0.9	6	1,000	292	263	117	125	1
20	4.7	B/3528-21	T495B475(1)020A(2)A3K0	0.9	6	3,000	168	160	106	125	1
20	6.8	B/3528-21	T495B685(1)020A(2)A1K0	1.4	6	1,000	292	263	117	125	1
20	6.8	C/6032-28	T495C685(1)020A(2)A480	1.4	6	480	479	431	192	125	1
20	10	B/3528-21	T495B106(1)020A(2)A1K0	2.0	6	1,000	292	263	117	125	1
20	10	C/6032-28	T495C106(1)020A(2)A1K6	2.0	6	1,600	262	249	166	125	1
20	10	C/6032-28	T495C106(1)020A(2)A475	2.0	6	475	481	433	192	125	1
20	15	C/6032-28	T495C156(1)020A(2)A1K5	3.0	6	1,500	271	257	171	125	1
20	15	C/6032-28	T495C156(1)020A(2)A400	3.0	6	400	524	472	210	125	1
20	15	D/7343-31	T495D156(1)020A(2)A275	3.0	4	275	739	665	296	125	1
20	22	C/6032-28	T495C226(1)020A(2)A1K4	4.4	6	1,400	280	266	177	125	1
20	22	D/7343-31	T495D226(1)020A(2)A1K0	4.4	6	1,000	387	367	245	125	1
20	22	D/7343-31	T495D226(1)020A(2)A200	4.4	4	200	870	783	348	125	1
20	22	D/7343-31	T495D226(1)020A(2)A180	4.4	4	180	913	822	365	125	1
20	33	D/7343-31	T495D336(1)020A(2)A200	6.6	6	200	866	779	346	125	1
20	33	D/7343-31	T495D336(1)020A(2)A800	6.6	6	800	433	411	274	125	1
20	33	X/7343-43	T495X336(1)020A(2)A200	6.6	8	200	908	817	363	125	1
20	47	D/7343-31	T495D476(1)020A(2)A250	9.4	6	250	775	698	310	125	1
20	47	D/7343-31	T495D476(1)020A(2)A800	9.4	6	800	433	411	274	125	1
20	47	X/7343-43	T495X476(1)020A(2)A150	9.4	4	150	1,049	944	420	125	1
20	47	X/7343-43	T495X476(1)020A(2)A100	9.4	4	100	1,285	1,219	812	125	1
20	68	D/7343-31	T495D686(1)020A(2)A300	13.6	6	300	707	636	283	125	1
20	68	X/7343-43	T495X686(1)020A(2)A120	13.6	6	120	1,173	1,056	469	125	1
20	100	D/7343-31	T495D107(1)020A(2)A200	20.0	8	200	870	783	348	125	1
20	100	X/7343-43	T495X107(1)020A(2)A150	20.0	8	150	1,049	944	420	125	1
25	1	A/3216-18	T495A105(1)025A(2)A5K0	0.5	4	5,000	122	110	49	125	1
25	1	A/3216-18	T495A105(1)025A(2)A8K0	0.5	6	8,000	97	92	61	125	1
25	1.5	B/3528-21	T495B155(1)025A(2)A1K5	0.5	6	1,500	238	214	95	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
25	2.2	B/3528-21	T495B225(1)025A(2)A1K2	0.6	6	1,200	266	239	106	125	1
25	2.2	C/6032-28	T495C225(1)025A(2)A1K3	0.6	6	1,300	291	262	116	125	1
25	3.3	B/3528-21	T495B335(1)025A(2)A1K2	0.8	6	1,200	266	239	106	125	1
25	3.3	C/6032-28	T495C335(1)025A(2)A750	0.8	6	750	383	345	153	125	1
25	4.7	B/3528-21	T495B475(1)025A(2)A1K0	1.2	6	1,000	292	263	117	125	1
25	4.7	B/3528-21	T495B475(1)025A(2)A3K2	1.2	6	3,200	163	155	103	125	1
25	4.7	C/6032-28	T495C475(1)025A(2)A575	1.2	6	575	437	393	175	125	1
25	6.8	B/3528-21	T495B685(1)025A(2)A1K5	1.7	6	1,500	238	214	95	125	1
25	6.8	C/6032-28	T495C685(1)025A(2)A500	1.7	6	500	469	422	188	125	1
25	10	B/3528-21	T495B106(1)025A(2)A750	2.5	6	750	340	306	136	125	1
25	10	C/6032-28	T495C106(1)025A(2)A450	2.5	6	450	494	445	198	125	1
25	10	C/6032-28	T495C106(1)025A(2)A1K6	2.5	6	1,600	262	249	166	125	1
25	10	D/7343-31	T495D106(1)025A(2)A1K2	2.5	6	1,200	354	319	142	125	1
25	15	C/6032-28	T495C156(1)025A(2)A300	3.8	6	300	606	545	242	125	1
25	15	D/7343-31	T495D156(1)025A(2)A275	3.8	6	275	739	665	296	125	1
25	15	X/7343-43	T495X156(1)025A(2)A200	3.8	4	200	908	817	363	125	1
25	22	C/6032-28	T495C226(1)025A(2)A900	5.5	6	900	350	315	140	125	1
25	22	D/7343-31	T495D226(1)025A(2)A200	5.5	6	200	866	779	346	125	1
25	22	D/7343-31	T495D226(1)025A(2)A800	5.5	6	800	433	411	274	125	1
25	22	X/7343-43	T495X226(1)025A(2)A230	5.5	4	230	847	762	339	125	1
25	33	D/7343-31	T495D336(1)025A(2)A200	8.3	6	200	866	779	346	125	1
25	33	D/7343-31	T495D336(1)025A(2)A800	8.3	6	800	433	411	274	125	1
25	33	X/7343-43	T495X336(1)025A(2)A200	8.3	4	200	908	817	363	125	1
25	47	D/7343-31	T495D476(1)025A(2)A120	11.8	6	120	1,118	1,006	447	125	1
25	47	D/7343-31	T495D476(1)025A(2)A150	11.8	6	150	1,000	900	400	125	1
25	47	D/7343-31	T495D476(1)025A(2)A250	11.8	6	250	775	735	490	125	1
25	47	X/7343-43	T495X476(1)025A(2)A800	11.6	6	800	454	431	287	125	1
25	47	X/7343-43	T495X476(1)025A(2)A120	11.8	6	120	1,173	1,056	469	125	1
25	47	X/7343-43	T495X476(1)025A(2)A100	11.8	6	100	1,285	1,157	514	125	1
25	68	D/7343-31	T495D686(1)025A(2)A200	17.0	10	200	866	779	346	125	1
25	68	X/7343-43	T495X686(1)025A(2)A200	17.0	6	200	908	817	363	125	1
25	68	X/7343-43	T495X686(1)025A(2)A150	17.0	6	150	1,049	995	663	125	1
25	100	X/7343-43	T495X107(1)025A(2)A150	25.0	10	150	1,049	944	420	125	1
35	0.33	A/3216-18	T495A334(1)035A(2)A7K0	0.5	4	7,000	104	94	42	125	1
35	0.47	A/3216-18	T495A474(1)035A(2)A7K0	0.5	4	7,000	104	94	42	125	1
35	0.47	B/3528-21	T495B474(1)035A(2)A2K5	0.5	4	2,500	184	166	74	125	1
35	0.68	A/3216-18	T495A684(1)035A(2)A6K0	0.5	4	6,000	112	101	45	125	1
35	1	A/3216-18	T495A105(1)035A(2)A7K0	0.5	4	7,000	104	94	42	125	1
35	1	B/3528-21	T495B105(1)035A(2)A2K0	0.5	4	2,000	206	185	82	125	1
35	1.5	B/3528-21	T495B155(1)035A(2)A2K0	0.5	6	2,000	206	185	82	125	1
35	2.2	B/3528-21	T495B225(1)035A(2)A2K0	0.8	6	2,000	206	185	82	125	1
35	2.2	C/6032-28	T495C225(1)035A(2)A750	0.8	6	750	383	345	153	125	1
35	3.3	B/3528-21	T495B335(1)035A(2)A1K0	1.2	6	1,000	292	263	117	125	1
35	3.3	C/6032-28	T495C335(1)035A(2)A600	1.2	6	600	428	385	171	125	1
35	4.7	B/3528-21	T495B475(1)035A(2)A1K0	1.6	6	1,000	292	263	117	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

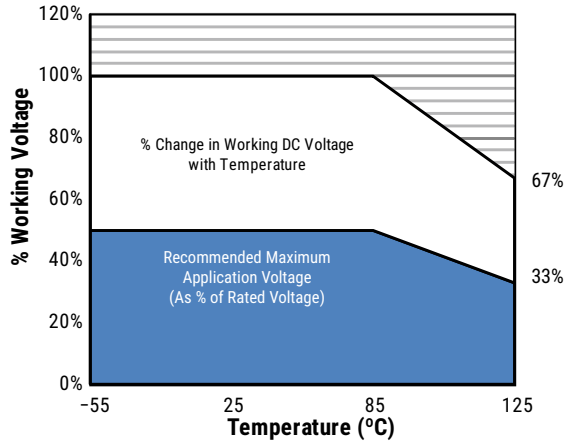
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
35	4.7	C/6032-28	T495C475(1)035A(2)A700	1.6	6	700	396	356	158	125	1
35	4.7	C/6032-28	T495C475(1)035A(2)A2K0	1.6	6	2,000	234	222	148	125	1
35	4.7	D/7343-31	T495D475(1)035A(2)A300	1.6	6	300	707	636	283	125	1
35	6.8	C/6032-28	T495C685(1)035A(2)A350	2.4	6	350	561	505	224	125	1
35	6.8	D/7343-31	T495D685(1)035A(2)A400	2.4	6	400	612	551	245	125	1
35	6.8	X/7343-43	T495X685(1)035A(2)A300	2.4	4	300	742	668	297	125	1
35	10	D/7343-31	T495D106(1)035A(2)A250	3.5	6	250	775	698	310	125	1
35	10	D/7343-31	T495D106(1)035A(2)A260	3.5	6	260	760	720	480	125	1
35	10	X/7343-43	T495X106(1)035A(2)A260	3.5	4	260	797	717	319	125	1
35	15	D/7343-31	T495D156(1)035A(2)A260	5.3	6	260	760	684	304	125	1
35	15	D/7343-31	T495D156(1)035A(2)A225	5.3	6	225	816	775	516	125	1
35	15	X/7343-43	T495X156(1)035A(2)A260	5.3	6	260	797	717	319	125	1
35	15	X/7343-43	T495X156(1)035A(2)A800	5.3	6	800	454	431	287	125	1
35	22	D/7343-31	T495D226(1)035A(2)A200	7.7	6	200	866	779	346	125	1
35	22	D/7343-31	T495D226(1)035A(2)A260	7.7	6	260	760	684	304	125	1
35	22	D/7343-31	T495D226(1)035A(2)A300	7.7	6	300	707	636	283	125	1
35	22	X/7343-43	T495X226(1)035A(2)A200	7.7	6	200	908	817	363	125	1
35	22	X/7343-43	T495X226(1)035A(2)A260	7.7	6	260	797	717	319	125	1
35	22	X/7343-43	T495X226(1)035A(2)A275	7.7	6	275	775	735	490	125	1
35	33	D/7343-31	T495D336(1)035A(2)A300	11.6	6	300	707	636	283	125	1
35	33	X/7343-43	T495X336(1)035A(2)A260	11.6	6	260	797	717	319	125	1
35	47	X/7343-43	T495X476(1)035A(2)A300	16.5	8	300	742	668	297	125	1
50	0.47	C/6032-28	T495C474(1)050A(2)A7K2	0.5	4	7,200	124	117	78	125	1
50	1	C/6032-28	T495C105(1)050A(2)A1K6	0.5	4	1,600	262	236	105	125	1
50	1	C/6032-28	T495C105(1)050A(2)A4K8	0.5	4	4,800	151	144	96	125	1
50	1.5	C/6032-28	T495C155(1)050A(2)A1K5	0.8	6	1,500	271	244	108	125	1
50	2.2	D/7343-31	T495D225(1)050A(2)A800	1.1	6	800	433	390	173	125	1
50	3.3	D/7343-31	T495D335(1)050A(2)A700	1.7	6	700	463	417	185	125	1
50	4.7	D/7343-31	T495D475(1)050A(2)A300	2.4	6	300	707	636	283	125	1
50	4.7	D/7343-31	T495D475(1)050A(2)A1K2	2.4	6	1,200	354	335	224	125	1
50	4.7	X/7343-43	T495X475(1)050A(2)A300	2.4	4	300	742	704	469	125	1
50	6.8	D/7343-31	T495D685(1)050A(2)A400	3.4	6	400	612	551	245	125	1
50	10	X/7343-43	T495X106(1)050A(2)A250	5.0	6	250	731	325	125	125	1
50	10	X/7343-43	T495X106(1)050A(2)A300	5.0	6	300	742	668	297	125	1
50	10	X/7343-43	T495X106(1)050A(2)A800	5.0	6	800	454	431	287	125	1
50	15	X/7343-43	T495X156(1)050A(2)A300	7.5	6	300	742	668	297	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	67% of V_R
Recommended maximum application voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

KEMET Series and Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C with +20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

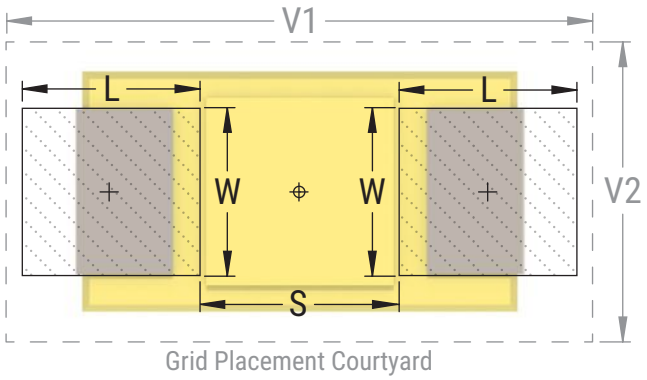
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
E[1]	7360–38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
T	3528–12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
V	7343–21	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*
[2] *Land pattern geometry is too small for silkscreen outline.*



Grid Placement Courtyard

Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

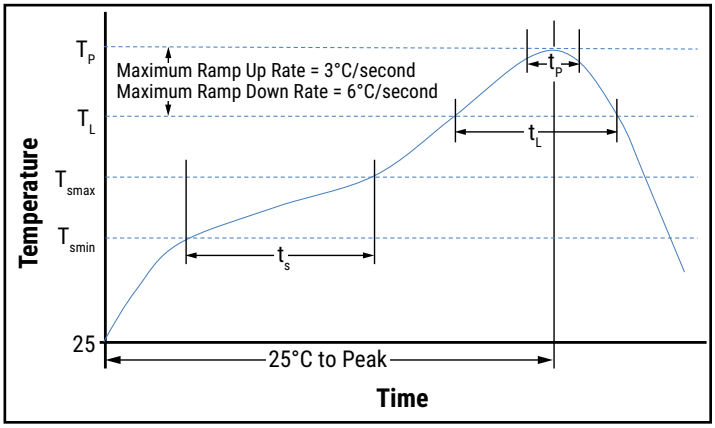
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

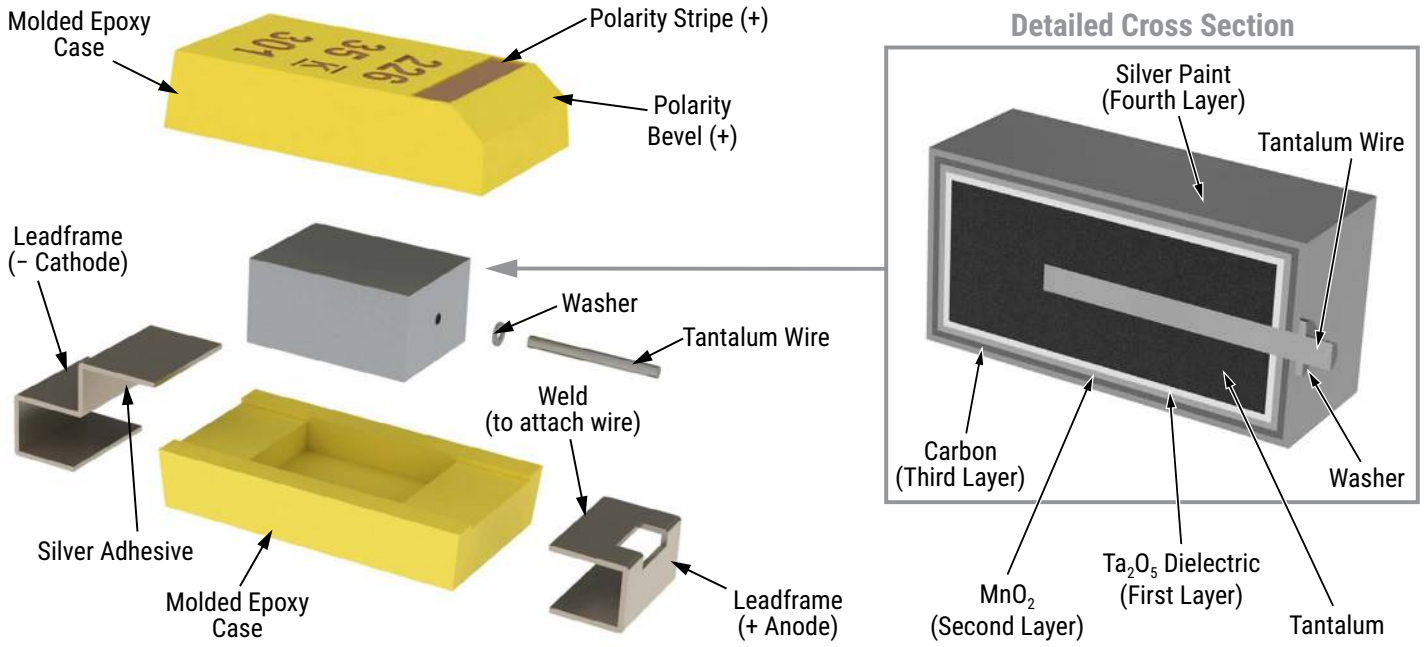
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



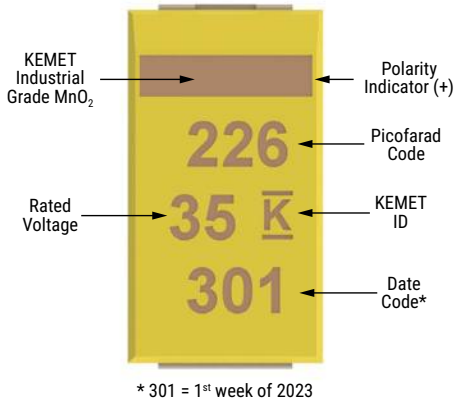
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = last number of year	8 = 2018 9 = 2019 0 = 2020 1 = 2021 2 = 2022
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

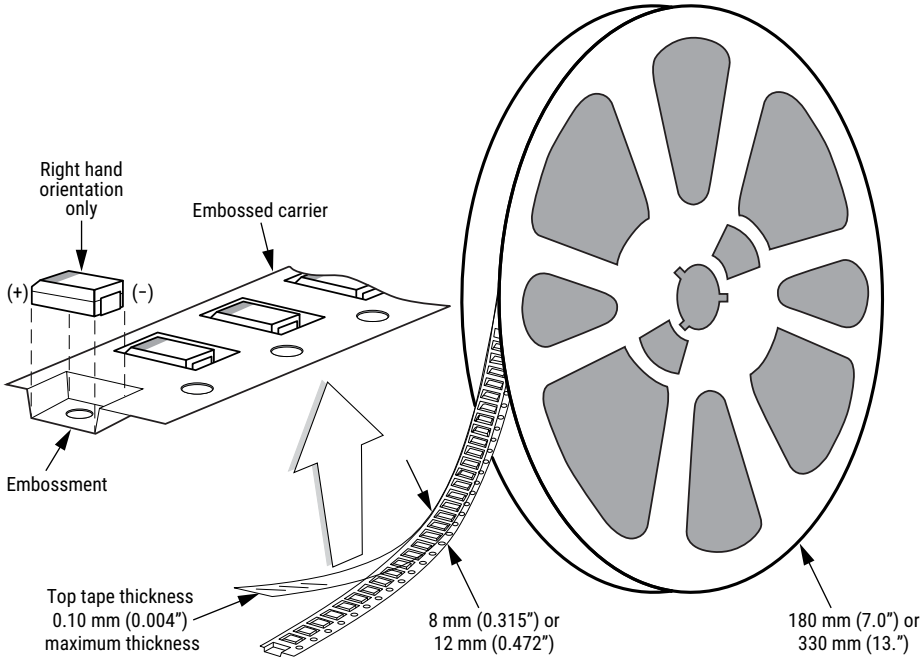


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

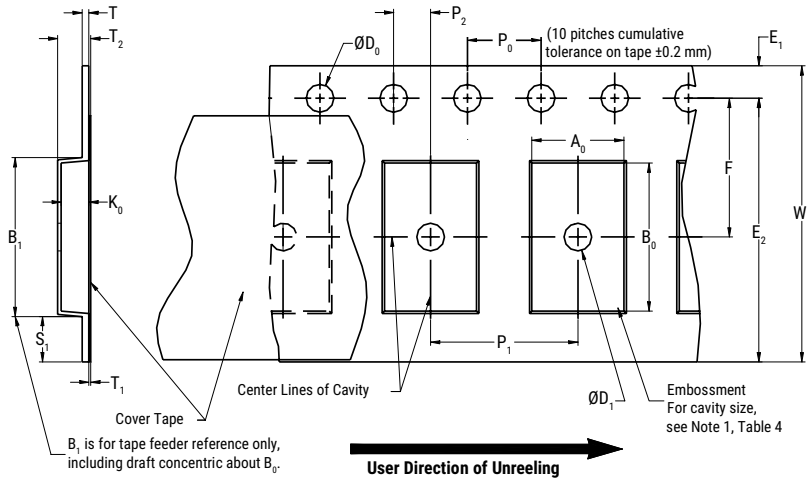


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

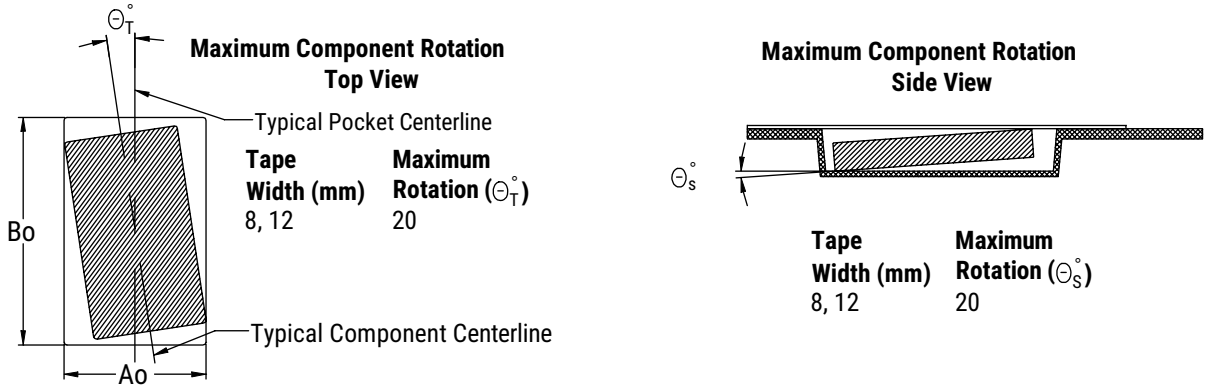


Figure 3 – Maximum Lateral Movement

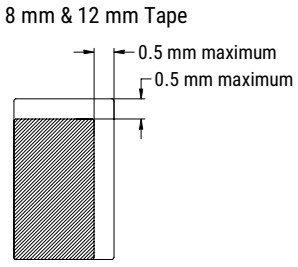


Figure 4 – Bending Radius

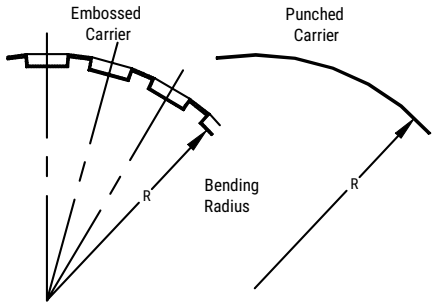
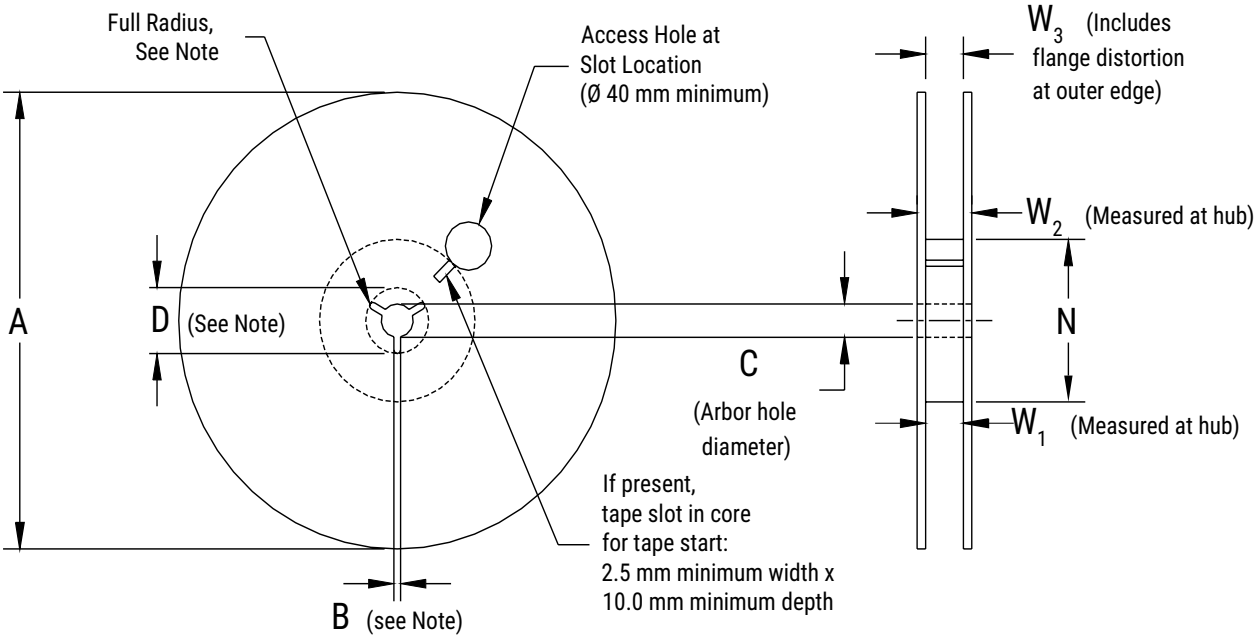


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

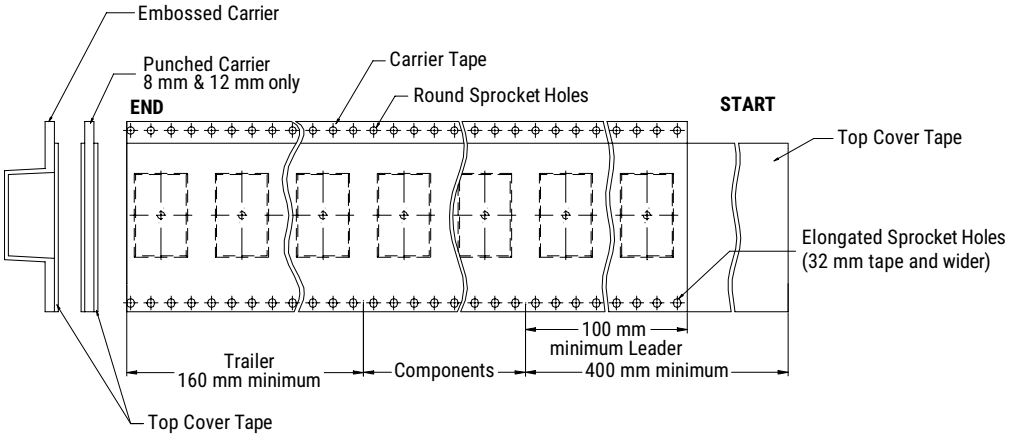
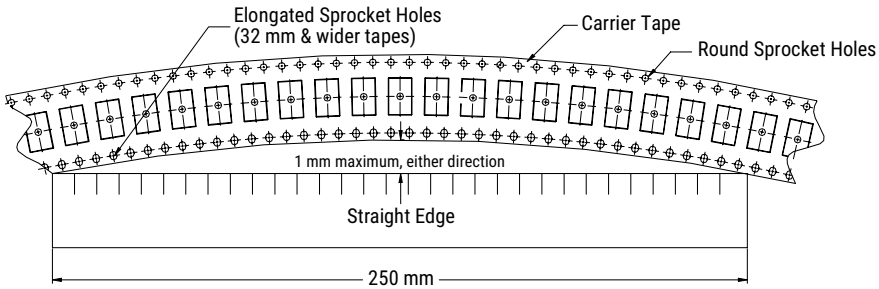


Figure 7 – Maximum Camber



T498 Automotive Grade MnO_2 150°C

Overview

The KEMET T498 is a high temperature product that offers optimum performance characteristics in applications with operating temperatures up to 150°C. Advanced materials and testing allow T498 AUTO to perform with a reliability level of 0.5%/1000 hours at rated voltage and temperature.

This series is classified as moisture sensitivity level (MSL) 1 under J STD 020: unlimited floorlife time at ≤ 30°C/85% RH. The T498 is available in five standard EIA case sizes, with RoHS compliant terminations as standard.

Benefits

- Meets or exceeds EIA standard 535BAAC
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Optional gold-plated terminations
- Laser-marked case
- 100% surge current testing
- Complies with AEC–Q200
- 100% steady-state accelerated aging
- Temperature/voltage derating is 2/3 at 150°C

Applications

Typical applications include decoupling and filtering in industrial and automotive end applications such as DC/DC converters, portable electronics, telecommunications, and control units operating at temperatures up to 150°C.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder or gold-plated.
- Halogen-free
- Epoxy compliant with UL94 V–0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	498	X	227	M	010	A	T	E500	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	ESR	Packaging (C-Spec)
T = Tantalum	High Temperature 150°C	A B C D X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte tin (Sn)-plated G = Gold-plated H = Standard solder coated (SnPb 5% Pb minimum)	E = ESR Last three digits specify ESR in mΩ (500 = 500 mΩ)	Blank = 7" reel 7280 = 13" reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 150°C
Rated Capacitance Range	0.1 – 220 µF at 120 Hz/25°C
Capacitance Tolerance	K tolerance (10%), M tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	150°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	150°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55°C to 150°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +150°C, +25°C			+25°C	–55°C	+85°C	+150°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (150°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

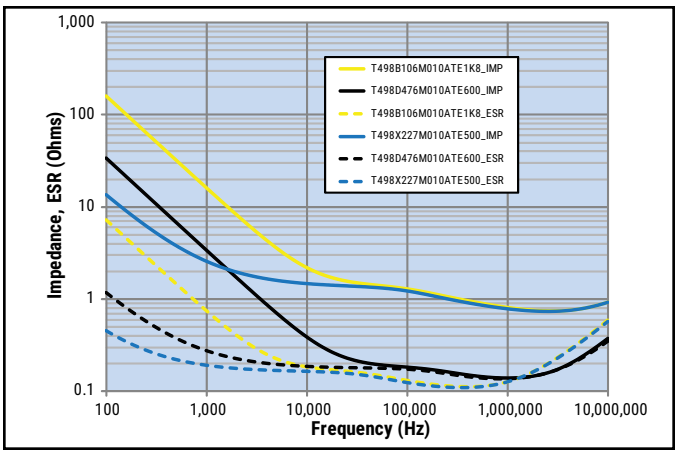
**IL = Initial Limit*

Certification

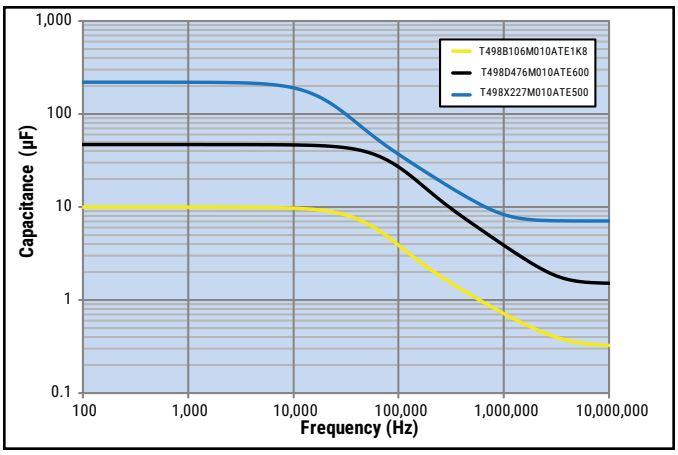
KEMET's Internal Qualification Plan for this Tantalum series of capacitors follows AEC–Q200 guidelines.

Electrical Characteristics

ESR vs. Frequency



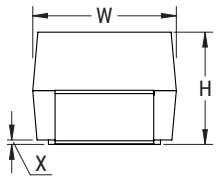
Capacitance vs. Frequency



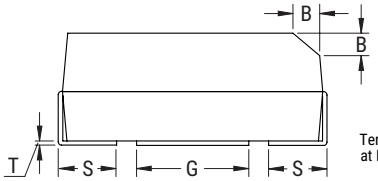
Dimensions – Millimeters (Inches)

Metric will govern

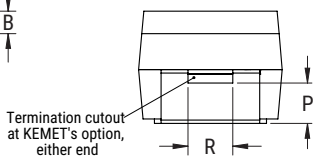
CATHODE (-) END VIEW



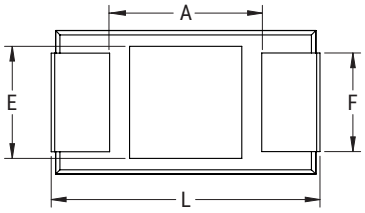
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component												
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S ±0.3 ±(0.012)	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216–18	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	1.2 (0.047)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9±0.2 (0.075±0.008)	2.2 (0.087)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.1 (0.122)	2.8 (0.110)	2.4 (0.094)
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169 ±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)

Notes: (Ref) – Dimensions provided for reference only.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	6.8	A/3216-18	T498A685(1)004A(2)E3K9	0.5	4.5	3900	139	125.1	55.6	150	1
4	10	A/3216-18	T498A106(1)004A(2)E2K9	0.5	4.5	2900	161	144.9	64.4	150	1
4	10	B/3528-21	T498B106(1)004A(2)E2K7	0.5	4.5	2700	177	159.3	70.8	150	1
4	15	A/3216-18	T498A156(1)004A(2)E2K7	0.6	4.5	2700	167	150.3	66.8	150	1
4	15	B/3528-21	T498B156(1)004A(2)E2K6	0.6	4.5	2600	181	162.9	72.4	150	1
4	22	B/3528-21	T498B226(1)004A(2)E1K8	0.9	4.5	1800	217	195.3	86.8	150	1
4	22	C/6032-28	T498C226(1)004A(2)E1K7	0.9	4.5	1700	254	228.6	101.6	150	1
4	33	B/3528-21	T498B336(1)004A(2)E1K5	1.3	4.5	1500	238	214.2	95.2	150	1
4	33	C/6032-28	T498C336(1)004A(2)E1K5	1.3	4.5	1500	271	243.9	108.4	150	1
4	47	C/6032-28	T498C476(1)004A(2)E1K1	1.9	4.5	1100	316	284.4	126.4	150	1
4	68	C/6032-28	T498C686(1)004A(2)E900	2.7	4.5	900	350	315	140	150	1
4	68	D/7343-31	T498D686(1)004A(2)E800	2.7	4.5	800	433	389.7	173.2	150	1
4	100	D/7343-31	T498D107(1)004A(2)E600	4.0	6.0	600	500	450	200	150	1
4	150	D/7343-31	T498D157(1)004A(2)E600	6.0	6.0	600	500	450	200	150	1
6.3	2.2	A/3216-18	T498A225(1)006A(2)E6K5	0.5	4.5	6500	107	96	43	150	1
6.3	3.3	A/3216-18	T498A335(1)006A(2)E4K6	0.5	4.5	4600	128	115	51	150	1
6.3	4.7	A/3216-18	T498A475(1)006A(2)E3K6	0.5	4.5	3600	144	130	58	150	1
6.3	6.8	A/3216-18	T498A685(1)006A(2)E2K9	0.5	4.5	2900	161	145	64	150	1
6.3	6.8	B/3528-21	T498B685(1)006A(2)E2K7	0.5	4.5	2700	177	159	71	150	1
6.3	10	A/3216-18	T498A106(1)006A(2)E2K7	0.6	4.5	2700	167	150	67	150	1
6.3	10	B/3528-21	T498B106(1)006A(2)E2K1	0.6	4.5	2100	201	181	80	150	1
6.3	15	B/3528-21	T498B156(1)006A(2)E1K8	0.9	4.5	1800	217	195	87	150	1
6.3	15	C/6032-28	T498C156(1)006A(2)E1K7	0.9	4.5	1700	254	229	102	150	1
6.3	22	B/3528-21	T498B226(1)006A(2)E1K5	1.4	4.5	1500	238	214	95	150	1
6.3	22	C/6032-28	T498C226(1)006A(2)E1K3	1.4	4.5	1300	291	262	116	150	1
6.3	33	B/3528-21	T498B336(1)006A(2)E1K7	2.1	6.0	1700	224	202	90	150	1
6.3	33	C/6032-28	T498C336(1)006A(2)E1K1	2.1	4.5	1100	316	284	126	150	1
6.3	47	C/6032-28	T498C476(1)006A(2)E800	3.0	4.5	800	371	334	148	150	1
6.3	47	D/7343-31	T498D476(1)006A(2)E800	3.0	4.5	800	433	390	173	150	1
6.3	68	C/6032-28	T498C686(1)006A(2)E800	4.3	4.5	800	371	334	148	150	1
6.3	68	D/7343-31	T498D686(1)006A(2)E600	4.3	4.5	600	500	450	200	150	1
6.3	100	D/7343-31	T498D107(1)006A(2)E600	6.3	6.0	600	500	450	200	150	1
6.3	150	D/7343-31	T498D157(1)006A(2)E500	9.5	6.0	500	548	493	219	150	1
10	1.5	A/3216-18	T498A155(1)010A(2)E6K5	0.5	4.5	6500	107	96	43	150	1
10	2.2	A/3216-18	T498A225(1)010A(2)E4K6	0.5	4.5	4600	128	115	51	150	1
10	3.3	A/3216-18	T498A335(1)010A(2)E3K6	0.5	4.5	3600	144	130	58	150	1
10	4.7	A/3216-18	T498A475(1)010A(2)E2K9	0.5	4.5	2900	161	145	64	150	1
10	4.7	B/3528-21	T498B475(1)010A(2)E2K7	0.5	4.5	2700	177	159	71	150	1
10	6.8	A/3216-18	T498A685(1)010A(2)E2K7	0.7	4.5	2700	167	150	67	150	1
10	6.8	B/3528-21	T498B685(1)010A(2)E2K1	0.7	4.5	2100	201	181	80	150	1
10	6.8	B/3528-21	T498B685(1)010A(2)E1K8	0.7	4.5	1800	217	195	87	150	1
10	10	A/3216-18	T498A106(1)010A(2)E3K4	1.0	4.5	3400	149	134	60	150	1
10	10	B/3528-21	T498B106(1)010A(2)E1K8	1.0	4.5	1800	217	195	87	150	1
10	10	B/3528-21	T498B106(1)010A(2)E1K5	1.0	4.5	1500	238	214	95	150	1
10	10	C/6032-28	T498C106(1)010A(2)E1K7	1.0	4.5	1700	254	229	102	150	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
10	15	B/3528-21	T498B156(1)010A(2)E1K5	1.5	4.5	1500	238	214	95	150	1
10	15	B/3528-21	T498B156(1)010A(2)E650	1.5	4.5	650	362	326	145	150	1
10	15	C/6032-28	T498C156(1)010A(2)E1K4	1.5	4.5	1400	280	252	112	150	1
10	22	B/3528-21	T498B226(1)010A(2)E1K5	2.2	6.0	1500	238	214	95	150	1
10	22	C/6032-28	T498C226(1)010A(2)E1K1	2.2	4.5	1100	316	284	126	150	1
10	33	C/6032-28	T498C336(1)010A(2)E900	3.3	4.5	900	350	315	140	150	1
10	33	D/7343-31	T498D336(1)010A(2)E800	3.3	4.5	800	433	390	173	150	1
10	47	C/6032-28	T498C476(1)010A(2)E800	4.7	4.5	800	371	334	148	150	1
10	47	C/6032-28	T498C476(1)010A(2)E350	4.7	4.5	350	561	505	224	150	1
10	47	D/7343-31	T498D476(1)010A(2)E600	4.7	4.5	600	500	450	200	150	1
10	68	D/7343-31	T498D686(1)010A(2)E600	6.8	4.5	600	500	450	200	150	1
10	100	D/7343-31	T498D107(1)010A(2)E600	10.0	6.0	600	500	450	200	150	1
10	150	X/7343-43	T498X157(1)010A(2)E500	15.0	6.0	500	574	517	230	150	1
10	220	X/7343-43	T498X227(1)010A(2)E500	22.0	9.0	500	574	517	230	150	1
16	1	A/3216-18	T498A105(1)016A(2)E6K5	0.5	3.0	6500	107	96	43	150	1
16	1.5	A/3216-18	T498A155(1)016A(2)E5K2	0.5	4.5	5200	120	108	48	150	1
16	2.2	A/3216-18	T498A225(1)016A(2)E4K3	0.5	4.5	4300	132	119	53	150	1
16	3.3	A/3216-18	T498A335(1)016A(2)E3K4	0.5	4.5	3400	149	134	60	150	1
16	3.3	B/3528-21	T498B335(1)016A(2)E3K0	0.5	4.5	3000	168	151	67	150	1
16	4.7	A/3216-18	T498A475(1)016A(2)E3K0	0.8	4.5	3000	158	142	63	150	1
16	4.7	B/3528-21	T498B475(1)016A(2)E2K1	0.8	4.5	2100	201	181	80	150	1
16	4.7	B/3528-21	T498B475(1)016A(2)E1K0	0.8	4.5	1000	292	263	117	150	1
16	6.8	A/3216-18	T498A685(1)016A(2)E2K0	1.1	4.5	2000	194	175	78	150	1
16	6.8	A/3216-18	T498A685(1)016A(2)E2K6	1.1	4.5	2600	170	153	68	150	1
16	6.8	B/3528-21	T498B685(1)016A(2)E1K8	1.1	4.5	1800	217	195	87	150	1
16	6.8	C/6032-28	T498C685(1)016A(2)E1K7	1.1	4.5	1700	254	229	102	150	1
16	10	B/3528-21	T498B106(1)016A(2)E2K8	1.6	4.5	2800	174	157	70	150	1
16	10	B/3528-21	T498B106(1)016A(2)E1K5	1.6	4.5	1500	238	214	95	150	1
16	10	C/6032-28	T498C106(1)016A(2)E1K4	1.6	4.5	1400	280	252	112	150	1
16	10	C/6032-28	T498C106(1)016A(2)E800	1.6	4.5	800	371	334	148	150	1
16	15	C/6032-28	T498C156(1)016A(2)E1K1	2.4	4.5	1100	316	284	126	150	1
16	22	B/3528-21	T498B226(1)016A(2)E1K9	3.5	6.0	1900	212	191	85	150	1
16	22	C/6032-28	T498C226(1)016A(2)E1K0	3.5	4.5	1000	332	299	133	150	1
16	22	C/6032-28	T498C226(1)016A(2)E400	3.5	4.5	400	524	472	210	150	1
16	22	D/7343-31	T498D226(1)016A(2)E800	3.5	4.5	800	433	390	173	150	1
16	33	C/6032-28	T498C336(1)016A(2)E900	5.3	4.5	900	350	315	140	150	1
16	33	D/7343-31	T498D336(1)016A(2)E700	5.3	4.5	700	463	417	185	150	
16	33	D/7343-31	T498D336(1)016A(2)E600	5.3	4.5	600	500	450	200	150	1
16	33	D/7343-31	T498D336(1)016A(2)E230	5.3	4.5	230	808	727	323	150	1
16	47	C/6032-28	T498C476(1)016A(2)E800	7.5	4.5	800	371	334	148	150	1
16	47	C/6032-28	T498C476(1)016A(2)E500	7.5	4.5	500	469	422	188	150	1
16	47	D/7343-31	T498D476(1)016A(2)E600	7.5	4.5	600	500	450	200	150	1
16	47	D/7343-31	T498D476(1)016A(2)E450	7.5	4.5	450	577	519	231	150	1
16	68	D/7343-31	T498D686(1)016A(2)E600	10.9	4.5	600	500	450	200	150	1
16	100	X/7343-43	T498X107(1)016A(2)E075	16.0	6	75	1483	1335	593	150	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
20	0.68	A/3216-18	T498A684(1)020A(2)E7K8	0.5	3.0	7800	98	88	39	150	1
20	1	A/3216-18	T498A105(1)020A(2)E5K9	0.5	3.0	5900	113	102	45	150	1
20	1.5	A/3216-18	T498A155(1)020A(2)E5K2	0.5	4.5	5200	120	108	48	150	1
20	2.2	B/3528-21	T498B225(1)020A(2)E3K6	0.5	4.5	3600	154	139	62	150	1
20	3.3	B/3528-21	T498B335(1)020A(2)E2K7	0.7	4.5	2700	177	159	71	150	1
20	4.7	B/3528-21	T498B475(1)020A(2)E1K9	0.9	4.5	1900	212	191	85	150	1
20	4.7	C/6032-28	T498C475(1)020A(2)E1K7	0.9	4.5	1700	254	229	102	150	1
20	6.8	C/6032-28	T498C685(1)020A(2)E1K3	1.4	4.5	1300	291	262	116	150	1
20	6.8	C/6032-28	T498C685(1)020A(2)E450	1.4	4.5	450	494	445	198	150	1
20	10	C/6032-28	T498C106(1)020A(2)E1K1	2.0	4.5	1100	316	284	126	150	1
20	15	C/6032-28	T498C156(1)020A(2)E1K0	3.0	4.5	1000	332	299	133	150	1
20	15	D/7343-31	T498D156(1)020A(2)E900	3.0	4.5	900	408	367	163	150	1
20	22	D/7343-31	T498D226(1)020A(2)E700	4.4	4.5	700	463	417	185	150	1
20	33	D/7343-31	T498D336(1)020A(2)E600	6.6	4.5	600	500	450	200	150	1
20	33	D/7343-31	T498D336(1)020A(2)E450	6.6	4.5	450	577	519	231	150	1
25	0.47	A/3216-18	T498A474(1)025A(2)E8K5	0.5	3.0	8500	94	85	38	150	1
25	0.68	A/3216-18	T498A684(1)025A(2)E6K5	0.5	3.0	6500	107	96	43	150	1
25	1	A/3216-18	T498A105(1)025A(2)E5K2	0.5	3.0	5200	120	108	48	150	1
25	1.5	B/3528-21	T498B155(1)025A(2)E4K2	0.5	4.5	4200	142	128	57	150	1
25	2.2	B/3528-21	T498B225(1)025A(2)E3K0	0.6	4.5	3000	168	151	67	150	1
25	3.3	C/6032-28	T498C335(1)025A(2)E2K0	0.8	4.5	2000	235	212	94	150	1
25	4.7	C/6032-28	T498C475(1)025A(2)E1K6	1.2	4.5	1600	262	236	105	150	1
25	6.8	C/6032-28	T498C685(1)025A(2)E1K4	1.7	4.5	1400	280	252	112	150	1
25	6.8	D/7343-31	T498D685(1)025A(2)E1K1	1.7	4.5	1100	369	332	148	150	1
25	10	C/6032-28	T498C106(1)025A(2)E800	2.5	4.5	800	371	334	148	150	1
25	10	C/6032-28	T498C106(1)025A(2)E1K1	2.5	4.5	1100	316	284	126	150	1
25	10	C/6032-28	T498C106(1)025A(2)E1K8	2.5	4.5	1800	247	222	99	150	1
25	10	D/7343-31	T498D106(1)025A(2)E1K0	2.5	4.5	1000	387	348	155	150	1
25	15	D/7343-31	T498D156(1)025A(2)E700	3.8	4.5	700	463	417	185	150	1
25	22	D/7343-31	T498D226(1)025A(2)E600	5.5	4.5	600	500	450	200	150	1
25	33	D/7343-31	T498D336(1)025A(2)E600	8.3	6.0	600	500	450	200	150	1
35	0.1	A/3216-18	T498A104(1)035A(2)E28K	0.5	3.0	28000	52	47	21	150	1
35	0.15	A/3216-18	T498A154(1)035A(2)E23K	0.5	3.0	23000	57	51	23	150	1
35	0.22	A/3216-18	T498A224(1)035A(2)E15K	0.5	3.0	15000	71	64	28	150	1
35	0.33	A/3216-18	T498A334(1)035A(2)E11K	0.5	3.0	11000	83	75	33	150	1
35	0.47	A/3216-18	T498A474(1)035A(2)E10K	0.5	3.0	10000	87	78	35	150	1
35	0.47	B/3528-21	T498B474(1)035A(2)E8K0	0.5	3.0	8000	103	93	41	150	1
35	0.68	B/3528-21	T498B684(1)035A(2)E5K5	0.5	3.0	5500	124	112	50	150	1
35	1	A/3216-18	T498A105(1)035A(2)E10K	0.5	4.0	10000	87	78	35	150	1
35	1	B/3528-21	T498B105(1)035A(2)E4K4	0.5	3.0	4400	139	125	56	150	1
35	1.5	C/6032-28	T498C155(1)035A(2)E3K3	0.5	4.5	3300	183	165	73	150	1
35	2.2	C/6032-28	T498C225(1)035A(2)E2K2	0.8	4.5	2200	224	202	90	150	1
35	3.3	C/6032-28	T498C335(1)035A(2)E1K7	1.2	4.5	1700	254	229	102	150	1
35	4.7	C/6032-28	T498C475(1)035A(2)E1K3	1.6	4.5	1300	291	262	116	150	1
35	4.7	D/7343-31	T498D475(1)035A(2)E1K0	1.6	4.5	1000	387	348	155	150	1
35	6.8	D/7343-31	T498D685(1)035A(2)E900	2.4	4.5	900	408	367	163	150	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

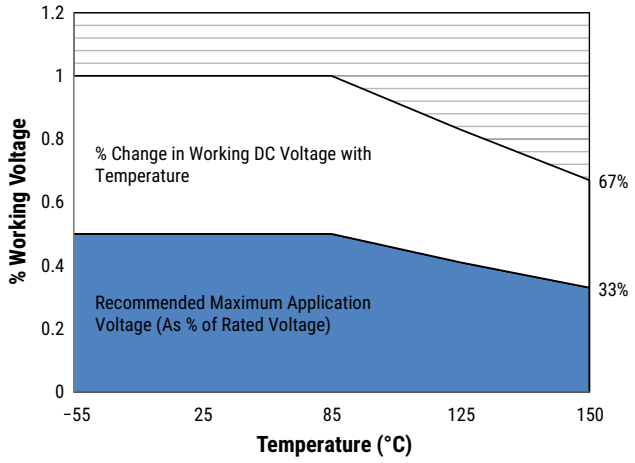
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
35	10	D/7343-31	T498D106(1)035A(2)E700	3.5	4.5	700	463	417	185	150	1
35	10	D/7343-31	T498D106(1)035A(2)E440	3.5	4.5	440	584	526	234	150	1
35	15	D/7343-31	T498D156(1)035A(2)E700	5.3	6.0	700	463	417	185	150	1
35	15	X/7343-43	T498X156(1)035A(2)E500	5.3	4.5	500	574	517	230	150	1
35	22	D/7343-31	T498D226(1)035A(2)E700	7.7	6.0	700	463	417	185	150	1
35	22	X/7343-43	T498X226(1)035A(2)E500	7.7	4.5	500	574	517	230	150	1
35	22	X/7343-43	T498X226(1)035A(2)E440	7.7	4.5	440	612	551	245	150	1
35	33	X/7343-43	T498X336(1)035A(2)E500	11.6	6.0	500	574	517	230	150	1
35	47	X/7343-43	T498X476(1)035A(2)E500	16.5	6.0	500	574	517	230	150	1
35	47	X/7343-43	T498X476(1)035A(2)E350	16.5	6.0	350	687	618	275	150	1
50	0.1	A/3216-18	T498A104(1)050A(2)E27K	0.5	3.0	27000	53	48	21	150	1
50	0.15	B/3528-21	T498B154(1)050A(2)E22K	0.5	3.0	22000	62	56	25	150	1
50	0.22	B/3528-21	T498B224(1)050A(2)E15K	0.5	3.0	15000	75	68	30	150	1
50	0.33	B/3528-21	T498B334(1)050A(2)E11K	0.5	3.0	11000	88	79	35	150	1
50	0.47	C/6032-28	T498C474(1)050A(2)E6K5	0.5	3.0	6500	130	117	52	150	1
50	0.68	C/6032-28	T498C684(1)050A(2)E5K5	0.5	3.0	5500	141	127	56	150	1
50	1	C/6032-28	T498C105(1)050A(2)E3K3	0.5	3.0	3300	183	165	73	150	1
50	1.5	D/7343-31	T498D155(1)050A(2)E2K8	0.8	4.5	2800	231	208	92	150	1
50	2.2	D/7343-31	T498D225(1)050A(2)E2K0	1.1	4.5	2000	274	247	110	150	1
50	3.3	D/7343-31	T498D335(1)050A(2)E1K1	1.7	4.5	1100	369	332	148	150	1
50	4.7	D/7343-31	T498D475(1)050A(2)E900	2.4	4.5	900	408	367	163	150	1
50	4.7	D/7343-31	T498D475(1)050A(2)E480	2.4	4.5	480	559	503	224	150	1
50	6.8	D/7343-31	T498D685(1)050A(2)E700	3.4	6.0	700	463	417	185	150	1
50	6.8	X/7343-43	T498X685(1)050A(2)E500	3.4	4.5	500	574	517	230	150	1
50	10	D/7343-31	T498D106(1)050A(2)E1K0	5.0	6.0	1000	387	348	155	150	1
50	10	X/7343-43	T498X106(1)050A(2)E500	5.0	4.5	500	574	517	230	150	1
50	10	X/7343-43	T498X106(1)050A(2)E1K0	5.0	4.5	1000	406	365	162	150	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at 25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-Plated, G = Gold-Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

Rated Voltage	Working Voltage		Recommended Application Voltage (for maximum reliability)	
	85°C	150°C	85°C	150°C
4	4	2.68	2	1.32
6.3	6.3	4.22	3.15	2.08
10	10	6.70	5	3.30
16	16	10.72	8	5.28
20	20	13.40	10	6.60
25	25	16.75	12.5	8.25
35	35	23.45	17.5	11.55
50	50	33.50	25	16.50



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Series and Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C with +20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current			
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C	T ≤ 150°C
1.00	0.90	0.40	0.30

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

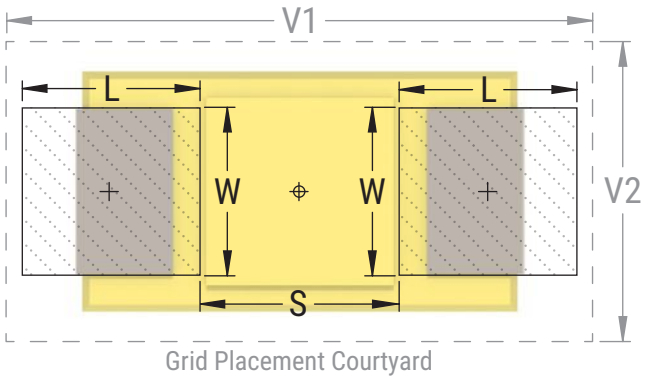
Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*

[1] *Height of these chips may create problems in wave soldering.*
[2] *Land pattern geometry is too small for silkscreen outline.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

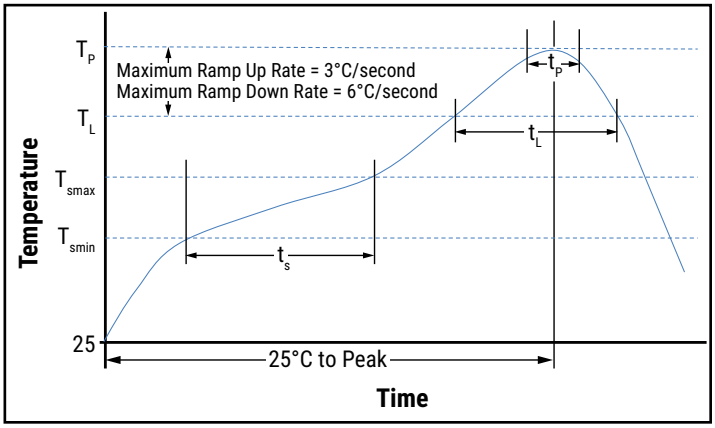
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

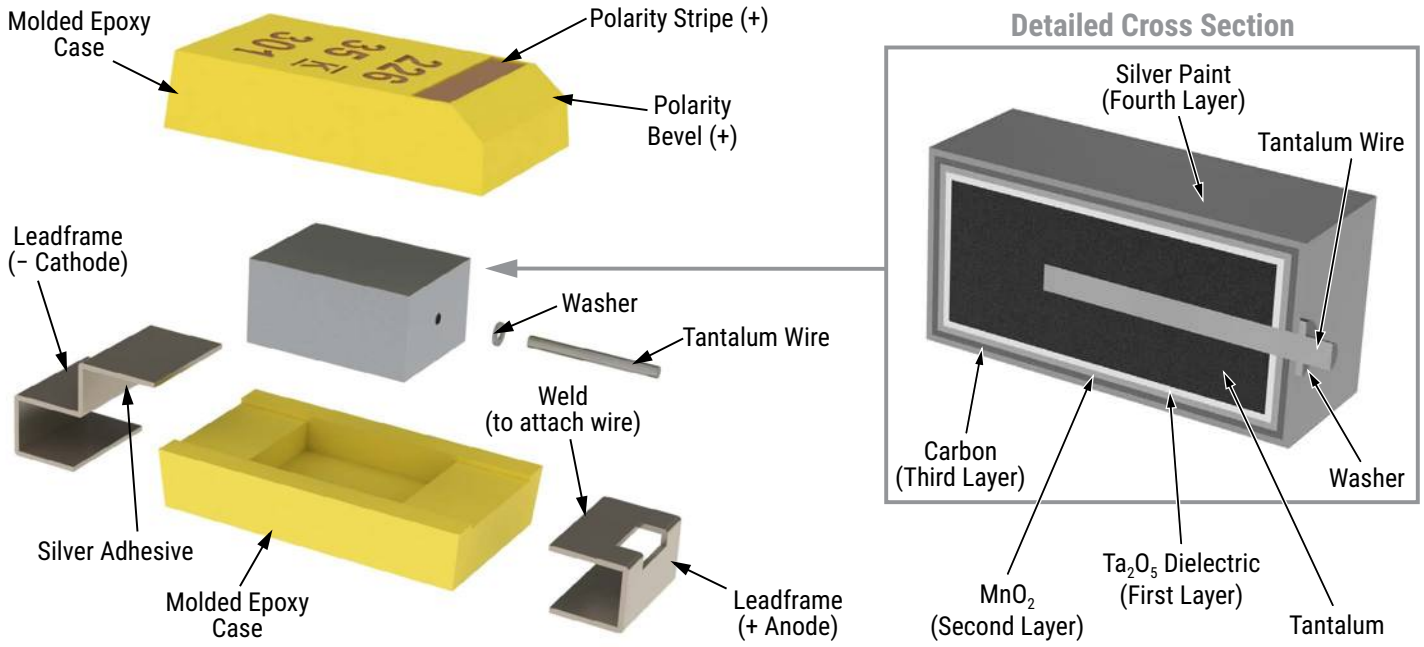
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



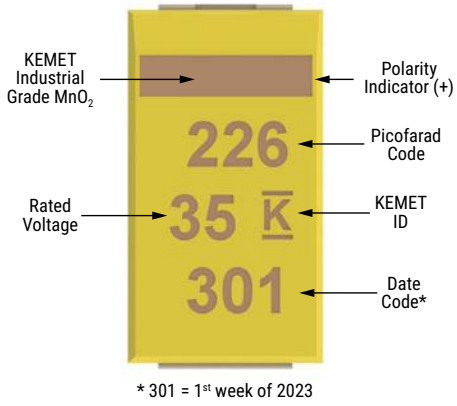
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = last number of year	8 = 2018 9 = 2019 0 = 2020 1 = 2021 2 = 2022
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

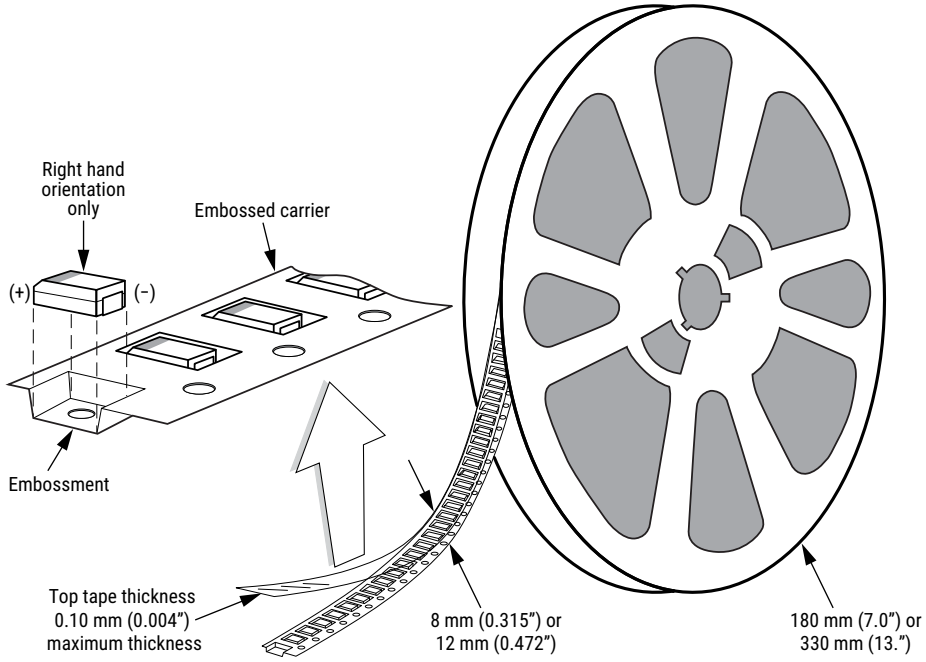


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

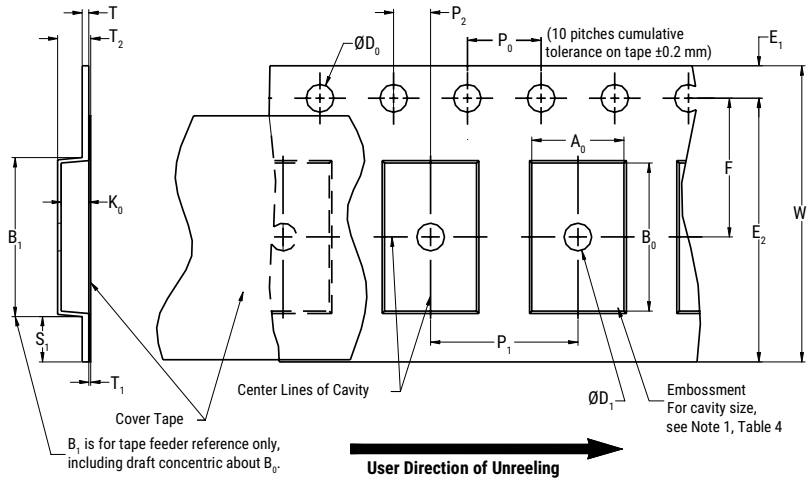


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

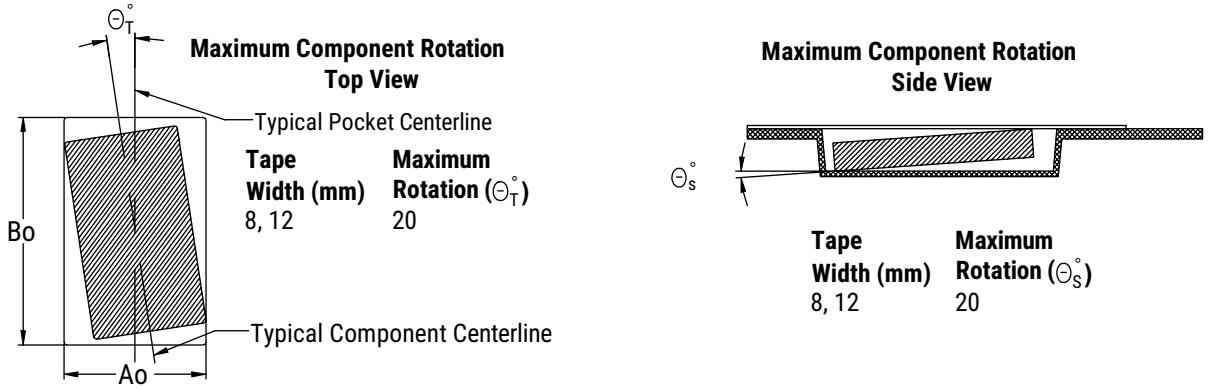


Figure 3 – Maximum Lateral Movement

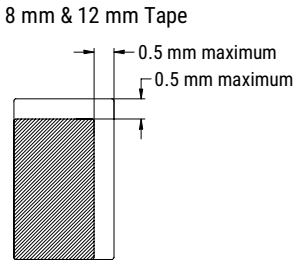


Figure 4 – Bending Radius

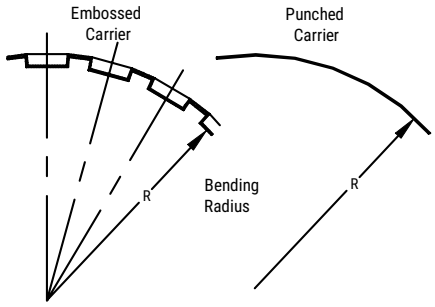
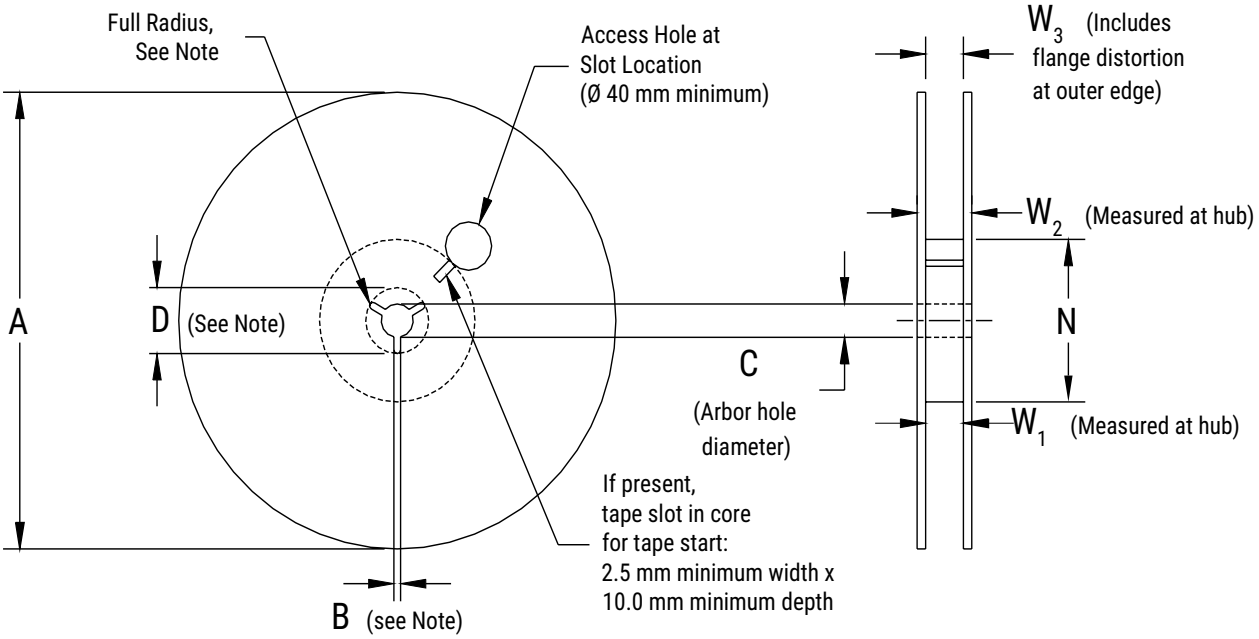


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

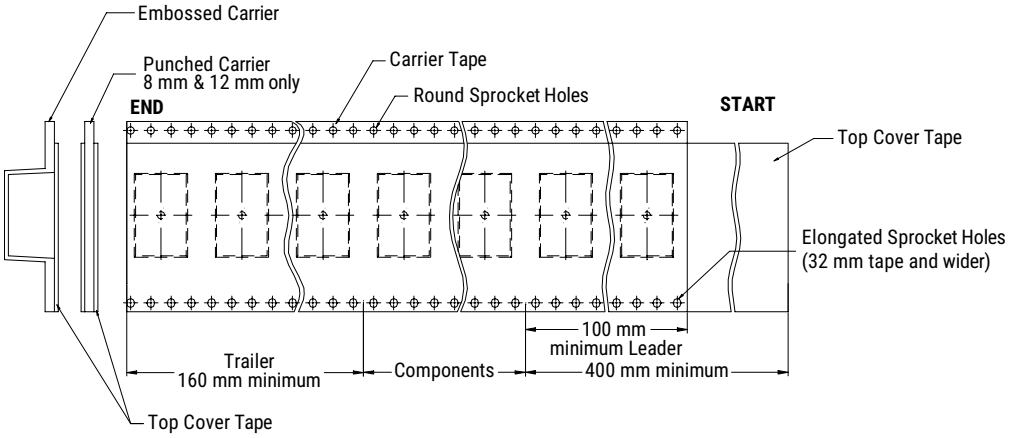
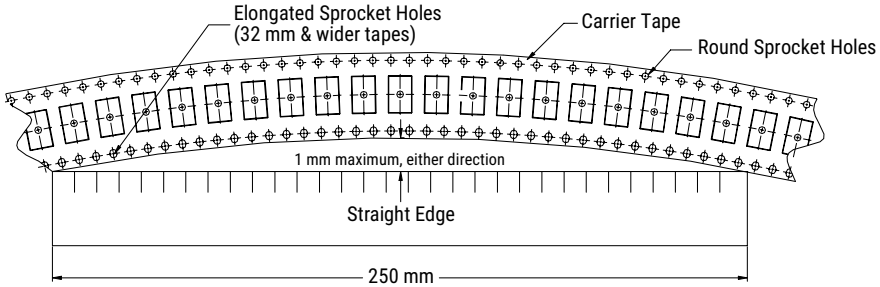


Figure 7 – Maximum Camber



T499 Automotive Grade MnO_2 175°C

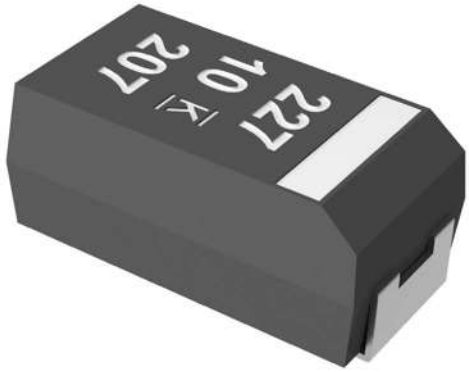
Overview

The KEMET T499 is a high-temperature product that offers optimum performance characteristics in applications with operating temperatures up to 175°C. Advanced materials and testing allow this series to perform with a reliability level of 0.5%/1000 hours at rated voltage and temperature.

T499 AUTO is classified as having moisture sensitivity level (MSL) 1 under J STD 020: unlimited floorlife time at ≤ 30°C/85% RH. T499 AUTO is available in five standard EIA case sizes, with ROHS-compliant terminations as standard.

Benefits

- Meets or exceeds EIA Standard 535BAAC
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Optional gold-plated terminations
- Laser-marked case
- 100% surge current testing
- Complies with AEC–Q200
- 100% steady-state accelerated aging
- Voltage derating is 1/2 at 175°C



Applications

Typical applications include decoupling and filtering in industrial and automotive end applications, such as DC/DC converters, portable electronics, telecommunications, and control units operating at temperatures up to 175°C.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder or gold-plated.
- Halogen-free
- Epoxy compliant with UL94 V–0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	499	X	227	M	010	A	T	E500	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	ESR	Packaging (C-Spec)
T = Tantalum	High Temperature 175°C	A B C D X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte tin (Sn)-plated G = Gold-plated H = Standard solder coated (SnPb 5% Pb minimum)	E = ESR Last three digits specify ESR in mΩ (500 = 500 mΩ)	Blank = 7" reel 7280 = 13" reel 7027 = Moisture barrier bag

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 175°C
Rated Capacitance Range	0.15 – 220 µF at 120 Hz/25°C
Capacitance Tolerance	K tolerance (10%), M tolerance (20%)
Rated Voltage Range	6 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	175°C at 1/2 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	175°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55°C to 175°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +175°C, +25°C			+25°C	–55°C	+85°C	+175°C
		Δ C/C		IL*	±10%	±10%	±30%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (150°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Figure 1, Condition F, 1,500 G peak MIL–STD–202, Method 214, 5g for 20 minutes/12 cycles each of 3 orientations. Test from 10 to 2,000 Hz		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

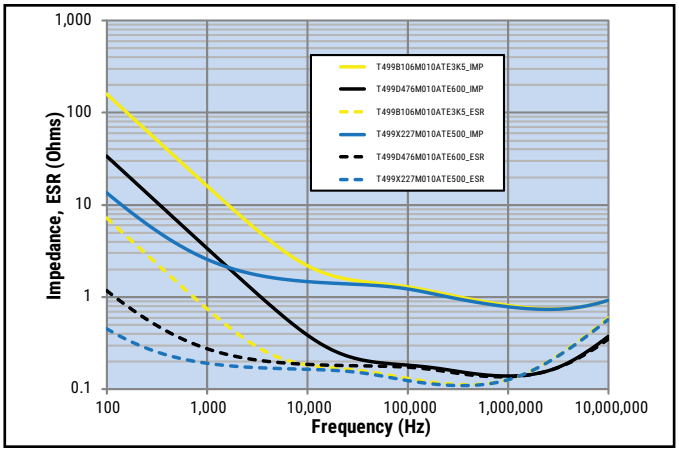
**IL = Initial Limit*

Certification

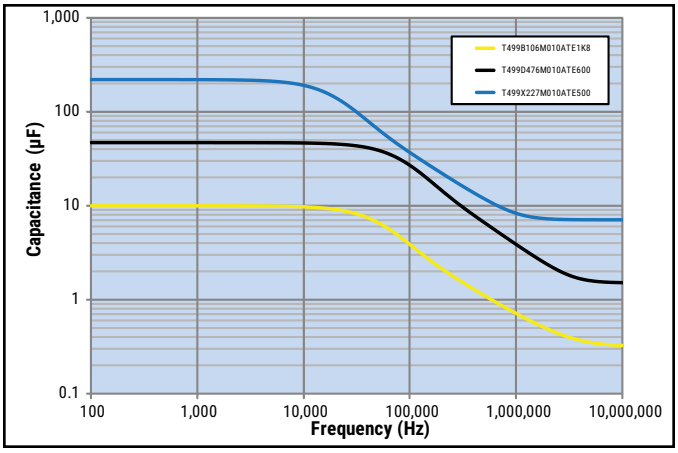
KEMET's Internal Qualification Plan for this Tantalum series of capacitors follows AEC–Q200 guidelines.

Electrical Characteristics

ESR vs. Frequency



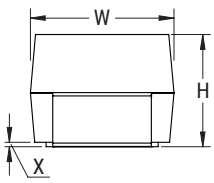
Capacitance vs. Frequency



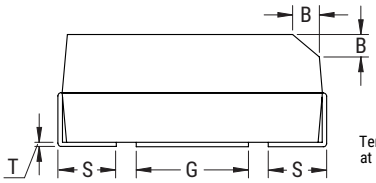
Dimensions – Millimeters (Inches)

Metric will govern

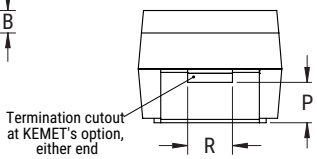
CATHODE (-) END VIEW



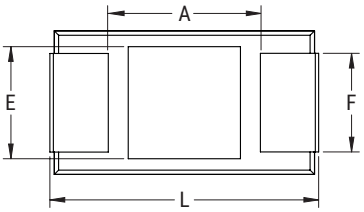
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component												
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S ±0.3 ±(0.012)	B ±0.15(Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216–18	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	1.2 (0.047)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9±0.2 (0.075±0.008)	2.2 (0.087)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.1 (0.122)	2.8 (0.110)	2.4 (0.094)
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)

Notes: (Ref) – Dimensions provided for reference only.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
6.3	4.7	A/3216-18	T499A475(1)006A(2)E6K0	0.5	6	6,000	112	101	45	175	1
6.3	6.8	B/3528-21	T499B685(1)006A(2)E3K5	0.5	6	3500	156	140.4	62.4	175	1
6.3	10	B/3528-21	T499B106(1)006A(2)E3K5	0.6	6	3,500	156	140	62	175	1
6.3	15	B/3528-21	T499B156(1)006A(2)E3K5	0.9	6	3,500	156	140	62	175	1
6.3	22	B/3528-21	T499B226(1)006A(2)E3K5	1.4	6	3,500	156	140	62	175	1
6.3	22	C/6032-28	T499C226(1)006A(2)E1K8	1.4	6	1,800	247	222	99	175	1
6.3	33	B/3528-21	T499B336(1)006A(2)E3K0	2.1	6	3,000	168	151	67	175	1
6.3	33	C/6032-28	T499C336(1)006A(2)E1K8	2.1	6	1,800	247	222	99	175	1
6.3	47	C/6032-28	T499C476(1)006A(2)E1K8	3.0	6	1,800	247	222	99	175	1
6.3	47	D/7343-31	T499D476(1)006A(2)E800	3.0	6	800	433	390	173	175	1
6.3	68	C/6032-28	T499C686(1)006A(2)E1K2	4.3	6	1,200	303	273	121	175	1
6.3	100	D/7343-31	T499D107(1)006A(2)E800	6.3	8	800	433	390	173	175	1
6.3	150	D/7343-31	T499D157(1)006A(2)E700	9.5	8	700	463	417	185	175	1
10	1.5	A/3216-18	T499A155(1)010A(2)E8K0	0.5	6	8,000	97	87	39	175	1
10	2.2	A/3216-18	T499A225(1)010A(2)E8K0	0.5	6	8,000	97	87	39	175	1
10	3.3	A/3216-18	T499A335(1)010A(2)E6K0	0.5	6	6,000	112	101	45	175	1
10	4.7	A/3216-18	T499A475(1)010A(2)E6K0	0.5	6	6,000	112	101	45	175	1
10	4.7	B/3528-21	T499B475(1)010A(2)E3K5	0.5	6	3,500	156	140	62	175	1
10	6.8	A/3216-18	T499A685(1)010A(2)E6K0	0.7	6	6,000	112	101	45	175	1
10	6.8	B/3528-21	T499B685(1)010A(2)E3K5	0.7	6	3,500	156	140	62	175	1
10	10	B/3528-21	T499B106(1)010A(2)E3K5	1.0	6	3,500	156	140	62	175	1
10	10	C/6032-28	T499C106(1)010A(2)E1K8	1.0	6	1,800	247	222	99	175	1
10	15	B/3528-21	T499B156(1)010A(2)E3K5	1.5	6	3,500	156	140	62	175	1
10	15	C/6032-28	T499C156(1)010A(2)E1K8	1.5	6	1,800	247	222	99	175	1
10	22	B/3528-21	T499B226(1)010A(2)E3K0	2.2	6	3,000	168	151	67	175	1
10	22	C/6032-28	T499C226(1)010A(2)E1K8	2.2	6	1,800	247	222	99	175	1
10	33	C/6032-28	T499C336(1)010A(2)E1K8	3.3	6	1,800	247	222	99	175	1
10	33	D/7343-31	T499D336(1)010A(2)E1K6	3.3	6	1,600	306	275	122	175	1
10	47	D/7343-31	T499D476(1)010A(2)E800	4.7	6	800	433	390	173	175	1
10	68	D/7343-31	T499D686(1)010A(2)E800	6.8	6	800	433	390	173	175	1
10	100	D/7343-31	T499D107(1)010A(2)E700	10.0	8	700	463	417	185	175	1
10	220	X/7343-43	T499X227(1)010A(2)E500	22.0	8	500	574	517	230	175	1
16	1	A/3216-18	T499A105(1)016A(2)E10K	0.5	4	10,000	87	78	35	175	1
16	1.5	A/3216-18	T499A155(1)016A(2)E8K0	0.5	6	8,000	97	87	39	175	1
16	2.2	A/3216-18	T499A225(1)016A(2)E6K0	0.5	6	6,000	112	101	45	175	1
16	3.3	A/3216-18	T499A335(1)016A(2)E6K0	0.5	6	6,000	112	101	45	175	1
16	3.3	B/3528-21	T499B335(1)016A(2)E3K5	0.5	6	3,500	156	140	62	175	1
16	4.7	B/3528-21	T499B475(1)016A(2)E6K0	0.8	6	6,000	119	107	48	175	1
16	6.8	A/3216-18	T499A685(1)016A(2)E7K0	1.1	6	7,000	104	94	42	175	1
16	6.8	B/3528-21	T499B685(1)016A(2)E3K5	1.1	6	3,500	156	140	62	175	1
16	6.8	C/6032-28	T499C685(1)016A(2)E1K8	1.1	6	1,800	247	222	99	175	1
16	10	B/3528-21	T499B106(1)016A(2)E3K5	1.6	6	3,500	156	140	62	175	1
16	10	C/6032-28	T499C106(1)016A(2)E1K8	1.6	6	1,800	247	222	99	175	1
16	15	C/6032-28	T499C156(1)016A(2)E1K8	2.4	6	1,800	247	222	99	175	1
16	22	C/6032-28	T499C226(1)016A(2)E1K6	3.5	6	1,600	262	236	105	175	1
16	22	D/7343-31	T499D226(1)016A(2)E800	3.5	6	800	433	390	173	175	1
16	33	D/7343-31	T499D336(1)016A(2)E800	5.3	6	800	433	390	173	175	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

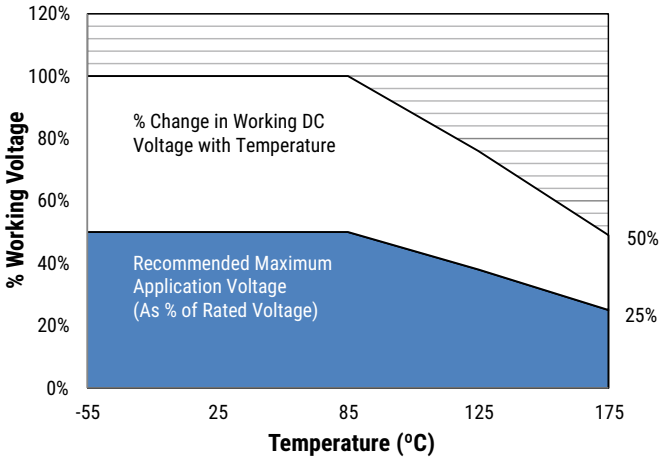
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
16	47	D/7343-31	T499D476(1)016A(2)E800	7.5	6	800	433	390	173	175	1
16	100	X/7343-43	T499X107(1)016A(2)E300	16.0	6	300	742	668	297	175	1
20	0.68	A/3216-18	T499A684(1)020A(2)E12K	0.5	4	12,000	79	71	32	175	1
20	1	A/3216-18	T499A105(1)020A(2)E10K	0.5	4	10,000	87	78	35	175	1
20	1.5	A/3216-18	T499A155(1)020A(2)E8K0	0.5	6	8,000	97	87	39	175	1
20	2.2	B/3528-21	T499B225(1)020A(2)E3K5	0.5	6	3,500	156	140	62	175	1
20	3.3	B/3528-21	T499B335(1)020A(2)E3K5	0.7	6	3,500	156	140	62	175	1
20	4.7	B/3528-21	T499B475(1)020A(2)E3K5	0.9	6	3,500	156	140	62	175	1
20	4.7	C/6032-28	T499C475(1)020A(2)E2K4	0.9	6	2,400	214	193	86	175	1
20	6.8	C/6032-28	T499C685(1)020A(2)E1K9	1.4	6	1,900	241	217	96	175	1
20	10	C/6032-28	T499C106(1)020A(2)E1K8	2.0	6	1,800	247	222	99	175	1
20	15	C/6032-28	T499C156(1)020A(2)E1K7	3.0	6	1,700	254	229	102	175	1
20	15	D/7343-31	T499D156(1)020A(2)E1K0	3.0	6	1,000	387	348	155	175	1
20	22	D/7343-31	T499D226(1)020A(2)E800	4.4	6	800	433	390	173	175	1
25	0.47	A/3216-18	T499A474(1)025A(2)E14K	0.5	4	14,000	73	66	29	175	1
25	0.68	A/3216-18	T499A684(1)025A(2)E10K	0.5	4	10,000	87	78	35	175	1
25	1	A/3216-18	T499A105(1)025A(2)E8K0	0.5	4	8,000	97	87	39	175	1
25	1.5	A/3216-18	T499A155(1)025A(2)E5K0	0.5	6	5,000	122	110	49	175	1
25	2.2	B/3528-21	T499B225(1)025A(2)E4K5	0.6	6	4,500	137	123	55	175	1
25	3.3	C/6032-28	T499C335(1)025A(2)E2K5	0.8	6	2,500	210	189	84	175	1
25	4.7	C/6032-28	T499C475(1)025A(2)E2K4	1.2	6	2,400	214	193	86	175	1
25	6.8	C/6032-28	T499C685(1)025A(2)E1K9	1.7	6	1,900	241	217	96	175	1
25	6.8	D/7343-31	T499D685(1)025A(2)E1K1	1.7	6	1,100	369	332	148	175	1
25	10	C/6032-28	T499C106(1)025A(2)E1K5	2.5	6	1,500	271	244	108	175	1
25	10	D/7343-31	T499D106(1)025A(2)E1K0	2.5	6	1,000	387	348	155	175	1
25	15	D/7343-31	T499D156(1)025A(2)E1K0	3.8	6	1,000	387	348	155	175	1
25	22	D/7343-31	T499D226(1)025A(2)E800	5.5	6	800	433	390	173	175	1
25	33	D/7343-31	T499D336(1)025A(2)E700	8.3	6	700	463	417	185	175	1
35	0.15	A/3216-18	T499A154(1)035A(2)E19K	0.5	4	19,000	63	57	25	175	1
35	0.22	A/3216-18	T499A224(1)035A(2)E18K	0.5	4	18,000	65	59	26	175	1
35	0.33	A/3216-18	T499A334(1)035A(2)E15K	0.5	4	15,000	71	64	28	175	1
35	0.47	B/3528-21	T499B474(1)035A(2)E8K0	0.5	4	8,000	103	93	41	175	1
35	0.68	B/3528-21	T499B684(1)035A(2)E6K5	0.5	4	6,000	119	107	48	175	1
35	1	A/3216-18	T499A105(1)035A(2)E10K	0.5	4	10,000	87	78	35	175	1
35	1	B/3528-21	T499B105(1)035A(2)E5K0	0.5	4	5,000	130	117	52	175	1
35	1.5	C/6032-28	T499C155(1)035A(2)E4K5	0.5	6	4,500	156	140	62	175	1
35	2.2	C/6032-28	T499C225(1)035A(2)E3K5	0.8	6	3,500	177	159	71	175	1
35	3.3	C/6032-28	T499C335(1)035A(2)E2K5	1.2	6	2,500	210	189	84	175	1
35	4.7	C/6032-28	T499C475(1)035A(2)E2K5	1.6	6	2,500	210	189	84	175	1
35	4.7	D/7343-31	T499D475(1)035A(2)E1K5	1.6	6	1,500	316	284	126	175	1
35	4.7	D/7343-31	T499D475(1)035A(2)E1K0	1.6	6	1,000	387	348	155	175	1
35	4.7	D/7343-31	T499D475(1)035A(2)E900	1.6	6	900	408	367	163	175	1
35	6.8	D/7343-31	T499D685(1)035A(2)E1K3	2.4	6	1,300	340	306	136	175	1
35	10	D/7343-31	T499D106(1)035A(2)E1K0	3.5	6	1,000	387	348	155	175	1
35	22	X/7343-43	T499X226(1)035A(2)E700	7.7	6	700	486	437	194	175	1
35	33	X/7343-43	T499X336(1)035A(2)E600	11.6	6	600	524	472	210	175	1
50	3.3	D/7343-31	T499D335(1)050A(2)E2K0	1.7	6	2,000	274	247	110	175	1
50	4.7	D/7343-31	T499D475(1)050A(2)E900	2.4	4.5	900	408	367	163	175	1
50	10	D/7343-31	T499D106(1)050A(2)E1K0	5.0	6	1,000	387	348	155	175	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

Rated Voltage	Working Voltage		Recommended Application Voltage (for maximum reliability)	
	85°C	175°C	85°C	175°C
6.3	6.3	3.15	3.15	1.58
10	10	5.00	5	2.50
16	16	8.00	8	4.00
20	20	10.00	10	5.00
25	25	12.50	12.5	6.25
35	35	17.50	17.5	8.75
50	50	25.00	25	12.50



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Series and Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C with +20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current			
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C	T ≤ 175°C
1.00	0.90	0.40	0.20

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

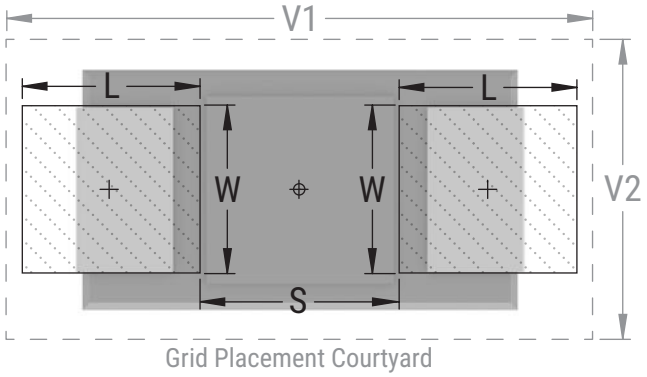
Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*

[1] *Height of these chips may create problems in wave soldering.*
[2] *Land pattern geometry is too small for silkscreen outline.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

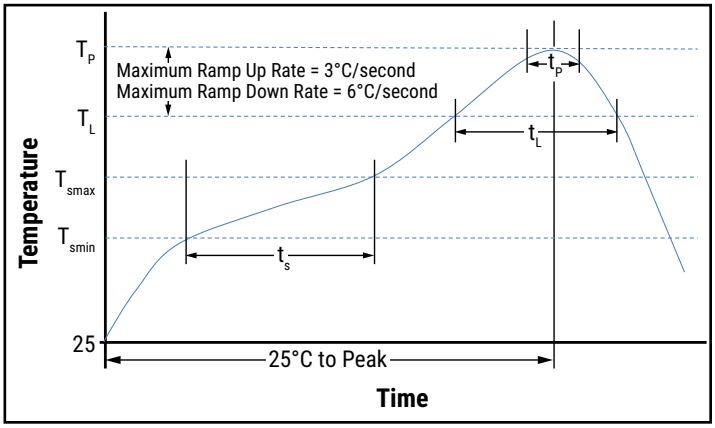
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

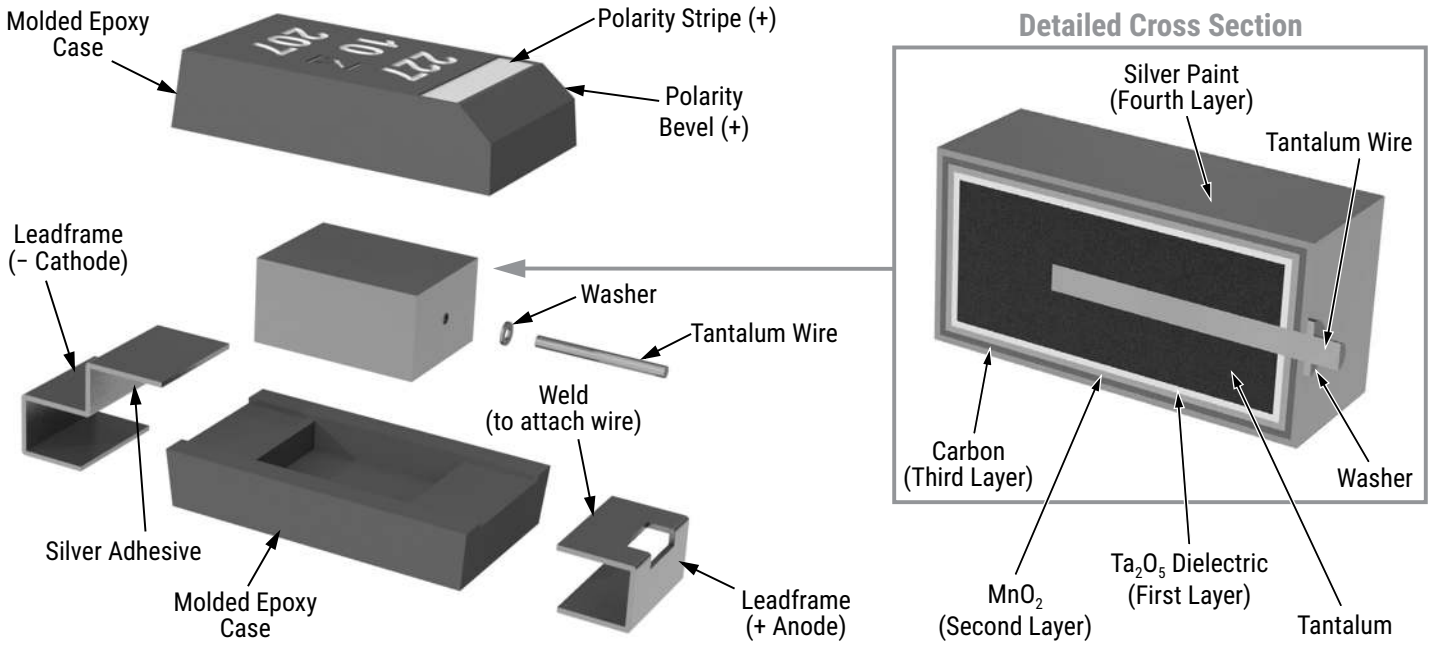
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



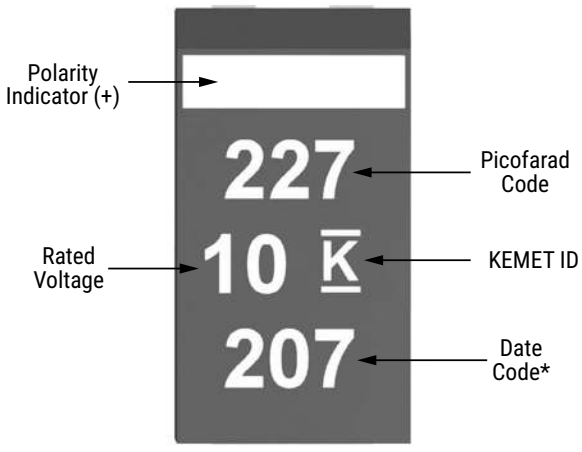
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 207 = 7th week of 2022

Date Code *	
1st digit = last number of year	8 = 2018 9 = 2019 0 = 2020 1 = 2021 2 = 2022
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

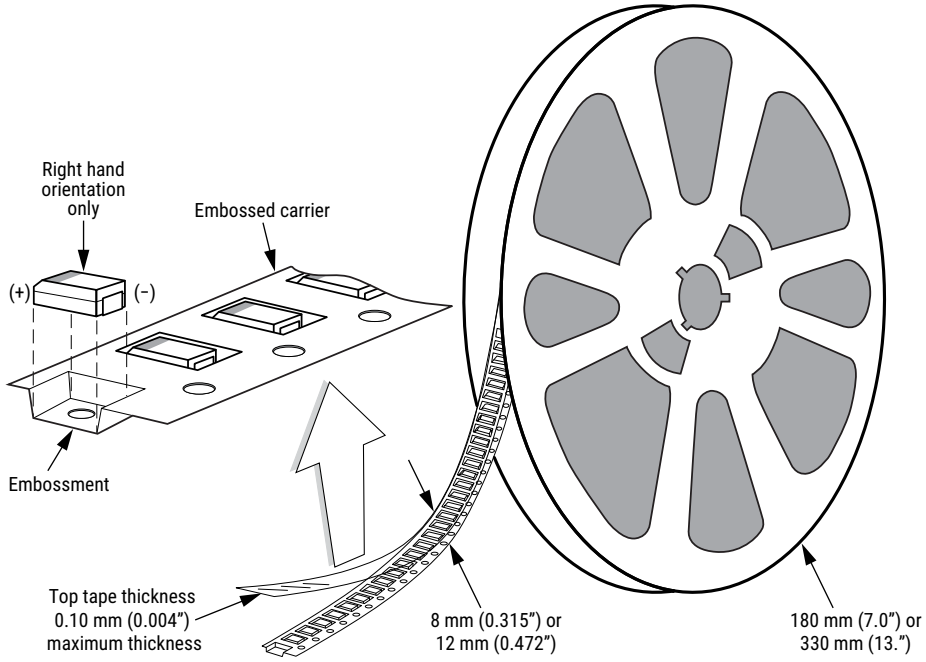


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

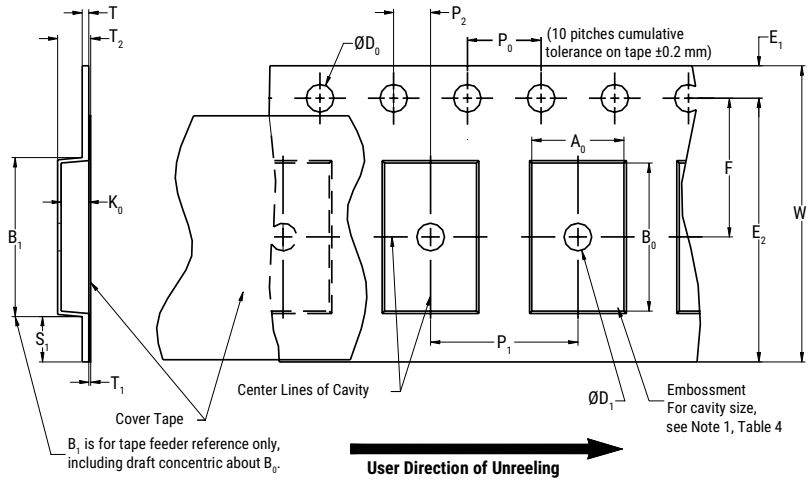


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

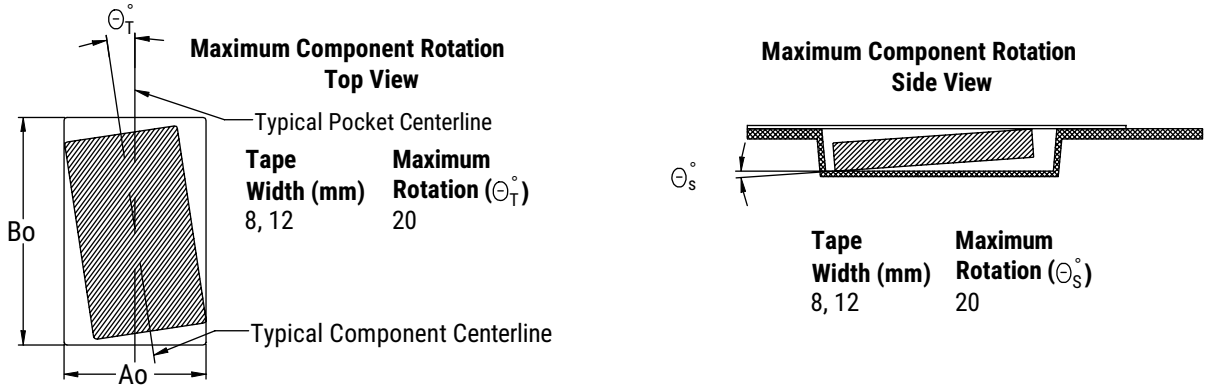


Figure 3 – Maximum Lateral Movement

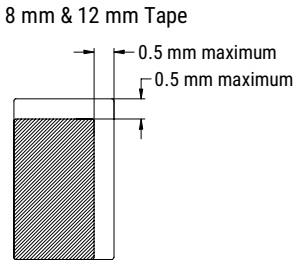


Figure 4 – Bending Radius

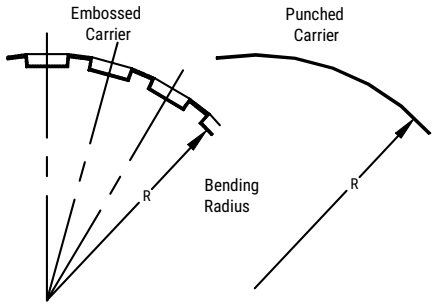
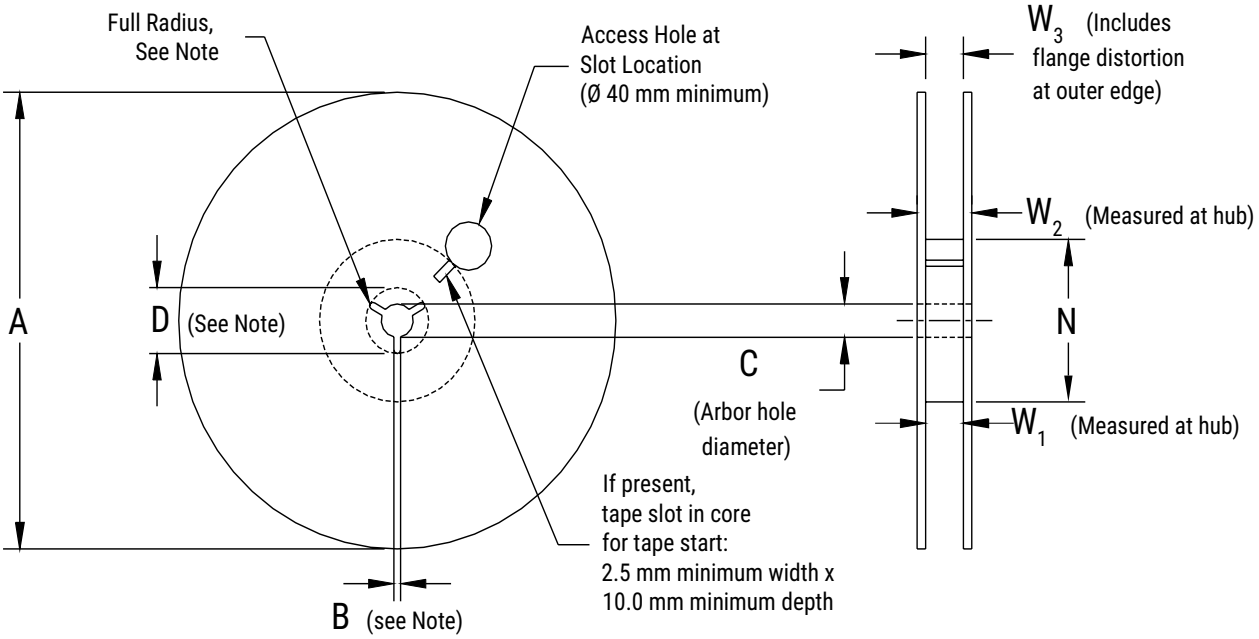


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

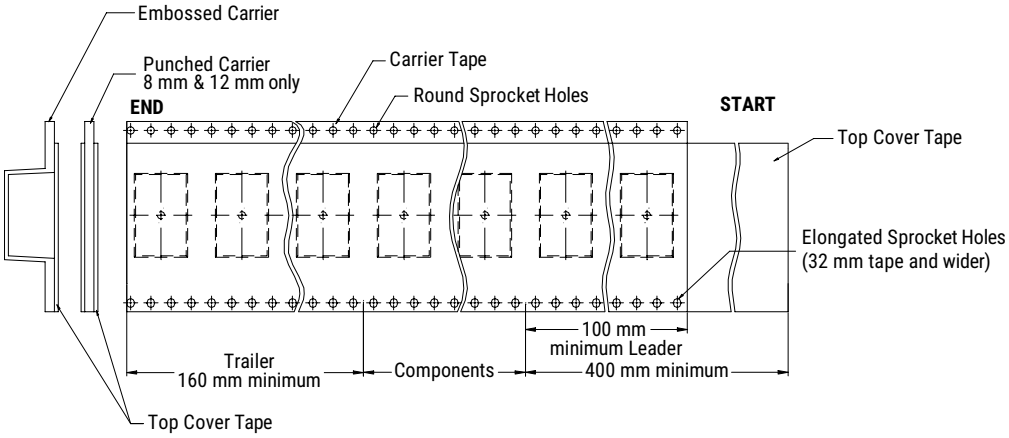
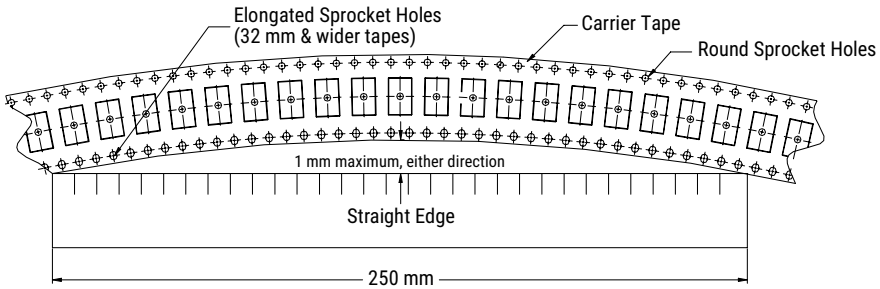


Figure 7 – Maximum Camber



T510 Automotive Grade Multiple Anode Low ESR MnO_2

Overview

The low ESR, surge-robust T510 is designed for demanding applications that require high surge current and high ripple current capability. This series builds upon the proven capabilities of our industrial grade tantalum chip capacitors, to offer several advantages such as low ESR, high ripple current capability, excellent capacitance stability, and improved resistance to high in-rush currents. These benefits are achieved though the utilization of multiple anodes, as well as high-stress, low impedance electrical conditioning performed prior to screening. This series is classified as MSL (Moisture Sensitivity Level) 1 under J–STD–020: unlimited floor life time at ≤ 30°C/85% RH.

Benefits

- Complies with AEC–Q200
- Meets or exceeds EIA standard 535BAAC
- Tape & Reel standard packaging per EIA 481
- High surge current capability
- Dedicated H termination option for Defense and Aerospace Segment
- Optional gold-plated terminations
- High ripple current capability
- 100% surge current test
- 100% steady-state accelerated aging
- Case sizes E and X
- ESR as low as 18 mΩ

Applications

Typical applications include decoupling and filtering in automotive end applications, such as DC/DC converters, portable electronics, telecommunications, and control units requiring high ripple current capability.

Environmental Compliance

- RoHS compliant when ordered with 100% Sn (AT) termination or Gold (AG) termination
- End of Life Vehicle compliant according to 2003/53/EC as amended by (EU) 2016/774 when ordered with 100% Sn (AT) termination.
- NOT RoHS or End of Life Vehicle compliant when ordered with SnPb termination (AH) due to the content of Lead (CAS # 7439-92-1) in the termination.
- REACH Candidate list of substance of very high concern, Lead (CAS# 7439-92-1) contained when ordered with SnPb termination (AH)
- Halogen-free
- Epoxy compliant with UL94 V–0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	510	X	477	M	006	A	T	A030	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	ESR	Packaging (C-Spec)
T = Tantalum	Multiple Anode Low ESR	E X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte Tin (Sn)-plated G = Gold-Plated (A, B, C, D, X only)	A = AUTO grade product 030 = Maximum ESR in mΩ at room temperature (30 mΩ)	Blank = 7" Reel 7280 = 13" Reel

H Termination

T	510	X	477	M	006	A	H	A030	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	ESR	Packaging (C-Spec)
T = Tantalum	Multiple Anode Low ESR	E X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	H = Standard Solder Coated (SnPb 5% Pb minimum)	A = AUTO grade product 030 = Maximum ESR in mΩ at room temperature (30 mΩ)	Blank = 7" Reel 7280 = 13" Reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	10 – 1,000 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55C° to 125° C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	n/a	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

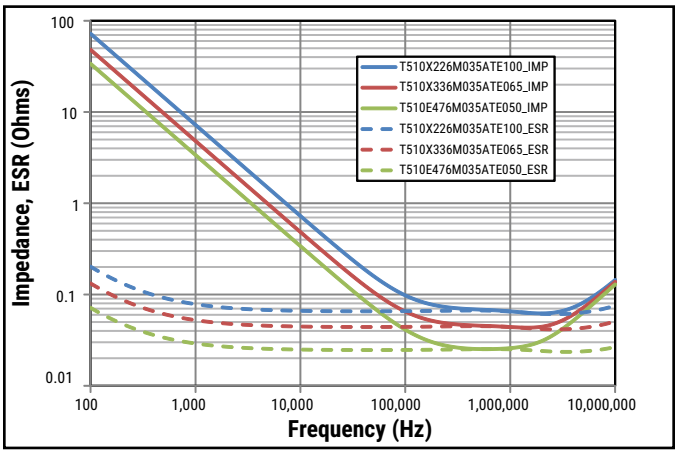
**IL = Initial limit*

Certification

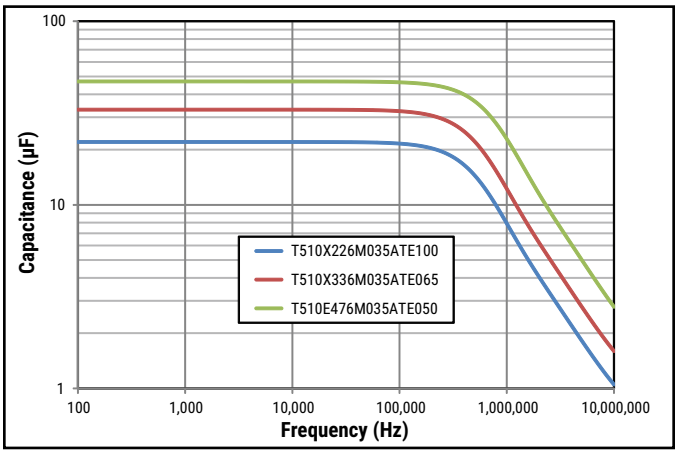
KEMET's Internal Qualification Plan for this Tantalum series of capacitors follows AEC–Q200 guidelines. Standard catalog part types ordered without a specific automotive designator, i.e., suffix AUTO or four digit customer specific designator (C-Spec), are not considered KEMET Automotive Grade tantalum capacitors.

Electrical Characteristics

Impedance, ESR vs. Frequency

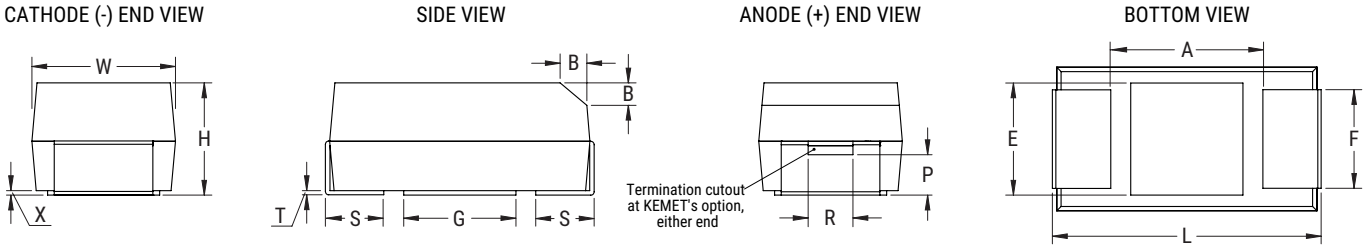


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component													Typical Weight
KEMET	EIA	L	W	H	F ±0.1 ±(.004)	S ±0.3 ±(.012)	B ±0.15 (Ref) ±.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)	(mg)
X	7343–43	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	430.15
E	7360–38	7.3 ±0.3 (0.287 ±0.012)	6.0 ±0.3 (0.236 ±0.012)	3.6 ±0.2 (0.142 ±0.008)	4.1 (0.161)	1.3 (0.051)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	n/a	n/a	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	500.73

Notes: (Ref) – Dimensions provided for reference only. For low profile cases, no dimensions are provided for B, P, or R because these cases do not have a bevel or a notch.

These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative.

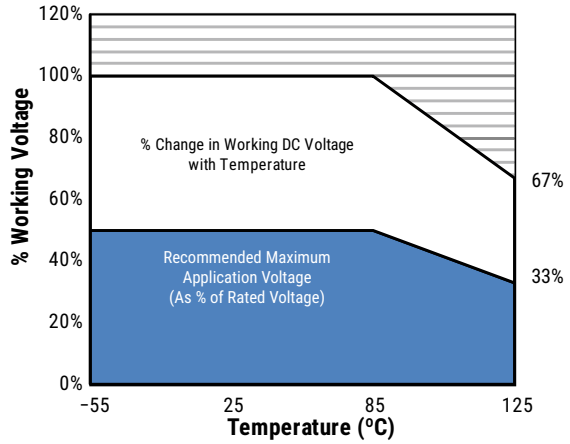
Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
4	680	X/7343-43	T510X687(1)004A(2)A030	27.2	6.0	30	3000	2700	1200	125	1
4	1000	X/7343-43	T510X108(1)004A(2)A035	40.0	6.0	35	2777	2499	1111	125	1
4	1000	E/7360-38	T510E108(1)004A(2)A018	40.0	6.0	18	3979	3581	1592	125	1
6.3	470	X/7343-43	T510X477(1)006A(2)A030	29.6	6.0	30	3000	2700	1200	125	1
6.3	680	X/7343-43	T510X687(1)006A(2)A023	42.8	6.0	23	3426	3083	1370	125	1
6.3	680	E/7360-38	T510E687(1)006A(2)A023	42.8	6.0	23	3520	3168	1408	125	1
10	330	X/7343-43	T510X337(1)010A(2)A035	33.0	6.0	35	2777	2499	1111	125	1
16	150	X/7343-43	T510X157(1)016A(2)A040	24.0	6.0	40	2598	2338	1039	125	1
16	220	X/7343-43	T510X227(1)016A(2)A040	35.2	10.0	40	2598	2338	1039	125	1
20	100	X/7343-43	T510X107(1)020A(2)A035	20.0	8.0	35	2777	2499	1111	125	1
20	100	X/7343-43	T510X107(1)020A(2)A040	20.0	6.0	40	2598	2338	1039	125	1
20	100	X/7343-43	T510X107(1)020A(2)A045	20.0	6.0	45	2449	2204	980	125	1
25	68	X/7343-43	T510X686(1)025A(2)A045	17.0	8.0	45	2449	2204	980	125	1
25	100	E/7360-38	T510E107(1)025A(2)A050	25.0	8.0	50	2387	2148	955	125	1
35	22	X/7343-43	T510X226(1)035A(2)A100	7.7	6.0	100	1643	1479	657	125	1
35	22	X/7343-43	T510X226(1)035A(2)A080	7.7	6.0	80	1837	1653	735	125	1
35	22	X/7343-43	T510X226(1)035A(2)A060	7.7	6.0	60	2121	1909	848	125	1
35	33	X/7343-43	T510X336(1)035A(2)A065	11.6	6.0	65	2038	1834	815	125	1
35	47	X/7343-43	T510X476(1)035A(2)A055	16.5	8.0	55	2216	1994	886	125	1
35	47	X/7343-43	T510X476(1)035A(2)A065	16.5	8.0	65	2038	1834	815	125	1
35	47	E/7360-38	T510E476(1)035A(2)A050	16.5	8.0	50	2387	2148	955	125	1
50	10	X/7343-43	T510X106(1)050A(2)A090	5.0	8.0	90	1732	1559	693	125	1
50	10	X/7343-43	T510X106(1)050A(2)A120	5.0	8.0	120	1500	1350	600	125	1
50	22	X/7343-43	T510X226(1)050A(2)A100	11.0	8.0	100	1643	1479	657	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Min	% at +25°C 120 Hz Max	mΩ at +25°C 100 kHz Max	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-plated, G = Gold -plated, H = Standard Solder coated (SnPb 5% Pb minimum), N = Non-Magnetic 100% Tin (Sn), M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Series and Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C w/+20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

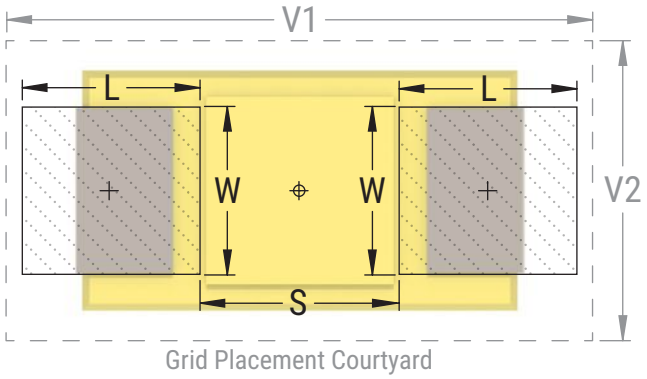
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
E[1]	7360–38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*
[2] *Land pattern geometry is too small for silkscreen outline.*



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

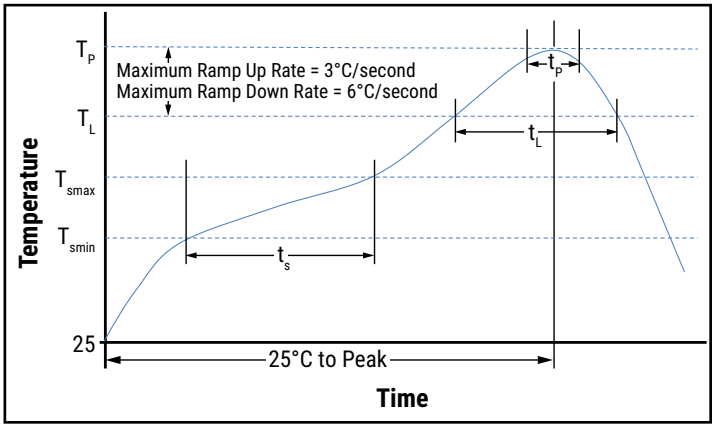
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/seconds maximum	3°C/seconds maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

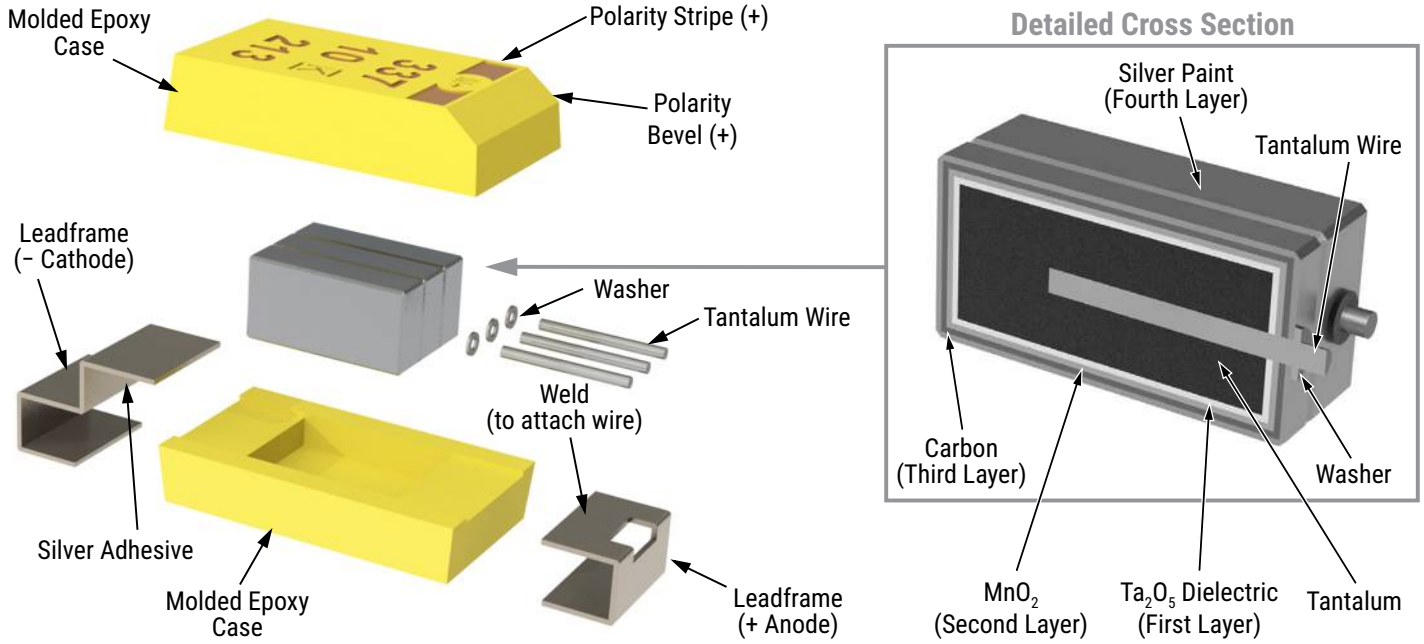
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



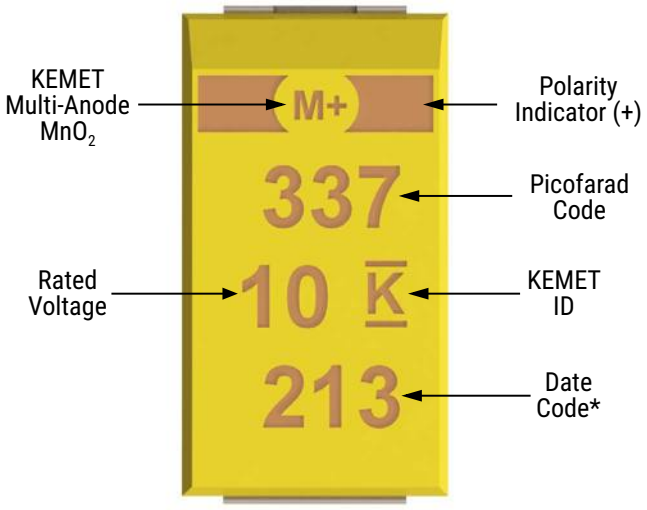
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 213 = 13th week of 2022

Date Code *	
1st digit = Last number of Year	8 = 2018 9 = 2019 0 = 2020 1 = 2021 2 = 2022
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

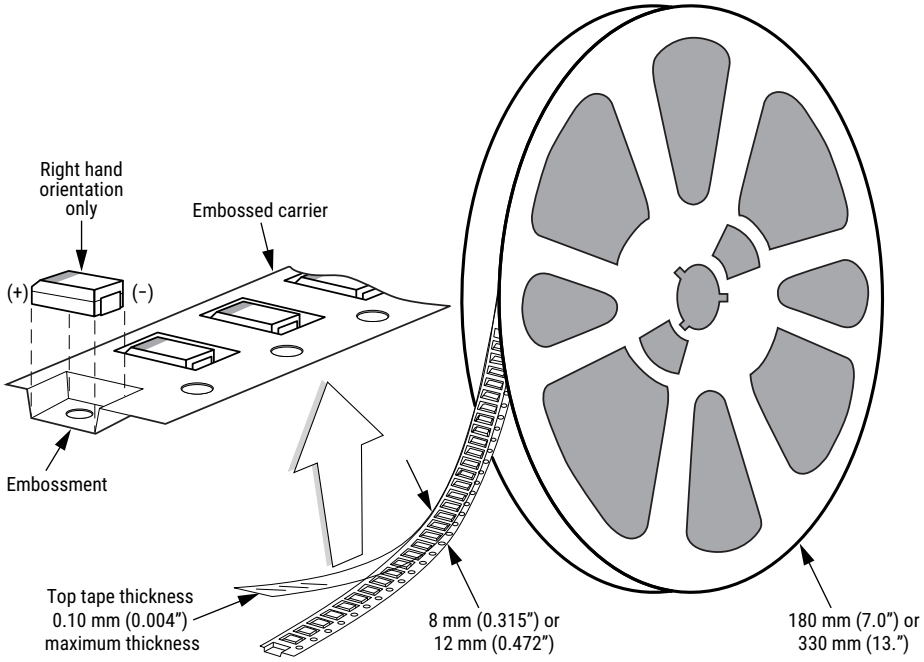


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

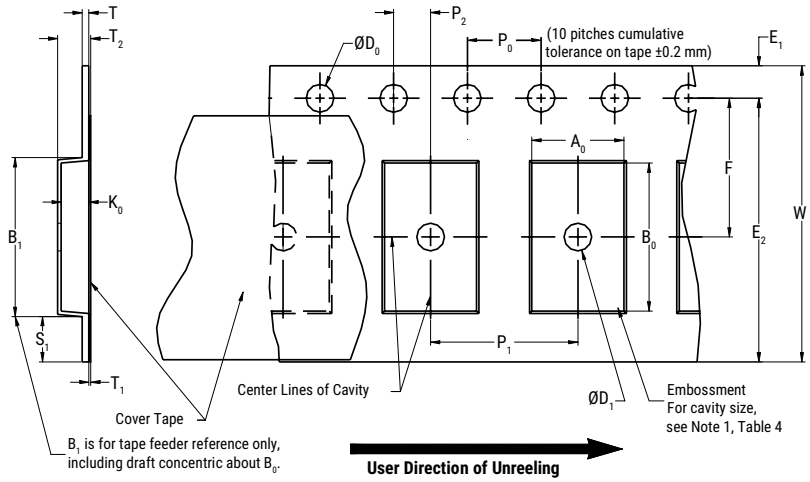


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

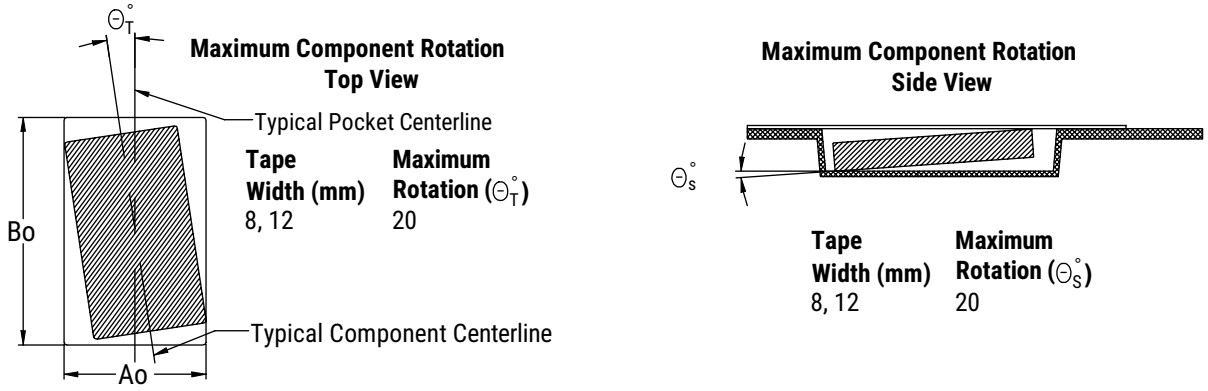


Figure 3 – Maximum Lateral Movement

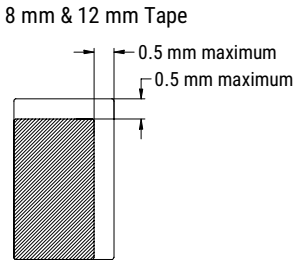


Figure 4 – Bending Radius

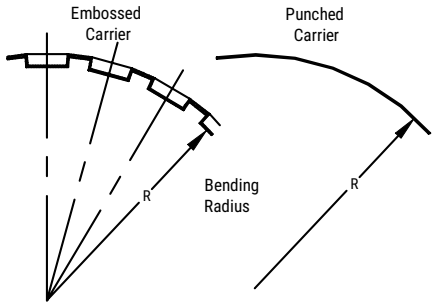
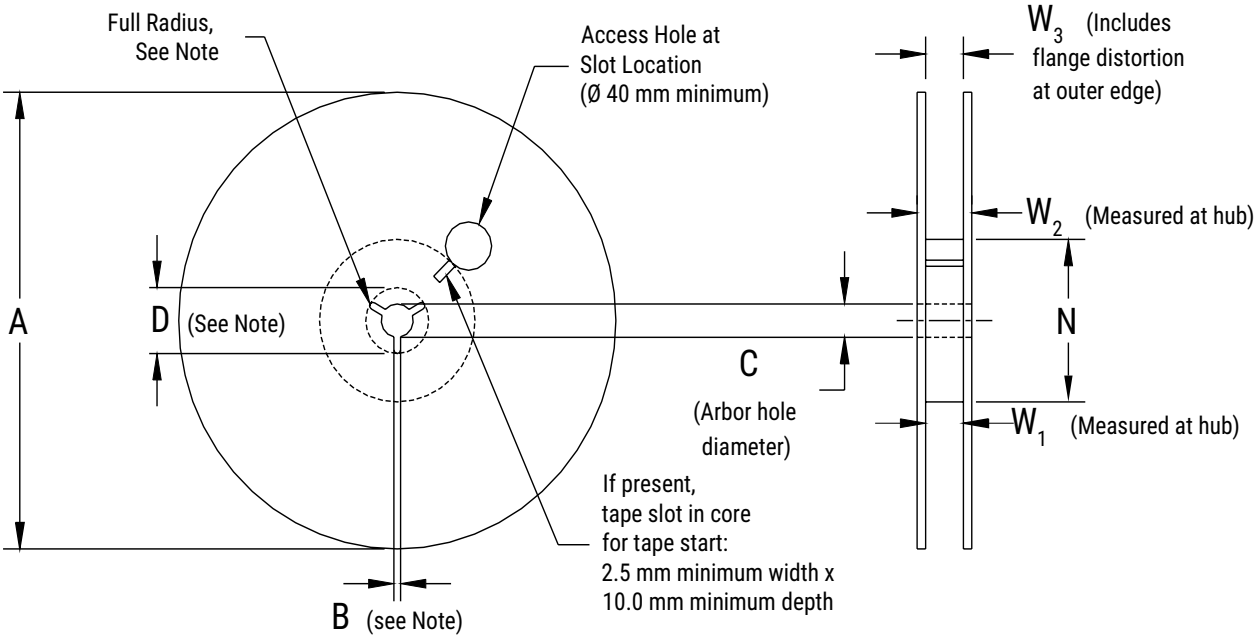


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

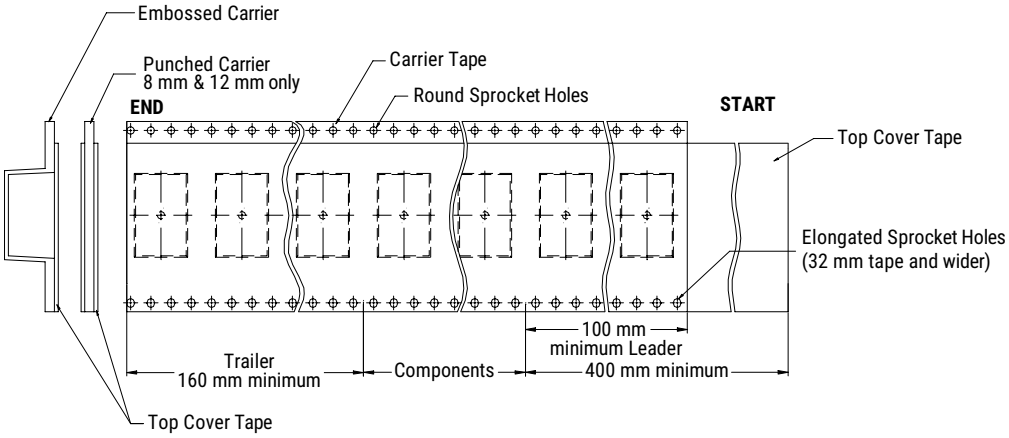
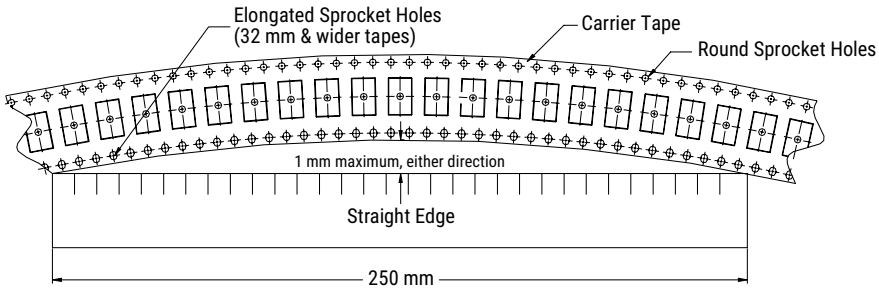


Figure 7 – Maximum Camber



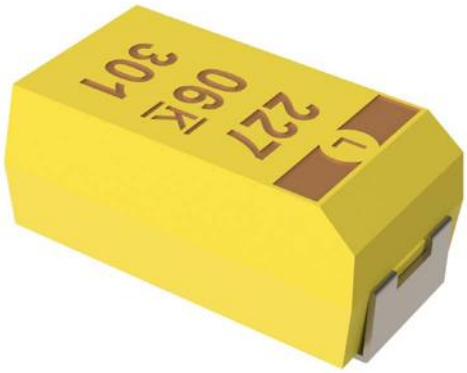
T489 Automotive Grade Low DC Leakage MnO_2

Overview

The KEMET T489 provides DC leakage current that is 25% lower than the commercial T491. The T489 also offers improved reliability, low ESR options, and meets or exceeds the requirements of EIA standard 535BAAC. This series is classified as moisture sensitivity level (MSL) 1 under J STD 020, with unlimited floor life time at ≤ 30°C/85% RH.The T489 standard terminations are available in 100% matte tin and provide excellent wetting characteristics and compatibility with today's surface mount solder systems. Tin/lead (Sn/Pb) terminations are available upon request for any part number. Gold-plated terminations are also available for use with conductive epoxy attachment processes. Standard packaging of these devices is Tape & Reel in accordance with EIA 481. This system provides perfect compatibility with all tape-fed placement units.

Benefits

- Complies with AEC–Q200
- DC Leakage at 0.0075CV
- Improved reliability: 0.50%/1,000 hours, 85°C, rated voltage
- Low ESR options available
- Meets or exceeds EIA standard 535BAAC
- Tape & Reel standard packaging per EIA 481
- Symmetrical, compliant terminations
- Laser-marked case



Applications

Typical applications include decoupling and filtering in automotive high-end applications.

Environmental Compliance

RoHS compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder or gold-plated.
- Halogen-free
- Epoxy compliant with UL94 V–0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	489	B	156	M	016	A	T	A800	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	C-Spec	Packaging (C-Spec)
T = Tantalum	Low DC leakage series	A B C D X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	T = 100% Matte tin (Sn)-plated H = Standard solder coated (SnPb 5% Pb minimum) G = Gold-plated	A = Automotive grade 800 = ESR value (800 = 800 mΩ)	Blank = 7" reel 7280 = 13" reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.10 – 470 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (±10%), M Tolerance (±20%)
Rated Voltage Range	6.3 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification
ESR (100 kHz)	Refer to Part Number Electrical Specification
Leakage Current	≤ 0.0075 CV (µA) at rated voltage after 5 minutes
Reliability	0.50%/1,000 hours at 85°C, V_R with 0.1 Ω series resistance

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55C° to 125° C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, -55°C, +25°C, +85°C, +125°C, +25°C			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak. MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

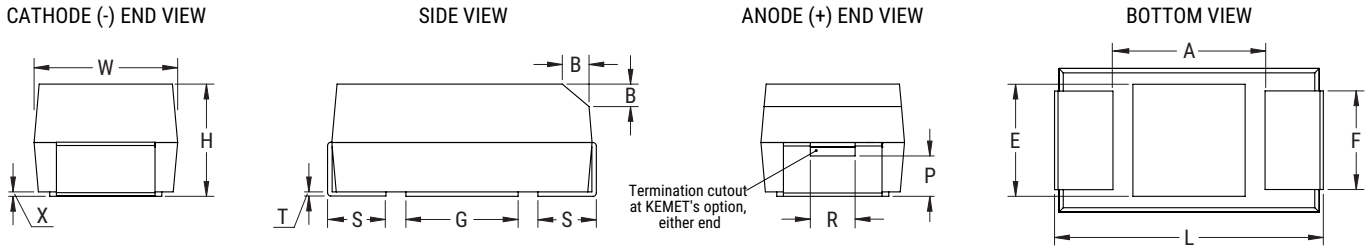
**IL = Initial limit*

Certification

KEMET's Internal Qualification Plan for this Tantalum series of capacitors follows AEC–Q200 guidelines. Standard catalog part types ordered without a specific automotive designator, i.e., suffix AUTO or four digit customer specific designator (C-Spec), are not considered KEMET automotive grade tantalum capacitors.

Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component												
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S ±0.3 ±(0.012)	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216–18	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	1.6±0.2 (0.063±0.008)	1.2 (0.047)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	1.2 (0.047)	1.1 (0.043)	1.3 (0.051)
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9±0.2 (0.075±0.008)	2.2 (0.087)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.1 (0.122)	2.8 (0.110)	2.4 (0.094)
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)

Notes: (Ref) – Dimensions provided for reference only.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Max	E-Spec Code	mΩ at +25°C 100 kHz Max	E-Spec Code	mA +25°C 100 kHz	mA +25°C 100 kHz	°C
6.3	10	B/3528-21	T489B106(1)006A(2)(3)	0.5	6.0	3000	A3K0			168	N/A	125
6.3	15	A/3216-18	T489A156(1)006A(2)(3)	0.7	6.0	2000	A2K0	1500	A1K5	194	224	125
6.3	22	B/3528-21	T489B226(1)006A(2)(3)	1.0	6.0	2000	A2K0			206	N/A	125
6.3	47	B/3528-21	T489B476(1)006A(2)(3)	2.2	6.0	1620	A1K6	500	A500	229	412	125
6.3	100	C/6032-28	T489C107(1)006A(2)(3)	4.7	6.0	440	A440			500	N/A	125
6.3	150	D/7343-31	T489D157(1)006A(2)(3)	7.1	6.0	400	A400	150	A150	612	1000	125
6.3	220	D/7343-31	T489D227(1)006A(2)(3)	10.4	8.0	360	A360	150	A150	645	1000	125
6.3	470	X/7343-43	T489X477(1)006A(2)(3)	22.2	8.0	250	A250	200	A200	812	908	125
10	2.2	A/3216-18	T489A225(1)010A(2)(3)	0.5	6.0	7000	A7K0			104	N/A	125
10	4.7	A/3216-18	T489A475(1)010A(2)(3)	0.5	6.0	2900	A2K9			161	N/A	125
10	6.8	A/3216-18	T489A685(1)010A(2)(3)	0.5	6.0	2650	A2K6			168	N/A	125
10	6.8	B/3528-21	T489B685(1)010A(2)(3)	0.5	6.0	3000	A3K0			168	N/A	125
10	10	A/3216-18	T489A106(1)010A(2)(3)	0.8	6.0	2200	A2K2	1800	A1K8	185	204	125
10	15	B/3528-21	T489B156(1)010A(2)(3)	1.1	6.0	2030	A2K0			205	N/A	125
10	22	B/3528-21	T489B226(1)010A(2)(3)	1.7	6.0	1880	A1K8	700	A700	213	348	125
10	33	B/3528-21	T489B336(1)010A(2)(3)	2.5	6.0	1000	A1K0	650	A650	292	362	125
10	33	C/6032-28	T489C336(1)010A(2)(3)	2.5	6.0	590	A590			432	N/A	125
10	47	C/6032-28	T489C476(1)010A(2)(3)	3.5	6.0	540	A540			451	N/A	125
10	47	D/7343-31	T489D476(1)010A(2)(3)	3.5	6.0	400	A400			612		125
10	68	C/6032-28	T489C686(1)010A(2)(3)	5.1	6.0	490	A490			474	N/A	125
10	100	C/6032-28	T489C107(1)010A(2)(3)	7.5	8.0	500	A500	200	A200	469	742	125
10	100	D/7343-31	T489D107(1)010A(2)(3)	7.5	6.0	440	A440	150	A150	584	1000	125
10	150	D/7343-31	T489D157(1)010A(2)(3)	11.3	8.0	400	A400	150	A150	612	1000	125
10	220	D/7343-31	T489D227(1)010A(2)(3)	16.5	8.0	500	A500			548		125
10	330	X/7343-43	T489X337(1)010A(2)(3)	24.8	8.0	300	A300			742		125
16	1	A/3216-18	T489A105(1)016A(2)(3)	0.5	6.0	10000	A10K			87	N/A	125
16	2.2	A/3216-18	T489A225(1)016A(2)(3)	0.5	6.0	4550	A4K5	3500	A3K5	128	146	125
16	3.3	B/3528-21	T489B335(1)016A(2)(3)	0.5	6.0	4500	A4K5			137	N/A	125
16	4.7	B/3528-21	T489B475(1)016A(2)(3)	0.6	6.0	3160	A3K1			164	N/A	125
16	6.8	B/3528-21	T489B685(1)016A(2)(3)	0.8	6.0	2650	A2K6			179	N/A	125
16	10	B/3528-21	T489B106(1)016A(2)(3)	1.2	6.0	2200	A2K2			197	N/A	125
16	10	C/6032-28	T489C106(1)016A(2)(3)	1.2	6.0	2000	A2K0			235	N/A	125
16	15	B/3528-21	T489B156(1)016A(2)(3)	1.8	6.0	2030	A2K0	800	A800	205	326	125
16	22	B/3528-21	T489B226(1)016A(2)(3)	2.6	6.0	1100	A1K1	600	A600	278	376	125
16	22	C/6032-28	T489C226(1)016A(2)(3)	2.6	6.0	700	A700	350	A350	396	561	125
16	33	C/6032-28	T489C336(1)016A(2)(3)	4.0	6.0	590	A590			432	N/A	125
16	47	C/6032-28	T489C476(1)016A(2)(3)	5.6	6.0	540	A540	350	A350	451	561	125
16	47	D/7343-31	T489D476(1)016A(2)(3)	5.6	6.0	540	A540	200	A200	527	866	125
16	68	D/7343-31	T489D686(1)016A(2)(3)	8.2	6.0	490	A490	150	A150	553	1000	125
16	100	D/7343-31	T489D107(1)016A(2)(3)	12.0	6.0	440	A440	150	A150	584	1000	125
16	150	X/7344-43	T489X157(1)016A(2)(3)	18.0	12.0	700	A700	150	A150	486	1049	125
20	1	A/3216-18	T489A105(1)020A(2)(3)	0.5	4.0	6630	A6K6			106	N/A	125
20	1.5	A/3216-18	T489A155(1)020A(2)(3)	0.5	6.0	5460	A5K4			117	N/A	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Max	E-Spec Code	mΩ at +25°C 100 kHz Max	E-Spec Code	mA +25°C 100 kHz	mA +25°C 100 kHz	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn)-Plated, G = Gold-Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
(3) To complete KEMET part number, insert the ESR specification code.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Max	E-Spec Code	mΩ at +25°C 100 kHz Max	E-Spec Code	mA +25°C 100 kHz	mA +25°C 100 kHz	°C
20	2.2	A/3216-18	T489A225(1)020A(2)(3)	0.5	6.0	4550	A4K5			128	N/A	125
20	3.3	A/3216-18	T489A335(1)020A(2)(3)	0.5	6.0	3740	A3K7	3500	A3K5	142	146	125
20	3.3	B/3528-21	T489B335(1)020A(2)(3)	0.5	6.0	3740	A3K7			151	N/A	125
20	4.7	B/3528-21	T489B475(1)020A(2)(3)	0.7	6.0	3160	A3K1			164	N/A	125
20	6.8	B/3528-21	T489B685(1)020A(2)(3)	1.0	6.0	2650	A2K6			179	N/A	125
20	6.8	C/6032-28	T489C685(1)020A(2)(3)	1.0	6.0	2000	A2K0			235	N/A	125
20	10	B/3528-21	T489B106(1)020A(2)(3)	1.5	6.0	2200	A2K2	1000	A1K0	197	292	125
20	10	C/6032-28	T489C106(1)020A(2)(3)	1.5	6.0	800	A800	500	A500	371	469	125
20	15	C/6032-28	T489C156(1)020A(2)(3)	2.3	6.0	720	A720	400	A400	391	524	125
20	22	D/7343-31	T489D226(1)020A(2)(3)	3.3	6.0	650	A650	300	A300	480	707	125
20	33	C/6032-28	T489C336(1)020A(2)(3)	5.0	6.0	590	A590	300	A300	432	606	125
20	33	D/7343-31	T489D336(1)020A(2)(3)	5.0	6.0	590	A590	250	A250	504	775	125
20	47	D/7343-31	T489D476(1)020A(2)(3)	7.1	6.0	540	A540	200	A200	527	866	125
20	68	D/7343-31	T489D686(1)020A(2)(3)	10.2	6.0	490	A490	200	A200	553	866	125
20	100	X/7343-43	T489X107(1)020A(2)(3)	15.0	6.0	300	A300	150	A150	742		125
25	0.47	A/3216-18	T489A474(1)025A(2)(3)	0.5	4.0	9530	A9K5	7000	A7K0	89	104	125
25	0.68	A/3216-18	T489A684(1)025A(2)(3)	0.5	4.0	7980	A7K9			97	N/A	125
25	1	A/3216-18	T489A105(1)025A(2)(3)	0.5	4.0	6630	A6K6			106	N/A	125
25	2.2	B/3528-21	T489B225(1)025A(2)(3)	0.5	6.0	4550	A4K5			137	N/A	125
25	3.3	B/3528-21	T489B335(1)025A(2)(3)	0.6	6.0	3740	A3K7	2000	A2K0	151	206	125
25	4.7	B/3528-21	T489B475(1)025A(2)(3)	0.9	6.0	3160	A3K1	1000	A1K0	164	292	125
25	6.8	B/3528-21	T489B685(1)025A(2)(3)	1.3	6.0	1500	A1K5	1000	A1K0	238	292	125
25	6.8	C/6032-28	T489C685(1)025A(2)(3)	1.3	6.0	1070	A1K0	600	A600	321	428	125
25	10	C/6032-28	T489C106(1)025A(2)(3)	1.9	6.0	800	A800	600	A600	371	428	125
25	10	D/7343-31	T489D106(1)025A(2)(3)	1.9	6.0	1200	A1K2			354		125
25	15	C/6032-28	T489C156(1)025A(2)(3)	2.8	6.0	720	A720			391	N/A	125
25	15	D/7343-31	T489D156(1)025A(2)(3)	2.8	6.0	720	A720	300	A300	456	707	125
25	22	D/7343-31	T489D226(1)025A(2)(3)	4.1	6.0	650	A650	300	A300	480	707	125
25	33	D/7343-31	T489D336(1)025A(2)(3)	6.2	6.0	590	A590	400	A400	504	612	125
25	47	D/7343-31	T489D476(1)025A(2)(3)	8.8	6.0	540	A540	250	A250	527	775	125
35	0.1	A/3216-18	T489A104(1)035A(2)(3)	0.5	4.0	20000	A20K			61	N/A	125
35	0.22	A/3216-18	T489A224(1)035A(2)(3)	0.5	4.0	13710	A13K			74	N/A	125
35	0.33	A/3216-18	T489A334(1)035A(2)(3)	0.5	4.0	11280	A11K			82	N/A	125
35	1	A/3216-18	T489A105(1)035A(2)(3)	0.5	4.0	6630	A6K6	3000	A3K0	106	158	125
35	1	B/3528-21	T489B105(1)035A(2)(3)	0.5	4.0	3400	A3K4	2000	A2K0	158	206	125
35	1.5	B/3528-21	T489B155(1)035A(2)(3)	0.5	6.0	5460	A5K4	2500	A2K5	125	184	125
35	2.2	B/3528-21	T489B225(1)035A(2)(3)	0.6	6.0	4550	A4K5	2000	A2K0	137	206	125
35	3.3	B/3528-21	T489B335(1)035A(2)(3)	0.9	6.0	3740	A3K7			151	N/A	125
35	3.3	C/6032-28	T489C335(1)035A(2)(3)	0.9	6.0	1840	A1K8	800	A800	245	371	125
35	4.7	C/6032-28	T489C475(1)035A(2)(3)	1.2	6.0	1410	A1K4	600	A600	279	428	125
35	6.8	C/6032-28	T489C685(1)035A(2)(3)	1.8	6.0	1070	A1K0	600	A600	321	428	125
35	6.8	D/7343-31	T489D685(1)035A(2)(3)	1.8	6.0	1300	A1K3			340		125
35	10	C/6032-28	T489C106(1)035A(2)(3)	2.6	6.0	800	A800	600	A600	371	428	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Max	E-Spec Code	mΩ at +25°C 100 kHz Max	E-Spec Code	mA +25°C 100 kHz	mA +25°C 100 kHz	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
(3) To complete KEMET part number, insert the ESR specification code.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

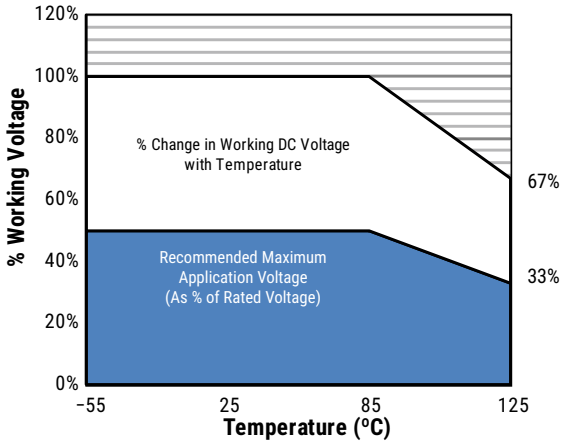
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Max	E-Spec Code	mΩ at +25°C 100 kHz Max	E-Spec Code	mA +25°C 100 kHz	mA +25°C 100 kHz	°C
35	10	D/7343-31	T489D106(1)035A(2)(3)	2.6	6.0	800	A800	400	A400	433	612	125
35	15	D/7343-31	T489D156(1)035A(2)(3)	3.9	6.0	720	A720	350	A350	456	655	125
35	22	D/7343-31	T489D226(1)035A(2)(3)	5.8	6.0	650	A650	300	A300	480	707	125
50	0.22	A/3216-18	T489A224(1)050A(2)(3)	0.5	4.0	7500	A7K5	7000	A7K0	100	104	125
50	0.33	A/3216-18	T489A334(1)050A(2)(3)	0.5	4.0	7000	A7K0			104	N/A	125
50	0.68	B/3528-21	T489B684(1)050A(2)(3)	0.5	4.0	4000	A4K0	2000	A2K0	146	206	125
50	1	C/6032-28	T489C105(1)050A(2)(3)	0.5	4.0	3000	A3K0			191	N/A	125
50	1.5	C/6032-28	T489C155(1)050A(2)(3)	0.6	6.0	2500	A2K5	1500	A1K5	210	271	125
50	2.2	C/6032-28	T489C225(1)050A(2)(3)	0.8	6.0	1700	A1K7	1000	A1K0	254	332	125
50	2.2	D/7343-31	T489D225(1)050A(2)(3)	0.8	4.5	2000	A2K0	1200	A1K2	274	354	125
50	3.3	D/7343-31	T489D335(1)050A(2)(3)	1.2	4.5	1100	A1K1	800	A800	369	433	125
50	4.7	D/7343-31	T489D475(1)050A(2)(3)	1.8	4.5	900	A900	600	A600	408	500	125
50	6.8	D/7343-31	T489D685(1)050A(2)(3)	2.6	4.5	700	A700			463		125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Max/5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Max	E-Spec Code	mΩ at +25°C 100 kHz Max	E-Spec Code	mA +25°C 100 kHz	mA +25°C 100 kHz	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR		Low ESR		Ripple Current STD ESR (rms)	Ripple Current Low ESR (rms)	Maximum Operating Temp

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
(3) To complete KEMET part number, insert the ESR specification code.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	67% of V_R
Recommended maximum application voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Series and Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C with +20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

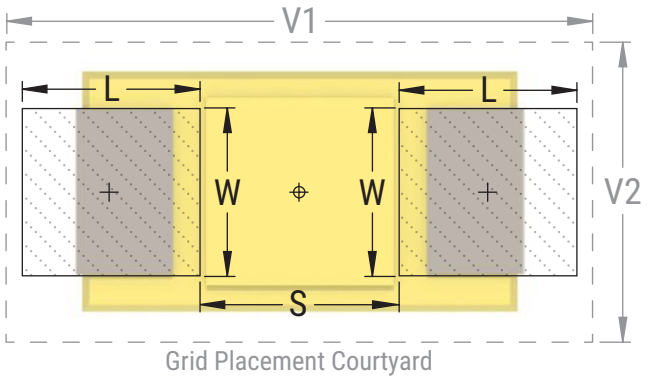
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

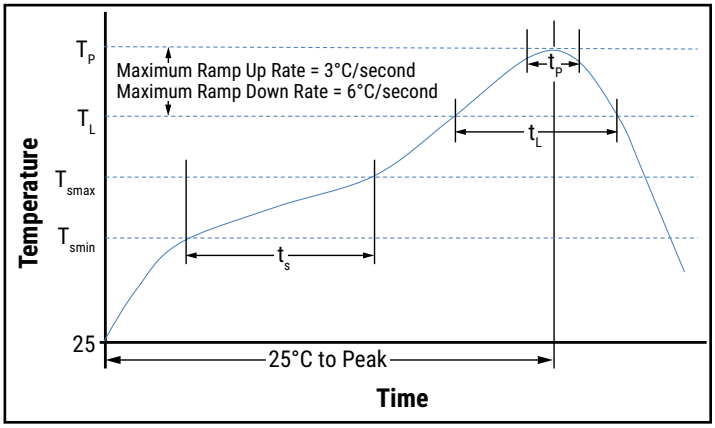
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

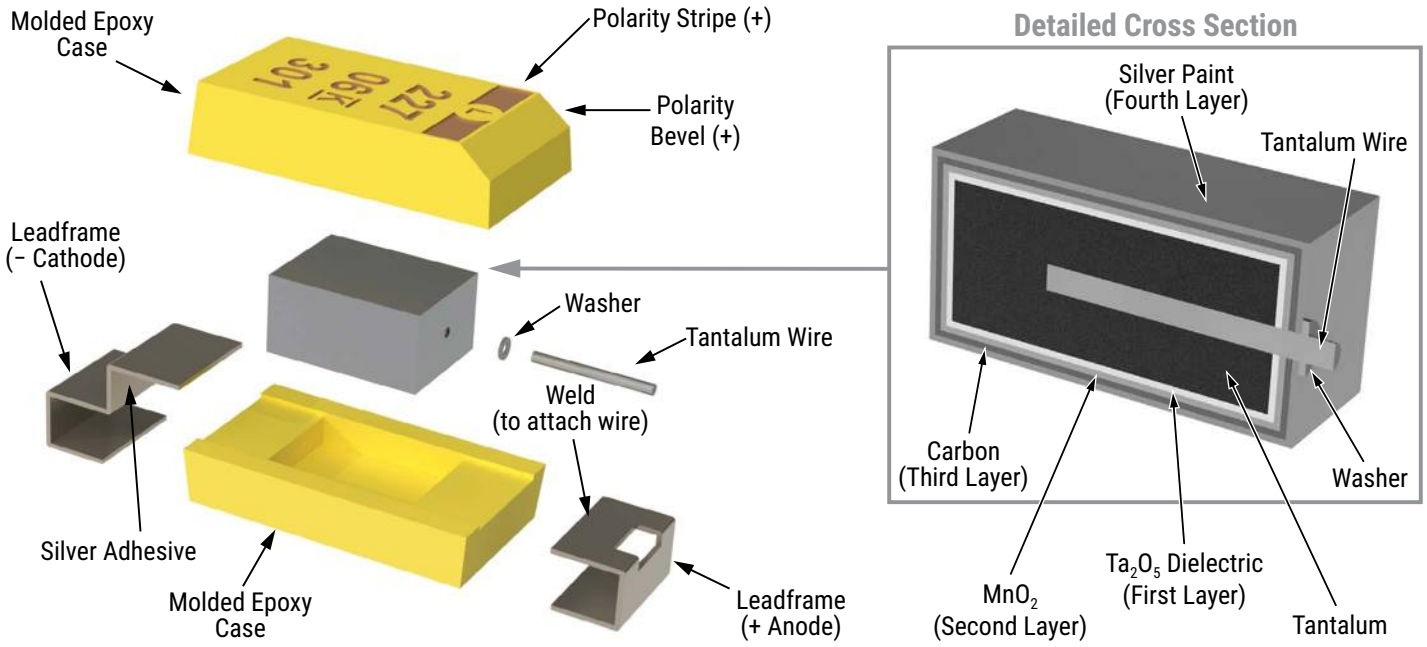
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



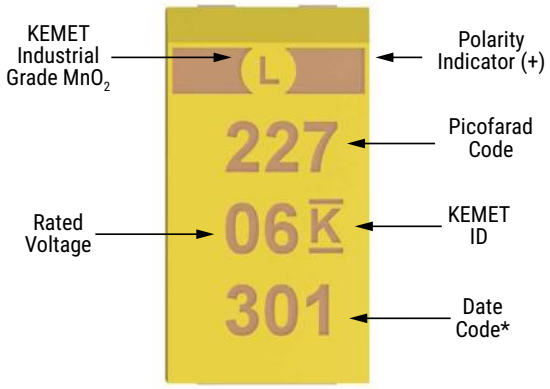
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = last number of year	0 = 2020 1 = 2021 2 = 2022 3 = 2023 4 = 2024
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

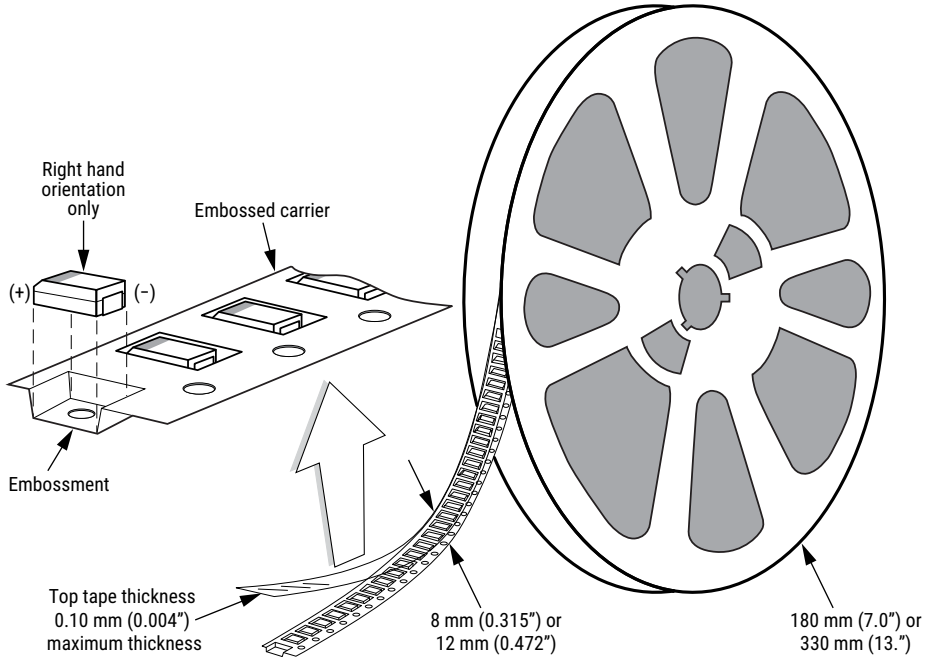


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

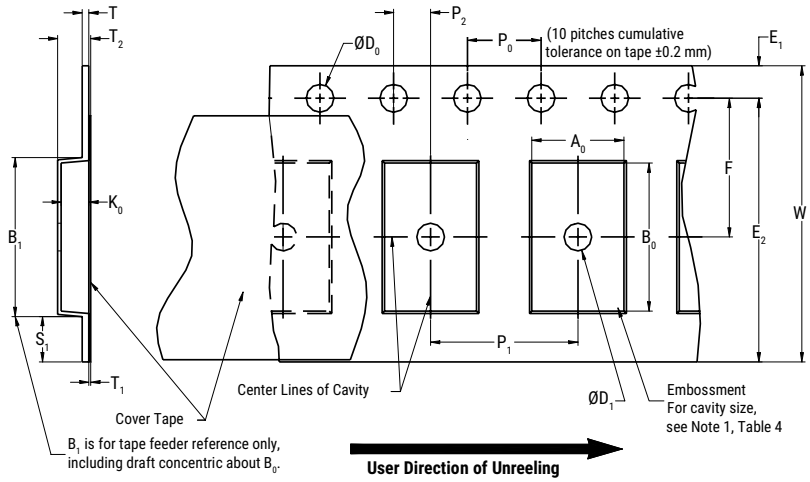


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

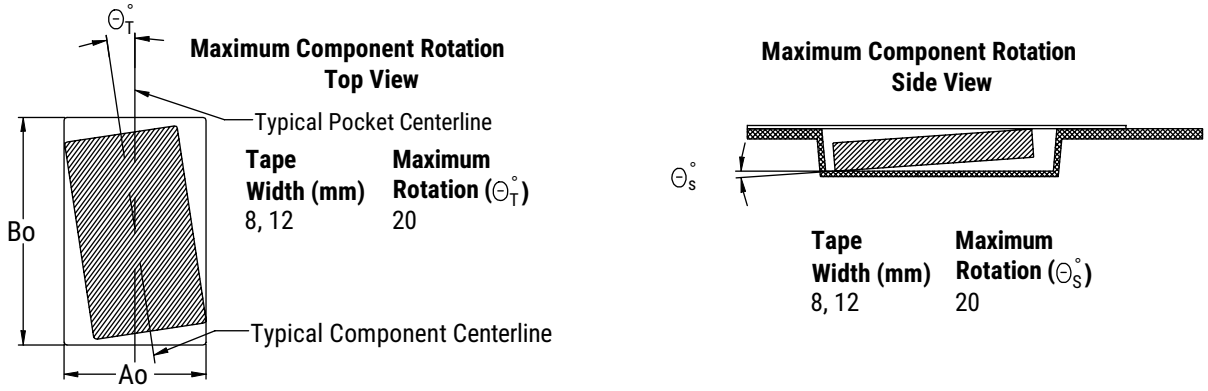


Figure 3 – Maximum Lateral Movement

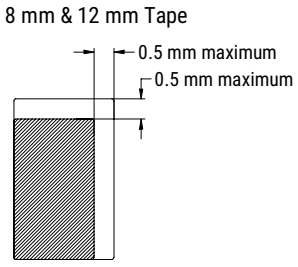


Figure 4 – Bending Radius

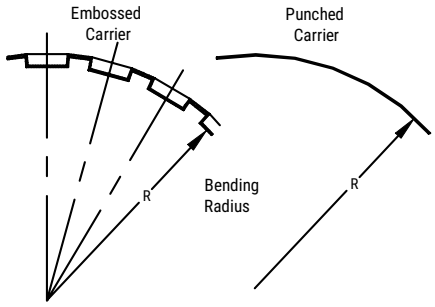
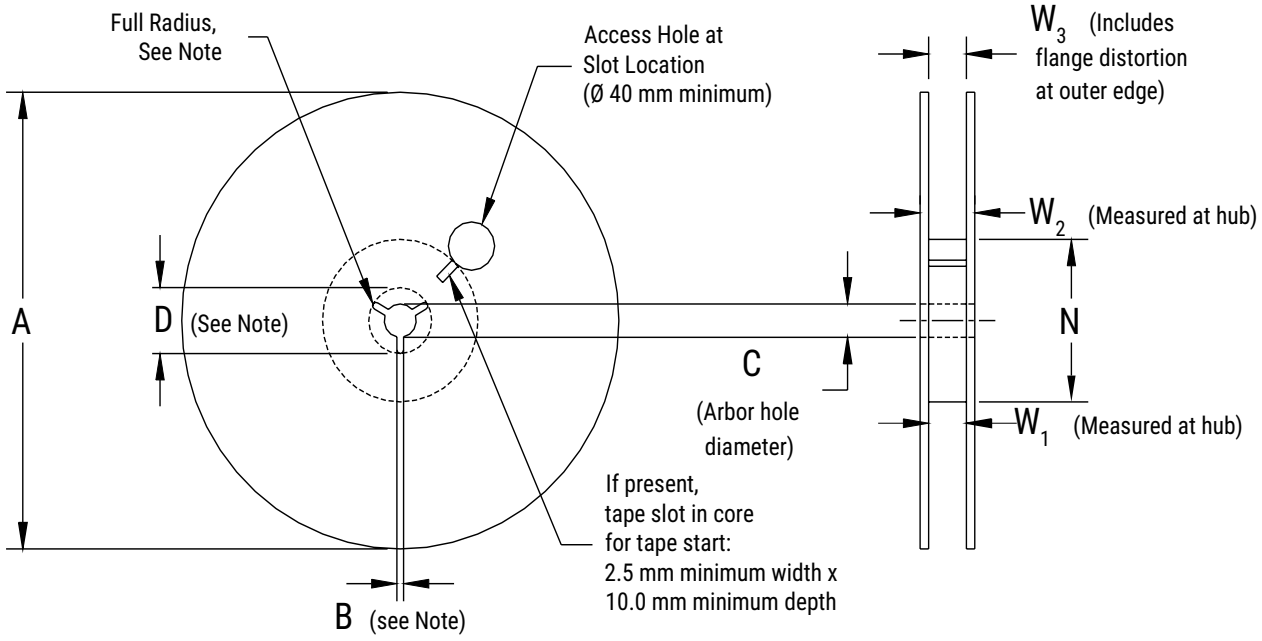


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

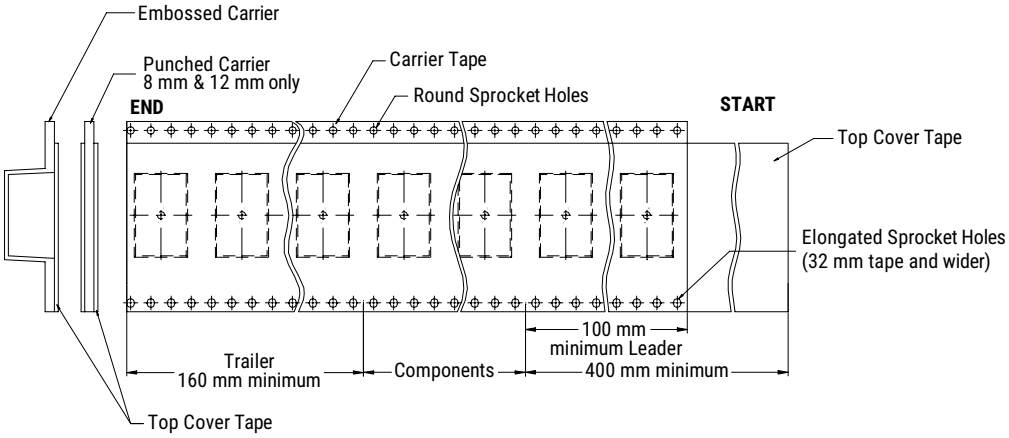
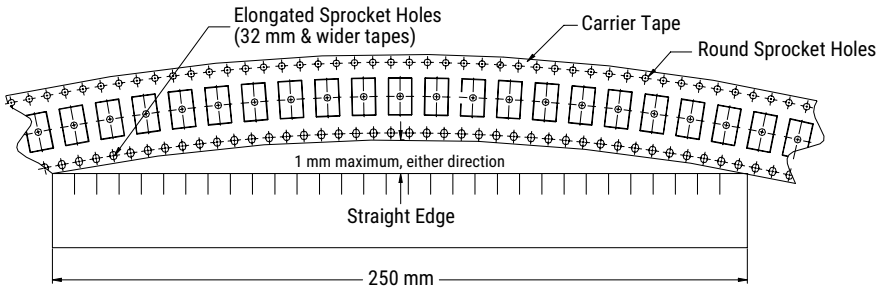


Figure 7 – Maximum Camber



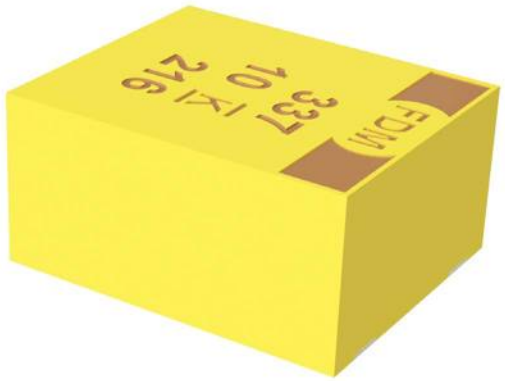
T428 High Reliability Alternative High Volumetric Efficiency Facedown MnO_2

Overview

The KEMET T428 was developed to provide the volumetric efficiency of a conformally coated capacitor in a pick-and-place friendly molded package. The planerity of the molded package eliminates the "drops" associated with the conformally coated tantalum surface mount devices. This new package design offers the highest CV/cc of any molded leadframe product. In addition, the facedown construction offers higher power ratings per cc. The robust design features and testing protocol make this part suitable for application in the telecommunications, industrial, defense, and aerospace markets.

Benefits

- High CV/cc
- Tape & Reel standard packaging per EIA 481
- Laser-marked case
- 100% surge current test available
- Extended range values
- Pick-and-place friendly



Applications

Typical applications include decoupling and filtering in telecommunications, computer, industrial, defense, and aerospace applications.

Environmental Compliance

RoHS Compliant when ordered with 100% Sn or Ni-Pd-Au.

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	428	P	337	K	010	A	H	61	10
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Surge	ESR
T = Tantalum	High volumetric efficiency facedown Hi-Rel MnO_2 COTS	P	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A B = 0.1%/ 1,000 hours	H = Standard solder-coated (SnPb 5% Pb)	61 = None 62 = 10 cycles, 25°C 63 = 10 cycles, −55°C and 85°C	10 = Standard 20 = Low 30 = Ultra-low

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	15 – 470 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C at 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, –55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, –55°C, +25°C, +85°C, +125°C, +25°C			+25°C	–55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	n/a	10 x IL	12 x IL
Surge Voltage	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10 of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Additional Qualification Tests per MIL–PRF–55365/8	Please contact KEMET for more information.					

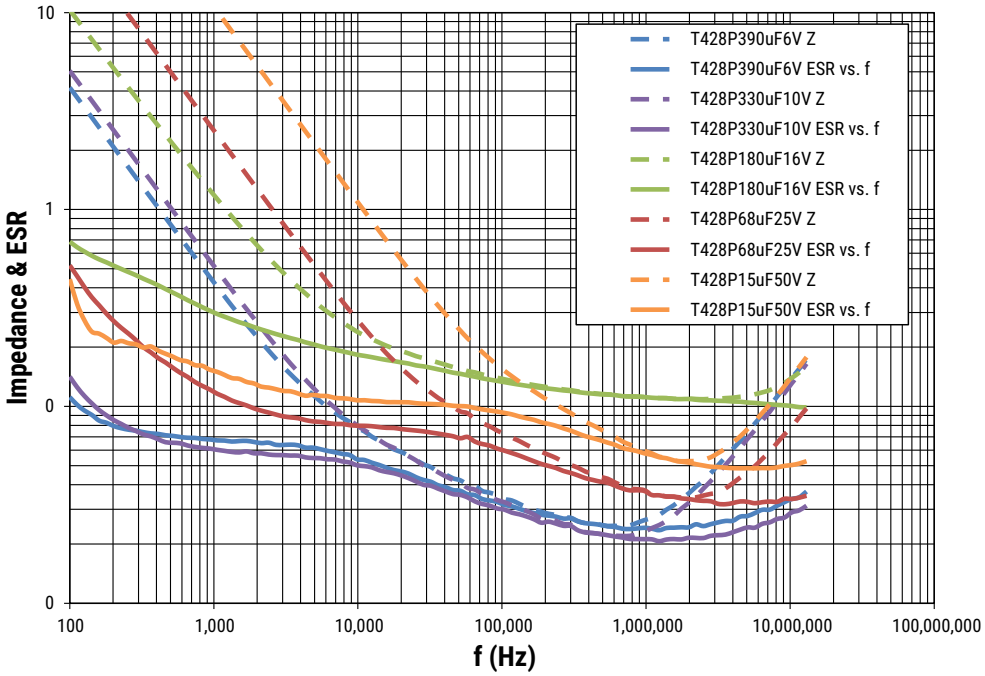
**IL = Initial limit*

Certification

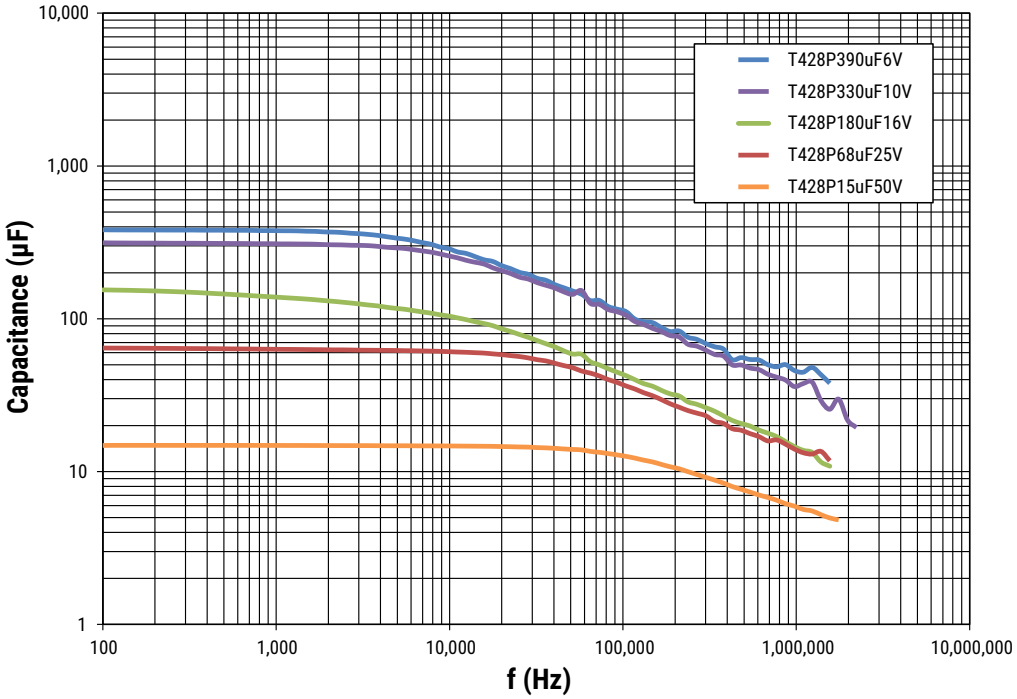
MIL–PRF–55365/8

Electrical Characteristics

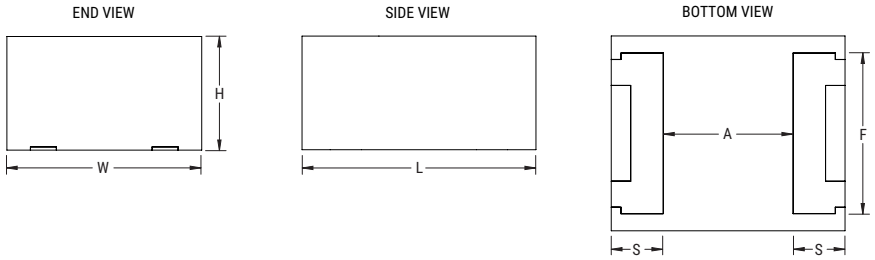
Impedance & ESR vs. Frequency



Capacitance vs. Frequency



Dimensions – Millimeters



Case Size	Component						Typical Weight
EIA	L Max	W ±0.3	H ±0.3	F ±0.20	S ±0.20	A (Nom)	(mg)
7360-38	7.2	6.0	3.5	4.95	1.6	3.8	0.86

These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative

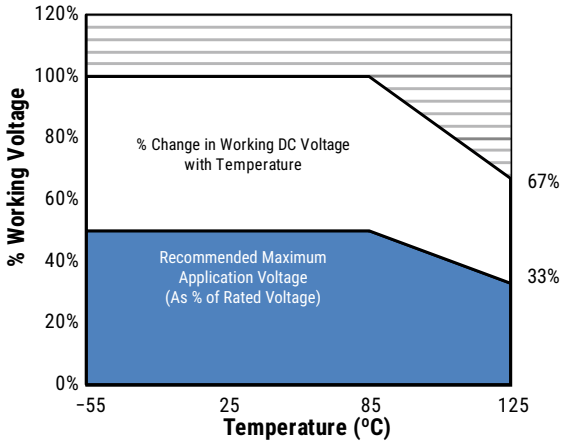
Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-Low ESR	Ripple Current (rms)	Maximum Operating Temp	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	mΩ at +25°C 100 kHz Maximum	Ω at +25°C 100 kHz Maximum	mA at +25°C 100 kHz	°C	Reflow Temp. ≤ 260°C
4	470	P/7360-38	T428P477(1)004(2)(3)(4)(5)	18.8	10.0	130	45	NA	2,687	125	1
6.3	390	P/7360-38	T428P397(1)006(2)(3)(4)(5)	24.6	8.0	130	45	NA	2,687	125	1
6.3	470	P/7360-38	T428P477(1)006(2)(3)(4)(5)	29.6	10.0	120	50	NA	2,550	125	1
10	330	P/7360-38	T428P337(1)010(2)(3)(4)(5)	33.0	8.0	130	45	NA	2,687	125	1
16	180	P/7360-38	T428P187(1)016(2)(3)(4)(5)	28.8	8.0	130	55	NA	2,430	125	1
16	220	P/7360-38	T428P227(1)016(2)(3)(4)(5)	35.2	8.0	120	55	NA	2,430	125	1
20	150	P/7360-38	T428P157(1)020(2)(3)(4)(5)	30.0	8.0	140	100	NA	1,803	125	1
25	68	P/7360-38	T428P686(1)025(2)(3)(4)(5)	17.0	6.0	200	95	NA	1,850	125	1
35	22	P/7360-38	T428P226(1)035(2)(3)(4)(5)	7.7	6.0	280	220	NA	1,215	125	1
50	15	P/7360-38	T428P156(1)050(2)(3)(4)(5)	7.5	6.0	400	350	NA	964	125	1

(1) To complete KEMET part number, insert M for ±20%, K for ±10% or J for ±5%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours) or A = N/A.
(3) To complete KEMET part number, insert H = Solder-plated. Designates termination finish.
(4) To complete KEMET part number, insert 61 = none, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C after Weibull or 64 = 10 cycles −55°C +85°C before Weibull. Designates surge current option.
(5) To complete KEMET part number, insert 10 = standard, 20 = lLow or 30 = ultra-low. Designates ESR option.
Please refer to Ordering Information for additional details.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
P	7360–38	325

Using the Pmax of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
Pmax = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details

Reverse Voltage

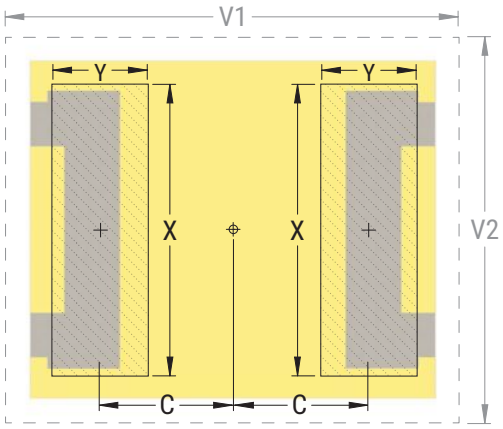
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe, plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the below table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	X	Y	C	V1	V2	X	Y	C	V1	V2	X	Y	C	V1	V2
P	7360-38	5.25	1.80	2.35	8.50	7.30	5.15	1.70	2.35	8.00	6.80	5.05	1.60	2.35	7.70	6.50

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC Standard 7351 (IPC–7351).*



Grid Placement Courtyard

Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

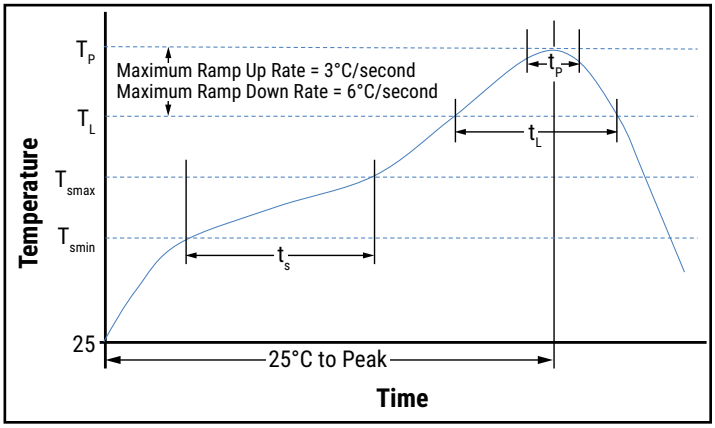
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/seconds maximum	3°C/seconds maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

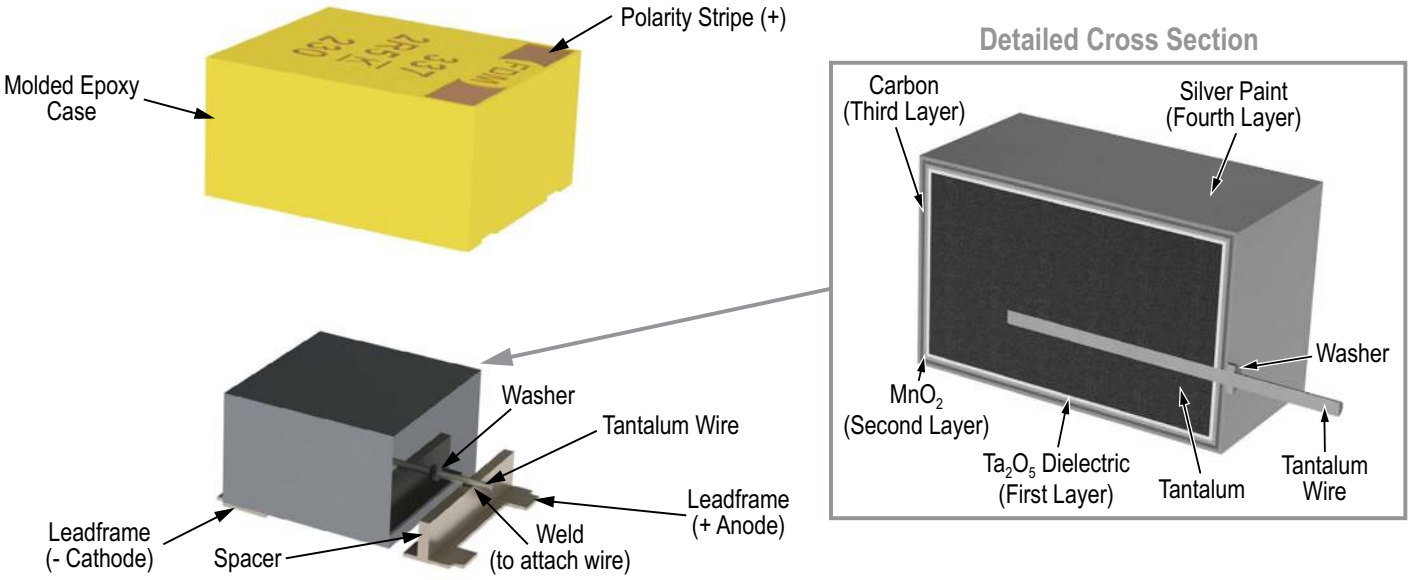
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



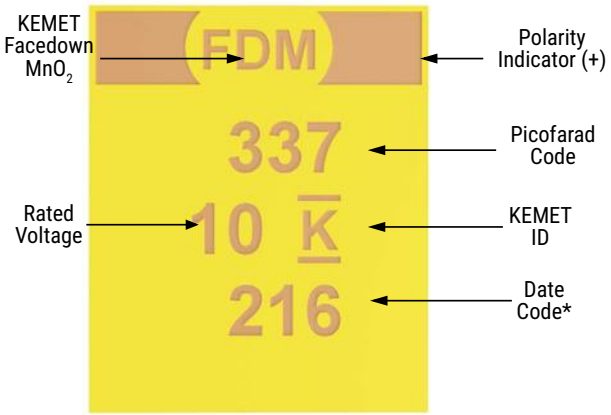
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 216 = 16th week of 2022

Date Code *	
1st digit = Last number of Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

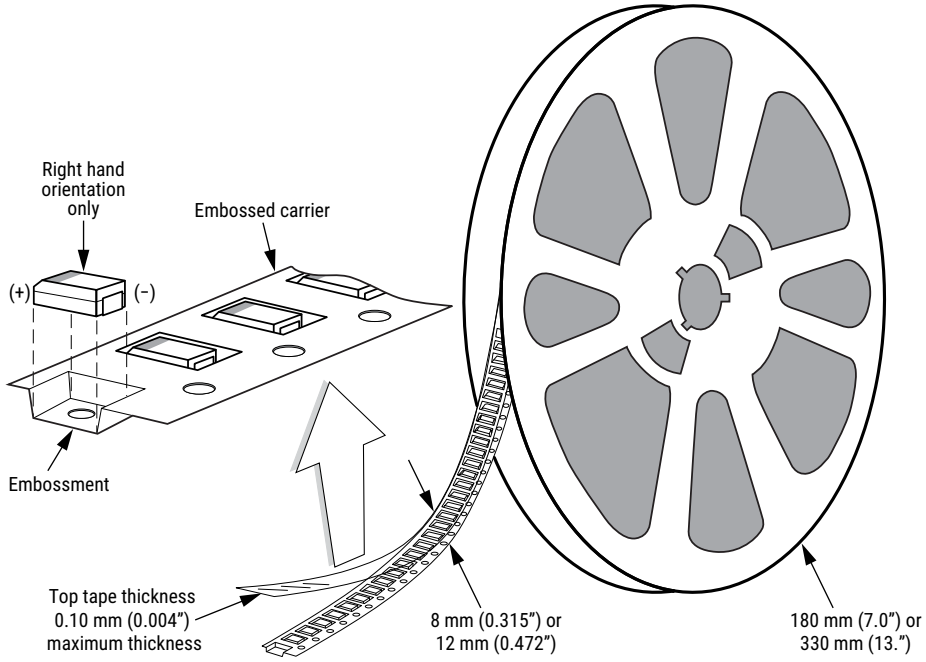


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

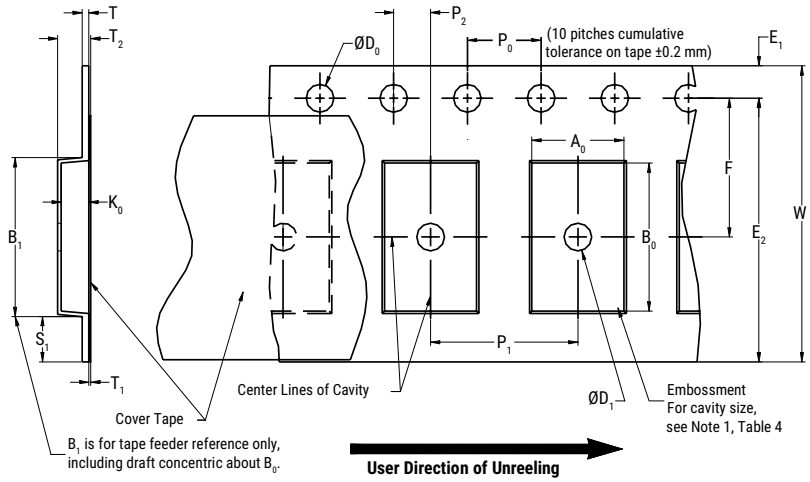


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

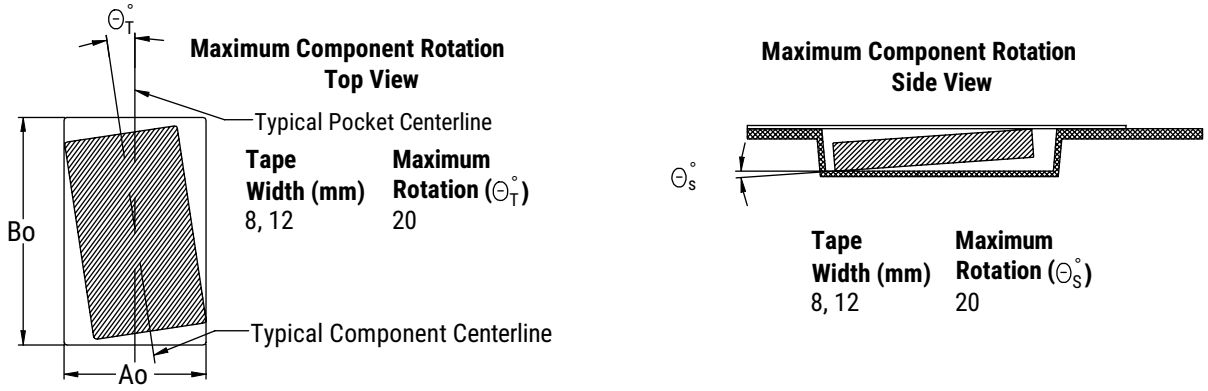


Figure 3 – Maximum Lateral Movement

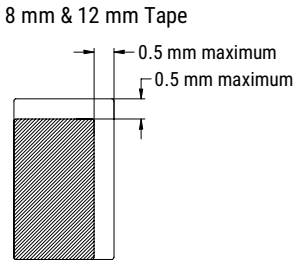


Figure 4 – Bending Radius

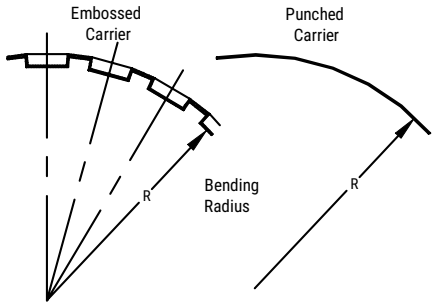
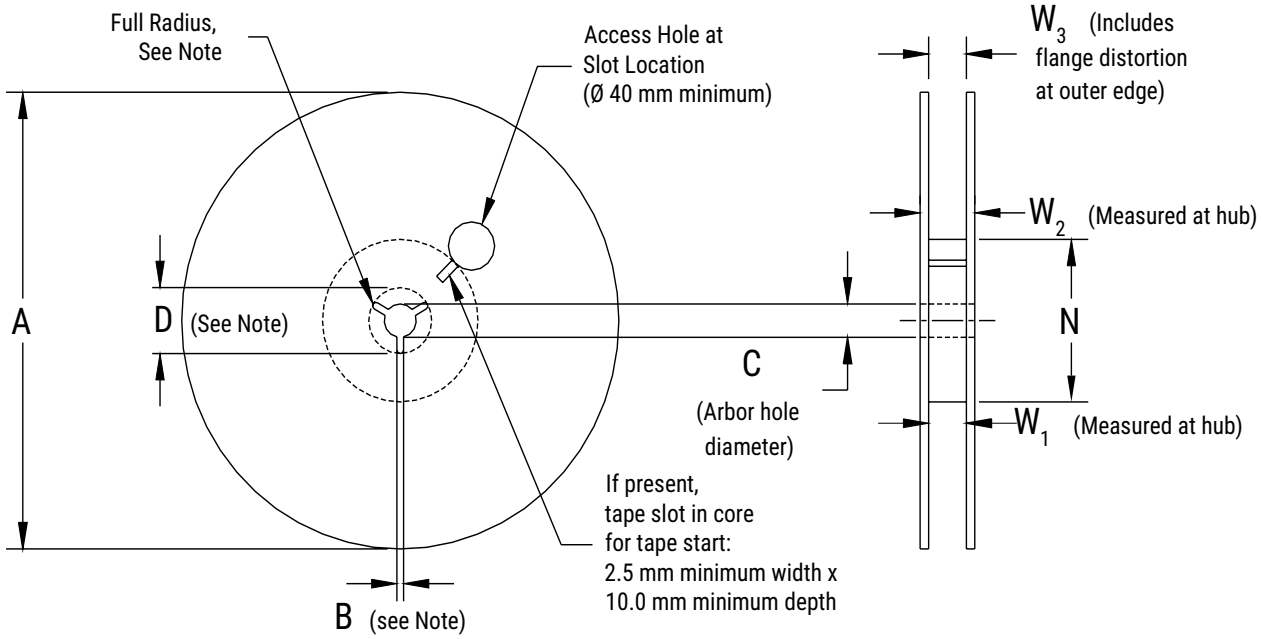


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

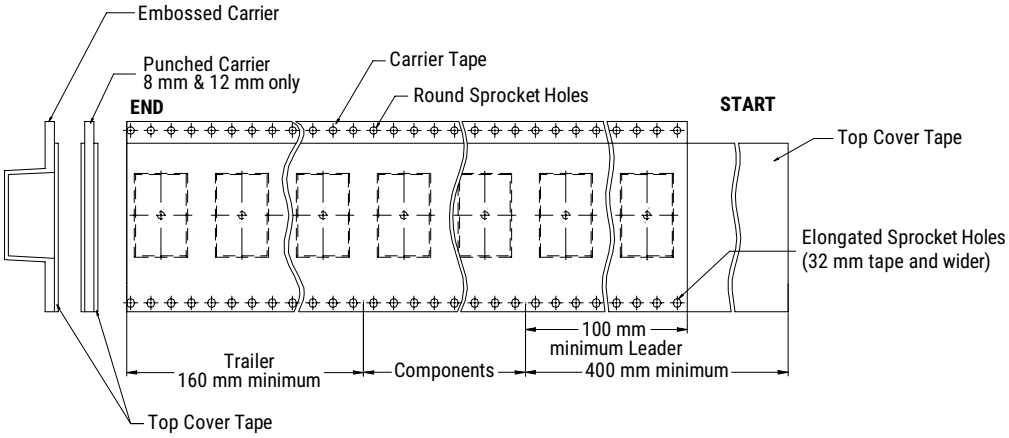
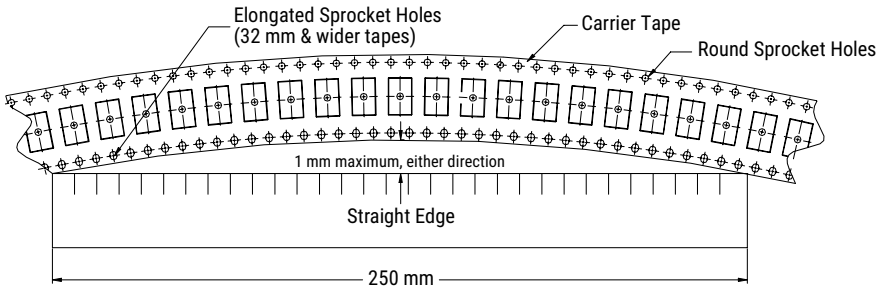


Figure 7 – Maximum Camber



T496 High Reliability Alternative Fused MnO_2, DLA Drawing 04053

Overview

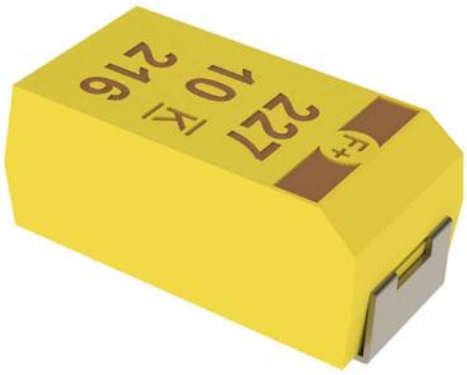
The T496 High Reliability Series (HRA) with a built-in fuse design, provides excellent protection from short circuit conditions in applications where damaging high fault currents exist.

The T496 HRA meets the MIL-PRF-55365 requirements and is suitable for use in high reliability applications, incorporating an intensive testing and screening protocol that is customizable depending on specific customer requirements. The T496 HRA is available in standard and low ESR.

Benefits

- Meets or exceeds EIA standard 535BAACC
- Patented fuse assembly, which protects against short circuit mode
- DLA Drawing 04053 available*
- Established Reliability Weibull Options B, C, or D
- 100% surge current testing options per MIL–PRF–55365 available
- Fuse actuation, 25°C: within 1 second at fault currents of 4 amps and higher
- Continuous current capability of 0.75 amps
- Post actuation resistance, 25°C: 10 MΩ, minimum
- Test tabs on side of case bypass of the capacitor element to allow direct testing of the fuse assembly
- Standard termination SnPb
- MSL Level 1

** Defense Logistics Agency (DLA), previously identified as DSCC*



Applications

Typical applications include decoupling and filtering in computing, telecommunications, defense, and industrial end applications requiring built-in fuse capability.

Environmental Compliance

RoHS compliant when ordered with 100% Sn solder.

- Halogen-free
- Epoxy compliant with UL94 V-0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	496	X	227	M	010	B	T	61	10	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Performance	ESR	Packaging (C-Spec)
T = Tantalum	Fail safe	B C D X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	B = 0.1%/ 1,000 hours C = 0.01%/ 1,000 hours D = 0.001%/ 1,000 hours A = Non-Weibull graded	T = 100% Matte tin (Sn)-plated H = Standard solder coated (SnPb 5% Pb minimum) C = Hot solder dipped K = Solder fused	61 = Surge none 62 = Surge at 25°C after Weibull 63 = Surge −55°C and +85°C after Weibull 64 = Surge −55°C and +85°C before Weibull	10 = Standard 20 = Low	Blank = 7" reel 7280 = 13" reel 7610 = Bulk Bag 7640 = Bulk plastic box WAFL = Waffle pack

Ordering Information DLA Drawing 04053

04053-	001	B
Drawing Number	Dash Number	Reliability Grade
	See Part Number List	B = 0.1%/1,000 hours C = 0.01%/1,000 hours D = 0.001%/1,000 hours Z = Non-Weibull graded

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.15 – 470 µF at 120 Hz/25°C
Capacitance Tolerance	K tolerance (10%), M tolerance (20%)
Rated Voltage Range	4 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Moisture Resistance	65°C to −10°C, 100% RH, 20 cycles, no load		Δ C/C	Within +/−15% of initial value		
			DF	Within 150 x initial limit		
			DCL	Within 200 x initial limit		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, −55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +125°C, +25°C			+25°C	−55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Resistance to Solder Heat	MIL–STD–202, Method 210, 1 cycle		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Resistance to Solvents	MIL–STD–202, Method 215, Aqueous wash chemical or equivalent		Δ C/C	Within ±10 of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

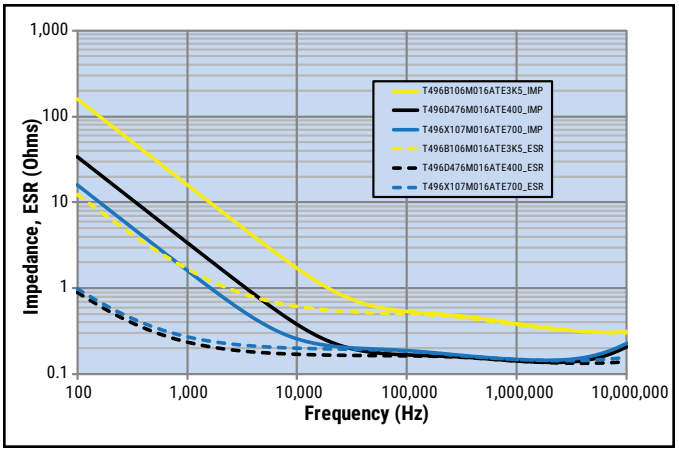
**IL = Initial limit*

Certification

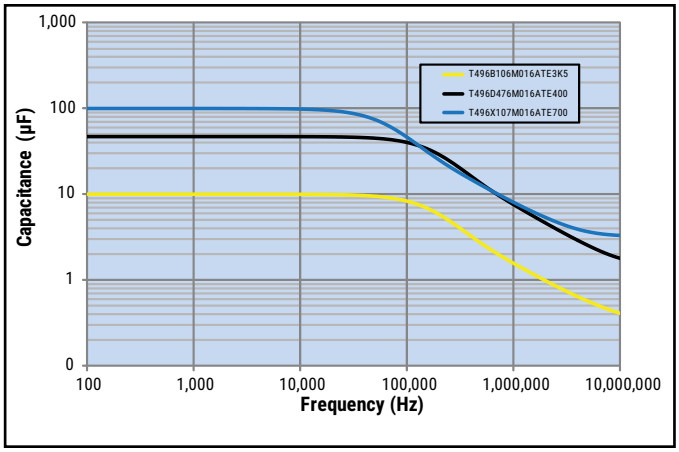
MIL–PRF–55365/8
DLA Drawing 04053

Electrical Characteristics

ESR vs. Frequency

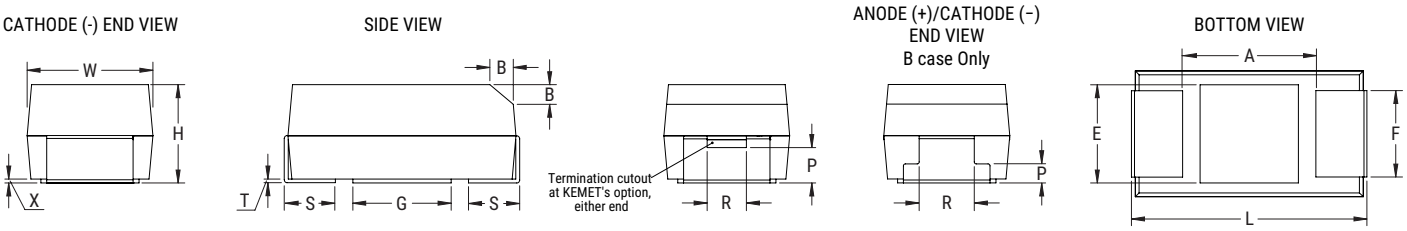


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component												
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S ±0.3 ±(0.012)	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9±0.2 (0.075±0.008)	2.2 (0.087)	0.8 (0.031)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.4 (0.016)	1.5 (0.059)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.1 (0.122)	2.8 (0.110)	2.4 (0.094)
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)
X	7343–43	7.3±0.3 (0.287±0.012)	4.0±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)

Notes: (Ref) – Dimensions provided for reference only.

Weight

Case Size/EIA	Typical Weight (mg)
B/3528	107.45
C/6032	224.48
D/7343	446.84
X/7343	652.04

These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DSCC)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
4	68	C/6032-28	T496C686(1)004(2)(3)(4)10	N/A	2.7	6.0	1,600	262	125
4	68	C/6032-28	T496C686(1)004(2)(3)(4)20	N/A	2.7	6.0	400	524	125
4	68	C/6032-28	T496C686M004(2)H4095	04053-001(2)	2.7	6.0	1,600	262	125
4	100	C/6032-28	T496C107(1)004(2)(3)(4)10	N/A	4.0	8.0	1,200	303	125
4	100	C/6032-28	T496C107M004(2)H4095	04053-002(2)	4.0	8.0	1,200	303	125
4	150	D/7343-31	T496D157(1)004(2)(3)(4)10	N/A	6.0	8.0	800	433	125
4	150	D/7343-31	T496D157M004(2)H4095	04053-003(2)	6.0	8.0	800	433	125
4	150	C/6032-28	T496C157(1)004(2)(3)(4)10	N/A	6.0	8.0	1,200	303	125
4	220	D/7343-31	T496D227(1)004(2)(3)(4)10	N/A	8.8	8.0	700	463	125
4	220	D/7343-31	T496D227(1)004(2)(3)(4)20	N/A	8.8	8.0	400	612	125
4	220	D/7343-31	T496D227M004(2)H4095	04053-004(2)	8.8	8.0	700	463	125
4	330	D/7343-31	T496D337(1)004(2)(3)(4)10	N/A	13.2	8.0	700	463	125
4	330	D/7343-31	T496D337(1)004(2)(3)(4)20	N/A	13.2	8.0	400	612	125
4	330	D/7343-31	T496D337M004(2)H4095	04053-005(2)	13.2	8.0	700	463	125
4	330	X/7343-43	T496X337(1)004(2)(3)(4)10	N/A	13.2	8.0	700	485	125
4	330	X/7343-43	T496X337M004(2)H4095	04053-006(2)	13.2	8.0	700	485	125
4	470	X/7343-43	T496X477(1)004(2)(3)(4)10	N/A	18.8	8.0	500	574	125
4	470	X/7343-43	T496X477M004(2)H4095	04053-007(2)	18.8	8.0	500	574	125
6.3	4.7	B/3528-21	T496B475(1)006(2)(3)(4)10	N/A	0.3	6.0	3,500	156	125
6.3	4.7	B/3528-21	T496B475M006(2)H4095	04053-008(2)	0.3	6.0	3,500	156	125
6.3	6.8	B/3528-21	T496B685(1)006(2)(3)(4)10	N/A	0.4	6.0	3,500	156	125
6.3	6.8	B/3528-21	T496B685M006(2)H4095	04053-009(2)	0.4	6.0	3,500	156	125
6.3	10	B/3528-21	T496B106(1)006(2)(3)(4)10	N/A	0.6	6.0	3,500	156	125
6.3	10	B/3528-21	T496B106M006(2)H4095	04053-010(2)	0.6	6.0	3,500	156	125
6.3	15	C/6032-28	T496C156(1)006(2)(3)(4)10	N/A	0.9	6.0	2,000	235	125
6.3	15	C/6032-28	T496C156M006(2)H4095	04053-011(2)	0.9	6.0	2,000	235	125
6.3	22	B/3528-21	T496B226(1)006(2)(3)(4)10	N/A	1.4	6.0	3,500	156	125
6.3	22	B/3528-21	T496B226(1)006(2)(3)(4)20	N/A	1.4	6.0	1,500	238	125
6.3	22	B/3528-21	T496B226M006(2)H4095	04053-012(2)	1.4	6.0	3,500	156	125
6.3	22	C/6032-28	T496C226(1)006(2)(3)(4)10	N/A	1.4	6.0	2,000	235	125
6.3	22	C/6032-28	T496C226M006(2)H4095	04053-013(2)	1.4	6.0	2,000	235	125
6.3	33	C/6032-28	T496C336(1)006(2)(3)(4)10	N/A	2.1	6.0	2,000	235	125
6.3	33	C/6032-28	T496C336(1)006(2)(3)(4)20	N/A	2.1	6.0	600	428	125
6.3	33	C/6032-28	T496C336M006(2)H4095	04053-014(2)	2.1	6.0	2,000	235	125
6.3	47	C/6032-28	T496C476(1)006(2)(3)(4)10	N/A	3.0	6.0	1,600	262	125
6.3	47	C/6032-28	T496C476(1)006(2)(3)(4)20	N/A	3.0	6.0	600	428	125
6.3	47	C/6032-28	T496C476M006(2)H4095	04053-016(2)	3.0	6.0	1,600	262	125
6.3	47	D/7343-31	T496D476(1)006(2)(3)(4)10	N/A	3.0	6.0	1,000	387	125
6.3	47	D/7343-31	T496D476M006(2)H4095	04053-015(2)	3.0	6.0	1,000	387	125
6.3	68	C/6032-28	T496C686(1)006(2)(3)(4)10	N/A	4.3	6.0	1,200	303	125
6.3	68	C/6032-28	T496C686M006(2)H4095	04053-018(2)	4.3	6.0	1,200	303	125
6.3	68	D/7343-31	T496D686(1)006(2)(3)(4)10	N/A	4.3	6.0	1,000	387	125
6.3	68	D/7343-31	T496D686M006(2)H4095	04053-017(2)	4.3	6.0	1,000	387	125
6.3	100	X/7343-43	T496X107(1)006(2)(3)(4)10	N/A	6.3	8.0	900	428	125
6.3	100	X/7343-43	T496X107(1)006(2)(3)(4)20	N/A	6.3	8.0	300	742	125
6.3	100	X/7343-43	T496X107M006(2)H4095	04053-019(2)	6.3	8.0	300	742	125
6.3	100	D/7343-31	T496D107(1)006(2)(3)(4)10	N/A	6.3	8.0	800	433	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DLA)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded). To complete DLA part number insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or Z (Non-Weibull Graded)
(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder-plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge −55°C and +85°C after Weibull or 64 = 10 cycles Surge −55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DSCC)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
6.3	100	D/7343-31	T496D107(1)006(2)(3)(4)20	N/A	6.3	8.0	400	612	125
6.3	100	D/7343-31	T496D107M006(2)H4095	04053-020(2)	6.3	8.0	800	433	125
6.3	100	C/6032-28	T496C107(1)006(2)(3)(4)10	N/A	6.3	8.0	400	524	125
6.3	150	D/7343-31	T496D157(1)006(2)(3)(4)10	N/A	9.5	8.0	700	463	125
6.3	150	D/7343-31	T496D157(1)006(2)(3)(4)20	N/A	9.5	8.0	300	707	125
6.3	150	D/7343-31	T496D157M006(2)H4095	04053-021(2)	9.5	8.0	700	463	125
6.3	150	X/7343-43	T496X157(1)006(2)(3)(4)10	N/A	9.5	8.0	300	742	125
6.3	220	X/7343-43	T496X227(1)006(2)(3)(4)10	N/A	13.9	8.0	700	485	125
6.3	220	X/7343-43	T496X227(1)006(2)(3)(4)20	N/A	13.9	8.0	300	742	125
6.3	220	X/7343-43	T496X227M006(2)H4095	04053-023(2)	13.9	8.0	700	485	125
6.3	220	D/7343-31	T496D227(1)006(2)(3)(4)10	N/A	13.9	8.0	700	463	125
6.3	220	D/7343-31	T496D227(1)006(2)(3)(4)20	N/A	13.9	8.0	300	707	125
6.3	220	D/7343-31	T496D227M006(2)H4095	04053-022(2)	13.9	8.0	700	463	125
6.3	330	X/7343-43	T496X337(1)006(2)(3)(4)10	N/A	20.8	8.0	500	574	125
6.3	330	X/7343-43	T496X337(1)006(2)(3)(4)20	N/A	20.8	8.0	300	742	125
6.3	330	X/7343-43	T496X337M006(2)H4095	04053-024(2)	20.8	8.0	500	574	125
10	3.3	B/3528-21	T496B335(1)010(2)(3)(4)10	N/A	0.3	6.0	3,500	156	125
10	3.3	B/3528-21	T496B335M010(2)H4095	04053-025(2)	0.3	6.0	3,500	156	125
10	4.7	B/3528-21	T496B475(1)010(2)(3)(4)10	N/A	0.5	6.0	3,500	156	125
10	4.7	B/3528-21	T496B475M010(2)H4095	04053-026(2)	0.5	6.0	3,500	156	125
10	6.8	B/3528-21	T496B685(1)010(2)(3)(4)10	N/A	0.7	6.0	3,500	156	125
10	6.8	B/3528-21	T496B685M010(2)H4095	04053-027(2)	0.7	6.0	3,500	156	125
10	10	C/6032-28	T496C106(1)010(2)(3)(4)10	N/A	1.0	6.0	2,000	235	125
10	10	C/6032-28	T496C106M010(2)H4095	04053-028(2)	1.0	6.0	2,000	235	125
10	15	B/3528-21	T496B156(1)010(2)(3)(4)10	N/A	1.5	6.0	3,500	156	125
10	15	B/3528-21	T496B156M010(2)H4095	04053-029(2)	1.5	6.0	3,500	156	125
10	15	C/6032-28	T496C156(1)010(2)(3)(4)10	N/A	1.5	6.0	2,000	235	125
10	15	C/6032-28	T496C156(1)010(2)(3)(4)20	N/A	1.5	6.0	600	428	125
10	15	C/6032-28	T496C156M010(2)H4095	04053-030(2)	1.5	6.0	2,000	235	125
10	22	C/6032-28	T496C226(1)010(2)(3)(4)10	N/A	2.2	6.0	2,000	235	125
10	22	C/6032-28	T496C226(1)010(2)(3)(4)20	N/A	2.2	6.0	500	469	125
10	22	C/6032-28	T496C226M010(2)H4095	04053-031(2)	2.2	6.0	2,000	235	125
10	33	D/7343-31	T496D336(1)010(2)(3)(4)10	N/A	3.3	6.0	1,000	387	125
10	33	D/7343-31	T496D336(1)010(2)(3)(4)20	N/A	3.3	6.0	400	612	125
10	33	D/7343-31	T496D336M010(2)H4095	04053-032(2)	3.3	6.0	1,000	387	125
10	33	C/6032-28	T496C336(1)010(2)(3)(4)10	N/A	3.3	6.0	1,600	262	125
10	33	C/6032-28	T496C336(1)010(2)(3)(4)20	N/A	3.3	6.0	400	524	125
10	33	C/6032-28	T496C336M010(2)H4095	04053-033(2)	3.3	6.0	1,600	262	125
10	47	D/7343-31	T496D476(1)010(2)(3)(4)10	N/A	4.7	6.0	1,000	387	125
10	47	D/7343-31	T496D476(1)010(2)(3)(4)20	N/A	4.7	6.0	400	612	125
10	47	D/7343-31	T496D476M010(2)H4095	04053-034(2)	4.7	6.0	1,000	387	125
10	47	C/6032-28	T496C476(1)010(2)(3)(4)10	N/A	4.7	6.0	1,200	303	125
10	47	C/6032-28	T496C476(1)010(2)(3)(4)20	N/A	4.7	6.0	400	524	125
10	47	C/6032-28	T496C476M010(2)H4095	04053-035(2)	4.7	6.0	1,200	303	125
10	68	X/7343-43	T496X686(1)010(2)(3)(4)10	N/A	6.8	6.0	900	428	125
10	68	X/7343-43	T496X686M010(2)H4095	04053-036(2)	6.8	6.0	900	428	125
10	68	D/7343-31	T496D686(1)010(2)(3)(4)10	N/A	6.8	6.0	800	433	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DLA)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded). To complete DLA part number insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or Z (Non-Weibull Graded)
(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder-plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge −55°C and +85°C after Weibull or 64 = 10 cycles Surge −55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DSCC)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
10	68	D/7343-31	T496D686(1)010(2)(3)(4)20	N/A	6.8	6.0	400	612	125
10	68	D/7343-31	T496D686M010(2)H4095	04053-037(2)	6.8	6.0	800	433	125
10	100	X/7343-43	T496X107(1)010(2)(3)(4)10	N/A	10.0	8.0	400	642	125
10	100	D/7343-31	T496D107(1)010(2)(3)(4)10	N/A	10.0	8.0	700	463	125
10	100	D/7343-31	T496D107(1)010(2)(3)(4)20	N/A	10.0	8.0	400	612	125
10	100	D/7343-31	T496D107M010(2)H4095	04053-038(2)	10.0	8.0	700	463	125
10	150	X/7343-43	T496X157(1)010(2)(3)(4)10	N/A	15.0	8.0	700	485	125
10	150	X/7343-43	T496X157(1)010(2)(3)(4)20	N/A	15.0	8.0	400	642	125
10	150	X/7343-43	T496X157M010(2)H4095	04053-039(2)	15.0	8.0	700	485	125
10	150	D/7343-31	T496D157(1)010(2)(3)(4)10	N/A	15.0	8.0	700	463	125
10	150	D/7343-31	T496D157(1)010(2)(3)(4)20	N/A	15.0	8.0	400	612	125
10	150	D/7343-31	T496D157M010(2)H4095	04053-040(2)	15.0	8.0	700	463	125
10	220	X/7343-43	T496X227(1)010(2)(3)(4)10	N/A	22.0	8.0	500	574	125
10	220	X/7343-43	T496X227(1)010(2)(3)(4)20	N/A	22.0	8.0	300	742	125
10	220	X/7343-43	T496X227M010(2)H4095	04053-041(2)	22.0	8.0	500	574	125
10	220	D/7343-31	T496D227(1)010(2)(3)(4)10	N/A	22.0	8.0	300	707	125
16	2.2	B/3528-21	T496B225(1)016(2)(3)(4)10	N/A	0.4	6.0	3,500	156	125
16	2.2	B/3528-21	T496B225M016(2)H4095	04053-042(2)	0.4	6.0	3,500	156	125
16	3.3	B/3528-21	T496B335(1)016(2)(3)(4)10	N/A	0.5	6.0	3,500	156	125
16	3.3	B/3528-21	T496B335(1)016(2)(3)(4)20	N/A	0.5	6.0	2,100	201	125
16	3.3	B/3528-21	T496B335M016(2)H4095	04053-043(2)	0.5	6.0	3,500	156	125
16	4.7	B/3528-21	T496B475(1)016(2)(3)(4)10	N/A	0.8	6.0	3,500	156	125
16	4.7	B/3528-21	T496B475(1)016(2)(3)(4)20	N/A	0.8	6.0	1,600	230	125
16	4.7	B/3528-21	T496B475M016(2)H4095	04053-044(2)	0.8	6.0	3,500	156	125
16	6.8	C/6032-28	T496C685(1)016(2)(3)(4)10	N/A	1.1	6.0	2,000	235	125
16	6.8	C/6032-28	T496C685(1)016(2)(3)(4)20	N/A	1.1	6.0	600	428	125
16	6.8	C/6032-28	T496C685M016(2)H4095	04053-045(2)	1.1	6.0	2,000	235	125
16	10	B/3528-21	T496B106(1)016(2)(3)(4)10	N/A	1.6	6.0	3,500	156	125
16	10	B/3528-21	T496B106M016(2)H4095	04053-046(2)	1.6	6.0	3,500	156	125
16	10	C/6032-28	T496C106(1)016(2)(3)(4)10	N/A	1.6	6.0	2,000	235	125
16	10	C/6032-28	T496C106(1)016(2)(3)(4)20	N/A	1.6	6.0	700	396	125
16	10	C/6032-28	T496C106M016(2)H4095	04053-047(2)	1.6	6.0	2,000	235	125
16	15	C/6032-28	T496C156(1)016(2)(3)(4)10	N/A	2.4	6.0	2,000	235	125
16	15	C/6032-28	T496C156(1)016(2)(3)(4)20	N/A	2.4	6.0	600	428	125
16	15	C/6032-28	T496C156M016(2)H4095	04053-048(2)	2.4	6.0	2,000	235	125
16	22	D/7343-31	T496D226(1)016(2)(3)(4)10	N/A	3.5	6.0	1,000	387	125
16	22	D/7343-31	T496D226(1)016(2)(3)(4)20	N/A	3.5	6.0	500	547	125
16	22	D/7343-31	T496D226M016(2)H4095	04053-049(2)	3.5	6.0	1,000	387	125
16	22	C/6032-28	T496C226(1)016(2)(3)(4)10	N/A	3.5	6.0	1,600	262	125
16	22	C/6032-28	T496C226(1)016(2)(3)(4)20	N/A	3.5	6.0	1,000	332	125
16	22	C/6032-28	T496C226M016(2)H4095	04053-050(2)	3.5	6.0	1,600	262	125
16	33	D/7343-31	T496D336(1)016(2)(3)(4)10	N/A	5.3	6.0	1,000	387	125
16	33	D/7343-31	T496D336(1)016(2)(3)(4)20	N/A	5.3	6.0	400	612	125
16	33	D/7343-31	T496D336M016(2)H4095	04053-051(2)	5.3	6.0	1,000	387	125
16	47	X/7343-43	T496X476(1)016(2)(3)(4)10	N/A	7.5	6.0	900	428	125
16	47	X/7343-43	T496X476(1)016(2)(3)(4)20	N/A	7.5	6.0	400	642	125
16	47	X/7343-43	T496X476M016(2)H4095	04053-052(2)	7.5	6.0	900	428	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DLA)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded). To complete DLA part number insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or Z (Non-Weibull Graded)
(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder-plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge −55°C and +85°C after Weibull or 64 = 10 cycles Surge −55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DSCC)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
16	47	D/7343-31	T496D476(1)016(2)(3)(4)10	N/A	7.5	6.0	800	433	125
16	47	D/7343-31	T496D476(1)016(2)(3)(4)20	N/A	7.5	6.0	400	612	125
16	47	D/7343-31	T496D476M016(2)H4095	04053-053(2)	7.5	6.0	800	433	125
16	68	D/7343-31	T496D686(1)016(2)(3)(4)10	N/A	10.9	8.0	400	612	125
16	100	X/7343-43	T496X107(1)016(2)(3)(4)10	N/A	16.0	8.0	700	485	125
16	100	X/7343-43	T496X107M016(2)H4095	04053-054(2)	16.0	8.0	700	485	125
20	1.5	B/3528-21	T496B155(1)020(2)(3)(4)10	N/A	0.3	6.0	5,000	130	125
20	1.5	B/3528-21	T496B155M020(2)H4095	04053-055(2)	0.3	6.0	5,000	130	125
20	2.2	B/3528-21	T496B225(1)020(2)(3)(4)10	N/A	0.4	6.0	3,500	156	125
20	2.2	B/3528-21	T496B225(1)020(2)(3)(4)20	N/A	0.4	6.0	1,600	230	125
20	2.2	B/3528-21	T496B225M020(2)H4095	04053-056(2)	0.4	6.0	3,500	156	125
20	3.3	B/3528-21	T496B335(1)020(2)(3)(4)10	N/A	0.7	6.0	3,500	156	125
20	3.3	B/3528-21	T496B335M020(2)H4095	04053-057(2)	0.7	6.0	3,500	156	125
20	4.7	C/6032-28	T496C475(1)020(2)(3)(4)10	N/A	0.9	6.0	2,000	235	125
20	4.7	C/6032-28	T496C475M020(2)H4095	04053-058(2)	0.9	6.0	2,000	235	125
20	6.8	C/6032-28	T496C685(1)020(2)(3)(4)10	N/A	1.4	6.0	2,000	235	125
20	6.8	C/6032-28	T496C685(1)020(2)(3)(4)20	N/A	1.4	6.0	600	428	125
20	6.8	C/6032-28	T496C685M020(2)H4095	04053-059(2)	1.4	6.0	2,000	235	125
20	10	C/6032-28	T496C106(1)020(2)(3)(4)10	N/A	2.0	6.0	2,000	235	125
20	10	C/6032-28	T496C106(1)020(2)(3)(4)20	N/A	2.0	6.0	800	371	125
20	10	C/6032-28	T496C106M020(2)H4095	04053-060(2)	2.0	6.0	2,000	235	125
20	15	D/7343-31	T496D156(1)020(2)(3)(4)10	N/A	3.0	6.0	1,000	387	125
20	15	D/7343-31	T496D156(1)020(2)(3)(4)20	N/A	3.0	6.0	500	547	125
20	15	D/7343-31	T496D156M020(2)H4095	04053-061(2)	3.0	6.0	1,000	387	125
20	15	C/6032-28	T496C156(1)020(2)(3)(4)10	N/A	3.0	6.0	500	469	125
20	22	D/7343-31	T496D226(1)020(2)(3)(4)10	N/A	4.4	6.0	1,000	387	125
20	22	D/7343-31	T496D226(1)020(2)(3)(4)20	N/A	4.4	6.0	500	547	125
20	22	D/7343-31	T496D226M020(2)H4095	04053-062(2)	4.4	6.0	1,000	387	125
20	33	X/7343-43	T496X336(1)020(2)(3)(4)10	N/A	6.6	6.0	900	428	125
20	33	X/7343-43	T496X336(1)020(2)(3)(4)20	N/A	6.6	6.0	400	642	125
20	33	X/7343-43	T496X336M020(2)H4095	04053-063(2)	6.6	6.0	900	428	125
20	33	D/7343-31	T496D336(1)020(2)(3)(4)10	N/A	6.6	6.0	400	612	125
20	47	X/7343-43	T496X476(1)020(2)(3)(4)10	N/A	9.4	6.0	300	742	125
20	47	X/7343-43	T496X476M020(2)H4095	04053-064(2)	9.4	6.0	300	742	125
20	47	D/7343-31	T496D476(1)020(2)(3)(4)10	N/A	9.4	6.0	300	707	125
25	0.68	B/3528-21	T496B684(1)025(2)(3)(4)10	N/A	0.2	4.0	6,500	114	125
25	0.68	B/3528-21	T496B684M025(2)H4095	04053-065(2)	0.2	4.0	6,500	114	125
25	1	B/3528-21	T496B105(1)025(2)(3)(4)10	N/A	0.3	4.0	5,000	130	125
25	1	B/3528-21	T496B105(1)025(2)(3)(4)20	N/A	0.3	4.0	3,500	156	125
25	1	B/3528-21	T496B105M025(2)H4095	04053-066(2)	0.3	4.0	5,000	130	125
25	1.5	B/3528-21	T496B155(1)025(2)(3)(4)10	N/A	0.4	6.0	5,000	130	125
25	1.5	B/3528-21	T496B155(1)025(2)(3)(4)20	N/A	0.4	6.0	1,600	230	125
25	1.5	B/3528-21	T496B155M025(2)H4095	04053-067(2)	0.4	6.0	5,000	130	125
25	2.2	C/6032-28	T496C225(1)025(2)(3)(4)10	N/A	0.6	6.0	3,500	177	125
25	2.2	C/6032-28	T496C225M025(2)H4095	04053-068(2)	0.6	6.0	3,500	177	125
25	3.3	C/6032-28	T496C335(1)025(2)(3)(4)10	N/A	0.8	6.0	2,500	210	125
25	3.3	C/6032-28	T496C335(1)025(2)(3)(4)20	N/A	0.8	6.0	2,100	229	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DLA)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded). To complete DLA part number insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or Z (Non-Weibull Graded)
(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder-plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge −55°C and +85°C after Weibull or 64 = 10 cycles Surge −55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DSCC)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
25	3.3	C/6032-28	T496C335M025(2)H4095	04053-069(2)	0.8	6.0	2,500	210	125
25	4.7	B/3528-21	T496B475(1)025(2)(3)(4)10	N/A	1.2	6.0	4,000	146	125
25	4.7	C/6032-28	T496C475(1)025(2)(3)(4)10	N/A	1.2	6.0	2,500	210	125
25	4.7	C/6032-28	T496C475(1)025(2)(3)(4)20	N/A	1.2	6.0	1,300	291	125
25	4.7	C/6032-28	T496C475M025(2)H4095	04053-070(2)	1.2	6.0	2,500	210	125
25	6.8	C/6032-28	T496C685(1)025(2)(3)(4)10	N/A	1.7	6.0	2,000	235	125
25	6.8	C/6032-28	T496C685(1)025(2)(3)(4)20	N/A	1.7	6.0	600	428	125
25	6.8	C/6032-28	T496C685M025(2)H4095	04053-071(2)	1.7	6.0	2,000	235	125
25	10	C/6032-28	T496C106(1)025(2)(3)(4)10	N/A	2.5	6.0	600	428	125
25	10	C/6032-28	T496C106M025(2)H4095	04053-072(2)	2.5	6.0	600	428	125
25	10	D/7343-31	T496D106(1)025(2)(3)(4)10	N/A	2.5	6.0	1,200	354	125
25	10	D/7343-31	T496D106(1)025(2)(3)(4)20	N/A	2.5	6.0	600	500	125
25	10	D/7343-31	T496D106M025(2)H4095	04053-073(2)	2.5	6.0	1,200	354	125
25	15	C/6032-28	T496C156(1)025(2)(3)(4)10	N/A	3.8	6.0	750	383	125
25	15	D/7343-31	T496D156(1)025(2)(3)(4)10	N/A	3.8	6.0	1,000	387	125
25	15	D/7343-31	T496D156(1)025(2)(3)(4)20	N/A	3.8	6.0	500	547	125
25	15	D/7343-31	T496D156M025(2)H4095	04053-074(2)	3.8	6.0	1,000	387	125
25	22	X/7343-43	T496X226(1)025(2)(3)(4)10	N/A	5.5	6.0	900	428	125
25	22	X/7343-43	T496X226(1)025(2)(3)(4)20	N/A	5.5	6.0	400	642	125
25	22	X/7343-43	T496X226M025(2)H4095	04053-075(2)	5.5	6.0	900	428	125
25	22	D/7343-31	T496D226(1)025(2)(3)(4)10	N/A	5.5	6.0	800	433	125
25	22	D/7343-31	T496D226(1)025(2)(3)(4)20	N/A	5.5	6.0	400	612	125
25	22	D/7343-31	T496D226M025(2)H4095	04053-076(2)	5.5	6.0	800	433	125
35	0.47	B/3528-21	T496B474(1)035(2)(3)(4)10	N/A	0.2	4.0	8,000	103	125
35	0.47	B/3528-21	T496B474(1)035(2)(3)(4)20	N/A	0.2	4.0	2,600	181	125
35	0.47	B/3528-21	T496B474M035(2)H4095	04053-077(2)	0.2	4.0	8,000	103	125
35	0.68	B/3528-21	T496B684(1)035(2)(3)(4)10	N/A	0.2	4.0	6,500	114	125
35	0.68	B/3528-21	T496B684M035(2)H4095	04053-078(2)	0.2	4.0	6,500	114	125
35	1	B/3528-21	T496B105(1)035(2)(3)(4)10	N/A	0.4	4.0	5,000	130	125
35	1	B/3528-21	T496B105(1)035(2)(3)(4)20	N/A	0.4	4.0	3,100	166	125
35	1	B/3528-21	T496B105M035(2)H4095	04053-079(2)	0.4	4.0	5,000	130	125
35	1.5	C/6032-28	T496C155(1)035(2)(3)(4)10	N/A	0.5	6.0	4,500	156	125
35	1.5	C/6032-28	T496C155(1)035(2)(3)(4)20	N/A	0.5	6.0	2,600	206	125
35	1.5	C/6032-28	T496C155M035(2)H4095	04053-080(2)	0.5	6.0	4,500	156	125
35	2.2	C/6032-28	T496C225(1)035(2)(3)(4)10	N/A	0.8	6.0	3,500	177	125
35	2.2	C/6032-28	T496C225(1)035(2)(3)(4)20	N/A	0.8	6.0	1,600	262	125
35	2.2	C/6032-28	T496C225M035(2)H4095	04053-081(2)	0.8	6.0	3,500	177	125
35	3.3	C/6032-28	T496C335(1)035(2)(3)(4)10	N/A	1.2	6.0	2,500	210	125
35	3.3	C/6032-28	T496C335(1)035(2)(3)(4)20	N/A	1.2	6.0	900	350	125
35	3.3	C/6032-28	T496C335M035(2)H4095	04053-082(2)	1.2	6.0	2,500	210	125
35	4.7	D/7343-31	T496D475(1)035(2)(3)(4)10	N/A	1.6	6.0	1,500	316	125
35	4.7	D/7343-31	T496D475(1)035(2)(3)(4)20	N/A	1.6	6.0	700	463	125
35	4.7	D/7343-31	T496D475M035(2)H4095	04053-083(2)	1.6	6.0	1,500	316	125
35	6.8	D/7343-31	T496D685(1)035(2)(3)(4)10	N/A	2.4	6.0	1,300	340	125
35	6.8	D/7343-31	T496D685(1)035(2)(3)(4)20	N/A	2.4	6.0	750	447	125
35	6.8	D/7343-31	T496D685M035(2)H4095	04053-084(2)	2.4	6.0	1,300	340	125
35	10	X/7343-43	T496X106(1)035(2)(3)(4)10	N/A	3.5	6.0	1,000	406	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DLA)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded). To complete DLA part number insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or Z (Non-Weibull Graded)
(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder-plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge −55°C and +85°C after Weibull or 64 = 10 cycles Surge −55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

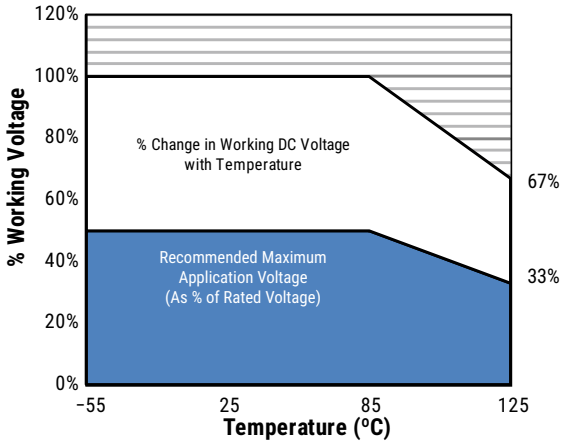
Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DSCC)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
35	10	X/7343-43	T496X106(1)035(2)(3)(4)20	N/A	3.5	6.0	500	574	125
35	10	X/7343-43	T496X106M035(2)H4095	04053-085(2)	3.5	6.0	1,000	406	125
35	10	D/7343-31	T496D106(1)035(2)(3)(4)10	N/A	3.5	6.0	400	612	125
35	15	X/7343-43	T496X156(1)035(2)(3)(4)10	N/A	5.3	6.0	900	428	125
35	15	X/7343-43	T496X156(1)035(2)(3)(4)20	N/A	5.3	6.0	500	574	125
35	15	X/7343-43	T496X156M035(2)H4095	04053-086(2)	5.3	6.0	900	428	125
35	15	D/7343-31	T496D156(1)035(2)(3)(4)10	N/A	5.3	6.0	500	547	125
35	22	X/7343-43	T496X226(1)035(2)(3)(4)10	N/A	7.7	6.0	300	742	125
35	22	X/7343-43	T496X226M035(2)H4095	04053-087(2)	7.7	6.0	300	742	125
50	0.15	B/3528-21	T496B154(1)050(2)(3)(4)10	N/A	0.1	4.0	16,000	73	125
50	0.15	B/3528-21	T496B154M050(2)H4095	04053-088(2)	0.1	4.0	16,000	73	125
50	0.22	B/3528-21	T496B224(1)050(2)(3)(4)10	N/A	0.1	4.0	14,000	78	125
50	0.22	B/3528-21	T496B224(1)050(2)(3)(4)20	N/A	0.1	4.0	10,000	92	125
50	0.22	B/3528-21	T496B224M050(2)H4095	04053-089(2)	0.1	4.0	14,000	78	125
50	0.33	B/3528-21	T496B334(1)050(2)(3)(4)10	N/A	0.2	4.0	10,000	92	125
50	0.33	B/3528-21	T496B334(1)050(2)(3)(4)20	N/A	0.2	4.0	2,600	181	125
50	0.33	B/3528-21	T496B334M050(2)H4095	04053-090(2)	0.2	4.0	10,000	92	125
50	0.47	C/6032-28	T496C474(1)050(2)(3)(4)10	N/A	0.2	4.0	8,000	117	125
50	0.47	C/6032-28	T496C474(1)050(2)(3)(4)20	N/A	0.2	4.0	1,900	241	125
50	0.47	C/6032-28	T496C474M050(2)H4095	04053-091(2)	0.2	4.0	8,000	117	125
50	0.68	C/6032-28	T496C684(1)050(2)(3)(4)10	N/A	0.3	4.0	7,000	125	125
50	0.68	C/6032-28	T496C684(1)050(2)(3)(4)20	N/A	0.3	4.0	1,700	254	125
50	0.68	C/6032-28	T496C684M050(2)H4095	04053-092(2)	0.3	4.0	7,000	125	125
50	1	C/6032-28	T496C105(1)050(2)(3)(4)10	N/A	0.5	4.0	5,500	141	125
50	1	C/6032-28	T496C105(1)050(2)(3)(4)20	N/A	0.5	4.0	2,700	202	125
50	1	C/6032-28	T496C105M050(2)H4095	04053-093(2)	0.5	4.0	5,500	141	125
50	1.5	C/6032-28	T496C155(1)050(2)(3)(4)10	N/A	0.8	6.0	5,000	148	125
50	1.5	C/6032-28	T496C155(1)050(2)(3)(4)20	N/A	0.8	6.0	2,000	235	125
50	1.5	C/6032-28	T496C155M050(2)H4095	04053-094(2)	0.8	6.0	5,000	148	125
50	2.2	D/7343-31	T496D225(1)050(2)(3)(4)10	N/A	1.1	6.0	2,500	245	125
50	2.2	D/7343-31	T496D225(1)050(2)(3)(4)20	N/A	1.1	6.0	900	408	125
50	2.2	D/7343-31	T496D225M050(2)H4095	04053-095(2)	1.1	6.0	2,500	245	125
50	3.3	D/7343-31	T496D335(1)050(2)(3)(4)10	N/A	1.7	6.0	2,000	274	125
50	3.3	D/7343-31	T496D335(1)050(2)(3)(4)20	N/A	1.7	6.0	1,000	387	125
50	3.3	D/7343-31	T496D335M050(2)H4095	04053-096(2)	1.7	6.0	2,000	274	125
50	4.7	X/7343-43	T496X475(1)050(2)(3)(4)10	N/A	2.4	6.0	1,500	331	125
50	4.7	X/7343-43	T496X475(1)050(2)(3)(4)20	N/A	2.4	6.0	400	642	125
50	4.7	D/7343-31	T496D475(1)050(2)(3)(4)10	N/A	2.4	6.0	1,500	316	125
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA at +25°C Maximum/ 5 Minutes	% at +25°C 120 Hz Maximum	mΩ at +25°C 100 kHz Maximum	100kHz, 25 °C	°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DLA)	DC Leakage	DF	ESR	Ripple Current (mArms)	Maximum Operating Temp.

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded). To complete DLA part number insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or Z (Non-Weibull Graded)
(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder-plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.
(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge −55°C and +85°C after Weibull or 64 = 10 cycles Surge −55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	67% of V_R
Recommended maximum application voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

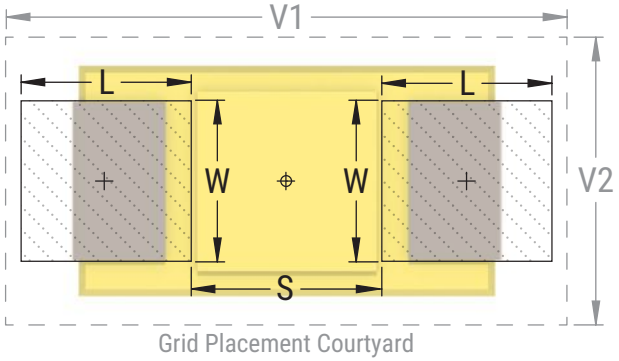
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
L	6032-19	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
M	3528-15	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
H	7360-20	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
E[1]	7360–38	3.25	2.77	3.67	10.22	7.30	3.13	2.37	3.87	9.12	6.80	3.03	1.99	4.03	8.26	6.54
Q	7343-12	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
R[2]	2012-12	1.05	1.83	0.15	4.82	2.50	0.93	1.50	0.22	3.72	2.00	0.83	1.12	0.38	2.86	1.74
S[2]	3216–12	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
T	3528–12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
U	6032–15	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
V	7343–21	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
W	7343–15	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
Y[1]	7343–40	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*



Grid Placement Courtyard

Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

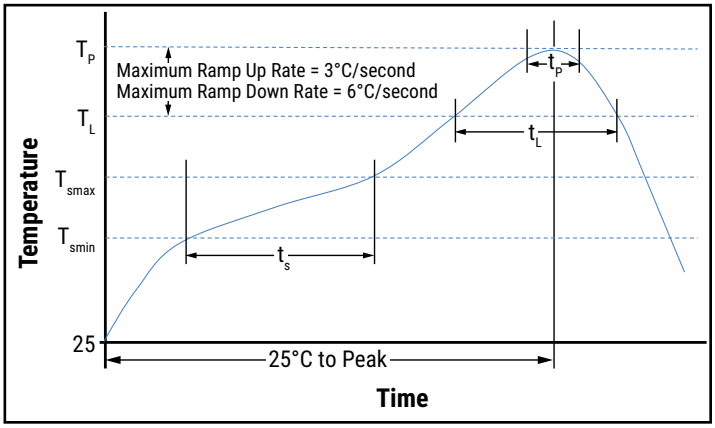
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

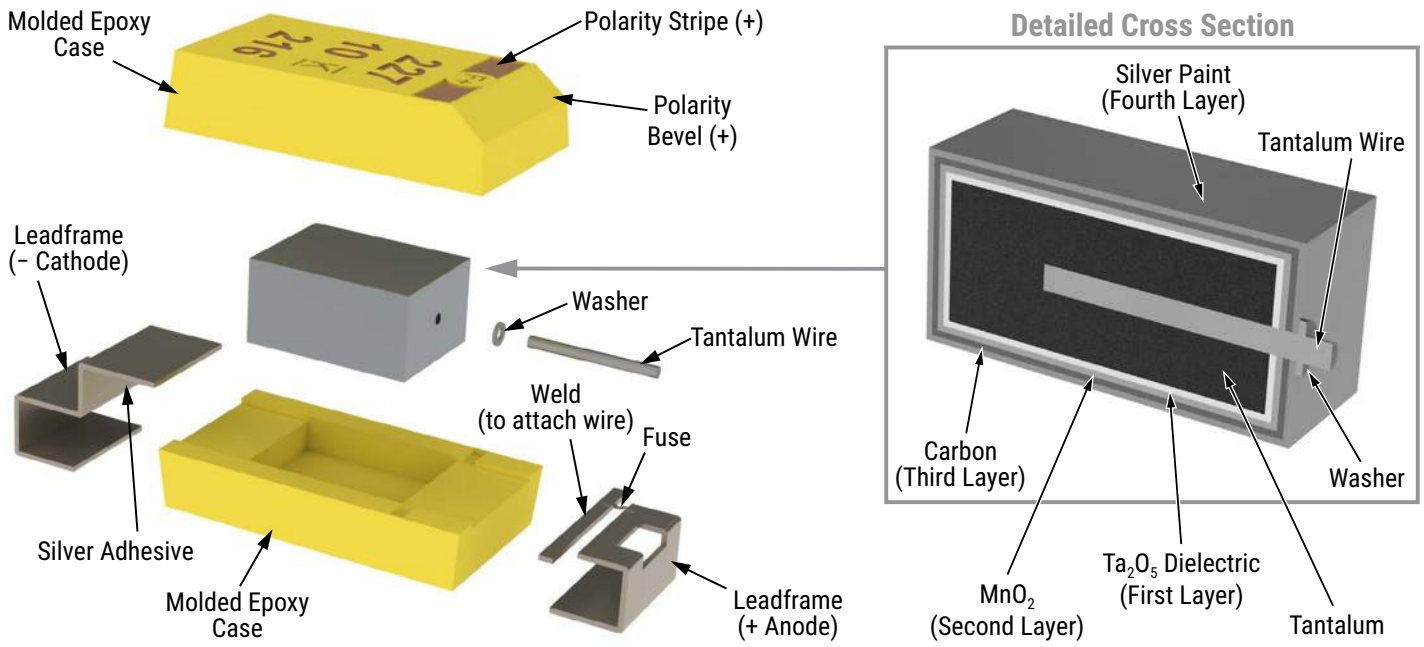
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



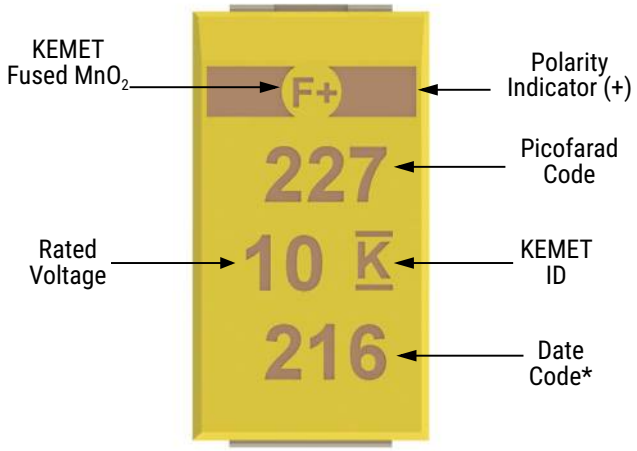
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 216 = 16th week of 2022

Date Code *	
1st digit = last number of year	0 = 2020 1 = 2021 2 = 2022 3 = 2023 4 = 2024
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

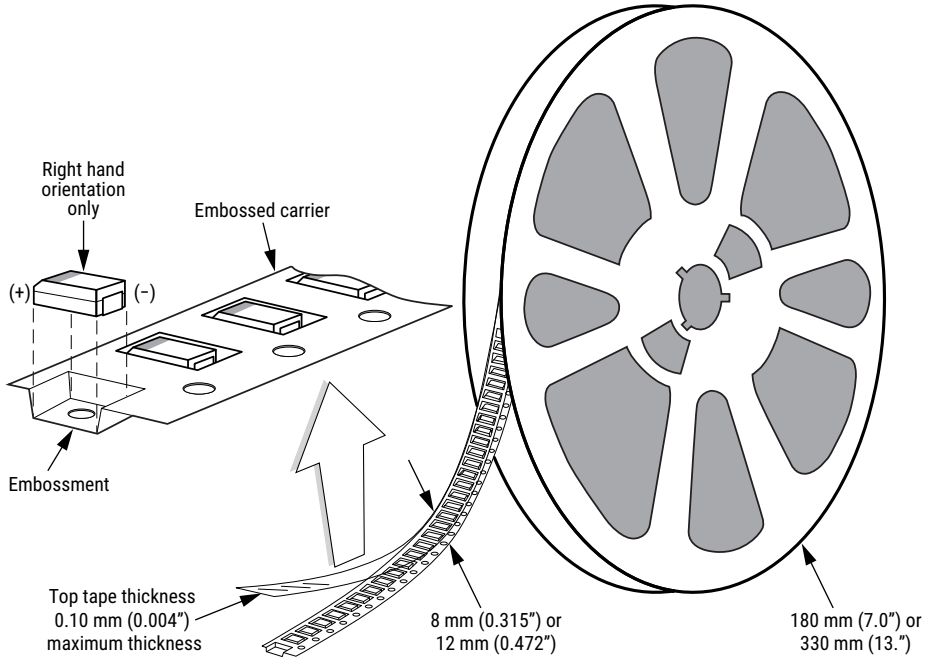


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

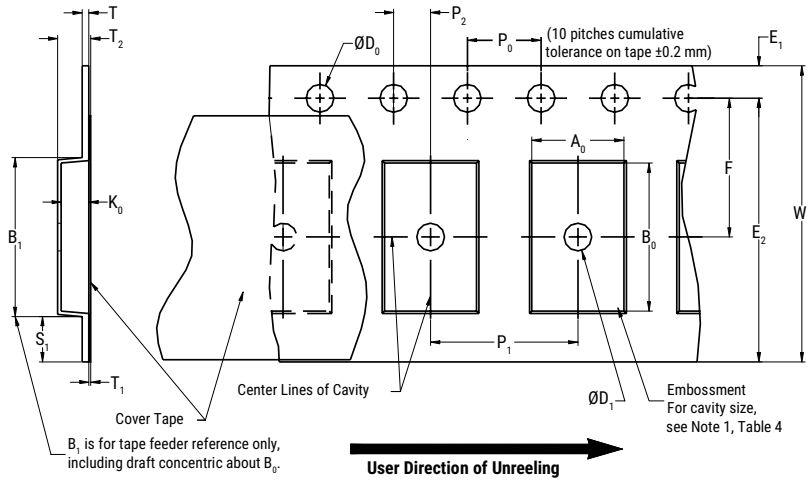


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

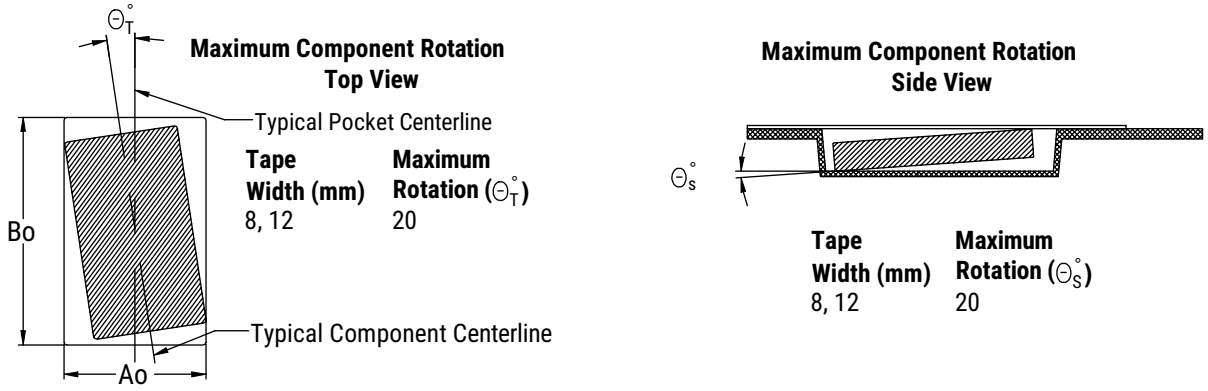


Figure 3 – Maximum Lateral Movement

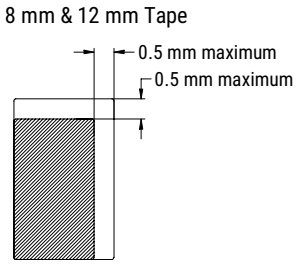


Figure 4 – Bending Radius

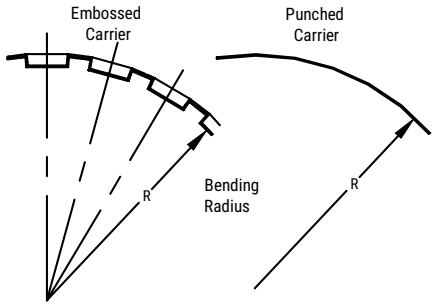
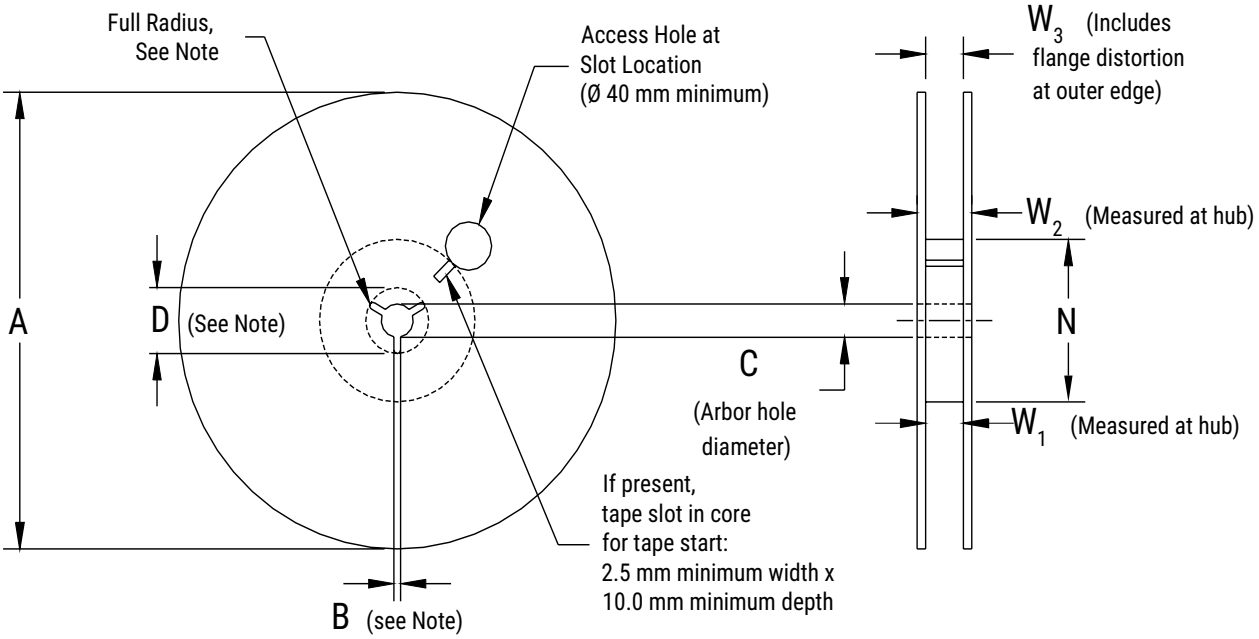


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

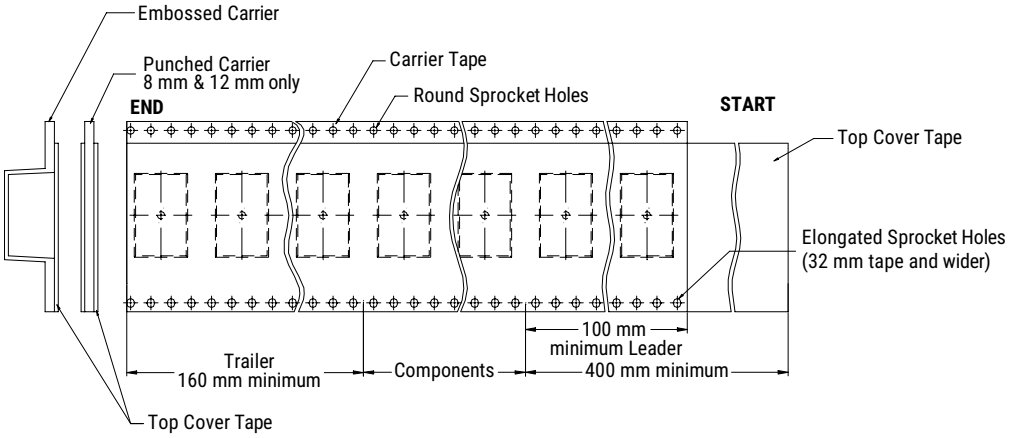
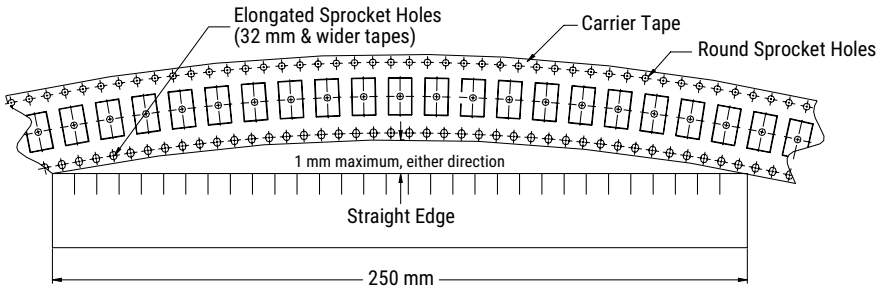


Figure 7 – Maximum Camber



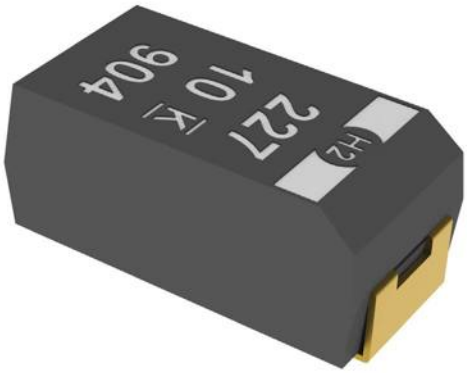
T500 MnO_2 200°C

Overview

The KEMET T500 is a high-temperature product that offers optimum performance characteristics in applications with operating temperatures up to 200°C. The T500 is classified as MSL (Moisture Sensitivity Level) 1 under J–STD–020: unlimited floor life time at ≤ 30°C/85% RH.

Benefits

- Meets or exceeds EIA standard 535BAAC
- Weibull failure rate to B Level available
- Standard gold-plated termination
- RoHS Compliant
- Operating temperature range of −55°C to +200°C
- 100% steady-state accelerated aging at 200°C
- Voltage derating is 40% at 200°C
- Qualified at 1,000 hours of life test at 200°C
- Taped and reeled per EIA 481
- Meets MSL 1 requirements for Pb-free assembly according to JEDEC J–STD–020 (*)
- Surge current options available



Applications

Typical applications include decoupling and filtering in down-hole, defense, and aerospace industries.

Ordering Information

T	500	X	227	M	010	A	G	61	10	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Performance	ESR	Packaging (C-Spec)
T = Tantalum	High Temperature 200°C	B C D X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	006 = 6.3 010 = 10 016 = 16 035 = 35 050 = 50	A = N/A B = 0.1%/1,000 hours	G = Gold-plated	61 = Surge None 62 = Surge at 25°C after Weibull 63 = Surge −55°C and +85°C after Weibull	10 = Standard ESR	Blank = 7" reel 7280 = 13" reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 200°C
Rated Capacitance Range	4.7 – 220 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6.3 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

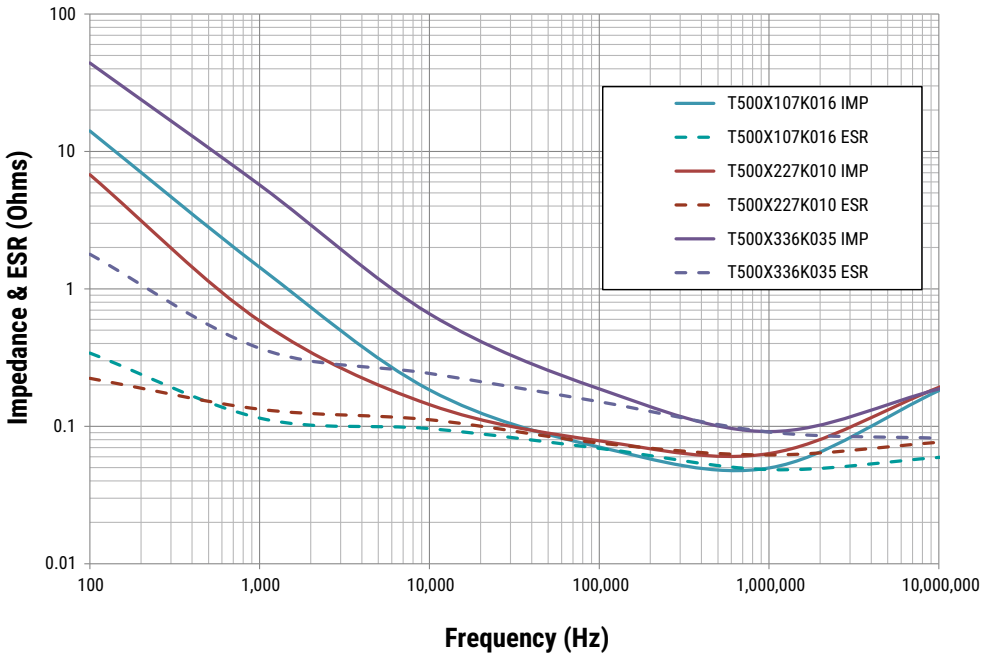
Qualification

Test	Condition		Characteristics			
Endurance	200°C at 0.4 x V_R, 1,000 hours (**)		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	1 mAmp maximum		
			ESR	Within initial limits		
Storage Life	200°C at 0 volts, 1,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	1 mAmp maximum		
			ESR	Within initial limits		
Humidity	85°C, 85% RH, 0 volts, 1,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +125°C, +25°C			+25°C	−55°C	+85°C	+150°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	N/A	10 x IL	12 x IL
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, 10 Hz to 2,000 Hz, 5 G for 20 minutes, 12 cycles each of 3 orientations		Δ C/C	Within ±10 of initial value			
			DF	Within initial limits			
			DCL	Within initial limits			

**IL = Initial limit*
**

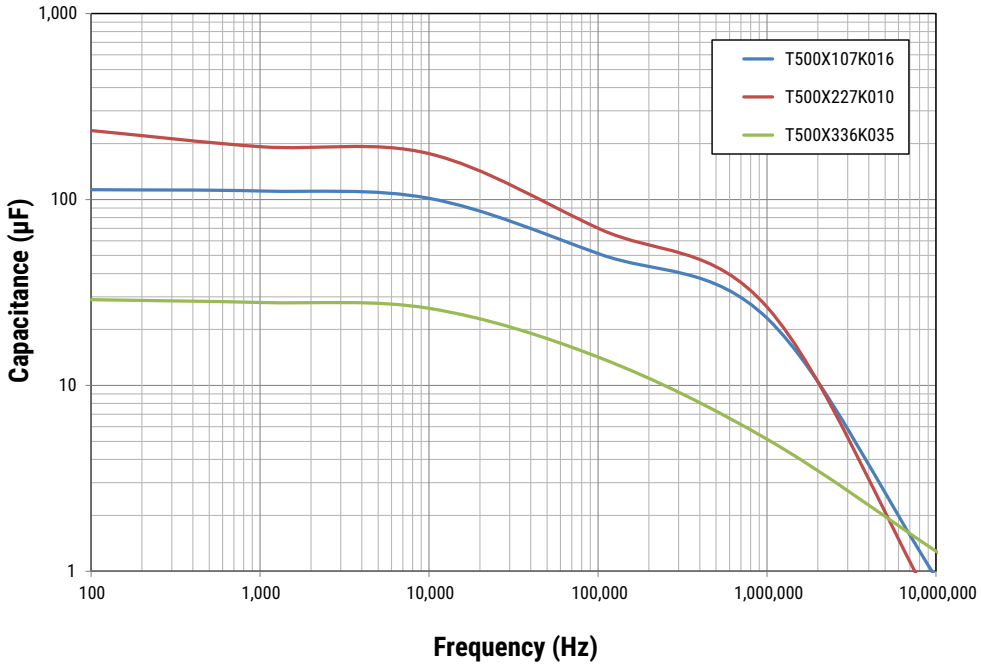
Electrical Characteristics

Impedance & ESR vs. Frequency



The measurements were taken at room temperature (25°C)

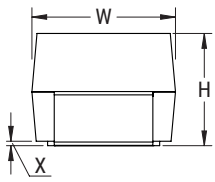
Capacitance vs. Frequency



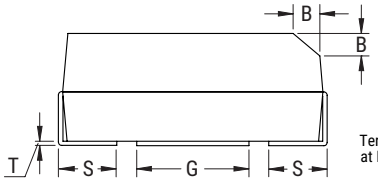
The measurements were taken at room temperature (25°C)

Dimensions – Millimeters

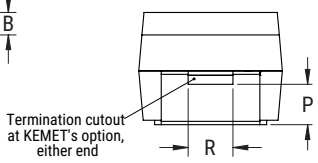
CATHODE (-) END VIEW



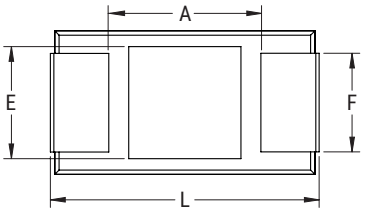
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component												
KEMET	EIA	L	W	H	F ±0.1 ±(0.004)	S ±0.3 (±0.012)	B ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Minimum)	G (Ref)	E (Ref)
B	3528–21	3.5±0.2 (0.138±0.008)	2.8±0.2 (0.110±0.008)	1.9±0.2 (0.075±0.008)	2.2 (0.087)	0.80+0.1/–0.3 (0.032+0.004/–0.012)	0.4 (0.016)	0.10±0.10 (0.004±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)
C	6032–28	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.9 (0.114)	2.8 (0.110)	2.4 (0.094)
D	7343–31	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)
X	7343–43	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10±0.10 (0.004±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)

Notes: (Ref) – Dimensions provided for reference only.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Working Voltage		Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage		DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temperature	MSL
VDC at 85°C	VDC at +125°C	VDC at +200°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Maximum /5 Minutes	µA at 200°C, 0.33 V_R Maximum /5 Minutes	% at 25°C 120 Hz Maximum	mΩ at 25°C 100 kHz Maximum	mA at +25°C 100 kHz	mA at +125°C 100 kHz	mA at +200°C 100 kHz	°C	Reflow Temp. ≤ 260°C
6.3	4.2	2.5	6.8	B/3528-21	T500B685(1)006AG(3)10	0.5	5	6	3500	156	62	16	200	1
6.3	4.2	2.5	10	B/3528-21	T500B106(1)006AG(3)10	0.6	6	6	2800	174	70	17	200	1
6.3	4.2	2.5	15	B/3528-21	T500B156(1)006AG(3)10	0.9	9	6	3500	156	62	16	200	1
6.3	4.2	2.5	22	B/3528-21	T500B226(1)006AG(3)10	1.4	14	6	3500	156	62	16	200	1
6.3	4.2	2.5	33	C/6032-28	T500C336(1)006AG(3)10	2.1	21	6	1800	247	99	25	200	1
6.3	4.2	2.5	47	C/6032-28	T500C476(1)006AG(3)10	3.0	30	6	1800	247	99	25	200	1
6.3	4.2	2.5	68	C/6032-28	T500C686(1)006AG(3)10	4.3	43	6	1200	303	121	30	200	1
10	6.6	4.0	6.8	B/3528-21	T500B685(1)010AG(3)10	0.7	7	6	3500	156	62	16	200	1
10	6.6	4.0	10	B/3528-21	T500B106(1)010AG(3)10	1	10	6	2800	174	70	17	200	1
10	6.6	4.0	15	B/3528-21	T500B156(1)010AG(3)10	1.5	15	6	3500	156	62	16	200	1
10	6.6	4.0	47	D/7343-31	T500D476(1)010AG(3)10*	4.7	47	6	800	433	173	43	200	1
10	6.6	4.0	220	X/7343-43	T500X227(1)010(2)G(3)10*	22	220	10	250	812	325	81	200	1
16	10.6	6.4	4.7	B/3528-21	T500B475(1)016AG(3)10	0.8	8	6	6000	119	48	12	200	1
16	10.6	6.4	6.8	B/3528-21	T500B685(1)016AG(3)10	1.1	11	6	3500	156	62	16	200	1
16	10.6	6.4	10	B/3528-21	T500B106(1)016AG(3)10	1.6	16	6	2800	174	70	17	200	1
16	10.6	6.4	33	D/7343-31	T500D336(1)016AG(3)10	5.3	53	6	800	433	173	43	200	1
16	10.6	6.4	47	D/7343-31	T500D476(1)016AG(3)10	7.5	75	6	800	433	173	43	200	1
16	10.6	6.4	100	X/7343-43	T500X107(1)016(2)G(3)10*	16	160	8	250	812	325	81	200	1
20	13.4	8.0	22	D/7343-31	T500D226(1)020AG(3)10	4.4	44	6	800	433	173	43	200	1
20	13.4	8.0	33	D/7343-31	T500D336(1)020AG(3)10	6.6	66	6	700	463	185	46	200	1
25	16.8	10.0	6.8	D/7343-31	T500D685(1)025AG(3)10	1.7	17	6	1300	340	136	34	200	1
25	16.8	10.0	10	D/7343-31	T500D106(1)025AG(3)10	2.5	25	6	1000	387	155	39	200	1
25	16.8	10.0	15	D/7343-31	T500D156(1)025AG(3)10	3.8	38	6	1000	387	155	39	200	1
25	16.8	10.0	22	D/7343-31	T500D226(1)025AG(3)10	5.5	55	6	800	433	173	43	200	1
25	16.8	10.0	33	D/7343-31	T500D336(1)025AG(3)10	8.3	83	6	700	463	185	46	200	1
35	23.1	14.0	6.8	D/7343-31	T500D685(1)035AG(3)10	2.4	24	6	1300	340	136	34	200	1
35	23.1	14.0	10	D/7343-31	T500D106(1)035AG(3)10	3.5	35	6	1000	387	155	39	200	1
35	23.1	14.0	10	X/7343-43	T500X106(1)035(2)G(3)10*	3.5	35	6	700	486	194	49	200	1
35	23.1	14.0	15	D/7343-31	T500D156(1)035AG(3)10	5.3	53	6	1000	387	155	39	200	1
35	23.1	14.0	22	D/7343-31	T500D226(1)035AG(3)10	7.7	77	6	700	460	184	46	200	1
35	23.1	14.0	33	X/7343-43	T500X336(1)035(2)G(3)10*	11.6	116	8	600	524	210	52	200	1
50	33.5	20.0	6.8	D/7343-31	T500D685(1)050AG(3)10	3.4	34	6	1000	387	155	39	200	1
50	33.5	20.0	10	D/7343-31	T500D106(1)050AG(3)10	5.0	50	6	1000	387	155	39	200	1

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.

(2) To complete KEMET part number, insert B (0.1%/1,000 hours) or A = N/A. Designates reliability level.

(3) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C after Weibull, 63 = 10 cycles −55°C +85°C after Weibull. Designates surge current option.

** For the part numbers marked with an (*) please consider a 33% derating at +200°C*

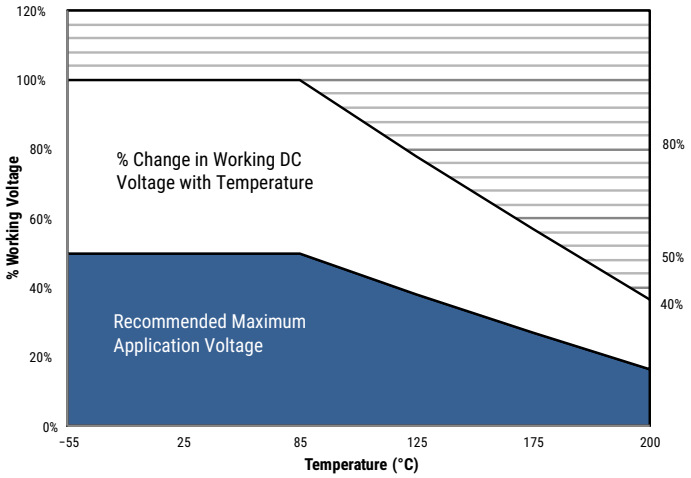
Refer to Ordering Information for additional detail.

Better than series product may be substituted within the same capacitance and voltage at KEMET's option.

Recommended Voltage Derating Guidelines

Rated Voltage	Working Voltage				Recommended Application Voltage (for maximum reliability)			
	+25°C	+85°C	+125°C	+200°C	25°C	85°C	125°C	200°C
6.3	6.3	6.3	5.0	2.5	3.2	3.2	2.5	1.3
10	10	10	8.0	4.0	5.0	5.0	4.0	2.0
16	16	16	12.8	6.4	8.0	8.0	6.4	3.2
20	20	20	16.0	8.0	10	10	8.0	4.0
25	25	25	20.0	10.0	12.5	12.5	10.0	5.0
35	35	35	28.0	14.0	17.5	17.5	14.0	7.0
50	50	50	40.0	20.0	25.0	25.0	20.0	10.0

Note: Additional reliability can be obtained through the derating of voltage



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts at 25°C with +20°C Rise
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Temperature Compensation Multipliers for Maximum Ripple Current					
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C	T ≤ 150°C	T ≤ 175°C	T ≤ 200°C
1.00	0.90	0.40	0.30	0.20	0.10

T = Environmental Temperature

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

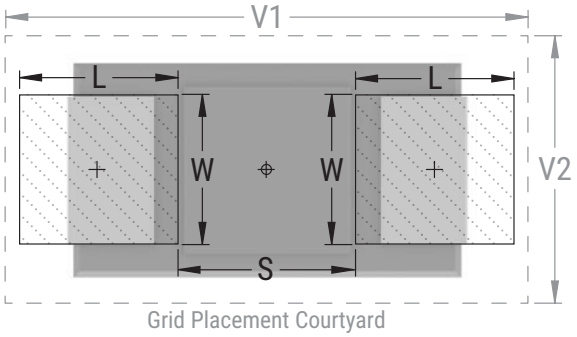
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe, plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the below table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032-28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component desity product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

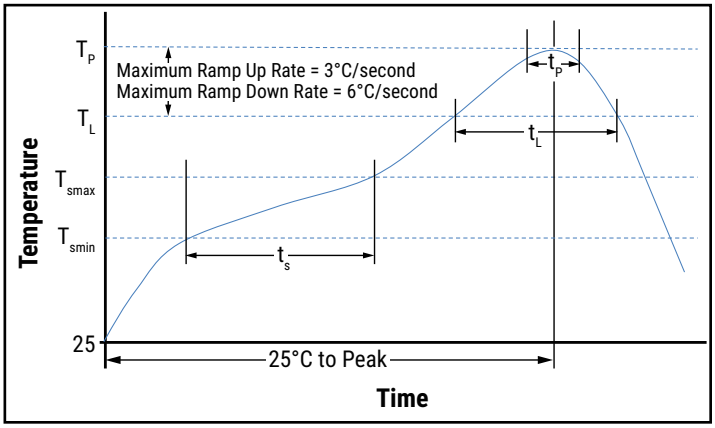
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*

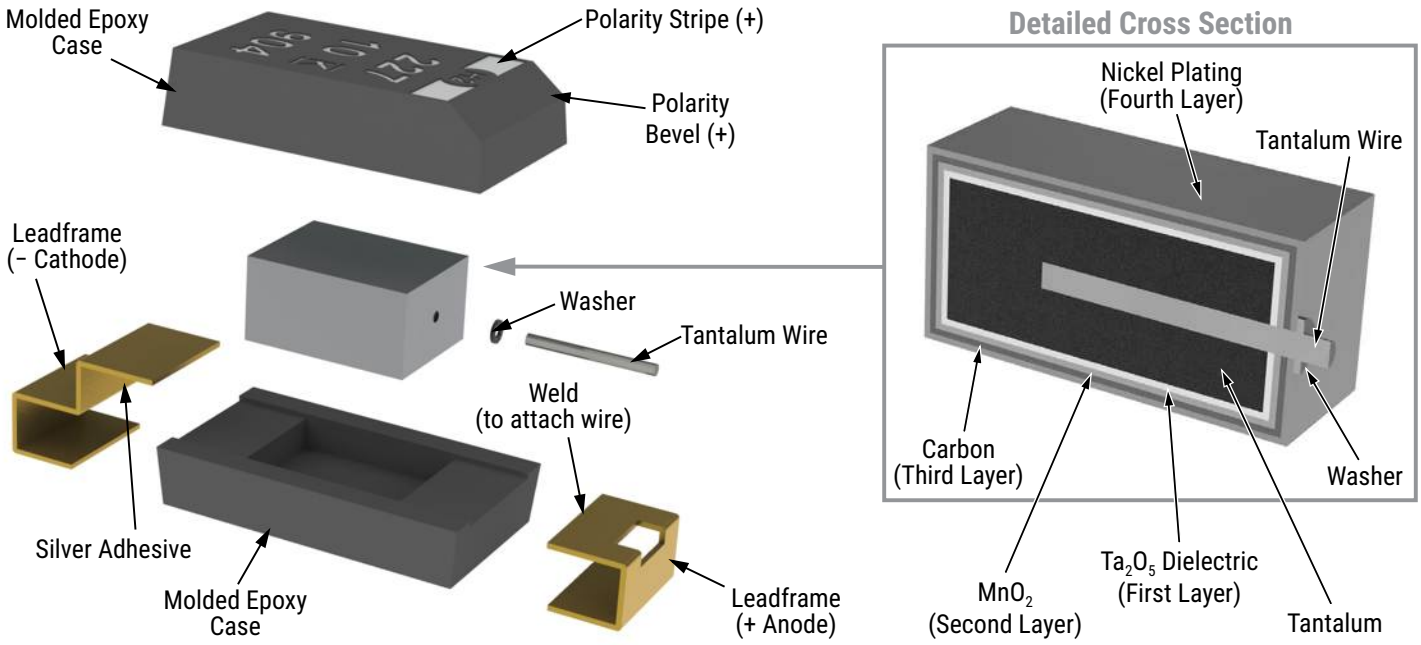


Storage

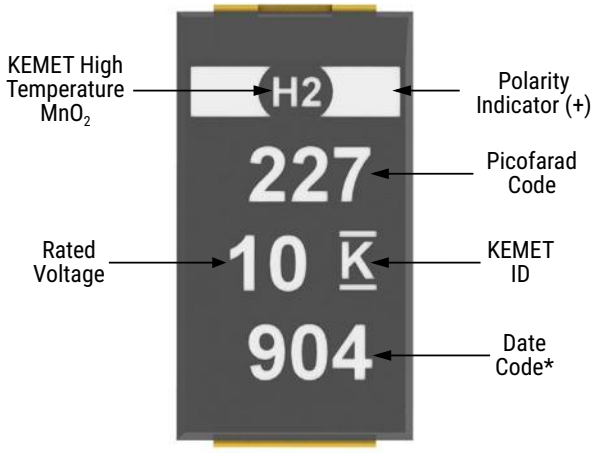
Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp, and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts, and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Due to the potential use of high melting point solders, KEMET has taken the initiative to package this product in moisture barrier bags with desiccant and a humidity indicator card.

Construction



Capacitor Marking



* 904 = 4th week of 2019

Date Code *	
1st digit = Last number of Year	8 = 2018 9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

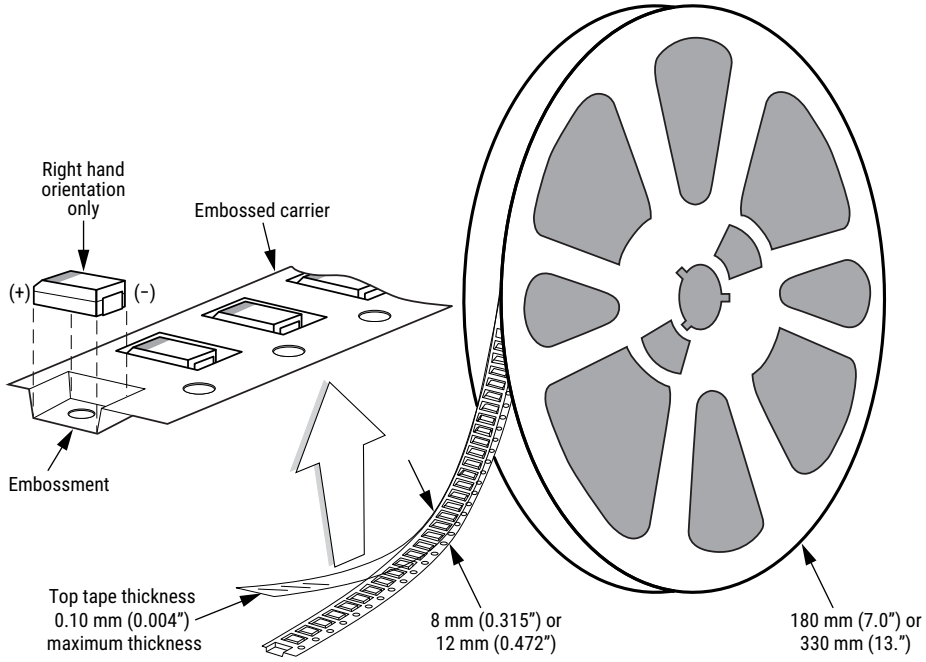


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
A	3216-18	8	2,000	9,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
B	3528-21	8	2,000	8,000
U	6032-15	12	1,000	5,000
C	6032-28	12	500	3,000
W	7343-15	12	1,000	3,000
V	7343-20	12	1,000	3,000
D	7343-31	12	500	2,500
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

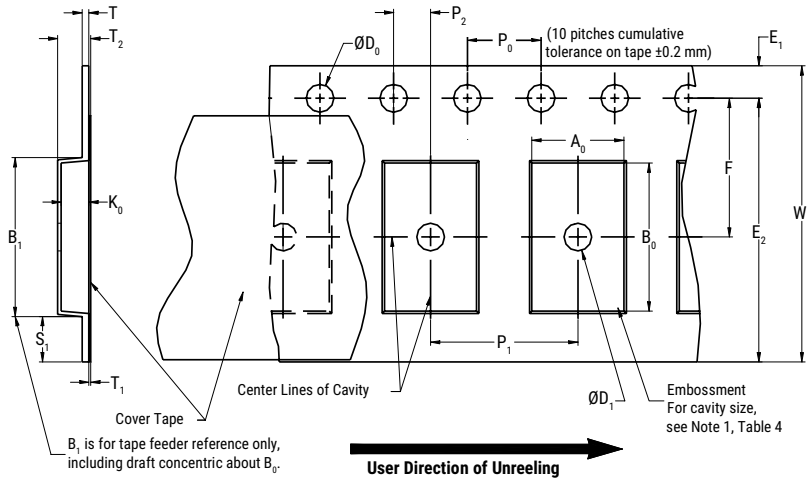


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

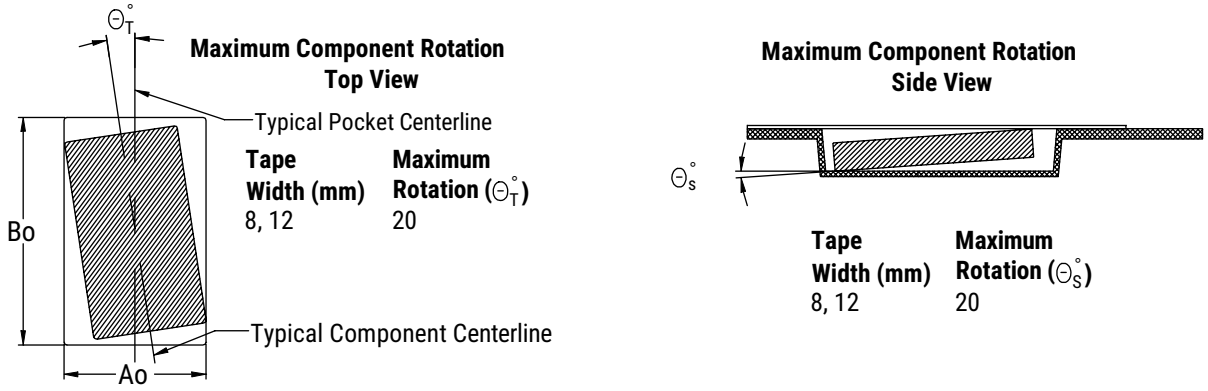


Figure 3 – Maximum Lateral Movement

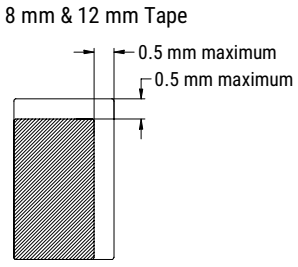


Figure 4 – Bending Radius

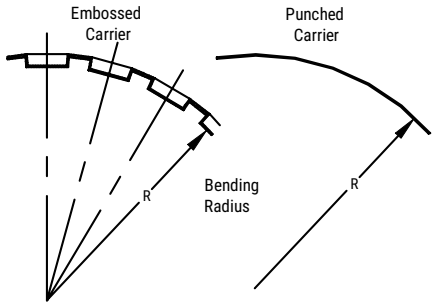
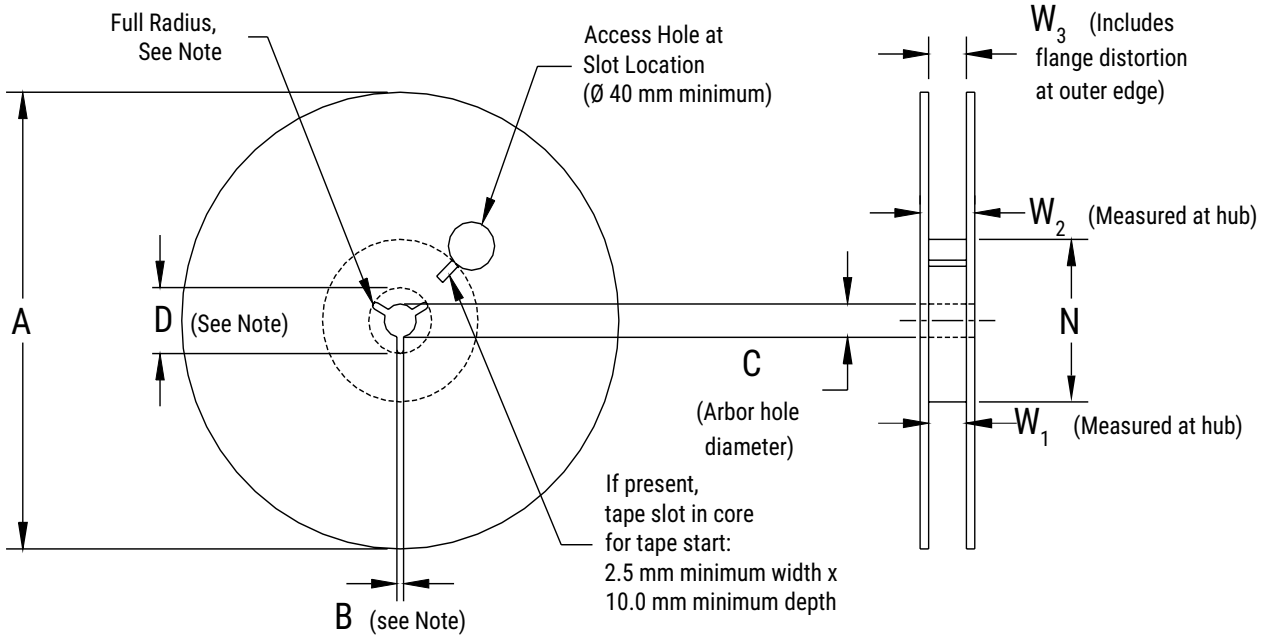


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

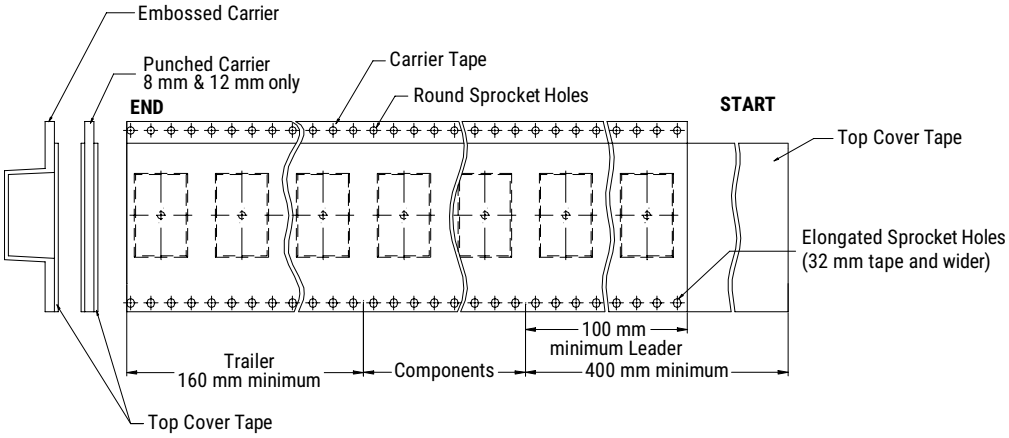
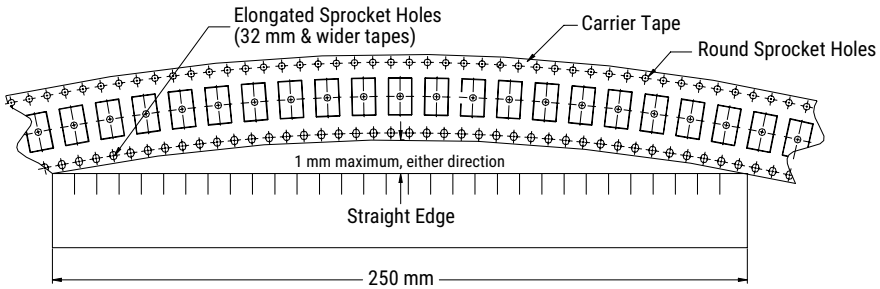


Figure 7 – Maximum Camber



T215 Axial High Temperature Solder (CSR13 Style)

Overview

The KEMET T215 Series High Temperature Solder is targeted for use in high humidity environments. These capacitors are ruggedly built, designed for miniaturized circuitry, and especially well-suited for coupling, bypass, filtering, and RC timing circuits. The T215 Series exhibits excellent stability as well as extremely low DC leakage current, dissipation factor and ESR/impedance over a wide temperature and frequency range. The internal design of these devices, as well as the hermetic seal, includes high temperature solder (minimum melting point of 221°C). The content of tin in the solder does not exceed 97%.
This assembly is especially suited for temperature conditions where solder may fail due to undesirable solder reflow.

The KEMET T215 Series is available in standard EIA capacitance values from 0.0047 µF to 330 µF in ±20%, ±10% and ±5% tolerances, and working voltages of 6 VDC to 100 VDC and low ESR limits.

Benefits

- Internal construction solder to resist up to 221°C
- Qualified to MIL–PRF–39003 (CSR13 Style)
- Failure rate options: Graded – B, C, D, and G, and Exponential – M, P, R, and S
- Operating temperature range of −55˚C to +125˚C
- Capacitance values of 0.0047 µF to 330 µF
- Tolerances of ±5%, ±10% and ±20%
- Voltage rating of 6 VDC – 100 VDC
- Surge current options D, E, and F
- Taped and reeled per EIA Specification RS–296
- Marking per MIL–STD–1285
- Case sizes: A, B, C, D

Applications

Typical applications include coupling, bypass, filtering, and RC timing circuits in miniaturized circuitry.

Ordering Information

T	215	A	105	K	050	B	S	7200
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	Hermetically sealed axial high temperature solder	A B C D	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50 075 = 75 100 = 100	Graded: B = 0.1%/k hours C = 0.01%/k hours D = 0.001%/k hours G= 1.0 %/k hours Exponential: M = 1%/k hours P = 0.1%/k hours R = 0.01%/k hours S = 0.001%/k hours	S = Standard (Sn/Pb)	Blank = Sleeved/Bulk 0100 = Without sleeve 7200 = Tape & Reel 7293 & 7443 = Ammo 4250 = 10 cycles, 25°C after Weibull 4251 = 10 cycles, −55 & 85°C after Weibull 4252 = 10 cycles, −55 & 85°C before Weibull All capacitors are sleeved unless specified.

Ordering Information – (CSR13 Style)

M39003	/01	6003	E
Capacitor Class	Slash	Dash Number	Surge Option
Military specification number	Specification sheet number	Failure rate level	D = C-4250 E = C-4251 F = C-4252 H = No C-Spec

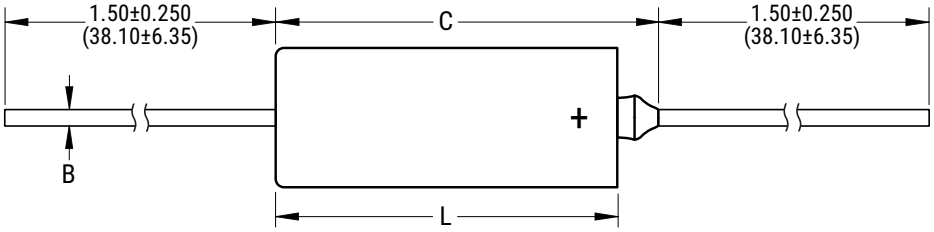
Orders should be entered by the military specification number, including the dash number and surge option letter (D, E, F, or H).

Performance Characteristics

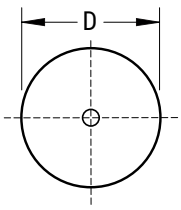
Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	0.0047 µF – 330 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6 – 100 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table (for reference only)
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)
Failure Rate (MIL–PRF–39003, CSR13 capacitors only)	Approved failure rate: Graded G (1.0%/k hours), B (0.1%/k hours), C (0.01%/k hours), D (0.001%/k hours) and Exponential M (1.0%/k hours), P (0.1%/k hours), R (0.01%/k hours), S (0.001%/k hours)

Dimensions – Inches (Millimeters)

SIDE VIEW



END VIEW



Case Size	Uninsulated		Insulated			
	D ±0.005 ±(0.13)	L ±0.031 ±(0.79)	D ±0.010 ±(0.25)	L ±0.031 ±(0.79)	B ±0.002 ±(0.05)	C Maximum
A	0.125 (3.18)	0.250 (6.35)	0.135 (3.43)	0.286 (7.26)	0.020 (0.51)	0.422 (10.72)
B	0.175 (4.45)	0.438 (11.13)	0.185 (4.70)	0.474 (12.04)	0.020 (0.51)	0.610 (15.49)
C	0.279 (7.09)	0.650 (16.51)	0.289 (7.34)	0.686 (17.42)	0.025 (0.64)	0.822 (20.88)
D	0.341 (8.66)	0.750 (19.05)	0.351 (8.92)	0.786 (19.96)	0.025 (0.64)	0.922 (23.42)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/1K				MIL–PRF–39003/1K			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
6	5.6	A	T215A565J006(2)S	0.3	4	5001-	5201-	5401-	5601-	4001-	6001-	7001-	8001-
6	5.6	A	T215A565K006(2)S	0.3	4	2241-	2481-	2721-	2961-	4002-	6002-	7002-	8002-
6	6.8	A	T215A685J006(2)S	0.3	6	5002-	5202-	5402-	5602-	4003-	6003-	7003-	8003-
6	6.8	A	T215A685K006(2)S	0.3	6	2242-	2482-	2722-	2962-	4004-	6004-	7004-	8004-
6	6.8	A	T215A685M006(2)S	0.3	6	2243-	2483-	2723-	2963-	4005-	6005-	7005-	8005-
6	47.0	B	T215B476J006(2)S	1.5	6	5003-	5203-	5403-	5603-	4006-	6006-	7006-	8006-
6	47.0	B	T215B476K006(2)S	1.5	6	2244-	2484-	2724-	2964-	4007-	6007-	7007-	8007-
6	47.0	B	T215B476M006(2)S	1.5	6	2245-	2485-	2725-	2965-	4008-	6008-	7008-	8008-
6	56.0	B	T215B566J006(2)S	1.5	6	5004-	5204-	5404-	5604-	4009-	6009-	7009-	8009-
6	56.0	B	T215B566K006(2)S	1.5	6	2246-	2486-	2726-	2966-	4010-	6010-	7010-	8010-
6	150.0	C	T215C157J006(2)S	4.5	6	5005-	5205-	5405-	5605-	4011-	6011-	7011-	8011-
6	150.0	C	T215C157K006(2)S	4.5	6	2247-	2487-	2727-	2967-	4012-	6012-	7012-	8012-
6	150.0	C	T215C157M006(2)S	4.5	6	2248-	2488-	2728-	2968-	4013-	6013-	7013-	8013-
6	180.0	C	T215C187J006(2)S	5.5	6	5006-	5206-	5406-	5606-	4014-	6014-	7014-	8014-
6	180.0	C	T215C187K006(2)S	5.5	6	2249-	2489-	2729-	2969-	4015-	6015-	7015-	8015-
6	270.0	D	T215D277J006(2)S	6.0	8	5007-	5207-	5407-	5607-	4016-	6016-	7016-	8016-
6	270.0	D	T215D277K006(2)S	6.0	8	2250-	2490-	2730-	2970-	4017-	6017-	7017-	8017-
6	330.0	D	T215D337J006(2)S	7.5	8	5008-	5208-	5408-	5608-	4018-	6018-	7018-	8018-
6	330.0	D	T215D337K006(2)S	7.5	8	2251-	2491-	2731-	2971-	4019-	6019-	7019-	8019-
6	330.0	D	T215D337M006(2)S	7.5	8	2252-	2492-	2732-	2972-	4020-	6020-	7020-	8020-
10	3.9	A	T215A395J010(2)S	0.3	4	5009-	5209-	5409-	5609-	4021-	6021-	7021-	8021-
10	3.9	A	T215A395K010(2)S	0.3	4	2253-	2493-	2733-	2973-	4022-	6022-	7022-	8022-
10	4.7	A	T215A475J010(2)S	0.4	4	5010-	5210-	5410-	5610-	4023-	6023-	7023-	8023-
10	4.7	A	T215A475K010(2)S	0.4	4	2254-	2494-	2734-	2974-	4024-	6024-	7024-	8024-
10	4.7	A	T215A475M010(2)S	0.4	4	2255-	2495-	2735-	2975-	4025-	6025-	7025-	8025-
10	27.0	B	T215B276J010(2)S	2.0	6	5011-	5211-	5411-	5611-	4026-	6026-	7026-	8026-
10	27.0	B	T215B276K010(2)S	2.0	6	2256-	2496-	2736-	2976-	4027-	6027-	7027-	8027-
10	33.0	B	T215B336J010(2)S	2.0	6	5012-	5212-	5412-	5612-	4028-	6028-	7028-	8028-
10	33.0	B	T215B336K010(2)S	2.0	6	2257-	2497-	2737-	2977-	4029-	6029-	7029-	8029-
10	33.0	B	T215B336M010(2)S	2.0	6	2258-	2498-	2738-	2978-	4030-	6030-	7030-	8030-
10	39.0	B	T215B396J010(2)S	2.0	6	5013-	5213-	5413-	5613-	4031-	6031-	7031-	8031-
10	39.0	B	T215B396K010(2)S	2.0	6	2259-	2499-	2739-	2979-	4032-	6032-	7032-	8032-
10	82.0	C	T215C826J010(2)S	3.0	6	5014-	5214-	5414-	5614-	4033-	6033-	7033-	8033-
10	82.0	C	T215C826K010(2)S	3.0	6	2260-	2500-	2740-	2980-	4034-	6034-	7034-	8034-
10	100.0	C	T215C107J010(2)S	5.0	6	5015-	5215-	5415-	5615-	4035-	6035-	7035-	8035-
10	100.0	C	T215C107K010(2)S	5.0	6	2261-	2501-	2741-	2981-	4036-	6036-	7036-	8036-
10	100.0	C	T215C107M010(2)S	5.0	6	2262-	2502-	2742-	2982-	4037-	6037-	7037-	8037-
10	120.0	C	T215C127J010(2)S	6.0	6	5016-	5216-	5416-	5616-	4038-	6038-	7038-	8038-
10	120.0	C	T215C127K010(2)S	6.0	6	2263-	2503-	2743-	2983-	4039-	6039-	7039-	8039-
10	180.0	D	T215D187J010(2)S	9.0	6	5017-	5217-	5417-	5617-	4040-	6040-	7040-	8040-
10	180.0	D	T215D187K010(2)S	9.0	6	2264-	2504-	2744-	2984-	4041-	6041-	7041-	8041-
10	220.0	D	T215D227J010(2)S	10.0	8	5018-	5218-	5418-	5618-	4042-	6042-	7042-	8042-
10	220.0	D	T215D227K010(2)S	10.0	8	2265-	2505-	2745-	2985-	4043-	6043-	7043-	8043-
10	220.0	D	T215D227M010(2)S	10.0	8	2266-	2506-	2746-	2986-	4044-	6044-	7044-	8044-
15	2.7	A	T215A275J015(2)S	0.3	4	5019-	5219-	5419-	5619-	4045-	6045-	7045-	8045-
15	2.7	A	T215A275K015(2)S	0.3	4	2267-	2507-	2747-	2987-	4046-	6046-	7046-	8046-
15	3.3	A	T215A335J015(2)S	0.4	4	5020-	5220-	5420-	5620-	4047-	6047-	7047-	8047-
15	3.3	A	T215A335K015(2)S	0.4	4	2268-	2508-	2748-	2988-	4048-	6048-	7048-	8048-
15	3.3	A	T215A335M015(2)S	0.4	4	2269-	2509-	2749-	2989-	4049-	6049-	7049-	8049-
15	18.0	B	T215B186J015(2)S	2.0	6	5021-	5221-	5421-	5621-	4050-	6050-	7050-	8050-
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							

(2) To complete KEMET part number (T215), insert graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates reliability level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/1K				MIL–PRF–39003/1K			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
15	18.0	B	T215B186K015(2)S	2.0	6	2270-	2510-	2750-	2990-	4051-	6051-	7051-	8051-
15	22.0	B	T215B226J015(2)S	2.0	6	5022-	5222-	5422-	5622-	4052-	6052-	7052-	8052-
15	22.0	B	T215B226K015(2)S	2.0	6	2271-	2511-	2751-	2991-	4053-	6053-	7053-	8053-
15	22.0	B	T215B226M015(2)S	2.0	6	2272-	2512-	2752-	2992-	4054-	6054-	7054-	8054-
15	56.0	C	T215C566J015(2)S	4.0	6	5023-	5223-	5423-	5623-	4055-	6055-	7055-	8055-
15	56.0	C	T215C566K015(2)S	4.0	6	2273-	2513-	2753-	2993-	4056-	6056-	7056-	8056-
15	68.0	C	T215C686J015(2)S	5.0	6	5024-	5224-	5424-	5624-	4057-	6057-	7057-	8057-
15	68.0	C	T215C686K015(2)S	5.0	6	2274-	2514-	2754-	2994-	4058-	6058-	7058-	8058-
15	68.0	C	T215C686M015(2)S	5.0	6	2275-	2515-	2755-	2995-	4059-	6059-	7059-	8059-
15	120.0	D	T215D127J015(2)S	6.0	6	5025-	5225-	5425-	5625-	4060-	6060-	7060-	8060-
15	120.0	D	T215D127K015(2)S	6.0	6	2276-	2516-	2756-	2996-	4061-	6061-	7061-	8061-
15	150.0	D	T215D157J015(2)S	8.0	6	5026-	5226-	5426-	5626-	4062-	6062-	7062-	8062-
15	150.0	D	T215D157K015(2)S	8.0	6	2277-	2517-	2757-	2997-	4063-	6063-	7063-	8063-
15	150.0	D	T215D157M015(2)S	8.0	6	2278-	2518-	2758-	2998-	4064-	6064-	7064-	8064-
20	1.2	A	T215A125J020(2)S	0.3	4	5027-	5227-	5427-	5627-	4065-	6065-	7065-	8065-
20	1.2	A	T215A125K020(2)S	0.3	4	2279-	2519-	2759-	2999-	4066-	6066-	7066-	8066-
20	1.5	A	T215A155J020(2)S	0.3	4	5028-	5228-	5428-	5628-	4067-	6067-	7067-	8067-
20	1.5	A	T215A155K020(2)S	0.3	4	2280-	2520-	2760-	3000-	4068-	6068-	7068-	8068-
20	1.5	A	T215A155M020(2)S	0.3	4	2281-	2521-	2761-	3001-	4069-	6069-	7069-	8069-
20	1.8	A	T215A185J020(2)S	0.3	4	5029-	5229-	5429-	5629-	4070-	6070-	7070-	8070-
20	1.8	A	T215A185K020(2)S	0.3	4	2282-	2522-	2762-	3002-	4071-	6071-	7071-	8071-
20	2.2	A	T215A225J020(2)S	0.4	4	5030-	5230-	5430-	5630-	4072-	6072-	7072-	8072-
20	2.2	A	T215A225K020(2)S	0.4	4	2283-	2523-	2763-	3003-	4073-	6073-	7073-	8073-
20	2.2	A	T215A225M020(2)S	0.4	4	2284-	2524-	2764-	3004-	4074-	6074-	7074-	8074-
20	8.2	B	T215B825J020(2)S	1.0	6	5031-	5231-	5431-	5631-	4075-	6075-	7075-	8075-
20	8.2	B	T215B825K020(2)S	1.0	6	2285-	2525-	2765-	3005-	4076-	6076-	7076-	8076-
20	10.0	B	T215B106J020(2)S	1.0	6	5032-	5232-	5432-	5632-	4077-	6077-	7077-	8077-
20	10.0	B	T215B106K020(2)S	1.0	6	2286-	2526-	2766-	3006-	4078-	6078-	7078-	8078-
20	10.0	B	T215B106M020(2)S	1.0	6	2287-	2527-	2767-	3007-	4079-	6079-	7079-	8079-
20	12.0	B	T215B126J020(2)S	1.0	6	5033-	5233-	5433-	5633-	4080-	6080-	7080-	8080-
20	12.0	B	T215B126K020(2)S	1.0	6	2288-	2528-	2768-	3008-	4081-	6081-	7081-	8081-
20	15.0	B	T215B156J020(2)S	2.0	6	5034-	5234-	5434-	5634-	4082-	6082-	7082-	8082-
20	15.0	B	T215B156K020(2)S	2.0	6	2289-	2529-	2769-	3009-	4083-	6083-	7083-	8083-
20	15.0	B	T215B156M020(2)S	2.0	6	2290-	2530-	2770-	3010-	4084-	6084-	7084-	8084-
20	27.0	C	T215C276J020(2)S	2.5	6	5035-	5235-	5435-	5635-	4085-	6085-	7085-	8085-
20	27.0	C	T215C276K020(2)S	2.5	6	2291-	2531-	2771-	3011-	4086-	6086-	7086-	8086-
20	33.0	C	T215C336J020(2)S	3.0	6	5036-	5236-	5436-	5636-	4087-	6087-	7087-	8087-
20	33.0	C	T215C336K020(2)S	3.0	6	2292-	2532-	2772-	3012-	4088-	6088-	7088-	8088-
20	33.0	C	T215C336M020(2)S	3.0	6	2293-	2533-	2773-	3013-	4089-	6089-	7089-	8089-
20	39.0	C	T215C396J020(2)S	3.0	6	5037-	5237-	5437-	5637-	4090-	6090-	7090-	8090-
20	39.0	C	T215C396K020(2)S	3.0	6	2294-	2534-	2774-	3014-	4091-	6091-	7091-	8091-
20	47.0	C	T215C476J020(2)S	4.5	6	5038-	5238-	5438-	5638-	4092-	6092-	7092-	8092-
20	47.0	C	T215C476K020(2)S	4.5	6	2295-	2535-	2775-	3015-	4093-	6093-	7093-	8093-
20	47.0	C	T215C476M020(2)S	4.5	6	2296-	2536-	2776-	3016-	4094-	6094-	7094-	8094-
20	56.0	D	T215D566J020(2)S	5.5	6	5039-	5239-	5439-	5639-	4095-	6095-	7095-	8095-
20	56.0	D	T215D566K020(2)S	5.5	6	2297-	2537-	2777-	3017-	4096-	6096-	7096-	8096-
20	68.0	D	T215D686J020(2)S	6.0	6	5040-	5240-	5440-	5640-	4097-	6097-	7097-	8097-
20	68.0	D	T215D686K020(2)S	6.0	6	2298-	2538-	2778-	3018-	4098-	6098-	7098-	8098-
20	68.0	D	T215D686M020(2)S	6.0	6	2299-	2539-	2779-	3019-	4099-	6099-	7099-	8099-
20	82.0	D	T215D826J020(2)S	6.0	6	5041-	5241-	5441-	5641-	4100-	6100-	7100-	8100-
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							

(2) To complete KEMET part number (T215), insert graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates reliability level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/1K				MIL–PRF–39003/1K			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
20	82.0	D	T215D826K020(2)S	6.0	6	2300-	2540-	2780-	3020-	4101-	6101-	7101-	8101-
20	100.0	D	T215D107J020(2)S	10.0	6	5042-	5242-	5442-	5642-	4102-	6102-	7102-	8102-
20	100.0	D	T215D107K020(2)S	10.0	6	2301-	2541-	2781-	3021-	4103-	6103-	7103-	8103-
20	100.0	D	T215D107M020(2)S	10.0	6	2302-	2542-	2782-	3022-	4104-	6104-	7104-	8104-
35	5.6	B	T215B565J035(2)S	1.0	4	5043-	5243-	5443-	5643-	4105-	6105-	7105-	8105-
35	5.6	B	T215B565K035(2)S	1.0	4	2303-	2543-	2783-	3023-	4106-	6106-	7106-	8106-
35	6.8	B	T215B685J035(2)S	1.5	4	5044-	5244-	5444-	5644-	4107-	6107-	7107-	8107-
35	6.8	B	T215B685K035(2)S	1.5	4	2304-	2544-	2784-	3024-	4108-	6108-	7108-	8108-
35	6.8	B	T215B685M035(2)S	1.5	6	2305-	2545-	2785-	3025-	4109-	6109-	7109-	8109-
35	22.0	C	T215C226J035(2)S	4.0	4	5045-	5245-	5445-	5645-	4110-	6110-	7110-	8110-
35	22.0	C	T215C226K035(2)S	4.0	4	2306-	2546-	2786-	3026-	4111-	6111-	7111-	8111-
35	22.0	C	T215C226M035(2)S	4.0	4	2307-	2547-	2787-	3027-	4112-	6112-	7112-	8112-
35	27.0	D	T215D276J035(2)S	4.5	4	5046-	5246-	5446-	5646-	4113-	6113-	7113-	8113-
35	27.0	D	T215D276K035(2)S	4.5	4	2308-	2548-	2788-	3028-	4114-	6114-	7114-	8114-
35	33.0	D	T215D336J035(2)S	5.5	4	5047-	5247-	5447-	5647-	4115-	6115-	7115-	8115-
35	33.0	D	T215D336K035(2)S	5.5	4	2309-	2549-	2789-	3029-	4116-	6116-	7116-	8116-
35	33.0	D	T215D336M035(2)S	5.5	4	2310-	2550-	2790-	3030-	4117-	6117-	7117-	8117-
35	39.0	D	T215D396J035(2)S	6.0	4	5048-	5248-	5448-	5648-	4118-	6118-	7118-	8118-
35	39.0	D	T215D396K035(2)S	6.0	4	2311-	2551-	2791-	3031-	4119-	6119-	7119-	8119-
35	47.0	D	T215D476J035(2)S	8.0	4	5049-	5249-	5449-	5649-	4120-	6120-	7120-	8120-
35	47.0	D	T215D476K035(2)S	8.0	4	2312-	2552-	2792-	3032-	4121-	6121-	7121-	8121-
35	47.0	D	T215D476M035(2)S	8.0	4	2313-	2553-	2793-	3033-	4122-	6122-	7122-	8122-
50	0.0047	A	T215A472J050(2)S	0.1	2	5050-	5250-	5450-	5650-	4123-	6123-	7123-	8123-
50	0.0047	A	T215A472K050(2)S	0.1	2	2314-	2554-	2794-	3034-	4124-	6124-	7124-	8124-
50	0.0047	A	T215A472M050(2)S	0.1	2	2315-	2555-	2795-	3035-	4125-	6125-	7125-	8125-
50	0.0056	A	T215A562J050(2)S	0.1	2	5051-	5251-	5451-	5651-	4126-	6126-	7126-	8126-
50	0.0056	A	T215A562K050(2)S	0.1	2	2316-	2556-	2796-	3036-	4127-	6127-	7127-	8127-
50	0.0068	A	T215A682J050(2)S	0.1	2	5052-	5252-	5452-	5652-	4128-	6128-	7128-	8128-
50	0.0068	A	T215A682K050(2)S	0.1	2	2317-	2557-	2797-	3037-	4129-	6129-	7129-	8129-
50	0.0068	A	T215A682M050(2)S	0.1	2	2318-	2558-	2798-	3038-	4130-	6130-	7130-	8130-
50	0.0082	A	T215A822J050(2)S	0.1	2	5053-	5253-	5453-	5653-	4131-	6131-	7131-	8131-
50	0.0082	A	T215A822K050(2)S	0.1	2	2319-	2559-	2799-	3039-	4132-	6132-	7132-	8132-
50	0.01	A	T215A103J050(2)S	0.1	2	5054-	5254-	5454-	5654-	4133-	6133-	7133-	8133-
50	0.01	A	T215A103K050(2)S	0.1	2	2320-	2560-	2800-	3040-	4134-	6134-	7134-	8134-
50	0.01	A	T215A103M050(2)S	0.1	2	2321-	2561-	2801-	3041-	4135-	6135-	7135-	8135-
50	0.012	A	T215A123J050(2)S	0.1	2	5055-	5255-	5455-	5655-	4136-	6136-	7136-	8136-
50	0.012	A	T215A123K050(2)S	0.1	2	2322-	2562-	2802-	3042-	4137-	6137-	7137-	8137-
50	0.015	A	T215A153J050(2)S	0.1	2	5056-	5256-	5456-	5656-	4138-	6138-	7138-	8138-
50	0.015	A	T215A153K050(2)S	0.1	2	2323-	2563-	2803-	3043-	4139-	6139-	7139-	8139-
50	0.015	A	T215A153M050(2)S	0.1	2	2324-	2564-	2804-	3044-	4140-	6140-	7140-	8140-
50	0.018	A	T215A183J050(2)S	0.1	2	5057-	5257-	5457-	5657-	4141-	6141-	7141-	8141-
50	0.018	A	T215A183K050(2)S	0.1	2	2325-	2565-	2805-	3045-	4142-	6142-	7142-	8142-
50	0.022	A	T215A223J050(2)S	0.1	2	5058-	5258-	5458-	5658-	4143-	6143-	7143-	8143-
50	0.022	A	T215A223K050(2)S	0.1	2	2326-	2566-	2806-	3046-	4144-	6144-	7144-	8144-
50	0.022	A	T215A223M050(2)S	0.1	2	2327-	2567-	2807-	3047-	4145-	6145-	7145-	8145-
50	0.027	A	T215A273J050(2)S	0.1	2	5059-	5259-	5459-	5659-	4146-	6146-	7146-	8146-
50	0.027	A	T215A273K050(2)S	0.1	2	2328-	2568-	2808-	3048-	4147-	6147-	7147-	8147-
50	0.033	A	T215A333J050(2)S	0.1	2	5060-	5260-	5460-	5660-	4148-	6148-	7148-	8148-
50	0.033	A	T215A333K050(2)S	0.1	2	2329-	2569-	2809-	3049-	4149-	6149-	7149-	8149-
50	0.033	A	T215A333M050(2)S	0.1	2	2330-	2570-	2810-	3050-	4150-	6150-	7150-	8150-
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							

(2) To complete KEMET part number (T215), insert graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates reliability level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/1K				MIL–PRF–39003/1K			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
50	0.039	A	T215A393J050(2)S	0.1	2	5061-	5261-	5461-	5661-	4151-	6151-	7151-	8151-
50	0.039	A	T215A393K050(2)S	0.1	2	2331-	2571-	2811-	3051-	4152-	6152-	7152-	8152-
50	0.047	A	T215A473J050(2)S	0.1	2	5062-	5262-	5462-	5662-	4153-	6153-	7153-	8153-
50	0.047	A	T215A473K050(2)S	0.1	2	2332-	2572-	2812-	3052-	4154-	6154-	7154-	8154-
50	0.047	A	T215A473M050(2)S	0.1	2	2333-	2573-	2813-	3053-	4155-	6155-	7155-	8155-
50	0.056	A	T215A563J050(2)S	0.1	2	5063-	5263-	5463-	5663-	4156-	6156-	7156-	8156-
50	0.056	A	T215A563K050(2)S	0.1	2	2334-	2574-	2814-	3054-	4157-	6157-	7157-	8157-
50	0.068	A	T215A683J050(2)S	0.1	2	5064-	5264-	5464-	5664-	4158-	6158-	7158-	8158-
50	0.068	A	T215A683K050(2)S	0.1	2	2335-	2575-	2815-	3055-	4159-	6159-	7159-	8159-
50	0.068	A	T215A683M050(2)S	0.1	2	2336-	2576-	2816-	3056-	4160-	6160-	7160-	8160-
50	0.082	A	T215A823J050(2)S	0.1	2	5065-	5265-	5465-	5665-	4161-	6161-	7161-	8161-
50	0.082	A	T215A823K050(2)S	0.1	2	2337-	2577-	2817-	3057-	4162-	6162-	7162-	8162-
50	0.1	A	T215A104J050(2)S	0.3	2	5066-	5266-	5466-	5666-	4163-	6163-	7163-	8163-
50	0.1	A	T215A104K050(2)S	0.3	2	2338-	2578-	2818-	3058-	4164-	6164-	7164-	8164-
50	0.1	A	T215A104M050(2)S	0.3	2	2339-	2579-	2819-	3059-	4165-	6165-	7165-	8165-
50	0.12	A	T215A124J050(2)S	0.3	2	5067-	5267-	5467-	5667-	4166-	6166-	7166-	8166-
50	0.12	A	T215A124K050(2)S	0.3	2	2340-	2580-	2820-	3060-	4167-	6167-	7167-	8167-
50	0.15	A	T215A154J050(2)S	0.3	2	5068-	5268-	5468-	5668-	4168-	6168-	7168-	8168-
50	0.15	A	T215A154K050(2)S	0.3	2	2341-	2581-	2821-	3061-	4169-	6169-	7169-	8169-
50	0.15	A	T215A154M050(2)S	0.3	2	2342-	2582-	2822-	3062-	4170-	6170-	7170-	8170-
50	0.18	A	T215A184J050(2)S	0.3	2	5069-	5269-	5469-	5669-	4171-	6171-	7171-	8171-
50	0.18	A	T215A184K050(2)S	0.3	2	2343-	2583-	2823-	3063-	4172-	6172-	7172-	8172-
50	0.22	A	T215A224J050(2)S	0.3	2	5070-	5270-	5470-	5670-	4173-	6173-	7173-	8173-
50	0.22	A	T215A224K050(2)S	0.3	2	2344-	2584-	2824-	3064-	4174-	6174-	7174-	8174-
50	0.22	A	T215A224M050(2)S	0.3	2	2345-	2585-	2825-	3065-	4175-	6175-	7175-	8175-
50	0.27	A	T215A274J050(2)S	0.3	2	5071-	5271-	5471-	5671-	4176-	6176-	7176-	8176-
50	0.27	A	T215A274K050(2)S	0.3	2	2346-	2586-	2826-	3066-	4177-	6177-	7177-	8177-
50	0.33	A	T215A334J050(2)S	0.3	2	5072-	5272-	5472-	5672-	4178-	6178-	7178-	8178-
50	0.33	A	T215A334K050(2)S	0.3	2	2347-	2587-	2827-	3067-	4179-	6179-	7179-	8179-
50	0.33	A	T215A334M050(2)S	0.3	2	2348-	2588-	2828-	3068-	4180-	6180-	7180-	8180-
50	0.39	A	T215A394J050(2)S	0.3	2	5073-	5273-	5473-	5673-	4181-	6181-	7181-	8181-
50	0.39	A	T215A394K050(2)S	0.3	2	2349-	2589-	2829-	3069-	4182-	6182-	7182-	8182-
50	0.47	A	T215A474J050(2)S	0.3	2	5074-	5274-	5474-	5674-	4183-	6183-	7183-	8183-
50	0.47	A	T215A474K050(2)S	0.3	2	2350-	2590-	2830-	3070-	4184-	6184-	7184-	8184-
50	0.47	A	T215A474M050(2)S	0.3	2	2351-	2591-	2831-	3071-	4185-	6185-	7185-	8185-
50	0.56	A	T215A564J050(2)S	0.3	2	5075-	5275-	5475-	5675-	4186-	6186-	7186-	8186-
50	0.56	A	T215A564K050(2)S	0.3	2	2352-	2592-	2832-	3072-	4187-	6187-	7187-	8187-
50	0.68	A	T215A684J050(2)S	0.3	2	5076-	5276-	5476-	5676-	4188-	6188-	7188-	8188-
50	0.68	A	T215A684K050(2)S	0.3	2	2353-	2593-	2833-	3073-	4189-	6189-	7189-	8189-
50	0.68	A	T215A684M050(2)S	0.3	2	2354-	2594-	2834-	3074-	4190-	6190-	7190-	8190-
50	0.82	A	T215A824J050(2)S	0.3	2	5077-	5277-	5477-	5677-	4191-	6191-	7191-	8191-
50	0.82	A	T215A824K050(2)S	0.3	2	2355-	2595-	2835-	3075-	4192-	6192-	7192-	8192-
50	1.0	A	T215A105J050(2)S	0.4	2	5078-	5278-	5478-	5678-	4193-	6193-	7193-	8193-
50	1.0	A	T215A105K050(2)S	0.4	2	2356-	2596-	2836-	3076-	4194-	6194-	7194-	8194-
50	1.0	A	T215A105M050(2)S	0.4	2	2357-	2597-	2837-	3077-	4195-	6195-	7195-	8195-
50	1.2	B	T215B125J050(2)S	0.4	4	5079-	5279-	5479-	5679-	4196-	6196-	7196-	8196-
50	1.2	B	T215B125K050(2)S	0.4	4	2358-	2598-	2838-	3078-	4197-	6197-	7197-	8197-
50	1.5	B	T215B155J050(2)S	0.5	4	5080-	5280-	5480-	5680-	4198-	6198-	7198-	8198-
50	1.5	B	T215B155K050(2)S	0.5	4	2359-	2599-	2839-	3079-	4199-	6199-	7199-	8199-
50	1.5	B	T215B155M050(2)S	0.5	4	2360-	2600-	2840-	3080-	4200-	6200-	7200-	8200-
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							

(2) To complete KEMET part number (T215), insert graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates reliability level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/1K				MIL–PRF–39003/1K			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
50	1.8	B	T215B185J050(2)S	0.5	4	5081-	5281-	5481-	5681-	4201-	6201-	7201-	8201-
50	1.8	B	T215B185K050(2)S	0.5	4	2361-	2601-	2841-	3081-	4202-	6202-	7202-	8202-
50	2.2	B	T215B225J050(2)S	0.8	4	5082-	5282-	5482-	5682-	4203-	6203-	7203-	8203-
50	2.2	B	T215B225K050(2)S	0.8	4	2362-	2602-	2842-	3082-	4204-	6204-	7204-	8204-
50	2.2	B	T215B225M050(2)S	0.8	4	2363-	2603-	2843-	3083-	4205-	6205-	7205-	8205-
50	2.7	B	T215B275J050(2)S	0.8	4	5083-	5283-	5483-	5683-	4206-	6206-	7206-	8206-
50	2.7	B	T215B275K050(2)S	0.8	4	2364-	2604-	2844-	3084-	4207-	6207-	7207-	8207-
50	3.3	B	T215B335J050(2)S	1.2	4	5084-	5284-	5484-	5684-	4208-	6208-	7208-	8208-
50	3.3	B	T215B335K050(2)S	1.2	4	2365-	2605-	2845-	3085-	4209-	6209-	7209-	8209-
50	3.3	B	T215B335M050(2)S	1.2	4	2366-	2606-	2846-	3086-	4210-	6210-	7210-	8210-
50	3.9	B	T215B395J050(2)S	1.5	4	5085-	5285-	5485-	5685-	4211-	6211-	7211-	8211-
50	3.9	B	T215B395K050(2)S	1.5	4	2367-	2607-	2847-	3087-	4212-	6212-	7212-	8212-
50	4.7	B	T215B475J050(2)S	1.7	4	5086-	5286-	5486-	5686-	4213-	6213-	7213-	8213-
50	4.7	B	T215B475K050(2)S	1.7	4	2368-	2608-	2848-	3088-	4214-	6214-	7214-	8214-
50	4.7	B	T215B475M050(2)S	1.7	4	2369-	2609-	2849-	3089-	4215-	6215-	7215-	8215-
50	5.6	C	T215C565J050(2)S	2.2	4	5087-	5287-	5487-	5687-	4216-	6216-	7216-	8216-
50	5.6	C	T215C565K050(2)S	2.2	4	2370-	2610-	2850-	3090-	4217-	6217-	7217-	8217-
50	6.8	C	T215C685J050(2)S	2.2	4	5088-	5288-	5488-	5688-	4218-	6218-	7218-	8218-
50	6.8	C	T215C685K050(2)S	2.2	4	2371-	2611-	2851-	3091-	4219-	6219-	7219-	8219-
50	6.8	C	T215C685M050(2)S	2.2	4	2372-	2612-	2852-	3092-	4220-	6220-	7220-	8220-
50	8.2	C	T215C825J050(2)S	2.5	4	5089-	5289-	5489-	5689-	4221-	6221-	7221-	8221-
50	8.2	C	T215C825K050(2)S	2.5	4	2373-	2613-	2853-	3093-	4222-	6222-	7222-	8222-
50	10.0	C	T215C106J050(2)S	2.5	4	5090-	5290-	5490-	5690-	4223-	6223-	7223-	8223-
50	10.0	C	T215C106K050(2)S	2.5	4	2374-	2614-	2854-	3094-	4224-	6224-	7224-	8224-
50	10.0	C	T215C106M050(2)S	2.5	4	2375-	2615-	2855-	3095-	4225-	6225-	7225-	8225-
50	12.0	C	T215C126J050(2)S	3.0	4	5091-	5291-	5491-	5691-	4226-	6226-	7226-	8226-
50	12.0	C	T215C126K050(2)S	3.0	4	2376-	2616-	2856-	3096-	4227-	6227-	7227-	8227-
50	15.0	C	T215C156J050(2)S	4.0	4	5092-	5292-	5492-	5692-	4228-	6228-	7228-	8228-
50	15.0	C	T215C156K050(2)S	4.0	4	2377-	2617-	2857-	3097-	4229-	6229-	7229-	8229-
50	15.0	C	T215C156M050(2)S	4.0	4	2378-	2618-	2858-	3098-	4230-	6230-	7230-	8230-
50	18.0	C	T215C186J050(2)S	4.5	4	5093-	5293-	5493-	5693-	4231-	6231-	7231-	8231-
50	18.0	C	T215C186K050(2)S	4.5	4	2379-	2619-	2859-	3099-	4232-	6232-	7232-	8232-
50	22.0	D	T215D226J050(2)S	5.5	4	5094-	5294-	5494-	5694-	4233-	6233-	7233-	8233-
50	22.0	D	T215D226K050(2)S	5.5	4	2380-	2620-	2860-	3100-	4234-	6234-	7234-	8234-
50	22.0	D	T215D226M050(2)S	5.5	4	2381-	2621-	2861-	3101-	4235-	6235-	7235-	8235-
75	0.1	A	T215A104J075(2)S	0.3	2	5095-	5295-	5495-	5695-	4236-	6236-	7236-	8236-
75	0.1	A	T215A104K075(2)S	0.3	2	2382-	2622-	2862-	3102-	4237-	6237-	7237-	8237-
75	0.1	A	T215A104M075(2)S	0.3	2	2383-	2623-	2863-	3103-	4238-	6238-	7238-	8238-
75	0.12	A	T215A124J075(2)S	0.3	2	5096-	5296-	5496-	5696-	4239-	6239-	7239-	8239-
75	0.12	A	T215A124K075(2)S	0.3	2	2384-	2624-	2864-	3104-	4240-	6240-	7240-	8240-
75	0.15	A	T215A154J075(2)S	0.3	2	5097-	5297-	5497-	5697-	4241-	6241-	7241-	8241-
75	0.15	A	T215A154K075(2)S	0.3	2	2385-	2625-	2865-	3105-	4242-	6242-	7242-	8242-
75	0.15	A	T215A154M075(2)S	0.3	2	2386-	2626-	2866-	3106-	4243-	6243-	7243-	8243-
75	0.18	A	T215A184J075(2)S	0.3	2	5098-	5298-	5498-	5698-	4244-	6244-	7244-	8244-
75	0.18	A	T215A184K075(2)S	0.3	2	2387-	2627-	2867-	3107-	4245-	6245-	7245-	8245-
75	0.22	A	T215A224J075(2)S	0.3	2	5099-	5299-	5499-	5699-	4246-	6246-	7246-	8246-
75	0.22	A	T215A224K075(2)S	0.3	2	2388-	2628-	2868-	3108-	4247-	6247-	7247-	8247-
75	0.22	A	T215A224M075(2)S	0.3	2	2389-	2629-	2869-	3109-	4248-	6248-	7248-	8248-
75	0.27	A	T215A274J075(2)S	0.3	2	5100-	5300-	5500-	5700-	4249-	6249-	7249-	8249-
75	0.27	A	T215A274K075(2)S	0.3	2	2390-	2630-	2870-	3110-	4250-	6250-	7250-	8250-
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							

(2) To complete KEMET part number (T215), insert graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates reliability level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/1K				MIL–PRF–39003/1K			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
75	0.33	A	T215A334J075(2)S	0.3	2	5101-	5301-	5501-	5701-	4251-	6251-	7251-	8251-
75	0.33	A	T215A334K075(2)S	0.3	2	2391-	2631-	2871-	3111-	4252-	6252-	7252-	8252-
75	0.33	A	T215A334M075(2)S	0.3	2	2392-	2632-	2872-	3112-	4253-	6253-	7253-	8253-
75	0.39	A	T215A394J075(2)S	0.3	2	5102-	5302-	5502-	5702-	4254-	6254-	7254-	8254-
75	0.39	A	T215A394K075(2)S	0.3	2	2393-	2633-	2873-	3113-	4255-	6255-	7255-	8255-
75	0.47	A	T215A474J075(2)S	0.3	2	5103-	5303-	5503-	5703-	4256-	6256-	7256-	8256-
75	0.47	A	T215A474K075(2)S	0.3	2	2394-	2634-	2874-	3114-	4257-	6257-	7257-	8257-
75	0.47	A	T215A474M075(2)S	0.3	2	2395-	2635-	2875-	3115-	4258-	6258-	7258-	8258-
75	0.56	A	T215A564J075(2)S	0.3	2	5104-	5304-	5504-	5704-	4259-	6259-	7259-	8259-
75	0.56	A	T215A564K075(2)S	0.3	2	2396-	2636-	2876-	3116-	4260-	6260-	7260-	8260-
75	0.68	A	T215A684J075(2)S	0.3	2	5105-	5305-	5505-	5705-	4261-	6261-	7261-	8261-
75	0.68	A	T215A684K075(2)S	0.3	2	2397-	2637-	2877-	3117-	4262-	6262-	7262-	8262-
75	0.68	A	T215A684M075(2)S	0.3	2	2398-	2638-	2878-	3118-	4263-	6263-	7263-	8263-
75	0.82	B	T215B824J075(2)S	0.3	2	5106-	5306-	5506-	5706-	4264-	6264-	7264-	8264-
75	0.82	B	T215B824K075(2)S	0.3	2	2399-	2639-	2879-	3119-	4265-	6265-	7265-	8265-
75	1.0	B	T215B105J075(2)S	0.3	2	5107-	5307-	5507-	5707-	4266-	6266-	7266-	8266-
75	1.0	B	T215B105K075(2)S	0.3	2	2400-	2640-	2880-	3120-	4267-	6267-	7267-	8267-
75	1.0	B	T215B105M075(2)S	0.3	2	2401-	2641-	2881-	3121-	4268-	6268-	7268-	8268-
75	1.2	B	T215B125J075(2)S	0.3	4	5108-	5308-	5508-	5708-	4269-	6269-	7269-	8269-
75	1.2	B	T215B125K075(2)S	0.3	4	2402-	2642-	2882-	3122-	4270-	6270-	7270-	8270-
75	1.5	B	T215B155J075(2)S	0.6	4	5109-	5309-	5509-	5709-	4271-	6271-	7271-	8271-
75	1.5	B	T215B155K075(2)S	0.6	4	2403-	2643-	2883-	3123-	4272-	6272-	7272-	8272-
75	1.5	B	T215B155M075(2)S	0.6	4	2404-	2644-	2884-	3124-	4273-	6273-	7273-	8273-
75	1.8	B	T215B185J075(2)S	0.7	4	5110-	5310-	5510-	5710-	4274-	6274-	7274-	8274-
75	1.8	B	T215B185K075(2)S	0.7	4	2405-	2645-	2885-	3125-	4275-	6275-	7275-	8275-
75	2.2	B	T215B225J075(2)S	0.8	4	5111-	5311-	5511-	5711-	4276-	6276-	7276-	8276-
75	2.2	B	T215B225K075(2)S	0.8	4	2406-	2646-	2886-	3126-	4277-	6277-	7277-	8277-
75	2.2	B	T215B225M075(2)S	0.8	4	2407-	2647-	2887-	3127-	4278-	6278-	7278-	8278-
75	2.7	B	T215B275J075(2)S	1.0	4	5112-	5312-	5512-	5712-	4279-	6279-	7279-	8279-
75	2.7	B	T215B275K075(2)S	1.0	4	2408-	2648-	2888-	3128-	4280-	6280-	7280-	8280-
75	3.3	B	T215B335J075(2)S	1.2	4	5113-	5313-	5513-	5713-	4281-	6281-	7281-	8281-
75	3.3	B	T215B335K075(2)S	1.2	4	2409-	2649-	2889-	3129-	4282-	6282-	7282-	8282-
75	3.3	B	T215B335M075(2)S	1.2	4	2410-	2650-	2890-	3130-	4283-	6283-	7283-	8283-
75	3.9	B	T215B395J075(2)S	1.5	4	5114-	5314-	5514-	5714-	4284-	6284-	7284-	8284-
75	3.9	B	T215B395K075(2)S	1.5	4	2411-	2651-	2891-	3131-	4285-	6285-	7285-	8285-
75	4.7	C	T215C475J075(2)S	3.0	4	5115-	5315-	5515-	5715-	4286-	6286-	7286-	8286-
75	4.7	C	T215C475K075(2)S	3.0	4	2412-	2652-	2892-	3132-	4287-	6287-	7287-	8287-
75	4.7	C	T215C475M075(2)S	3.0	4	2413-	2653-	2893-	3133-	4288-	6288-	7288-	8288-
75	5.6	C	T215C565J075(2)S	3.0	4	5116-	5316-	5516-	5716-	4289-	6289-	7289-	8289-
75	5.6	C	T215C565K075(2)S	3.0	4	2414-	2654-	2894-	3134-	4290-	6290-	7290-	8290-
75	6.8	C	T215C685J075(2)S	5.0	4	5117-	5317-	5517-	5717-	4291-	6291-	7291-	8291-
75	6.8	C	T215C685K075(2)S	5.0	4	2415-	2655-	2895-	3135-	4292-	6292-	7292-	8292-
75	6.8	C	T215C685M075(2)S	5.0	4	2416-	2656-	2896-	3136-	4293-	6293-	7293-	8293-
75	8.2	C	T215C825J075(2)S	5.0	4	5118-	5318-	5518-	5718-	4294-	6294-	7294-	8294-
75	8.2	C	T215C825K075(2)S	5.0	4	2417-	2657-	2897-	3137-	4295-	6295-	7295-	8295-
75	10.0	C	T215C106J075(2)S	5.0	4	5119-	5319-	5519-	5719-	4296-	6296-	7296-	8296-
75	10.0	C	T215C106K075(2)S	5.0	4	2418-	2658-	2898-	3138-	4297-	6297-	7297-	8297-
75	10.0	C	T215C106M075(2)S	5.0	4	2419-	2659-	2899-	3139-	4298-	6298-	7298-	8298-
75	12.0	D	T215D126J075(2)S	5.0	4	5120-	5320-	5520-	5720-	4299-	6299-	7299-	8299-
75	12.0	D	T215D126K07(2)S	5.0	4	2420-	2660-	2900-	3140-	4300-	6300-	7300-	8300-
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							

(2) To complete KEMET part number (T215), insert graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates reliability level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/1K				MIL–PRF–39003/1K			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
75	15.0	D	T215D156J075(2)S	7.0	4	5121-	5321-	5521-	5721-	4301-	6301-	7301-	8301-
75	15.0	D	T215D156K075(2)S	7.0	4	2421-	2661-	2901-	3141-	4302-	6302-	7302-	8302-
75	15.0	D	T215D156M075(2)S	7.0	4	2422-	2662-	2902-	3142-	4303-	6303-	7303-	8303-
100	0.0047	A	T215A472J100(2)S	0.3	2	5122-	5322-	5522-	5722-	4304-	6304-	7304-	*
100	0.0047	A	T215A472K100(2)S	0.3	2	2423-	2663-	2903-	3143-	4305-	6305-	7305-	*
100	0.0047	A	T215A472M100(2)S	0.3	2	2424-	2664-	2904-	3144-	4306-	6306-	7306-	*
100	0.0056	A	T215A562J100(2)S	0.3	2	5123-	5323-	5523-	5723-	4307-	6307-	7307-	*
100	0.01	A	T215A562K100(2)S	0.3	2	2425-	2665-	2905-	3145-	4308-	6308-	7308-	*
100	0.0068	A	T215A682J100(2)S	0.3	2	5124-	5324-	5524-	5724-	4309-	6309-	7309-	*
100	0.0068	A	T215A682K100(2)S	0.3	2	2426-	2666-	2906-	3146-	4310-	6310-	7310-	*
100	0.0068	A	T215A682M100(2)S	0.3	2	2427-	2667-	2907-	3147-	4311-	6311-	7311-	*
100	0.0082	A	T215A822J100(2)S	0.3	2	5125-	5325-	5525-	5725-	4312-	6312-	7312-	*
100	0.0082	A	T215A822K100(2)S	0.3	2	2428-	2668-	2908-	3148-	4313-	6313-	7313-	*
100	0.01	A	T215A103J100(2)S	0.3	2	5126-	5326-	5526-	5726-	4314-	6314-	7314-	*
100	0.01	A	T215A103K100(2)S	0.3	2	2429-	2669-	2909-	3149-	4315-	6315-	7315-	*
100	0.01	A	T215A103M100(2)S	0.3	2	2430-	2670-	2910-	3150-	4316-	6316-	7316-	*
100	0.012	A	T215A123J100(2)S	0.3	2	5127-	5327-	5527-	5727-	4317-	6317-	7317-	*
100	0.012	A	T215A123K100(2)S	0.3	2	2431-	2671-	2911-	3151-	4318-	6318-	7318-	*
100	0.015	A	T215A153J100(2)S	0.3	2	5128-	5328-	5528-	5728-	4319-	6319-	7319-	*
100	0.015	A	T215A153K100(2)S	0.3	2	2432-	2672-	2912-	3152-	4320-	6320-	7320-	*
100	0.015	A	T215A153M100(2)S	0.3	2	2433-	2673-	2913-	3153-	4321-	6321-	7321-	*
100	0.018	A	T215A183J100(2)S	0.3	2	5129-	5329-	5529-	5729-	4322-	6322-	7322-	*
100	0.018	A	T215A183K100(2)S	0.3	2	2434-	2674-	2914-	3154-	4323-	6323-	7323-	*
100	0.022	A	T215A223J100(2)S	0.3	2	5130-	5330-	5530-	5730-	4324-	6324-	7324-	*
100	0.022	A	T215A223K100(2)S	0.3	2	2435-	2675-	2915-	3155-	4325-	6325-	7325-	*
100	0.022	A	T215A223M100(2)S	0.3	2	2436-	2676-	2916-	3156-	4326-	6326-	7326-	*
100	0.027	A	T215A273J100(2)S	0.3	2	5131-	5331-	5531-	5731-	4327-	6327-	7327-	*
100	0.027	A	T215A273K100(2)S	0.3	2	2437-	2677-	2917-	3157-	4328-	6328-	7328-	*
100	0.033	A	T215A333J100(2)S	0.3	2	5132-	5332-	5532-	5732-	4329-	6329-	7329-	*
100	0.033	A	T215A333K100(2)S	0.3	2	2438-	2678-	2918-	3158-	4330-	6330-	7330-	*
100	0.033	A	T215A333M100(2)S	0.3	2	2439-	2679-	2919-	3159-	4331-	6331-	7331-	*
100	0.039	A	T215A393J100(2)S	0.3	2	5133-	5333-	5533-	5733-	4332-	6332-	7332-	*
100	0.039	A	T215A393K100(2)S	0.3	2	2440-	2680-	2920-	3160-	4333-	6333-	7333-	*
100	0.047	A	T215A473J100(2)S	0.3	2	5134-	5334-	5534-	5734-	4334-	6334-	7334-	*
100	0.047	A	T215A473K100(2)S	0.3	2	2441-	2681-	2921-	3161-	4335-	6335-	7335-	*
100	0.047	A	T215A473M100(2)S	0.3	2	2442-	2682-	2922-	3162-	4336-	6336-	7336-	*
100	0.056	A	T215A563J100(2)S	0.3	2	5135-	5335-	5535-	5735-	4337-	6337-	7337-	*
100	0.056	A	T215A563K100(2)S	0.3	2	2443-	2683-	2923-	3163-	4338-	6338-	7338-	*
100	0.068	A	T215A683J100(2)S	0.3	2	5136-	5336-	5536-	5736-	4339-	6339-	7339-	*
100	0.068	A	T215A683K100(2)S	0.3	2	2444-	2684-	2924-	3164-	4340-	6340-	7340-	*
100	0.068	A	T215A683M100(2)S	0.3	2	2445-	2685-	2925-	3165-	4341-	6341-	7341-	*
100	0.082	A	T215A823J100(2)S	0.3	2	5137-	5337-	5537-	5737-	4342-	6342-	7342-	*
100	0.082	A	T215A823K100(2)S	0.3	2	2446-	2686-	2926-	3166-	4343-	6343-	7343-	*
100	0.1	A	T215A104J100(2)S	0.3	2	5138-	5338-	5538-	5738-	4344-	6344-	7344-	*
100	0.1	A	T215A104K100(2)S	0.3	2	2447-	2687-	2927-	3167-	4345-	6345-	7345-	*
100	0.1	A	T215A104M100(2)S	0.3	2	2448-	2688-	2928-	3168-	4346-	6346-	7346-	*
100	0.12	A	T215A124J100(2)S	0.3	2	5139-	5339-	5539-	5739-	4347-	6347-	7347-	*
100	0.12	A	T215A124K100(2)S	0.3	2	2449-	2689-	2929-	3169-	4348-	6348-	7348-	*
100	0.15	A	T215A154J100(2)S	0.3	2	5140-	5340-	5540-	5740-	4349-	6349-	7349-	*
100	0.15	A	T215A154K100(2)S	0.3	2	2450-	2690-	2930-	3170-	4350-	6350-	7350-	*
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							

(2) To complete KEMET part number (T215), insert graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates reliability level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/1K				MIL–PRF–39003/1K			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
100	0.15	A	T215A154M100(2)S	0.3	2	2451-	2691-	2931-	3171-	4351-	6351-	7351-	*
100	0.18	A	T215A184J100(2)S	0.3	2	5141-	5341-	5541-	5741-	4352-	6352-	7352-	*
100	0.18	A	T215A184K100(2)S	0.3	2	2452-	2692-	2932-	3172-	4353-	6353-	7353-	*
100	0.22	A	T215A224J100(2)S	0.3	2	5142-	5342-	5542-	5742-	4354-	6354-	7354-	*
100	0.22	A	T215A224K100(2)S	0.3	2	2453-	2693-	2933-	3173-	4355-	6355-	7355-	*
100	0.22	A	T215A224M100(2)S	0.3	2	2454-	2694-	2934-	3174-	4356-	6356-	7356-	*
100	0.27	A	T215A274J100(2)S	0.3	2	5143-	5343-	5543-	5743-	4357-	6357-	7357-	*
100	0.27	A	T215A274K100(2)S	0.3	2	2455-	2695-	2935-	3175-	4358-	6358-	7358-	*
100	0.33	A	T215A334J100(2)S	0.3	2	5144-	5344-	5544-	5744-	4359-	6359-	7359-	*
100	0.33	A	T215A334K100(2)S	0.3	2	2456-	2696-	2936-	3176-	4360-	6360-	7360-	*
100	0.33	A	T215A334M100(2)S	0.3	2	2457-	2697-	2937-	3177-	4361-	6361-	7361-	*
100	0.39	A	T215A394J100(2)S	0.3	2	5145-	5345-	5545-	5745-	4362-	6362-	7362-	*
100	0.39	A	T215A394K100(2)S	0.3	2	2458-	2698-	2938-	3178-	4363-	6363-	7363-	*
100	0.47	A	T215A474J100(2)S	0.3	2	5146-	5346-	5546-	5746-	4364-	6364-	7364-	*
100	0.47	A	T215A474K100(2)S	0.3	2	2459-	2699-	2939-	3179-	4365-	6365-	7365-	*
100	0.47	A	T215A474M100(2)S	0.3	2	2460-	2700-	2940-	3180-	4366-	6366-	7366-	*
100	0.56	A	T215A564J100(2)S	0.3	2	5147-	5347-	5547-	5747-	4367-	6367-	7367-	*
100	0.56	A	T215A564K100(2)S	0.3	2	2461-	2701-	2941-	3181-	4368-	6368-	7368-	*
100	0.68	B	T215B684J100(2)S	0.3	2	5148-	5348-	5548-	5748-	4369-	6369-	7369-	*
100	0.68	B	T215B684K100(2)S	0.3	2	2462-	2702-	2942-	3182-	4370-	6370-	7370-	*
100	0.68	B	T215B684M100(2)S	0.3	2	2463-	2703-	2943-	3183-	4371-	6371-	7371-	*
100	0.82	B	T215B824J100(2)S	0.4	2	5149-	5349-	5549-	5749-	4372-	6372-	7372-	*
100	0.82	B	T215B824K100(2)S	0.4	2	2464-	2704-	2944-	3184-	4373-	6373-	7373-	*
100	1.0	B	T215B105J100(2)S	0.5	2	5150-	5350-	5550-	5750-	4374-	6374-	7374-	*
100	1.0	B	T215B105K100(2)S	0.5	2	2465-	2705-	2945-	3185-	4375-	6375-	7375-	*
100	1.0	B	T215B105M100(2)S	0.5	2	2466-	2706-	2946-	3186-	4376-	6376-	7376-	*
100	1.2	B	T215B125J100(2)S	0.5	3	5151-	5351-	5551-	5751-	4377-	6377-	7377-	*
100	1.2	B	T215B125K100(2)S	0.5	3	2467-	2707-	2947-	3187-	4378-	6378-	7378-	*
100	1.5	B	T215B155J100(2)S	0.7	3	5152-	5352-	5552-	5752-	4379-	6379-	7379-	*
100	1.5	B	T215B155K100(2)S	0.7	3	2468-	2708-	2948-	3188-	4380-	6380-	7380-	*
100	1.5	B	T215B155M100(2)S	0.7	3	2469-	2709-	2949-	3189-	4381-	6381-	7381-	*
100	1.8	B	T215B185J100(2)S	0.7	3	5153-	5353-	5553-	5753-	4382-	6382-	7382-	*
100	1.8	B	T215B185K100(2)S	0.7	3	2470-	2710-	2950-	3190-	4383-	6383-	7383-	*
100	2.2	B	T215B225J100(2)S	0.9	3	5154-	5354-	5554-	5754-	4384-	6384-	7384-	*
100	2.2	B	T215B225K100(2)S	0.9	3	2471-	2711-	2951-	3191-	4385-	6385-	7385-	*
100	2.2	B	T215B225M100(2)S	0.9	3	2472-	2712-	2952-	3192-	4386-	6386-	7386-	*
100	2.7	B	T215B275J100(2)S	1.1	3	5155-	5355-	5555-	5755-	4387-	6387-	7387-	*
100	2.7	B	T215B275K100(2)S	1.1	3	2473-	2713-	2953-	3193-	4388-	6388-	7388-	*
100	3.3	C	T215C335J100(2)S	1.5	3	5156-	5356-	5556-	5756-	4389-	6389-	*	*
100	3.3	C	T215C335K100(2)S	1.5	3	5157-	5357-	5557-	5757-	4390-	6390-	*	*
100	3.3	C	T215C335M100(2)S	1.5	3	5158-	5358-	5558-	5758-	4391-	6391-	*	*
100	3.9	C	T215C395J100(2)S	1.5	3	5159-	5359-	5559-	5759-	4392-	6392-	*	*
100	3.9	C	T215C395K100(2)S	1.5	3	5160-	5360-	5560-	5760-	4393-	6393-	*	*
100	4.7	C	T215C475J100(2)S	2.5	3	5161-	5361-	5561-	5761-	4394-	6394-	*	*
100	4.7	C	T215C475K100(2)S	2.5	3	5162-	5362-	5562-	5762-	4395-	6395-	*	*
100	4.7	C	T215C475M100(2)S	2.5	3	5163-	5363-	5563-	5763-	4396-	6396-	*	*
100	5.6	C	T215C565J100(2)S	2.5	3	5164-	5364-	5564-	5764-	4397-	6397-	*	*
100	5.6	C	T215C565K100(2)S	2.5	3	5165-	5365-	5565-	5765-	4398-	6398-	*	*
100	6.80	C	T215C685J100(2)S	2.5	3	5166-	5366-	5566-	5766-	4399-	6399-	*	*
100	6.80	C	T215C685K100(2)S	2.5	3	5167-	5367-	5567-	5767-	4400-	6400-	*	*
100	6.80	C	T215C685M100(2)S	2.5	3	5168-	5368-	5568-	5768-	4401-	6401-	*	*
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR13) Capacitors							

(2) To complete KEMET part number (T215), insert graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates reliability level.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Permissible AC ripple current can be determined by the following:

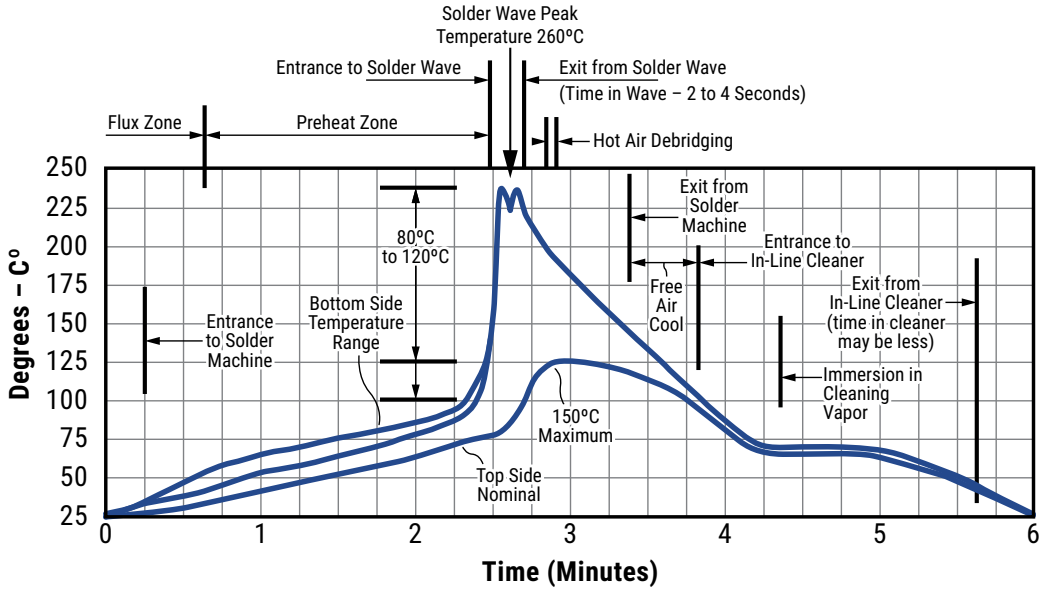
$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

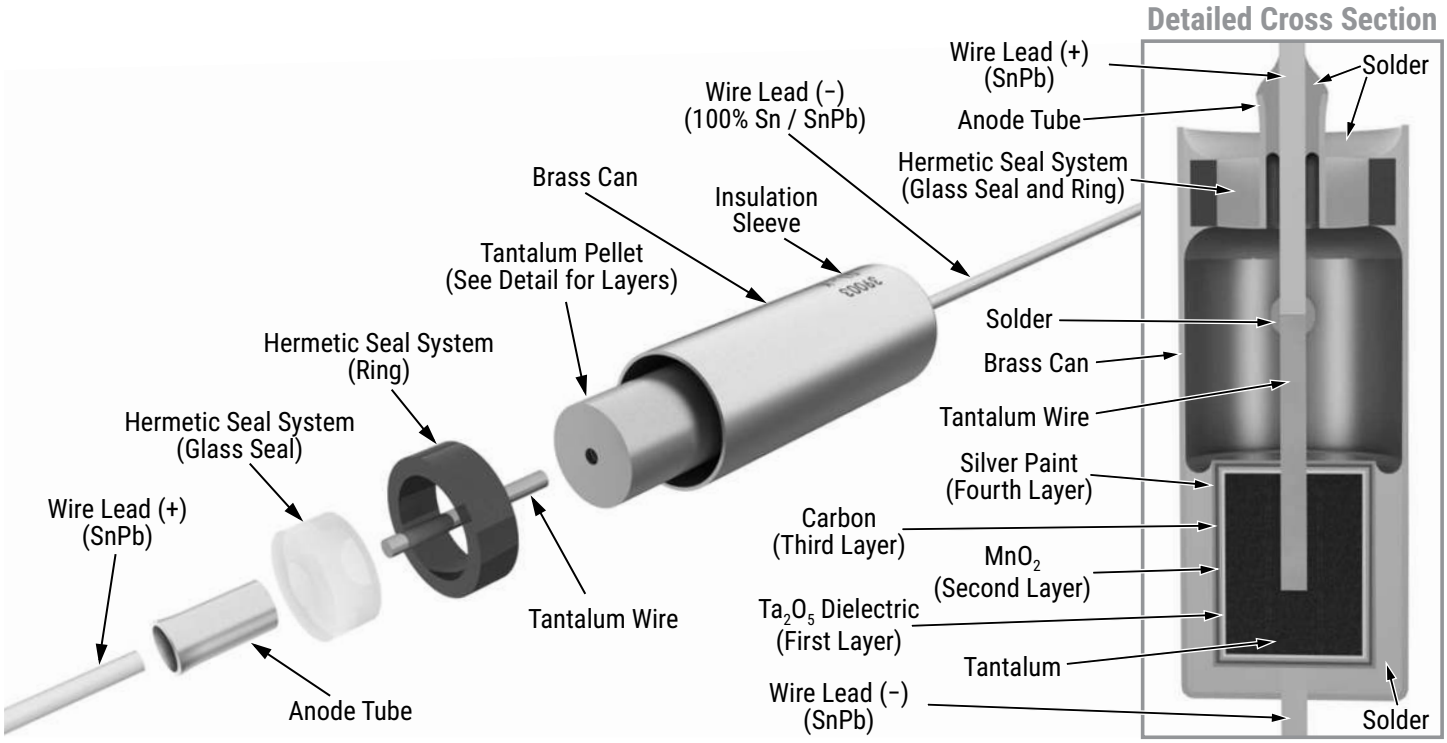
Optimum Solder Wave Profile



Mounting

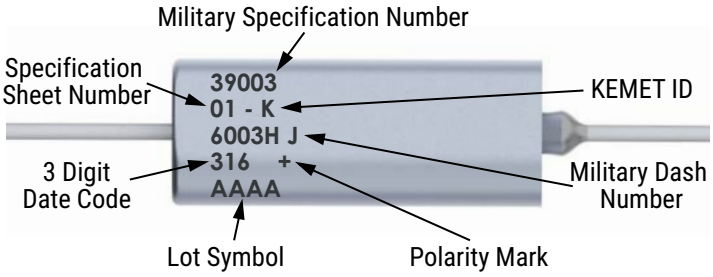
All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Construction

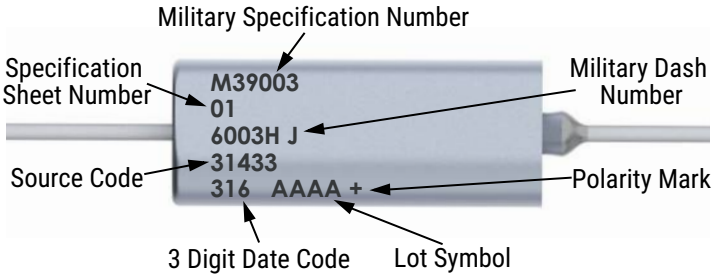


Capacitor Marking

A Case

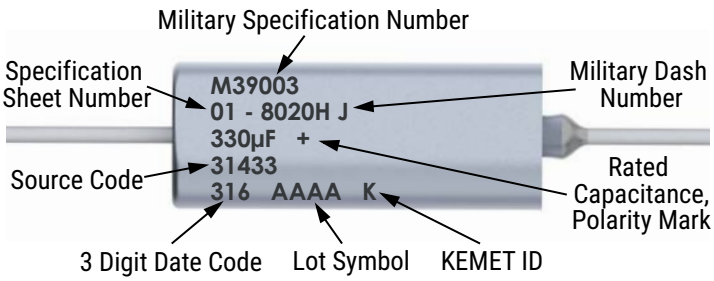


B Case



Date Code	3 Digit	4 Digit
Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023	19 = 2019 20 = 2020 21 = 2021 22 = 2022 23 = 2023
Week	01 = 1st week of the year to 52 = 52nd week of the year	

C & D Case



Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS-296E.

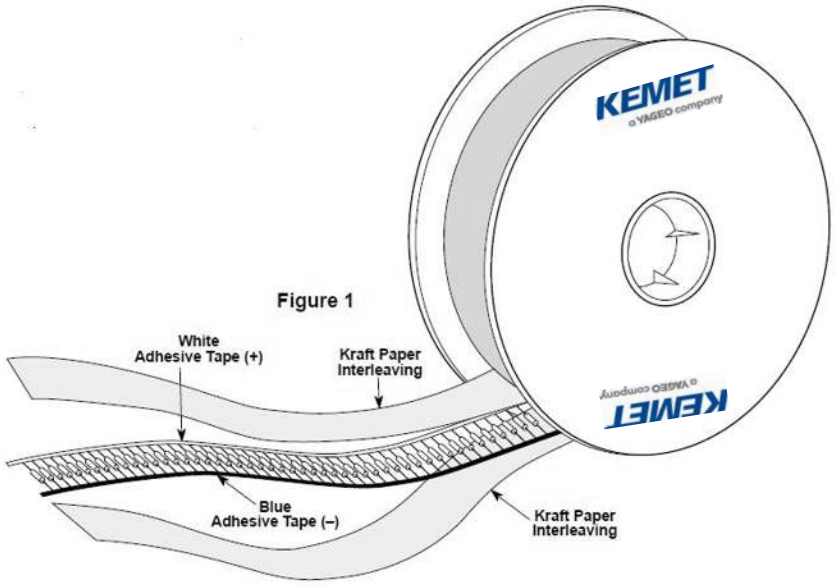


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity	Ammo Pack C-Spec
A	150/Box	3,500	C-7200	1,500	C-7293
B	75/Box	2,500	C-7200	1,000	Class I
C	20/Tray	500	C-7200	250	C-7442
D	20/Tray	400	C-7200	250	Class II C-7443 Class III

Figure 2

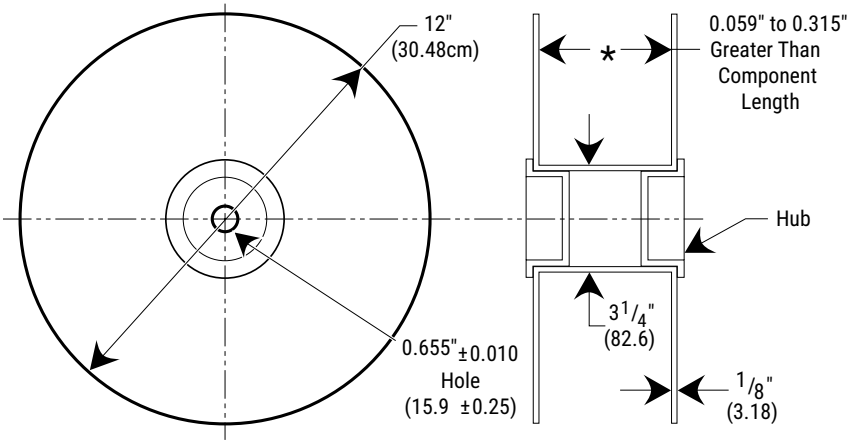


Figure 3

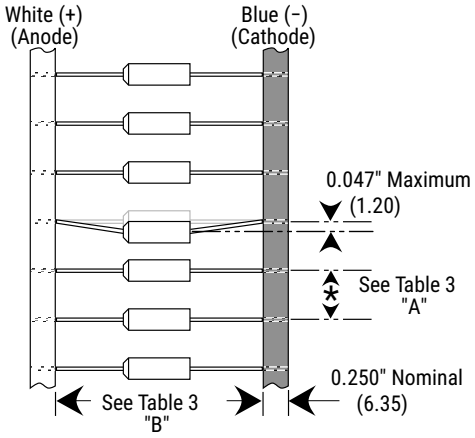


Table 3 – Tape Dimensions

Dimensions in Inches (& Millimeters)

BODY DIAMETER	A PITCH ±0.020 (0.5)	B INSIDE TAPE SPACING ±0.059 (1.5)		
		Class		
		I	II	III
≤ 0.197 (5.0)	0.200 (5.0)	2.063 (52.4)	2.500 (63.5)	2.874 (73)
0.198 (5.0) to 0.394 (10.0)	0.400 (10.0)			

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50 lbs. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lbs. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center.

Figures 1 and 2 show the KEMET standard chipboard tape reel.

A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors.

Universal splicing clips are used to connect the tape.

T225 Series Axial High Temperature Solder (CSR09 Style)

Overview

The KEMET T225 High Temperature Solder Series of solid tantalum capacitors is especially designed for miniaturization and employs a unique glass-to-metal compression end seal that has no protruding eyelet. This flush end seal construction ideally suits the T225 Series for all miniature high density packaging applications. The capacitors consist of a dry porous tantalum pellet, hermetically sealed in a solder coated metal case with solder coated alloy 52 and solder coated nickel.

The internal design of these devices, as well as the hermetic seal, includes high temperature solder (minimum melting point of 221°C). The content of tin in the solder does not exceed 97%. This assembly is especially suited for temperature conditions where solder may fail due to undesirable solder reflow.

The T225 series is approved to all ratings and failure rates of MIL–PRF–39003/2.

Benefits

- Internal construction solder to resist up to 221°C
- Qualified to MIL–PRF–39003 (CSR09 Style)
- Failure rate options: Graded – B, C, D, and G, and Exponential – M, P, R, and S
- Surge current options D, E, and F
- Operating temperature range of −55˚C to +125˚C
- Capacitance values of 0.047 µF to 18 µF
- Tolerances of ±5%, and ±10%
- Voltage rating of 6 – 75 VDC
- Case sizes: A and B
- Taped and reeled per EIA Specification RS–296
- Marking per MIL–STD–1285

Applications

KEMET's T225 High Temperature Solder Series of solid tantalum capacitors is especially designed for miniaturization.

Ordering Information

T	225	A	225	K	010	B	S	7200
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	Hermetically sealed axial high temperature solder	A B	First two digits represent significant figures. Third digit specifies number of zeros to follow.	J = ±5% K = ±10%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50 075 = 75	Graded: B = 0.1%/k hours C = 0.01%/k hours D = 0.001%/k hours G = 1.0%/k hours Exponential: M = 1%/k hours P = 0.1%/k hours R = 0.01%/k hours S = 0.001%/k hours	S = Standard	Blank = Sleeved/Bulk 0100 = Without sleeve 7200 = Tape & Reel 7293 & 7443 = Ammo 4250 = 10 cycles, 25°C after Weibull 4251 = 10 cycles, -55 & 85°C after Weibull 4252 = 10 cycles, -55 & 85°C before Weibull All capacitors are sleeved unless specified.

Ordering Information – (CSR09 Style)

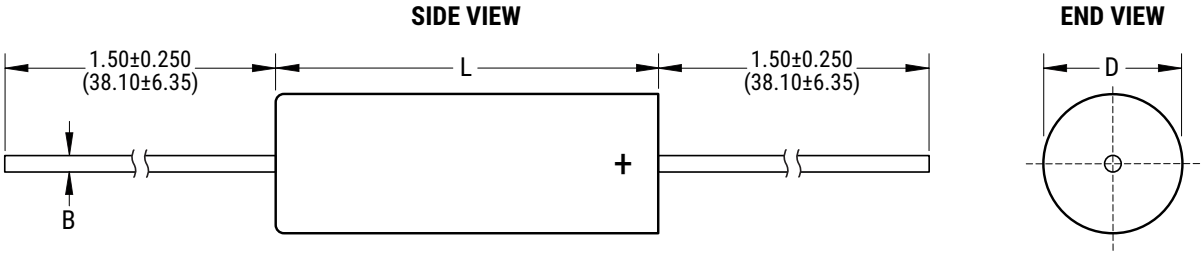
M39003	/02	3036	A
Capacitor Class	Slash	Dash Number	Surge Option
Military specification number	Specification sheet number	Failure rate level	A = C-4250 B = C-4251 C = C-4252 Blank = No surge

Orders should be entered by the military specification number, including the dash number and surge option letter (A, B or C).

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	–55°C to 125°C
Rated Capacitance Range	0.047 – 18 µF at 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%)
Rated Voltage Range	6 – 75 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table (for reference only)
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)
Failure Rate (MIL–PRF–39003, CSR09 capacitors only)	Approved failure rate: Graded G (1.0%/k hours), B (0.1%/k hours), C (0.01%/k hours), D (0.001%/k hours) and Exponential M (1.0%/k hours), P (0.1%/k hours), R (0.01%/k hours), S (0.001%/k hours)

Dimensions – Inches (Millimeters)



Case Size	Uninsulated		Insulated		B Wire Diameter
	D ±0.005 (±0.13)	L	D	L	
A	0.085 (2.16)	0.245+0.015/−0.010 (6.22+0.38/−0.25)	0.090 ±0.009 (2.29 ±0.23)	0.250+0.031/−0.015 (6.35+0.79/−0.38)	0.016+0.005/−0.001 (0.41+0.13/−0.03)
B	0.127 (3.23)	0.375±0.015 (9.53±0.38)	0.138 ±0.010 (3.51 ±0.25)	0.390±0.015 (9.91±0.38)	0.016+0.005/−0.001 (0.41+0.13/−0.03)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR09) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/2J				MIL–PRF–39003/2J			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
6	2.7	A	T225A275J006(1)S	0.6	6	1001-	1061-	1121-	1181-	5001-	2001-	3001-	4001-
6	2.7	A	T225A275K006(1)S	0.6	6	0001-	0061-	0121-	0181-	5002-	2002-	3002-	4002-
6	18.0	B	T225B186J006(1)S	1.4	6	1002-	1062-	1122-	1182-	5003-	2003-	3003-	4003-
6	18.0	B	T225B186K006(1)S	1.4	6	0002-	0062-	0122-	0182-	5004-	2004-	3004-	4004-
10	1.8	A	T225A185J010(1)S	0.6	6	1007-	1067-	1127-	1187-	5005-	2005-	3005-	4005-
10	1.8	A	T225A185K010(1)S	0.6	6	0007-	0067-	0127-	0187-	5006-	2006-	3006-	4006-
10	2.2	A	T225A225J010(1)S	0.6	6	1008-	1068-	1128-	1188-	5007-	2007-	3007-	4007-
10	2.2	A	T225A225K010(1)S	0.6	6	0008-	0068-	0128-	0188-	5008-	2008-	3008-	4008-
10	10.0	B	T225B106J010(1)S	2.0	6	1009-	1069-	1129-	1189-	5009-	2009-	3009-	4009-
10	10.0	B	T225B106K010(1)S	2.0	6	0009-	0069-	0129-	0189-	5010-	2010-	3010-	4010-
10	12.0	B	T225B126J010(1)S	2.0	6	1010-	1070-	1130-	1190-	5011-	2011-	3011-	4011-
10	12.0	B	T225B126K010(1)S	2.0	6	0010-	0070-	0130-	0190-	5012-	2012-	3012-	4012-
10	15.0	B	T225B156J010(1)S	2.0	6	1011-	1071-	1131-	1191-	5013-	2013-	3013-	4013-
10	15.0	B	T225B156K010(1)S	2.0	6	0011-	0071-	0131-	0191-	5014-	2014-	3014-	4014-
15	1.0	A	T225A105J015(1)S	0.6	6	1012-	1072-	1132-	1192-	5015-	2015-	3015-	4015-
15	1.0	A	T225A105K015(1)S	0.6	6	0012-	0072-	0132-	0192-	5016-	2016-	3016-	4016-
15	1.2	A	T225A125J015(1)S	0.6	6	1013-	1073-	1133-	1193-	5017-	2017-	3017-	4017-
15	1.2	A	T225A125K015(1)S	0.6	6	0013-	0073-	0133-	0193-	5018-	2018-	3018-	4018-
15	1.5	A	T225A155J015(1)S	0.6	6	1014-	1074-	1134-	1194-	5019-	2019-	3019-	4019-
15	1.5	A	T225A155K015(1)S	0.6	6	0014-	0074-	0134-	0194-	5020-	2020-	3020-	4020-
15	8.2	B	T225B825J015(1)S	1.8	6	1015-	1075-	1135-	1195-	5021-	2021-	3021-	4021-
15	8.2	B	T225B825K075(1)S	1.8	6	0015-	0075-	0135-	0195-	5022-	2022-	3022-	4022-
20	0.56	A	T225A564J020(1)S	0.6	3	1016-	1076-	1136-	1196-	5023-	2023-	3023-	4023-
20	0.56	A	T225A564K020(1)S	0.6	3	0016-	0076-	0136-	0196-	5024-	2024-	3024-	4024-
20	0.68	A	T225A684J020(1)S	0.6	3	1017-	1077-	1137-	1197-	5025-	2025-	3025-	4025-
20	0.68	A	T225A684K020(1)S	0.6	3	0017-	0077-	0137-	0197-	5026-	2026-	3026-	4026-
20	0.82	A	T225A824J020(1)S	0.6	3	1018-	1078-	1138-	1198-	5027-	2027-	3027-	4027-
20	0.82	A	T225A824K020(1)S	0.6	3	0018-	0078-	0138-	0198-	5028-	2028-	3028-	4028-
20	1.0	A	T225A105J020(1)S	0.6	3	1019-	1079-	1139-	1199-	5029-	2029-	3029-	4029-
20	1.0	A	T225A105K020(1)S	0.6	3	0019-	0079-	0139-	0199-	5030-	2030-	3030-	4030-
20	3.3	B	T225B335J020(1)S	1.0	3	1020-	1080-	1140-	1200-	5031-	2031-	3031-	4031-
20	3.3	B	T225B335K020(1)S	1.0	3	0020-	0080-	0140-	0200-	5032-	2032-	3032-	4032-
20	3.9	B	T225B395J020(1)S	2.0	3	1021-	1081-	1141-	1201-	5033-	2033-	3033-	4033-
20	3.9	B	T225B395K020(1)S	2.0	3	0021-	0081-	0141-	0201-	5034-	2034-	3034-	4034-
20	4.7	B	T225B475J020(1)S	2.0	3	1022-	1082-	1142-	1202-	5035-	2035-	3035-	4035-
20	4.7	B	T225B475K020(1)S	2.0	3	0022-	0082-	0142-	0202-	5036-	2036-	3036-	4036-
20	5.6	B	T225B565J020(1)S	2.0	3	1023-	1083-	1143-	1203-	5037-	2037-	3037-	4037-
20	5.6	B	T225B565K020(1)S	2.0	3	0023-	0083-	0143-	0203-	5038-	2038-	3038-	4038-
20	6.8	B	T225B685J020(1)S	2.0	3	1024-	1084-	1144-	1204-	5039-	2039-	3039-	4039-
20	6.8	B	T225B685K020(1)S	2.0	3	0024-	0084-	0144-	0204-	5040-	2040-	3040-	4040-
35	0.33	A	T225A334J035(1)S	0.6	3	1025-	1085-	1145-	1205-	5041-	2041-	3041-	4041-
35	0.33	A	T225A334K035(1)S	0.6	3	0025-	0085-	0145-	0205-	5042-	2042-	3042-	4042-
35	0.39	A	T225A394J035(1)S	0.6	3	1026-	1086-	1146-	1206-	5043-	2043-	3043-	4043-
35	0.39	A	T225A394K035(1)S	0.6	3	0026-	0086-	0146-	0206-	5044-	2044-	3044-	4044-
35	0.47	A	T225A474J035(1)S	0.6	3	1027-	1087-	1147-	1207-	5045-	2045-	3045-	4045-
35	0.47	A	T225A474K035(1)S	0.6	3	0027-	0087-	0147-	0207-	5046-	2046-	3046-	4046-
35	2.2	B	T225B225J035(1)S	1.4	3	1028-	1088-	1148-	1208-	5047-	2047-	3047-	4047-
35	2.2	B	T225B225K035(1)S	1.4	3	0028-	0088-	0148-	0208-	5048-	2048-	3048-	4048-
35	2.7	B	T225B275J035(1)S	1.4	3	1029-	1089-	1149-	1209-	5049-	2049-	3049-	4049-
35	2.7	B	T225B275K035(1)S	1.4	3	0029-	0089-	0149-	0209-	5050-	2050-	3050-	4050-
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR09) Capacitors							

(1) To complete KEMET Part Number (T225), insert Graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates Reliability Level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR09) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/2J				MIL–PRF–39003/2J			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
50	0.22	A	T225A224J050(1)S	0.6	3	1030-	1090-	1150-	1210-	5051-	2051-	3051-	4051-
50	0.22	A	T225A224K050(1)S	0.6	3	0030-	0090-	0150-	0210-	5052-	2052-	3052-	4052-
50	0.27	A	T225A274J050(1)S	0.6	3	1031-	1091-	1151-	1211-	5053-	2053-	3053-	4053-
50	0.27	A	T225A274K050(1)S	0.6	3	0031-	0091-	0151-	0211-	5054-	2054-	3054-	4054-
50	1.5	B	T225B155J050(1)S	1.4	3	1032-	1092-	1152-	1212-	5055-	2055-	3055-	4055-
50	1.5	B	T225B155K050(1)S	1.4	3	0032-	0092-	0152-	0212-	5056-	2056-	3056-	4056-
50	1.8	B	T225B185J050(1)S	1.4	3	1033-	1093-	1153-	1213-	5057-	2057-	3057-	4057-
50	1.8	B	T225B185K050(1)S	1.4	3	0033-	0093-	0153-	0213-	5058-	2058-	3058-	4058-
75	0.047	A	T225A473J075(1)S	0.6	3	1034-	1094-	1154-	1214-	5059-	2059-	3059-	4059-
75	0.047	A	T225A473K075(1)S	0.6	3	0034-	0094-	0154-	0214-	5060-	2060-	3060-	4060-
75	0.056	A	T225A563J075(1)S	0.6	3	1035-	1095-	1155-	1215-	5061-	2061-	3061-	4061-
75	0.056	A	T225A563K075(1)S	0.6	3	0035-	0095-	0155-	0215-	5062-	2062-	3062-	4062-
75	0.068	A	T225A683J075(1)S	0.6	3	1036-	1096-	1156-	1216-	5063-	2063-	3063-	4063-
75	0.068	A	T225A683K075(1)S	0.6	3	0036-	0096-	0156-	0216-	5064-	2064-	3064-	4064-
75	0.082	A	T225A823J075(1)S	1.8	3	1037-	1097-	1157-	1217-	5065-	2065-	3065-	4065-
75	0.082	A	T225A823K075(1)S	1.8	3	0037-	0097-	0157-	0217-	5066-	2066-	3066-	4066-
75	0.10	A	T225A104J075(1)S	0.6	3	1038-	1098-	1158-	1218-	5067-	2067-	3067-	4067-
75	0.10	A	T225A104K075(1)S	0.6	3	0038-	0098-	0158-	0218-	5068-	2068-	3068-	4068-
75	0.12	A	T225A124J075(1)S	0.6	3	1039-	1099-	1159-	1219-	5069-	2069-	3069-	4069-
75	0.12	A	T225A124K075(1)S	0.6	3	0039-	0099-	0159-	0219-	5070-	2070-	3070-	7070-
75	0.15	A	T225A154J075(1)S	0.6	3	1040-	1100-	1160-	1220-	5071-	2071-	3071-	4071-
75	0.15	A	T225A154K075(1)S	0.6	3	0040-	0100-	0160-	0220-	5072-	2072-	3072-	4072-
75	0.18	A	T225A184J075(1)S	0.6	3	1041-	1101-	1161-	1221-	5073-	2073-	3073-	4073-
75	0.18	A	T225A184K075(1)S	0.6	3	0041-	0101-	0161-	0221-	5074-	2074-	3074-	4074-
75	0.22	B	T225B224J075(1)S	1.0	3	1042-	1102-	1162-	1222-	5075-	2075-	3075-	4075-
75	0.22	B	T225B224K075(1)S	1.0	3	0042-	0102-	0162-	0222-	5076-	2076-	3076-	4076-
75	0.27	B	T225B274J075(1)S	2.0	3	1043-	1103-	1163-	1223-	5077-	2077-	3077-	4077-
75	0.27	B	T225B274K075(1)S	2.0	3	0043-	0103-	0163-	0223-	5078-	2078-	3078-	4078-
75	0.33	B	T225B334J075(1)S	2.0	3	1044-	1104-	1164-	1224-	5079-	2079-	3079-	4079-
75	0.33	B	T225B334K075(1)S	2.0	3	0044-	0104-	0164-	0224-	5080-	2080-	3080-	4080-
75	0.39	B	T225B394J075(1)S	2.0	3	1045-	1105-	1165-	1225-	5081-	2081-	3081-	4081-
75	0.39	B	T225B394K075(1)S	2.0	3	0045-	0105-	0165-	0225-	5082-	2082-	3082-	4082-
75	0.47	B	T225B474J075(1)S	2.0	3	1046-	1106-	1166-	1226-	5083-	2083-	3083-	4083-
75	0.47	B	T225B474K075(1)S	2.0	3	0046-	0106-	0166-	0226-	5084-	2084-	3084-	4084-
75	0.56	B	T225B564J075(1)S	0.6	3	1047-	1107-	1167-	1227-	5085-	2085-	3085-	4085-
75	0.56	B	T225B564K075(1)S	0.6	3	0047-	0107-	0167-	0227-	5086-	2086-	3086-	4086-
75	0.68	B	T225B684J075(1)S	0.6	3	1048-	1108-	1168-	1228-	5087-	2087-	3087-	4087-
75	0.68	B	T225B684K075(1)S	0.6	3	0048-	0108-	0168-	0228-	5088-	2088-	3088-	4088-
75	0.82	B	T225B824J075(1)S	0.6	3	1049-	1109-	1169-	1229-	5089-	2089-	3089-	4089-
75	0.82	B	T225B824K075(1)S	0.6	3	0049-	0109-	0169-	0229-	5090-	2090-	3090-	4090-
75	1.0	B	T225B105J075(1)S	1.4	3	1050-	1110-	1170-	1230-	5091-	2091-	3091-	4091-
75	1.0	B	T225B105K075(1)S	1.4	3	0050-	0110-	0170-	0230-	5092-	2092-	3092-	4092-
75	1.2	B	T225B125J075(1)S	1.4	3	1051-	1111-	1171-	1231-	5093-	2093-	3093-	4093-
75	1.2	B	T225B125K075(1)S	1.4	3	0051-	0111-	0171-	0231-	5094-	2094-	3094-	4094-
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR09) Capacitors							

(1) To complete KEMET Part Number (T225), insert Graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates Reliability Level.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Permissible AC ripple current can be determined by the following:

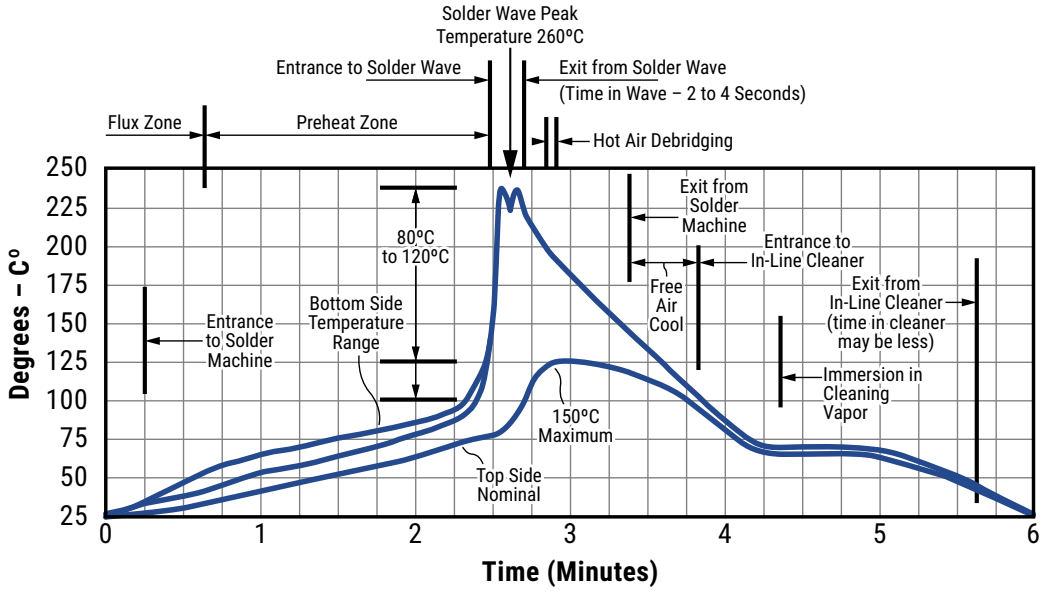
$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

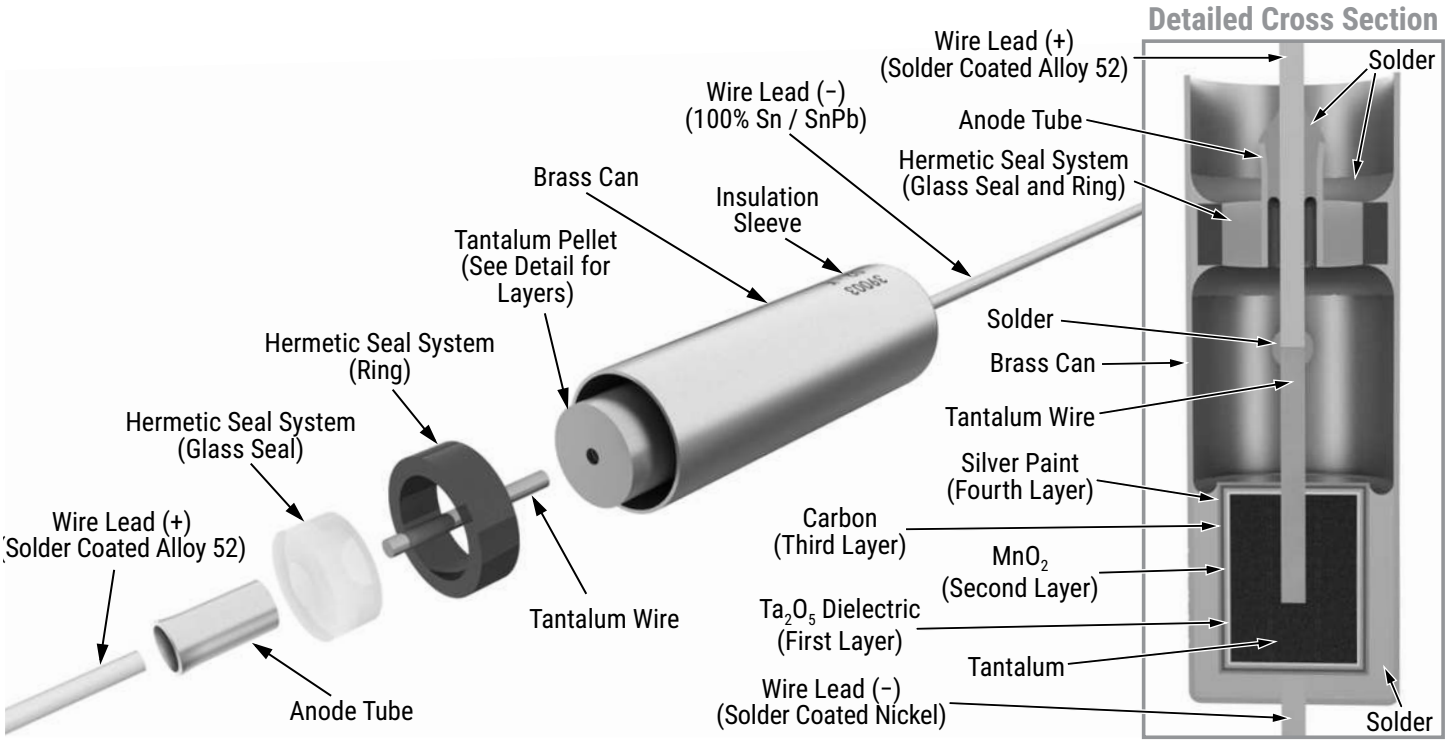
Optimum Solder Wave Profile



Mounting

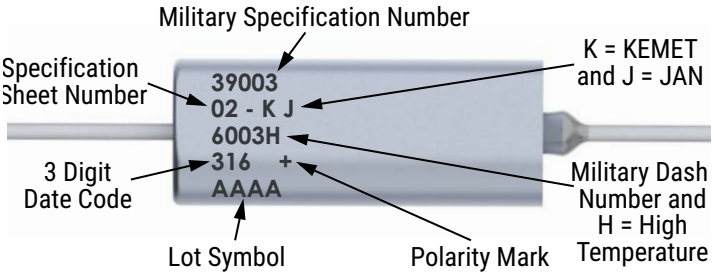
All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Construction

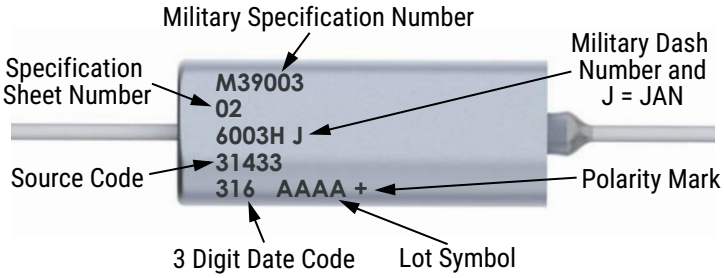


Capacitor Marking

A Case



B Case



Date Code	3 Digit	4 Digit
Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023	19 = 2019 20 = 2020 21 = 2021 22 = 2022 23 = 2023
Week	01 = 1st week of the year to 52 = 52nd week of the year	

Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS–296E.

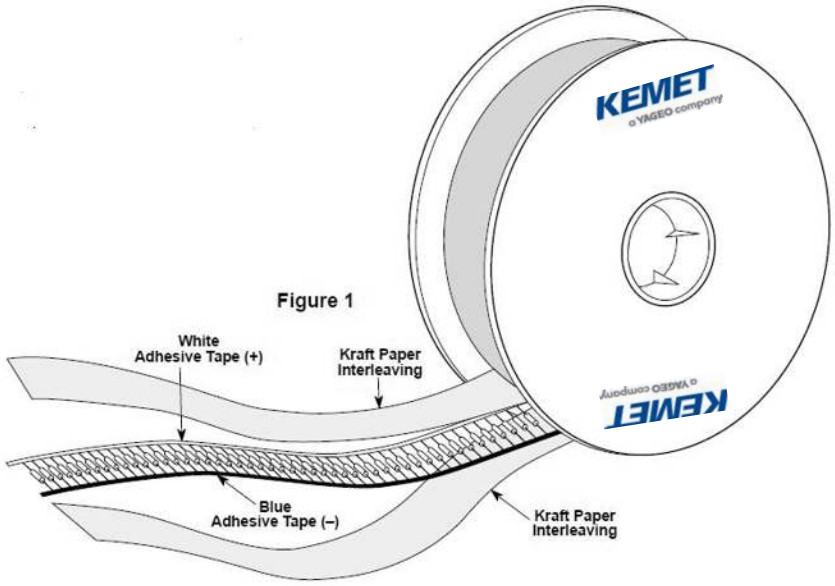


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity
A/B	50/Tray
A	300/Box
B	150/Box

Figure 2

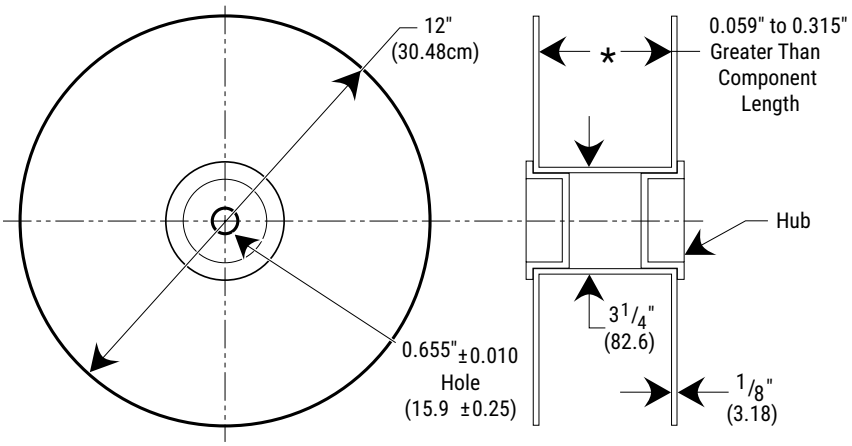


Figure 3

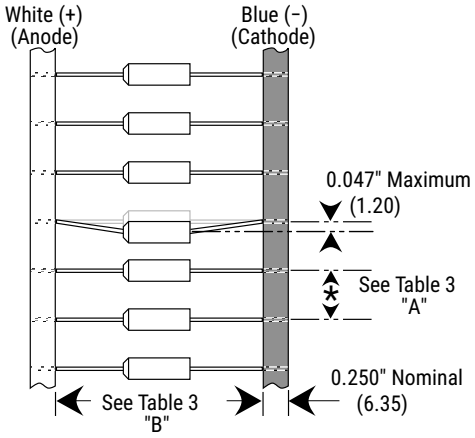


Table 3 – Tape Dimensions

Component Body Diameter	Component Pitch "A"	Inside Tape Spacing "B" ±1.5 mm (0.059")		
	0.020" or (±0.5 mm)	I	II	III
0" (0 mm) to 0.197" (5 mm)	0.200" or (5 mm)	2.062"	2.500"	2.874"
0.197" (5.01 mm) to 0.394" (10 mm)	0.400 or (10 mm)	(52.4 mm)	(63.5 mm)	(73 mm)

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50lb. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lb. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center. Figures 1 and 2 show the KEMET standard chipboard tape reel. A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors. Universal splicing clips are used to connect the tape.

T255 Axial High Temperature Solder (CSR33 Style)

Overview

The KEMET T255 High Temperature Solder Series of solid tantalum capacitors offers high capacitance-to-volume ratios and is available in standard MIL style A, B, C, and D cases. These devices meet or exceed the environmental and mechanical requirements of MIL–PRF–39003. Designed to operate from −55°C to +125°C, the internal design of these capacitors, as well as the hermetic seal, includes high temperature solder (minimum melting point of 221°C). The content of tin in the solder does not exceed 97%. This assembly is especially suited for temperature conditions where solder may fail due to undesirable solder reflow.

The T255 Series exhibits exceptionally low DC leakage, dissipation factor and impedance characteristics. These parts are available in Style CSR33 per MIL–PRF–39003/06.

Benefits

- Internal construction solder to resist up to 221°C
- Failure rate options: Graded – B, C, D, and G, and Exponential – M, P, R, and S
- Surge current options D, E, and F
- Taped and reeled per EIA Specification RS-296
- Marking per MIL–STD–1285
- Qualified to MIL–PRF–39003 (CSR33 Style)
- Operating temperature range of −55°C to +125˚C
- Capacitance values of 1.2 µF to 1,000 µF
- Tolerances of ±10%, and ±20%
- Voltage rating of 6 VDC – 50 VDC
- Marking per MIL–STD–1285
- Case sizes: A, B, C, D

Applications

These capacitors are ideal for coupling, bypass, filtering and timing circuits, and are excellent substitutes for wet tantalums in low voltage applications.

Ordering Information

T	255	A	125	K	050	M	S	C
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	Hermetically sealed axial high temperature solder	A B C D	First two digits represent significant figures. Third digit specifies number of zeros to follow.	K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50	Graded: B = 0.1%/k hours C = 0.01%/k hours D = 0.001%/k hours G = 1.0%/k hours Exponential: M = 1%/k hours P = 0.1%/k hours R = 0.01%/k hours S = 0.001%/k hours	S = Standard	Blank = Sleeved/Bulk 4251 = 10 cycles, −55 and 85°C after Weibull 4252 = 10 cycles, −55 and 85°C before Weibull 7200 = Tape & Reel 7293 & 7443 = Ammo

Ordering Information – T255 (CSR33 Style)

M39003	/06	4073	H
Capacitor Class	Slash	Dash Number	Surge Option
Military specification number	Specification sheet number	Failure rate level	E = C-4251 F = C-4252 H = Hi-temp solder only

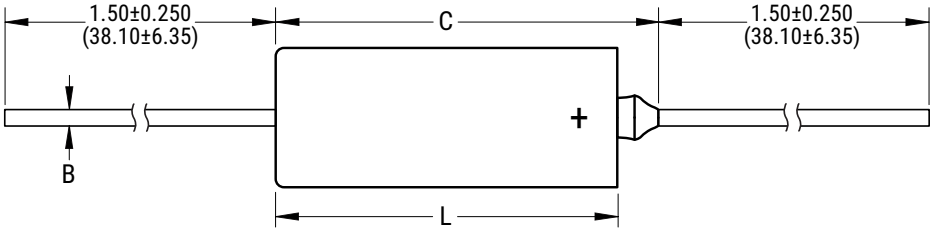
Orders should be entered by the military specification number, including the dash number and surge option letter (E, F or H).

Performance Characteristics

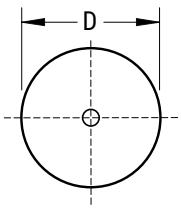
Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	1.2 –1,000 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6 – 50 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
ESR and Impedance (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table (for reference only)
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)
Failure Rate (MIL–PRF–39003, CSR33 capacitors only)	Approved failure rate: Graded G (1.0%/k hours), B (0.1%/k hours), C (0.01%/k hours), D (0.001%/k hours) and Exponential M (1.0%/k hours), P (0.1%/k hours), R (0.01%/k hours), S (0.001%/k hours)

Dimensions – Inches (Millimeters)

SIDE VIEW



END VIEW



Case Size	Uninsulated		Insulated			
	D ±0.005 ±(0.13)	L ±0.031 ±(0.79)	D ±0.010 ±(0.25)	L ±0.031 ±(0.79)	B ±0.002 ±(0.05)	C Maximum
A	0.125 (3.18)	0.250 (6.35)	0.135 (3.43)	0.286 (7.26)	0.020 (0.51)	0.422 (10.72)
B	0.175 (4.45)	0.438 (11.13)	0.185 (4.70)	0.474 (12.04)	0.020 (0.51)	0.610 (15.49)
C	0.279 (7.09)	0.650 (16.51)	0.289 (7.34)	0.686 (17.42)	0.025 (0.64)	0.822 (20.88)
D	0.341 (8.66)	0.750 (19.05)	0.351 (8.92)	0.786 (19.96)	0.025 (0.64)	0.922 (23.42)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR33) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/6F				MIL–PRF–39003/6F			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
6	10.0	A	T255A106K006(1)S	0.5	6	0001-	0101-	0201-	0301-	5001-	2001-	3001-	4001-
6	10.0	A	T255A106M006(1)S	0.5	6	0002-	0102-	0202-	0302-	5002-	2002-	3002-	4002-
6	12.0	A	T255A126K006(1)S	0.5	6	0003-	0103-	0203-	0303-	5003-	2003-	3003-	4003-
6	100.0	B	T255B107K006(1)S	1.0	8	0004-	0104-	0204-	0304-	5004-	2004-	3004-	4004-
6	100.0	B	T255B107M006(1)S	1.0	8	0005-	0105-	0205-	0305-	5005-	2005-	3005-	4005-
6	330.0	C	T255C337K006(1)S	2.0	8	0006-	0106-	0206-	0306-	5006-	2006-	3006-	4006-
6	330.0	C	T255C337M006(1)S	2.0	8	0007-	0107-	0207-	0307-	5007-	2007-	3007-	4007-
6	390.0	C	T255C397K006(1)S	2.0	10	0008-	0108-	0208-	0308-	5008-	2008-	3008-	4008-
6	470.0	C	T255C477K006(1)S	2.0	10	0009-	0109-	0209-	0309-	5009-	2009-	3009-	4009-
6	470.0	C	T255C477M006(1)S	2.0	10	0010-	0110-	0210-	0310-	5010-	2010-	3010-	4010-
6	680.0	D	T255D687K006(1)S	5.0	10	0011-	0111-	0211-	0311-	5011-	2011-	3011-	4011-
6	680.0	D	T255D687M006(1)S	5.0	10	0012-	0112-	0212-	0312-	5012-	2012-	3012-	4012-
6	820.0	D	T255D827K006(1)S	5.0	10	0013-	0113-	0213-	0313-	5013-	2013-	3013-	4013-
6	1000.0	D	T255D108K006(1)S	5.0	10	0014-	0114-	0214-	0314-	5014-	2014-	3014-	4014-
6	1000.0	D	T255D108M006(1)S	5.0	10	0015-	0115-	0215-	0315-	5015-	2015-	3015-	4015-
10	6.8	A	T255A685K010(1)S	0.5	6	0016-	0116-	0216-	0316-	5016-	2016-	3016-	4016-
10	6.8	A	T255A685M010(1)S	0.5	6	0017-	0117-	0217-	0317-	5017-	2017-	3017-	4017-
10	8.2	A	T255A825K010(1)S	0.5	6	0018-	0118-	0218-	0318-	5018-	2018-	3018-	4018-
10	47.0	B	T255B476K010(1)S	1.0	6	0019-	0119-	0219-	0319-	5019-	2019-	3019-	4019-
10	47.0	B	T255B476M010(1)S	1.0	6	0020-	0120-	0220-	0320-	5020-	2020-	3020-	4020-
10	56.0	B	T255B566K010(1)S	1.0	6	0021-	0121-	0221-	0321-	5021-	2021-	3021-	4021-
10	68.0	B	T255B686K010(1)S	1.0	6	0022-	0122-	0222-	0322-	5022-	2022-	3022-	4022-
10	68.0	B	T255B686M010(1)S	1.0	6	0023-	0123-	0223-	0323-	5023-	2023-	3023-	4023-
10	82.0	B	T255B826K010(1)S	1.0	6	0024-	0124-	0224-	0324-	5024-	2024-	3024-	4024-
10	220.0	C	T255C227K010(1)S	1.0	8	0025-	0125-	0225-	0325-	5025-	2025-	3025-	4025-
10	220.0	C	T255C227M010(1)S	1.0	8	0026-	0126-	0226-	0326-	5026-	2026-	3026-	4026-
10	270.0	C	T255C277K010(1)S	2.0	8	0027-	0127-	0227-	0327-	5027-	2027-	3027-	4027-
10	390.0	D	T255D397K010(1)S	2.0	10	0028-	0128-	0228-	0328-	5028-	2028-	3028-	4028-
10	470.0	D	T255D477K010(1)S	4.0	10	0029-	0129-	0229-	0329-	5029-	2029-	3029-	4029-
10	470.0	D	T255D477M010(1)S	4.0	10	0030-	0130-	0230-	0330-	5030-	2030-	3030-	4030-
10	560.0	D	T255D567K010(1)S	4.0	10	0031-	0131-	0231-	0331-	5031-	2031-	3031-	4031-
15	4.7	A	T255A475K015(1)S	0.5	4	0032-	0132-	0232-	0332-	5032-	2032-	3032-	4032-
15	4.7	A	T255A475M015(1)S	0.5	4	0033-	0133-	0233-	0333-	5033-	2033-	3033-	4033-
15	5.6	A	T255A565K015(1)S	0.5	4	0034-	0134-	0234-	0334-	5034-	2034-	3034-	4034-
15	33.0	B	T255B336K015(1)S	1.0	6	0035-	0135-	0235-	0335-	5035-	2035-	3035-	4035-
15	33.0	B	T255B336M015(1)S	1.0	6	0036-	0136-	0236-	0336-	5036-	2036-	3036-	4036-
15	39.0	B	T255B396K015(1)S	1.0	6	0037-	0137-	0237-	0337-	5037-	2037-	3037-	4037-
15	150.0	C	T255C157K015(1)S	1.0	8	0038-	0138-	0238-	0338-	5038-	2038-	3038-	4038-
15	150.0	C	T255C157M015(1)S	1.0	8	0039-	0139-	0239-	0339-	5039-	2039-	3039-	4039-
15	180.0	C	T255C187K015(1)S	2.0	8	0040-	0140-	0240-	0340-	5040-	2040-	3040-	4040-
15	220.0	D	T255D227K015(1)S	2.0	8	0041-	0141-	0241-	0341-	5041-	2041-	3041-	4041-
15	220.0	D	T255D227M015(1)S	2.0	8	0042-	0142-	0242-	0342-	5042-	2042-	3042-	4042-
15	270.0	D	T255D277K015(1)S	2.0	8	0043-	0143-	0243-	0343-	5043-	2043-	3043-	4043-
15	330.0	D	T255D337K015(1)S	2.0	8	0044-	0144-	0244-	0344-	5044-	2044-	3044-	4044-
15	330.0	D	T255D337M015(1)S	2.0	8	0045-	0145-	0245-	0345-	5045-	2045-	3045-	4045-
20	2.7	A	T255A275K020(1)S	0.5	4	0046-	0146-	0246-	0346-	5046-	2046-	3046-	4046-
20	3.3	A	T255A335K020(1)S	0.5	4	0047-	0147-	0247-	0347-	5047-	2047-	3047-	4047-
20	3.3	A	T255A335M020(1)S	0.5	4	0048-	0148-	0248-	0348-	5048-	2048-	3048-	4048-
20	3.9	A	T255A395K020(1)S	0.5	4	0049-	0149-	0249-	0349-	5049-	2049-	3049-	4049-
20	18.0	B	T255B186K020(1)S	1.0	6	0050-	0150-	0250-	0350-	5050-	2050-	3050-	4050-
(V) 85°C	µF	Case Size Code	(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR33) Capacitors							

(1) To complete KEMET Part Number (T255), insert Graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates Reliability Level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR33) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/6F				MIL–PRF–39003/6F			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
20	22.0	B	T255B226K020(1)S	1.0	6	0051-	0151-	0251-	0351-	5051-	2051-	3051-	4051-
20	22.0	B	T255B226M020(1)S	1.0	6	0052-	0152-	0252-	0352-	5052-	2052-	3052-	4052-
20	27.0	B	T255B276K020(1)S	1.0	6	0053-	0153-	0253-	0353-	5053-	2053-	3053-	4053-
20	56.0	C	T255C556K020(1)S	1.0	6	0054-	0154-	0254-	0354-	5054-	2054-	3054-	4054-
20	68.0	C	T255C686K020(1)S	1.0	6	0055-	0155-	0255-	0355-	5055-	2055-	3055-	4055-
20	68.0	C	T255C686M020(1)S	1.0	6	0056-	0156-	0256-	0356-	5056-	2056-	3056-	4056-
20	82.0	C	T255C826K020(1)S	1.0	6	0057-	0157-	0257-	0357-	5057-	2057-	3057-	4057-
20	100.0	C	T255C107K020(1)S	1.0	6	0058-	0158-	0258-	0358-	5058-	2058-	3058-	4058-
20	100.0	C	T255C107M020(1)S	1.0	6	0059-	0159-	0259-	0359-	5059-	2059-	3059-	4059-
20	120.0	C	T255C127K020(1)S	1.0	6	0060-	0160-	0260-	0360-	5060-	2060-	3060-	4060-
20	150.0	D	T255D157K020(1)S	2.0	8	0061-	0161-	0261-	0361-	5061-	2061-	3061-	4061-
20	150.0	D	T255D157M020(1)S	2.0	8	0062-	0162-	0262-	0362-	5062-	2062-	3062-	4062-
20	180.0	D	T255D187K020(1)S	2.0	8	0063-	0163-	0263-	0363-	5063-	2063-	3063-	4063-
35	1.8	A	T255A185K035(1)S	0.5	4	0064-	0164-	0264-	0364-	5064-	2064-	3064-	4064-
35	8.2	B	T255B825K035(1)S	1.0	6	0065-	0165-	0265-	0365-	5065-	2065-	3065-	4065-
35	10.0	B	T255B106K035(1)S	1.0	6	0066-	0166-	0266-	0366-	5066-	2066-	3066-	4066-
35	10.0	B	T255B106M035(1)S	1.0	6	0067-	0167-	0267-	0367-	5067-	2067-	3067-	4067-
35	33.0	C	T255C336K035(1)S	1.0	6	0068-	0168-	0268-	0368-	5068-	2068-	3068-	4068-
35	33.0	C	T255C336M035(1)S	1.0	6	0069-	0169-	0269-	0369-	5069-	2069-	3069-	4069-
35	39.0	C	T255C396K035(1)S	1.0	6	0070-	0170-	0270-	0370-	5070-	2070-	3070-	4070-
35	47.0	C	T255C476K035(1)S	1.0	6	0071-	0171-	0271-	0371-	5071-	2071-	3071-	4071-
35	47.0	C	T255C476M035(1)S	1.0	6	0072-	0172-	0272-	0372-	5072-	2072-	3072-	4072-
35	56.0	D	T255D566K035(1)S	2.0	6	0073-	0173-	0273-	0373-	5073-	2073-	3073-	4073-
35	68.0	D	T255D686K035(1)S	2.0	6	0074-	0174-	0274-	0374-	5074-	2074-	3074-	4074-
35	68.0	D	T255D686M035(1)S	2.0	6	0075-	0175-	0275-	0375-	5075-	2075-	3075-	4075-
50	1.2	A	T255A125K050(1)S	0.5	4	0076-	0176-	0276-	0376-	5076-	2076-	3076-	4076-
50	1.5	A	T255A155K050(1)S	0.5	4	0077-	0177-	0277-	0377-	5077-	2077-	3077-	4077-
50	1.5	A	T255A155M050(1)S	0.5	4	0078-	0178-	0278-	0378-	5078-	2078-	3078-	4078-
50	5.6	B	T255B565K050(1)S	1.0	4	0079-	0179-	0279-	0379-	5079-	2079-	3079-	4079-
50	6.8	B	T255B685K050(1)S	1.0	6	0080-	0180-	0280-	0380-	5080-	2080-	3080-	4080-
50	6.8	B	T255B685M050(1)S	1.0	6	0081-	0181-	0281-	0381-	5081-	2081-	3081-	4081-
50	22.0	C	T255C226K050(1)S	1.0	6	0082-	0182-	0282-	0382-	5082-	2082-	3082-	4082-
50	22.0	C	T255C226M050(1)S	1.0	6	0083-	0183-	0283-	0383-	5083-	2083-	3083-	4083-
50	27.0	C	T255C276K050(1)S	1.0	6	0084-	0184-	0284-	0384-	5084-	2084-	3084-	4084-
50	33.0	D	T255D336K050(1)S	1.0	6	0085-	0185-	0285-	0385-	5085-	2085-	*	*
50	33.0	D	T255D336M050(1)S	1.0	6	0086-	0186-	0286-	0386-	5086-	2086-	*	*
50	39.0	D	T255D396K050(1)S	1.0	6	0087-	0187-	0287-	0387-	5087-	2087-	*	*
(V) 85°C	µF	Case Size Code	(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR33) Capacitors							

(1) To complete KEMET Part Number (T255), insert Graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates Reliability Level.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Permissible AC ripple current can be determined by the following:

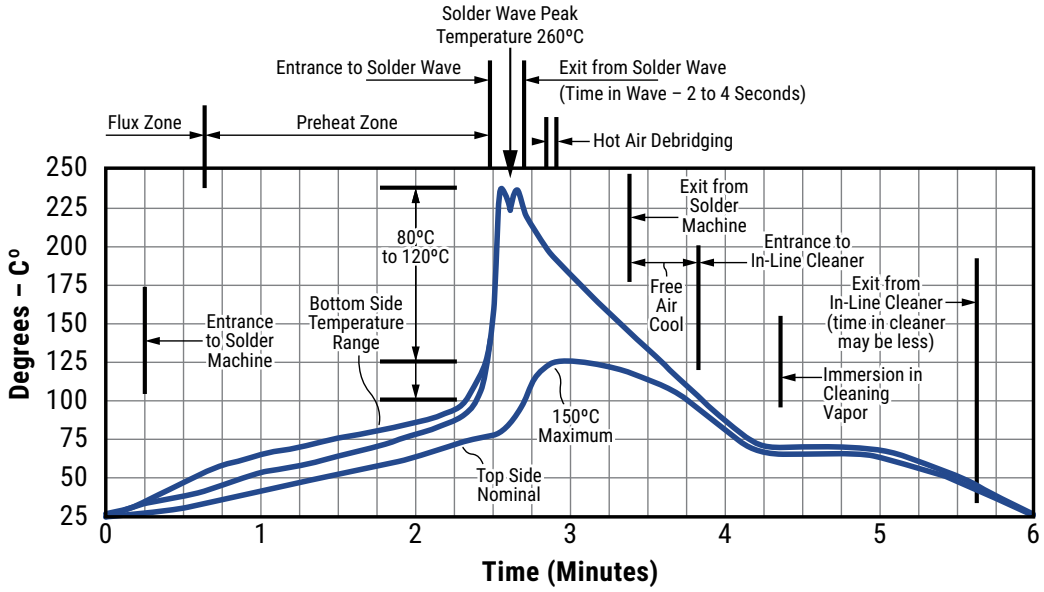
$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

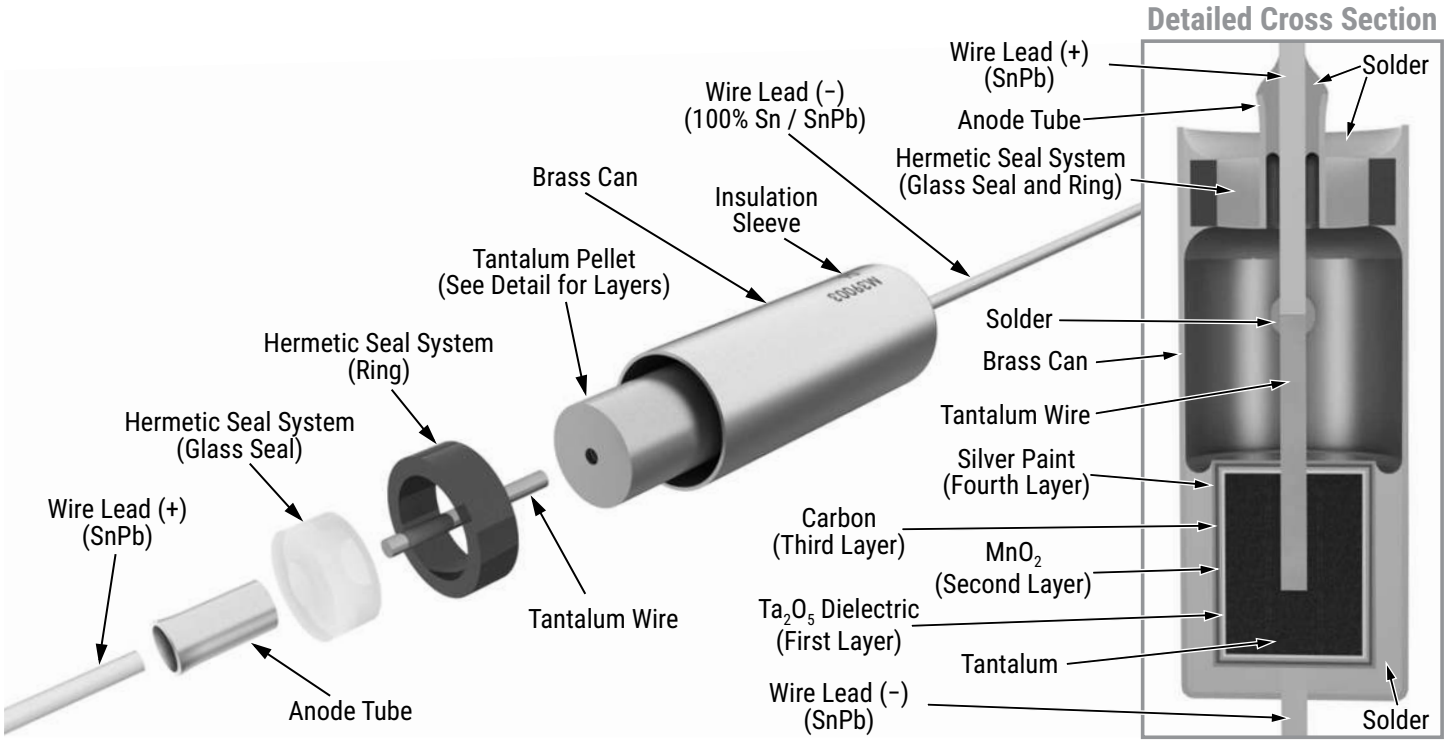
Optimum Solder Wave Profile



Mounting

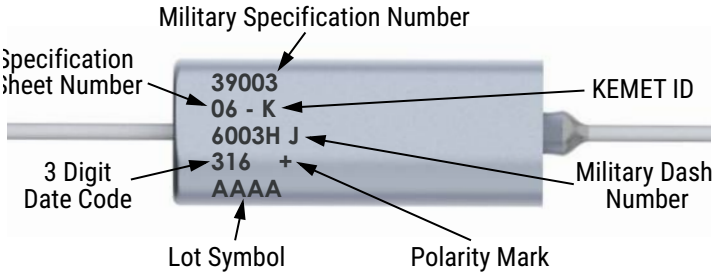
All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Construction

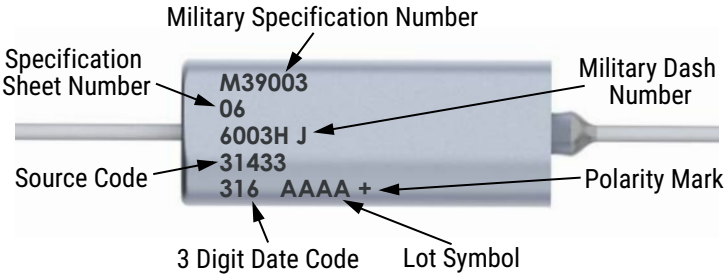


Capacitor Marking

A Case

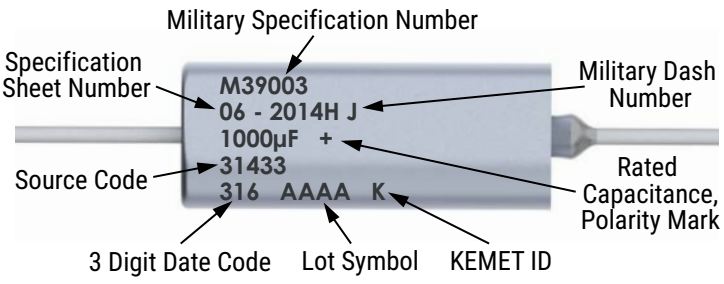


B Case



Date Code	3 Digit	4 Digit
Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023	19 = 2019 20 = 2020 21 = 2021 22 = 2022 23 = 2023
Week	01 = 1st week of the year to 52 = 52nd week of the year	

C & D Case



Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature– reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS-296E.

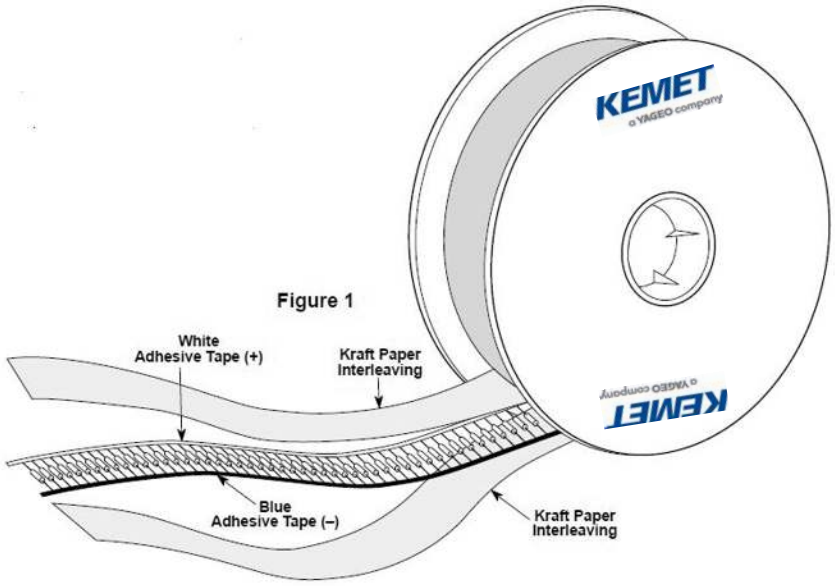


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity	Ammo Pack C-Spec
A	150/Box	3,500	C-7200	1,500	C-7293
B	75/Box	2,500	C-7200	1,000	Class I
C	20/Tray	500	C-7200	250	C-7442
D	20/Tray	400	C-7200	250	Class II C-7443 Class III

Figure 2

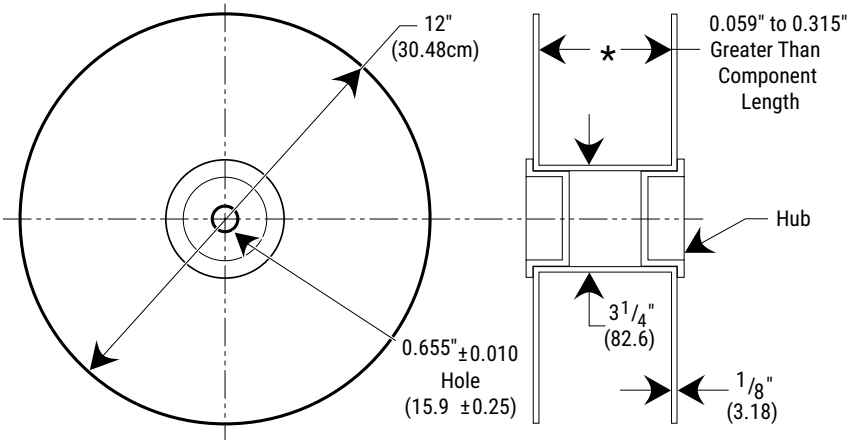


Figure 3

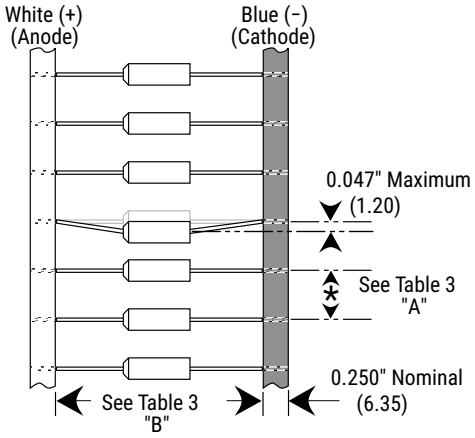


Table 3 – Tape Dimensions

Dimensions in Inches (& Millimeters)

BODY DIAMETER	A PITCH ±0.020 (0.5)	B INSIDE TAPE SPACING ±0.059 (1.5)		
		Class		
		I	II	III
≤ 0.197 (5.0)	0.200 (5.0)	2.063 (52.4)	2.500 (63.5)	2.874 (73)
0.198 (5.0) to 0.394 (10.0)	0.400 (10.0)			

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50 lbs. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lbs. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center.

Figures 1 and 2 show the KEMET standard chipboard tape reel.

A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors.

Universal splicing clips are used to connect the tape.

T245 Series Axial High Temperature Solder (CSR23 Style)

Overview

The KEMET standard MIL case hermetically sealed T245 Series (Extended Capacitance Range) is compact, ruggedly built and designed for miniaturized circuitry. The capacitors are especially well-suited for coupling, bypass filtering and RC timing circuits. The T245 Series exhibits excellent stability, low DC leakage current, dissipation factor, and ESR/impedance over a wide temperature and frequency range.

Benefits

- Internal construction solder to resist up to 221°C
- Operating temperature range of −55˚C to +125˚C
- Qualified to MIL–PRF–39003 (CSR23 Style)
- Failure rate options: Graded – B, C, D, and G and Exponential - M, P, R, and S
- Capacitance values of 1.2 µF to 1,000 µF
- Tolerances of ±10% and ±20%
- Voltage rating of 6 VDC – 50 VDC
- Surge current options D, E, and F
- Taped and reeled per EIA Specification RS–296
- Marking per MIL–STD–1285
- Case sizes: A, B, C, D

Applications

Typical applications include coupling, bypass, filtering and RC timing circuits in miniaturized circuitry.

Ordering Information

T	245	A	105	K	050	A	S	7200
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/Military Product Only	Termination Finish	Specification
T = Tantalum	Hermetically sealed axial high temperature solder	A B C D	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20 035 = 35 050 = 50	Graded: B = 0.1%/k hours C = 0.01%/k hours D = 0.001%/k hours G = 1.0%/k hours Exponential: M = 1%/k hours P = 0.1%/k hours R = 0.01%/k hours S = 0.001%/k hours	S = Standard	Blank = Sleeved/Bulk 0100 = Without sleeve 7200 = Tape & Reel 7293 & 7443 = Ammo 4250 = 10 cycles, 25°C after Weibull 4251 = 10 cycles, -55 & 85°C after Weibull 4252 = 10 cycles, -55 & 85°C before Weibull All capacitors are sleeved unless specified.

Ordering Information – (CSR23 Style)

M39003	/03	3075	E
Capacitor Class	Slash	Dash Number	Surge Option
Military specification number	Specification sheet number	Failure rate level	D = C-4250 E = C-4251 F = C-4252 H = No C-Spec

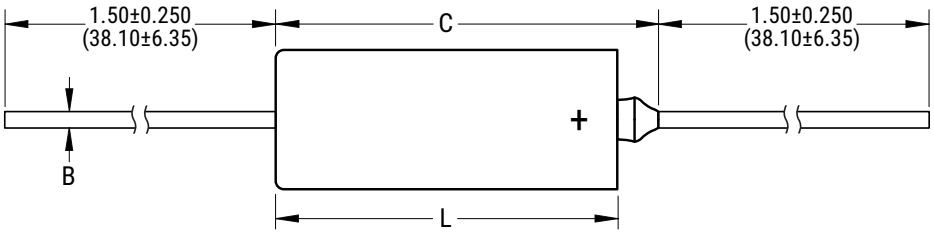
Orders should be entered by the military specification number, including the dash number and surge option letter (D, E, F, or H).

Performance Characteristics

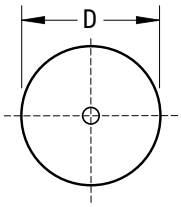
Item	Performance Characteristics
Operating Temperature	–55°C to 125°C
Rated Capacitance Range	1.2 – 1,000 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6 – 50 V
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)
Failure Rate (MIL–PRF–39003, CSR23 capacitors only)	Approved failure rate: Graded G (1.0%/k hours), B (0.1%/k hours), C (0.01%/k hours), D (0.001%/k hours) and Exponential M (1.0%/k hours), P (0.1%/k hours), R (0.01%/k hours), S (0.001%/k hours)

Dimensions – Inches (Millimeters)

SIDE VIEW



END VIEW



Case Size	Uninsulated		Insulated			
	D ±0.005 ±(0.13)	L ±0.031 ±(0.79)	D ±0.010 ±(0.25)	L ±0.031 ±(0.79)	B ±0.002 ±(0.05)	C Maximum
A	0.125 (3.18)	0.250 (6.35)	0.135 (3.43)	0.286 (7.26)	0.020 (0.51)	0.422 (10.72)
B	0.175 (4.45)	0.438 (11.13)	0.185 (4.70)	0.474 (12.04)	0.020 (0.51)	0.610 (15.49)
C	0.279 (7.09)	0.650 (16.51)	0.289 (7.34)	0.686 (17.42)	0.025 (0.64)	0.822 (20.88)
D	0.341 (8.66)	0.750 (19.05)	0.351 (8.92)	0.786 (19.96)	0.025 (0.64)	0.922 (23.42)

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/3J				MIL–PRF–39003/3J			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
6	10.0	A	T245A106K006(1)S	0.9	6	0101-	0201-	0301-	0401-	5001-	2001-	3001-	4001-
6	10.0	A	T245A106M006(1)S	0.9	6	0102-	0202-	0302-	0402-	5002-	2002-	3002-	4002-
6	12.0	A	T245A126K006(1)S	1.0	6	0103-	0203-	0303-	0403-	5003-	2003-	3003-	4003-
6	100.0	B	T245B107K006(1)S	6.0	6	0104-	0204-	0304-	0404-	5004-	2004-	3004-	4004-
6	100.0	B	T245B107M006(1)S	6.0	6	0105-	0205-	0305-	0405-	5005-	2005-	3005-	4005-
6	330.0	C	T245C337K006(1)S	10.0	8	0106-	0206-	0306-	0406-	5006-	2006-	3006-	4006-
6	330.0	C	T245C337M006(1)S	10.0	8	0107-	0207-	0307-	0407-	5007-	2007-	3007-	4007-
6	390.0	C	T245C397K006(1)S	10.0	10	0108-	0208-	0308-	0408-	5008-	2008-	3008-	4008-
6	470.0	C	T245C477K006(1)S	10.0	10	0109-	0209-	0309-	0409-	5009-	2009-	3009-	4009-
6	470.0	C	T245C477M006(1)S	10.0	10	0110-	0210-	0310-	0410-	5010-	2010-	3010-	4010-
6	680.0	D	T245D687K006(1)S	20.0	10	0111-	0211-	0311-	0411-	5011-	2011-	3011-	4011-
6	680.0	D	T245D687M006(1)S	20.0	10	0112-	0212-	0312-	0412-	5012-	2012-	3012-	4012-
6	820.0	D	T245D827K006(1)S	20.0	10	0113-	0213-	0313-	0413-	5013-	2013-	3013-	4013-
6	1000.0	D	T245D108K006(1)S	20.0	10	0114-	0214-	0314-	0414-	5014-	2014-	3014-	4014-
6	1000.0	D	T245D108M006(1)S	20.0	10	0115-	0215-	0315-	0415-	5015-	2015-	3015-	4015-
10	6.8	A	T245A685K010(1)S	1.0	6	0116-	0216-	0316-	0416-	5016-	2016-	3016-	4016-
10	6.8	A	T245A685M010(1)S	1.0	6	0117-	0217-	0317-	0417-	5017-	2017-	3017-	4017-
10	8.2	A	T245A825K010(1)S	1.2	6	0118-	0218-	0318-	0418-	5018-	2018-	3018-	4018-
10	47.0	B	T245B476K010(1)S	4.0	6	0119-	0219-	0319-	0419-	5019-	2019-	3019-	4019-
10	47.0	B	T245B476M010(1)S	4.0	6	0120-	0220-	0320-	0420-	5020-	2020-	3020-	4020-
10	56.0	B	T245B566K010(1)S	5.0	6	0121-	0221-	0321-	0421-	5021-	2021-	3021-	4021-
10	68.0	B	T245B686K010(1)S	6.0	6	0122-	0222-	0322-	0422-	5022-	2022-	3022-	4022-
10	68.0	B	T245B686M010(1)S	6.0	6	0123-	0223-	0323-	0423-	5023-	2023-	3023-	4023-
10	82.0	B	T245B826K010(1)S	7.0	6	0124-	0224-	0324-	0424-	5024-	2024-	3024-	4024-
10	220.0	C	T245C227K010(1)S	12.0	8	0125-	0225-	0325-	0425-	5025-	2025-	3025-	4025-
10	220.0	C	T245C227M010(1)S	12.0	8	0126-	0226-	0326-	0426-	5026-	2026-	3026-	4026-
10	270.0	C	T245C277K010(1)S	13.0	8	0127-	0227-	0327-	0427-	5027-	2027-	3027-	4027-
10	390.0	D	T245D397K010(1)S	16.0	10	0128-	0228-	0328-	0428-	5028-	2028-	3028-	4028-
10	470.0	D	T245D477K010(1)S	16.0	10	0129-	0229-	0329-	0429-	5029-	2029-	3029-	4029-
10	470.0	D	T245D477M010(1)S	16.0	10	0130-	0230-	0330-	0430-	5030-	2030-	3030-	4030-
10	560.0	D	T245D567K010(1)S	20.0	10	0131-	0231-	0331-	0431-	5031-	2031-	3031-	4031-
15	4.7	A	T245A475K015(1)S	1	4	0132-	0232-	0332-	0432-	5032-	2032-	3032-	4032-
15	4.7	A	T245A475M015(1)S	1	4	0133-	0233-	0333-	0433-	5033-	2033-	3033-	4033-
15	5.6	A	T245A565K015(1)S	1.3	4	0134-	0234-	0334-	0434-	5034-	2034-	3034-	4034-
15	33.0	B	T245B336K015(1)S	5	6	0135-	0235-	0335-	0435-	5035-	2035-	3035-	4035-
15	33.0	B	T245B336M015(1)S	5	6	0136-	0236-	0336-	0436-	5036-	2036-	3036-	4036-
15	39.0	B	T245B396K015(1)S	5.3	6	0137-	0237-	0337-	0437-	5037-	2037-	3037-	4037-
15	150.0	C	T245C157K015(1)S	15	8	0138-	0238-	0338-	0438-	5038-	2038-	3038-	4038-
15	150.0	C	T245C157M015(1)S	15	8	0139-	0239-	0339-	0439-	5039-	2039-	3039-	4039-
15	180.0	C	T245C187K015(1)S	15	8	0140-	0240-	0340-	0440-	5040-	2040-	3040-	4040-
15	220.0	D	T245D227K015(1)S	20	8	0141-	0241-	0341-	0441-	5041-	2041-	3041-	4041-
15	220.0	D	T245D227M015(1)S	20	8	0142-	0242-	0342-	0442-	5042-	2042-	3042-	4042-
15	270.0	D	T245D277K015(1)S	20	8	0143-	0243-	0343-	0443-	5043-	2043-	3043-	4043-
15	330.0	D	T245D337K015(1)S	20	8	0144-	0244-	0344-	0444-	5044-	2044-	3044-	4044-
15	330.0	D	T245D337M015(1)S	20	8	0145-	0245-	0345-	0445-	5045-	2045-	3045-	4045-
20	2.7	A	T245A275K020(1)S	0.8	4	0146-	0246-	0346-	0446-	5046-	2046-	3046-	4046-
20	3.3	A	T245A335K020(1)S	1.0	4	0147-	0247-	0347-	0447-	5047-	2047-	3047-	4047-
20	3.3	A	T245A335M020(1)S	1.0	4	0148-	0248-	0348-	0448-	5048-	2048-	3048-	4048-
20	3.9	A	T245A395K020(1)S	1.2	4	0149-	0249-	0349-	0449-	5049-	2049-	3049-	4049-
20	18.0	B	T245B186K020(1)S	3.0	6	0150-	0250-	0350-	0450-	5050-	2050-	3050-	4050-
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors							

(1) To complete KEMET Part Number (T245), insert Graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates Reliability Level.

Table 1 – Ratings & Part Number Reference cont.

Rated Voltage	Rated Capacitance	Case Size Code	KEMET Military Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors							
						Dash Number Reference							
						Failure Rate Level (%/1,000 hours)							
						MIL–PRF–39003/3J				MIL–PRF–39003/3J			
						Exponential				Graded			
(V) 85°C	µF		(See below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
20	22.0	B	T245B226K020(1)S	3.0	6	0151-	0251-	0351-	0451-	5051-	2051-	3051-	4051-
20	22.0	B	T245B226M020(1)S	3.0	6	0152-	0252-	0352-	0452-	5052-	2052-	3052-	4052-
20	27.0	B	T245B276K020(1)S	4.0	6	0153-	0253-	0353-	0453-	5053-	2053-	3053-	4053-
20	56.0	C	T245C566K020(1)S	7.0	6	0154-	0254-	0354-	0454-	5054-	2054-	3054-	4054-
20	68.0	C	T245C686K020(1)S	8.0	6	0155-	0255-	0355-	0455-	5055-	2055-	3055-	4055-
20	68.0	C	T245C686M020(1)S	8.0	6	0156-	0256-	0356-	0456-	5056-	2056-	3056-	4056-
20	82.0	C	T245C826K020(1)S	10.0	6	0157-	0257-	0357-	0457-	5057-	2057-	3057-	4057-
20	100.0	C	T245C107K020(1)S	12.0	6	0158-	0258-	0358-	0458-	5058-	2058-	3058-	4058-
20	100.0	C	T245C107M020(1)S	12.0	6	0159-	0259-	0359-	0459-	5059-	2059-	3059-	4059-
20	120.0	C	T245C127K020(1)S	12.0	6	0160-	0260-	0360-	0460-	5060-	2060-	3060-	4060-
20	150.0	D	T245D157K020(1)S	15.0	8	0161-	0261-	0361-	0461-	5061-	2061-	3061-	4061-
20	150.0	D	T245D157M020(1)S	15.0	8	0162-	0262-	0362-	0462-	5062-	2062-	3062-	4062-
20	180.0	D	T245D187K020(1)S	15.0	8	0163-	0263-	0363-	0463-	5063-	2063-	3063-	4063-
35	1.8	A	T245A185K035(1)S	1.0	4	0164-	0264-	0364-	0464-	5064-	2064-	3064-	4064-
35	8.2	B	T245B825K035(1)S	3.0	4	0165-	0265-	0365-	0465-	5065-	2065-	3065-	4065-
35	10.0	B	T245B106K035(1)S	3.0	4	0166-	0266-	0366-	0466-	5066-	2066-	3066-	4066-
35	10.0	B	T245B106M035(1)S	3.0	4	0167-	0267-	0367-	0467-	5067-	2067-	3067-	4067-
35	33.0	C	T245C336K035(1)S	8.0	6	0168-	0268-	0368-	0468-	5068-	2068-	3068-	4068-
35	33.0	C	T245C336M035(1)S	8.0	6	0169-	0269-	0369-	0469-	5069-	2069-	3069-	4069-
35	39.0	C	T245C396K035(1)S	10.0	6	0170-	0270-	0370-	0470-	5070-	2070-	3070-	4070-
35	47.0	C	T245C476K035(1)S	10.0	6	0171-	0271-	0371-	0471-	5071-	2071-	3071-	4071-
35	47.0	C	T245C476M035(1)S	10.0	6	0172-	0272-	0372-	0472-	5072-	2072-	3072-	4072-
35	56.0	D	T245D566K035(1)S	12.0	6	0173-	0273-	0373-	0473-	5073-	2073-	3073-	4073-
35	68.0	D	T245D686K035(1)S	12.0	6	0174-	0274-	0374-	0474-	5074-	2074-	3074-	4074-
35	68.0	D	T245D686M035(1)S	12.0	6	0175-	0275-	0375-	0475-	5075-	2075-	3075-	4075-
50	1.2	A	T245A125K050(1)S	0.6	4	0176-	0276-	0376-	0476-	5076-	2076-	3076-	4076-
50	1.5	A	T245A155K050(1)S	0.8	4	0177-	0277-	0377-	0477-	5077-	2077-	3077-	4077-
50	1.5	A	T245A155M050(1)S	0.8	4	0178-	0278-	0378-	0478-	5078-	2078-	3078-	4078-
50	5.6	B	T245B565K050(1)S	2.5	4	0179-	0279-	0379-	0479-	5079-	2079-	3079-	4079-
50	6.8	B	T245B685K050(1)S	2.5	4	0180-	0280-	0380-	0480-	5080-	2080-	3080-	4080-
50	6.8	B	T245B685M050(1)S	2.5	4	0181-	0281-	0381-	0481-	5081-	2081-	3081-	4081-
50	22.0	C	T245C226K050(1)S	7.0	6	0182-	0282-	0382-	0482-	5082-	2082-	3082-	4082-
50	22.0	C	T245C226M050(1)S	7.0	6	0183-	0283-	0383-	0483-	5083-	2083-	3083-	4083-
50	27.0	C	T245C276K050(1)S	8.0	6	0184-	0284-	0384-	0484-	5084-	2084-	3084-	4084-
50	33.0	D	T245D336K050(1)S	10.0	6	0185-	0285-	0385-	0485-	5085-	2085-	3085-	4085-
50	33.0	D	T245D336M050(1)S	10.0	6	0186-	0286-	0386-	0486-	5086-	2086-	3086-	4086-
50	39.0	D	T245D396K050(1)S	10.0	6	0187-	0287-	0387-	0487-	5087-	2087-	3087-	4087-
(V) 85°C	µF	Case Size Code	(see below for part options)	µA at 25°C Max/5 Minutes	120 Hz Maximum	M (1.0)	P (0.1)	R (0.01)	S (0.001)	G (1)	B (0.1)	C (0.01)	D (0.001)
Rated Voltage	Rated Capacitance		KEMET Part Number	DC Leakage	DF % at 25°C	MIL–PRF–39003 (CSR23) Capacitors							

(1) To complete KEMET Part Number (T245), insert Graded failure rate: G for 1%/k hours, B for 0.1%/k hours, C for 0.01%/k hours, D for 0.001%/k hours or the exponential rate letter. Designates Reliability Level.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Permissible AC ripple current can be determined by the following:

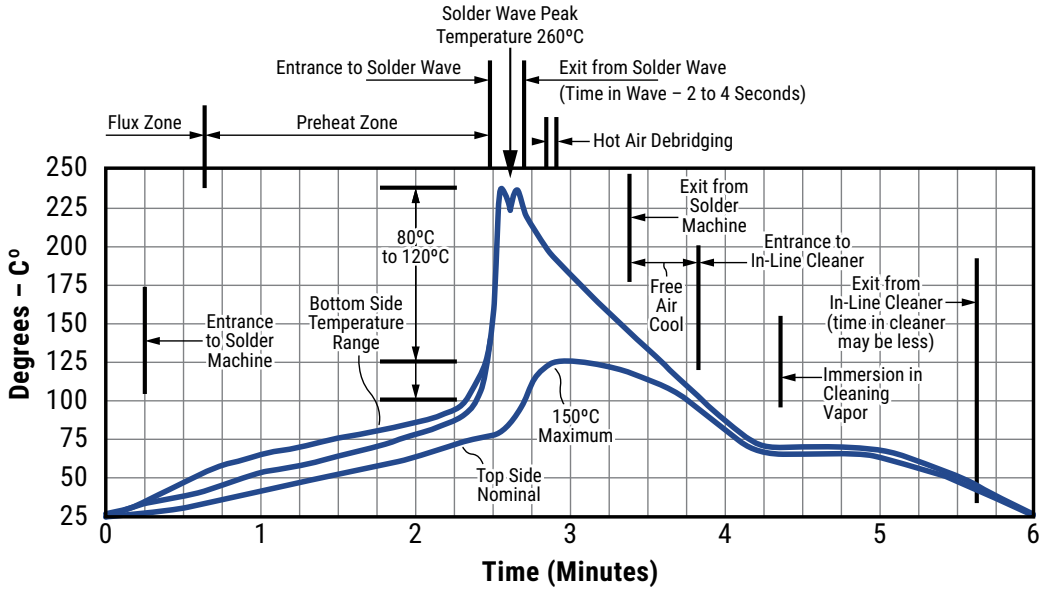
$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

Case Size	Maximum Power Dissipation (P max)	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

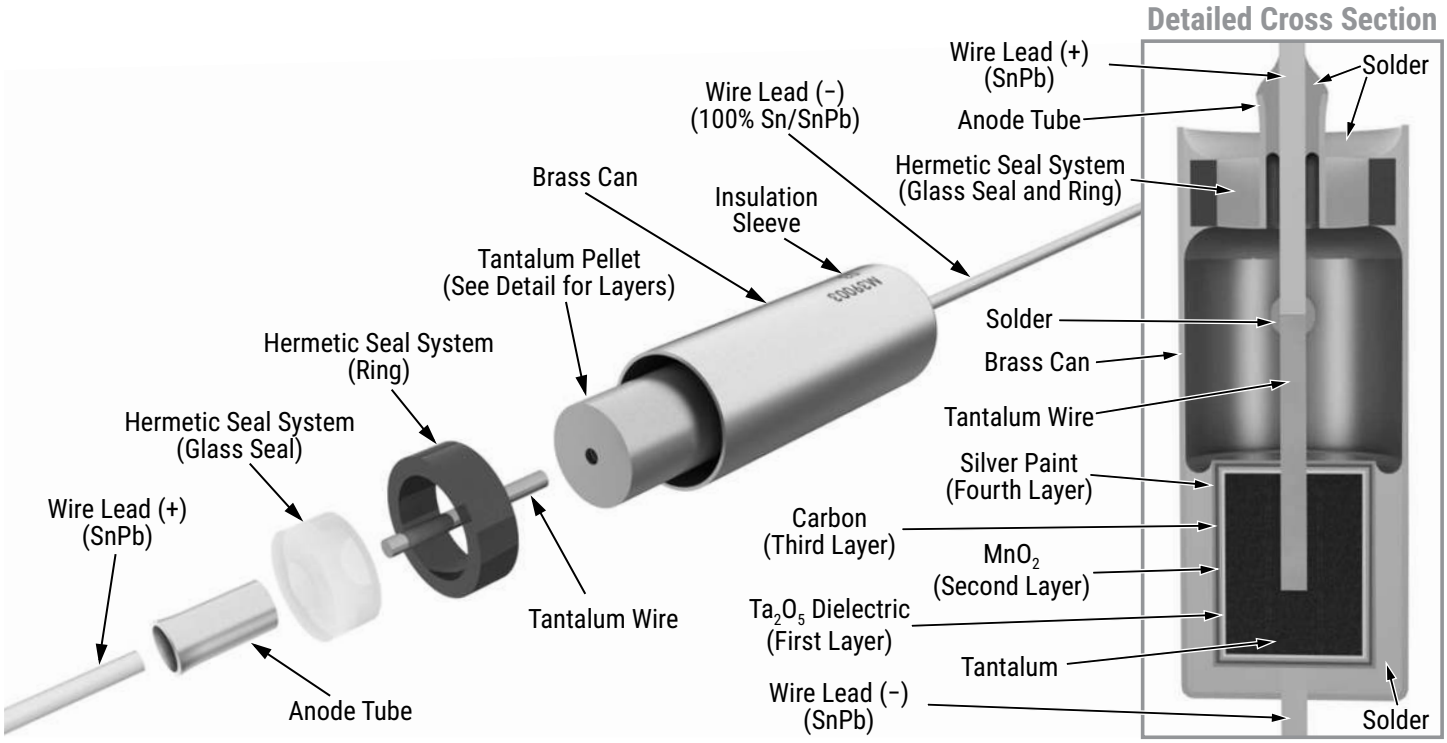
Optimum Solder Wave Profile



Mounting

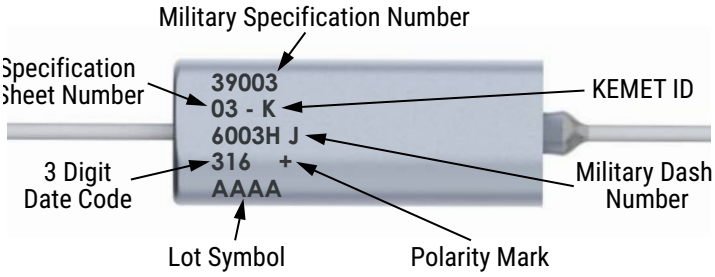
All encased capacitors will pass the Resistance to Soldering Heat Test of MIL–STD–202, Method 210, Condition C. This test simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum capacitors.

Construction

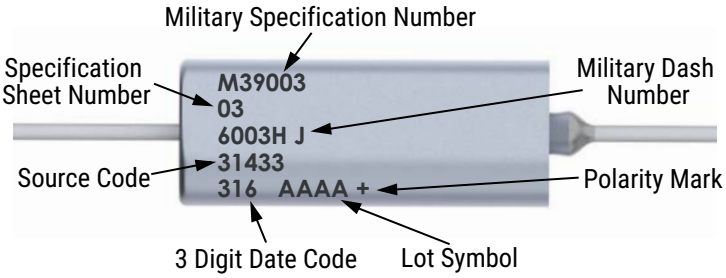


Capacitor Marking

A Case



B Case



Date Code	3 Digit	4 Digit
Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023	19 = 2019 20 = 2020 21 = 2021 22 = 2022 23 = 2023
Week	01 = 1st week of the year to 52 = 52nd week of the year	

Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS-296E.

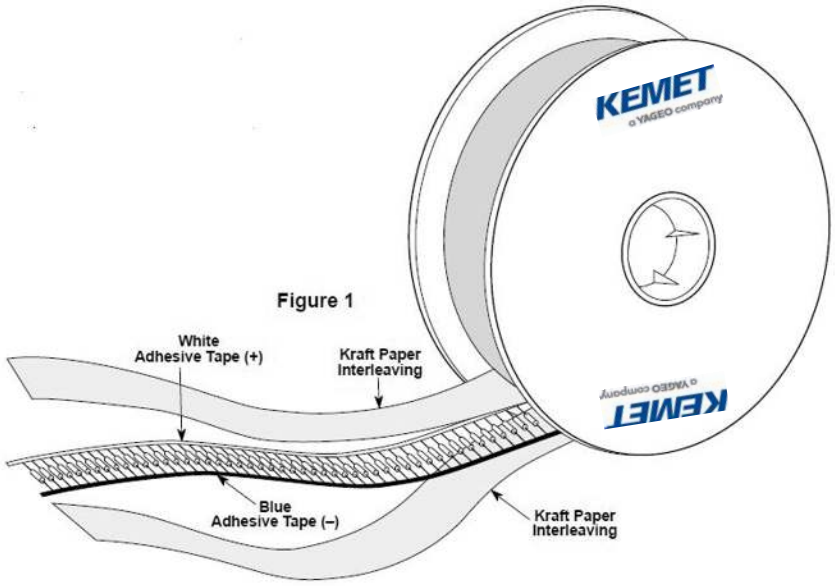


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity	Ammo Pack C-Spec
A	150/Box	3,500	C–7200	1,500	C–7293
B	75/Box	2,500	C–7200	1,000	Class I
C	20/Tray	500	C–7200	250	C–7442
D	20/Tray	400	C–7200	250	Class II C–7443 Class III

Figure 2

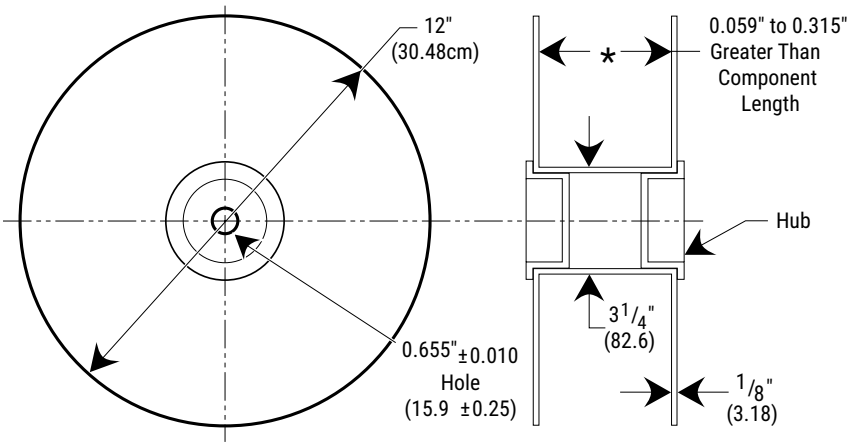


Figure 3

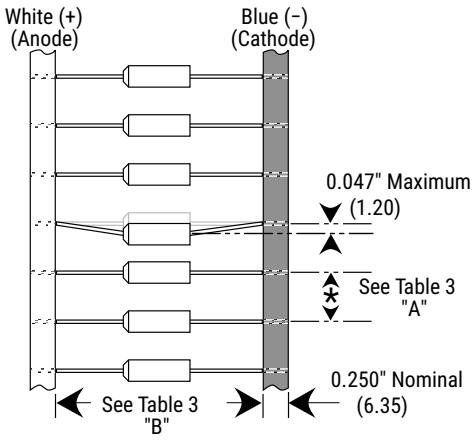


Table 3 – Tape Dimensions

Dimensions in Inches (& Millimeters)

BODY DIAMETER	A PITCH ±0.020 (0.5)	B INSIDE TAPE SPACING ±0.059 (1.5)		
		Class		
		I	II	III
≤ 0.197 (5.0)	0.200 (5.0)	2.063 (52.4)	2.500 (63.5)	2.874 (73)
0.198 (5.0) to 0.394 (10.0)	0.400 (10.0)			

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50 lbs. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lbs. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center.

Figures 1 and 2 show the KEMET standard chipboard tape reel.

A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors.

Universal splicing clips are used to connect the tape.

T495 High Reliability Alternative Surge Robust, Low ESR MnO_2 DLA Drawing 95158

Overview

The low ESR, surge-robust High Reliability Series (HRA) T495 is designed for demanding applications that require high surge current and high ripple current capability. This T495 is approved for DLA Drawing 95158, incorporating an intensive testing and screening protocol that is customizable depending on specific customer requirements. This series offers several advantages such as low ESR, high ripple current capability, excellent capacitance stability, and improved resistance to high in-rush currents. These benefits are achieved through a combination of proprietary design, materials, and process parameters, as well as high-stress, low impedance electrical conditioning performed prior to screening.

Benefits

- Approved for DLA Drawing 95158
- Meets or exceeds EIA standard 535BAAC
- Taped and reeled per EIA 481
- High surge current capability
- Optional gold-plated terminations
- High ripple current capability
- 100% surge current test
- 100% steady-state accelerated aging

Applications

Typical applications include decoupling and filtering in defense applications, such as DC/DC converters, portable electronics, telecommunications, and control units requiring high ripple current capability.

Environmental Compliance

RoHS compliant when ordered with 100% Sn solder.
- Halogen-free
- Epoxy compliant with UL94 V–0
- Molded Epoxy complies for outgassing testing under ASTM E 595.

Ordering Information

T	495	X	107	M	010	A	H	4095	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Customer Specification	Packaging (C-Spec)
T = Tantalum	Surge robust low ESR	C D X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	006 = 6.3 010 = 10 016 = 16 020 = 20 025 = 25 035 = 35 050 = 50	A = N/A	H = Standard solder-coated (SnPb 5% Pb minimum) B = Gold-plated N = Non-magnetic 100% tin (Sn) M = Non-magnetic (SnPb)	Tested to meet the Established Reliability	Blank = 7" reel 7280 = 13" reel 7610 = Bulk bag 7640 = Bulk plastic box WAFL = Waffle pack

Ordering Information – DLA Drawing 95158

95158-	07	M	H
Drawing Number	Dash Number	Capacitance Tolerance	Termination Finish
Capacitor, Fixed, Tantalum Chip, Low ESR	See Part Number List	K = ±10% M = ±20%	H = Solder plated B= Gold-plated

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	4.7 – 220 µF at 120 Hz/25° C
Capacitance Tolerance	K tolerance (10%), M tolerance (20%)
Rated Voltage Range	6 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table

Qualification

Test	Condition		Characteristics			
Endurance	85°C at rated voltage, 2,000 hours 125°C at 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Moisture Resistance	65°C to −10°C, 100% RH, 20 cycles, no load		Δ C/C	Within +/−15% of initial value		
			DF	Within 150 x initial limit		
			DCL	Within 200 x initial limit		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, −55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +125°C, +25°C			+25°C	−55°C	+85°C	+125°C
		Δ C/C		IL*	±10%	±10%	±20%
		DF		IL	IL	1.5 x IL	1.5 x IL
		DCL		IL	n/a	10 x IL	12 x IL
Resistance to Solder Heat	MIL–STD–202, Method 210, 1 cycle		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Resistance to Solvents	MIL–STD–202, Method 215, Aqueous wash chemical or equivalent		Δ C/C	Within ±10 of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

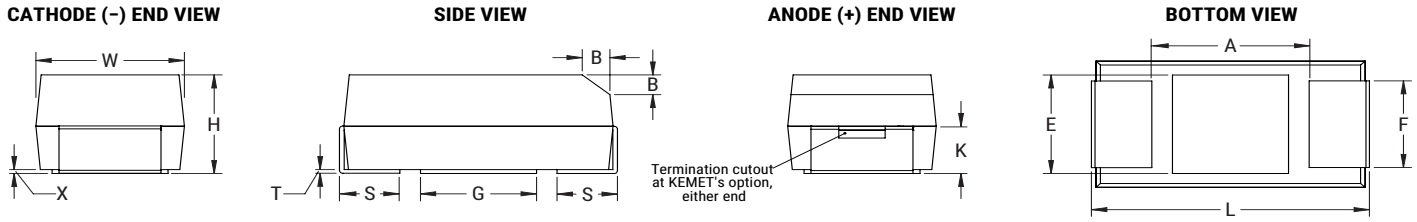
**IL = Initial limit*

Certification

DLA Drawing 95158

Dimensions – Millimeters (Inches)

Metric will govern



Case Code	Component											
KEMET	L	W	H	K ±0.20 ±(0.008) (Ref)	F ±0.1 ±(0.004) (Ref)	S ±0.3 ±(0.012) (Ref)	B ±0.15 ±(0.006) (Ref)	X ± 0.10 ±(0.004)(Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
C	6.0±0.3 (0.236±0.012)	3.2±0.3 (0.126±0.012)	2.5±0.3 (0.098±0.012)	1.4 (0.055)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10 (0.004)	0.13 (0.005)	3.1 (0.122)	2.8 (0.110)	2.4 (0.094)
D	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	2.8±0.3 (0.110±0.012)	1.5 (0.059)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10 (0.004)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)
X	7.3±0.3 (0.287±0.012)	4.3±0.3 (0.169±0.012)	4.0±0.3 (0.157±0.012)	2.3 (0.091)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10 (0.004)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)

Weight

Case Size	Typical Weight (mg)
C/6032	224.48
D/7343	446.84
X/7343	652.04

These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative

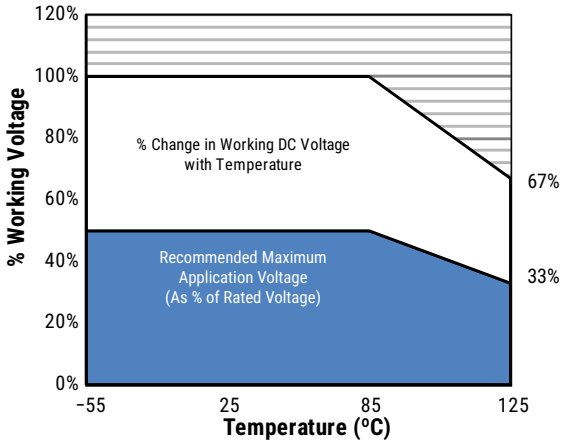
Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DSCC) 95158/1	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp.	MSL
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA +25°C Max./5 Min.	% at +25°C 120 Hz Max.	mΩ at 25°C 100 kHz Max.	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp ≤ 260°C
6.3	68	D/7343-31	T495D686(1)006A(2)4095	95158-01(1)(2)	3.3	4.0	175	926	833	370	125	1
6.3	150	X/7343-43	T495X157(1)006A(2)4095	95158-02(1)(2)	7.2	6.0	125	1149	1034	460	125	1
6.3	220	X/7343-43	T495X227(1)006A(2)4095	95158-03(1)(2)	13.2	8.0	100	1285	1157	514	125	1
6.3	220	D/7343-31	T495D227(1)006A(2)4095	95158-25(1)(2)	13.2	8.0	100	1225	1103	490	125	1
10	47	D/7343-31	T495D476(1)010A(2)4095	95158-04(1)(2)	3.8	4.0	200	866	779	346	125	1
10	68	X/7343-43	T495X686(1)010A(2)4095	95158-05(1)(2)	5.4	4.0	150	1049	944	420	125	1
10	100	D/7343-31	T495D107(1)010A(2)4095	95158-06(1)(2)	10.0	8.0	100	1225	1103	490	125	1
10	100	X/7343-43	T495X107(1)010A(2)4095	95158-07(1)(2)	8.0	6.0	100	1285	1157	514	125	1
10	150	X/7343-43	T495X157(1)010A(2)4095	95158-08(1)(2)	15.0	8.0	100	1285	1157	514	125	1
10	150	D/7343-31	T495D157(1)010A(2)4095	95158-26(1)(2)	15.0	8.0	100	1225	1103	490	125	1
10	220	X/7343-43	T495X227(1)010A(2)4095	95158-28(1)(2)	15.0	8.0	100	1285	1157	514	125	1
16	33	D/7343-31	T495D336(1)016A(2)4095	95158-09(1)(2)	4.2	4.0	250	775	698	310	125	1
16	47	D/7343-31	T495D476(1)016A(2)4095	95158-10(1)(2)	7.5	6.0	200	866	779	346	125	1
16	100	X/7343-43	T495X107(1)016A(2)4095	95158-11(1)(2)	16.0	8.0	125	1149	1034	460	125	1
20	15	D/7343-31	T495D156(1)020A(2)4095	95158-12(1)(2)	2.4	4.0	275	739	665	296	125	1
20	22	D/7343-31	T495D226(1)020A(2)4095	95158-13(1)(2)	3.5	4.0	275	739	665	296	125	1
20	47	X/7343-43	T495X476(1)020A(2)4095	95158-14(1)(2)	7.5	4.0	150	1049	944	420	125	1
20	68	X/7343-43	T495X686(1)020A(2)4095	95158-15(1)(2)	13.6	6.0	150	1049	944	420	125	1
25	15	D/7343-31	T495D156(1)025A(2)4095	95158-16(1)(2)	3.8	6.0	275	739	665	296	125	1
25	15	X/7343-43	T495X156(1)025A(2)4095	95158-17(1)(2)	3.0	4.0	200	908	817	363	125	1
25	22	X/7343-43	T495X226(1)025A(2)4095	95158-18(1)(2)	4.4	4.0	225	856	770	342	125	1
25	33	X/7343-43	T495X336(1)025A(2)4095	95158-19(1)(2)	6.6	4.0	175	971	874	388	125	1
35	4.7	C/6032-28	T495C475(1)035A(2)4095	95158-29(1)(2)	1.7	6.0	600	428	385	171	125	1
35	6.8	X/7343-43	T495X685(1)035A(2)4095	95158-20(1)(2)	1.9	4.0	300	742	668	297	125	1
35	10	D/7343-31	T495D106(1)035A(2)4095	95158-27(1)(2)	3.5	4.0	300	707	636	283	125	1
35	10	X/7343-43	T495X106(1)035A(2)4095	95158-21(1)(2)	2.8	4.0	250	812	731	325	125	1
35	15	X/7343-43	T495X156(1)035A(2)4095	95158-22(1)(2)	5.3	6.0	225	856	770	342	125	1
35	22	X/7343-43	T495X226(1)035A(2)4095	95158-23(1)(2)	7.7	6.0	300	742	668	297	125	1
50	4.7	X/7343-43	T495X475(1)050A(2)4095	95158-24(1)(2)	1.9	4.0	300	742	668	297	125	1
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA +25°C Max./5 Min.	% at +25°C 120 Hz Max.	mΩ at 25°C 100 kHz Max.	mA at +25°C 100 kHz	mA at +85°C 100 kHz	mA at +125°C 100 kHz	°C	Reflow Temp. ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DSCC) 95158/1	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)			Maximum Operating Temp.	MSL

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B = Gold-plated, H = Standard Solder coated (SnPb 5% Pb minimum),
N = Non-Magnetic 100% Tin (Sn) or M = Non-Magnetic (SnPb). Designates Termination Finish.
Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C
% Change in working DC voltage with temperature	V_R	67% of V_R
Recommended maximum application voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
C	6032–28	110
D	7343–31	150
X	7343–43	165

Using the Pmax of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{Pmax/R}$
$E(max) = Z\sqrt{Pmax/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
Pmax = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Reverse Voltage

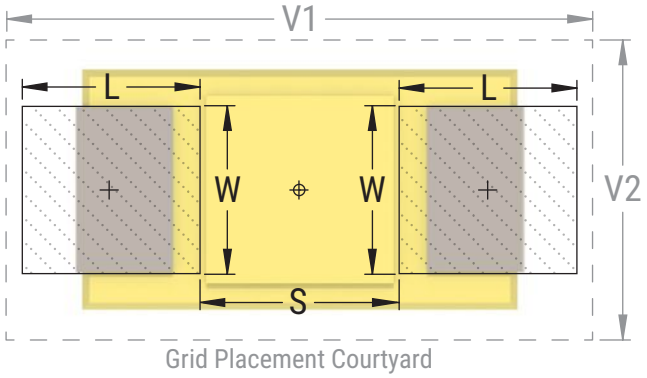
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
C	6032–28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

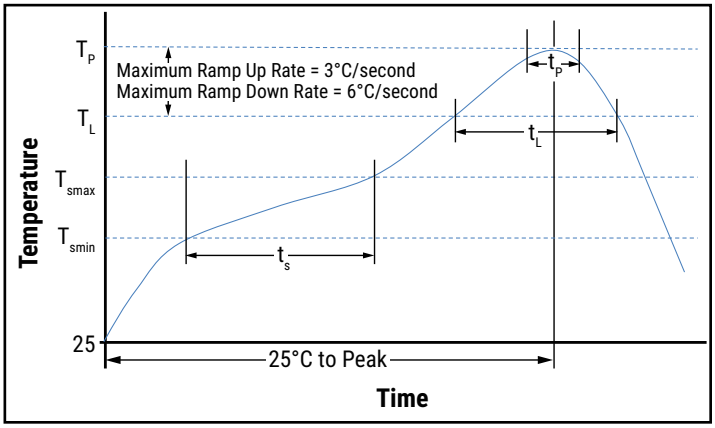
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

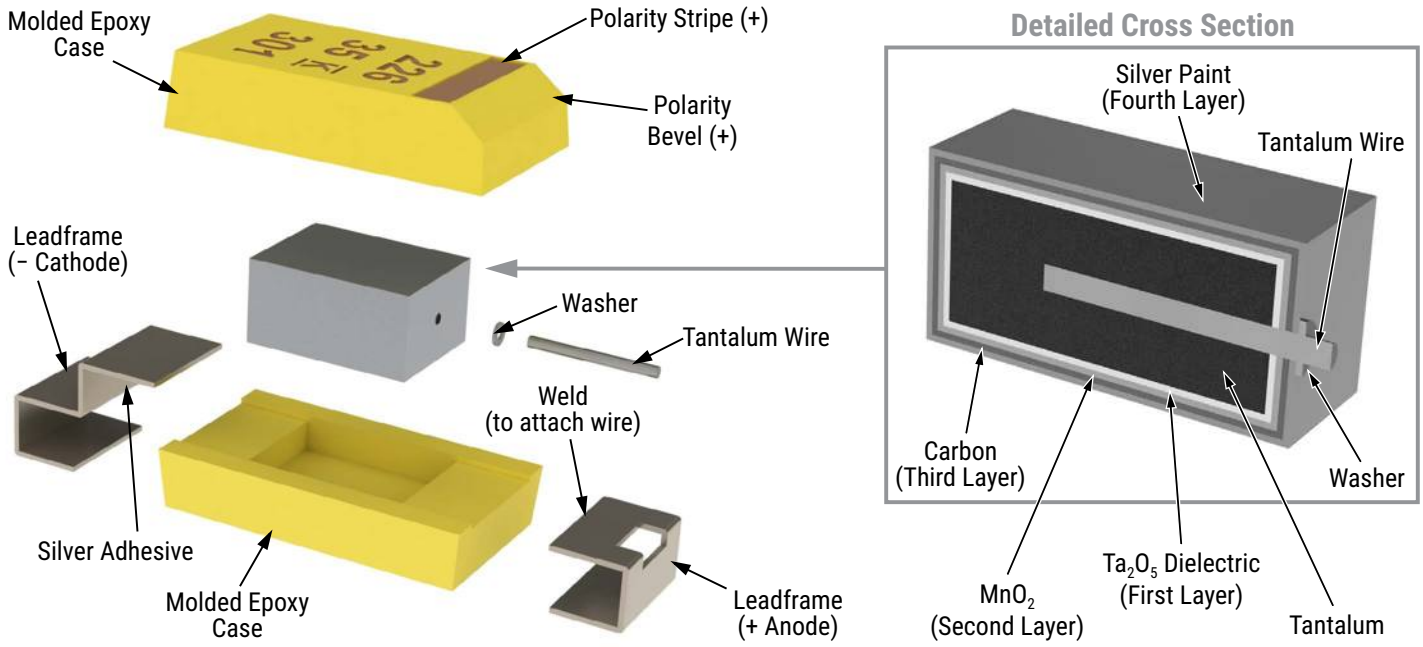
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



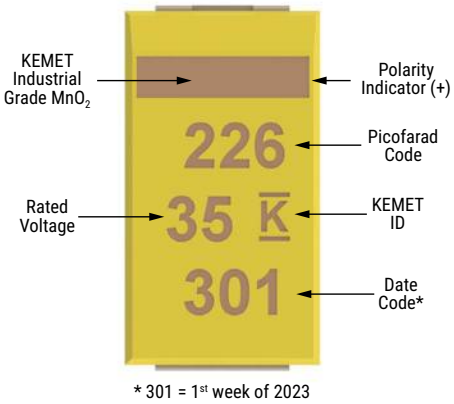
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 301 = 1st week of 2023

Date Code *	
1st digit = last number of year	5 = 2015 6 = 2016 7 = 2017 8 = 2018 9 = 2019
2nd and 3rd digit = week of the year	01 = 1st week of the year to 52 = 52nd week of the year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

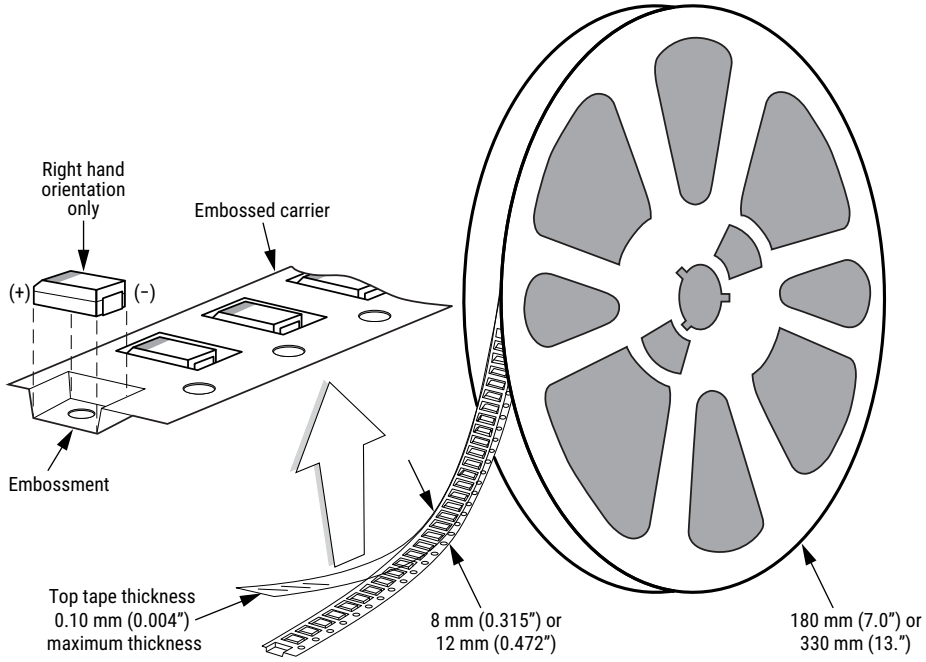


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	3,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500
O	7360-43	12	250	1,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

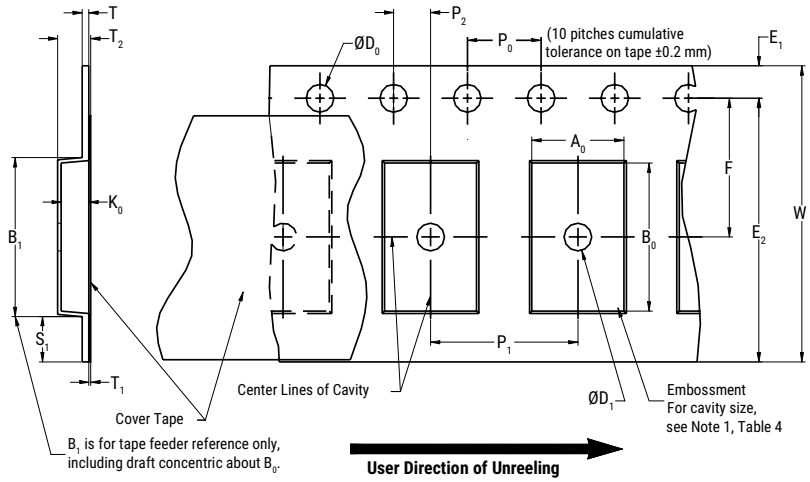


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

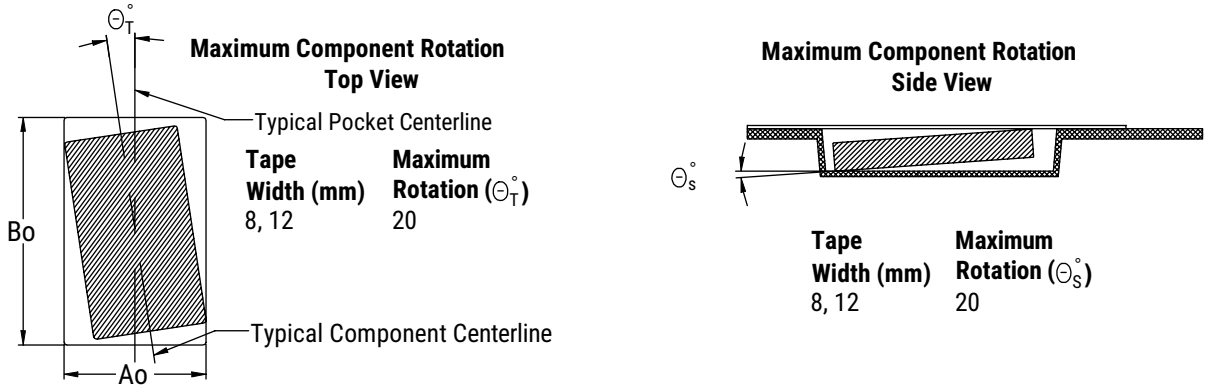


Figure 3 – Maximum Lateral Movement

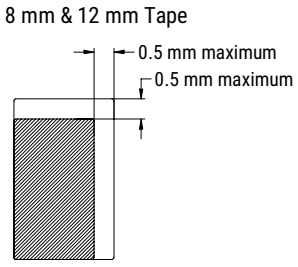


Figure 4 – Bending Radius

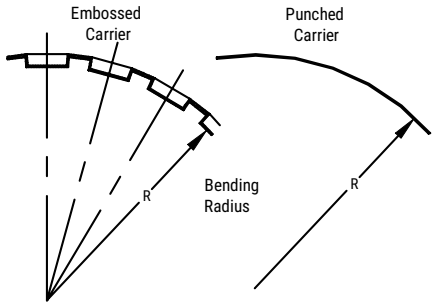
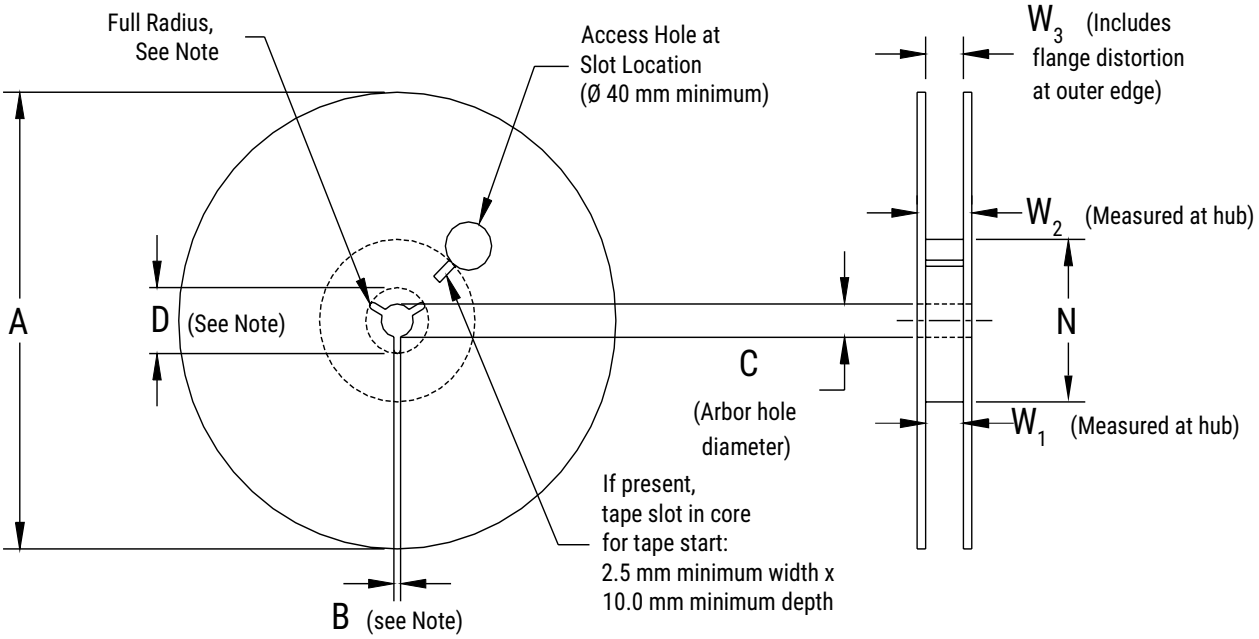


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

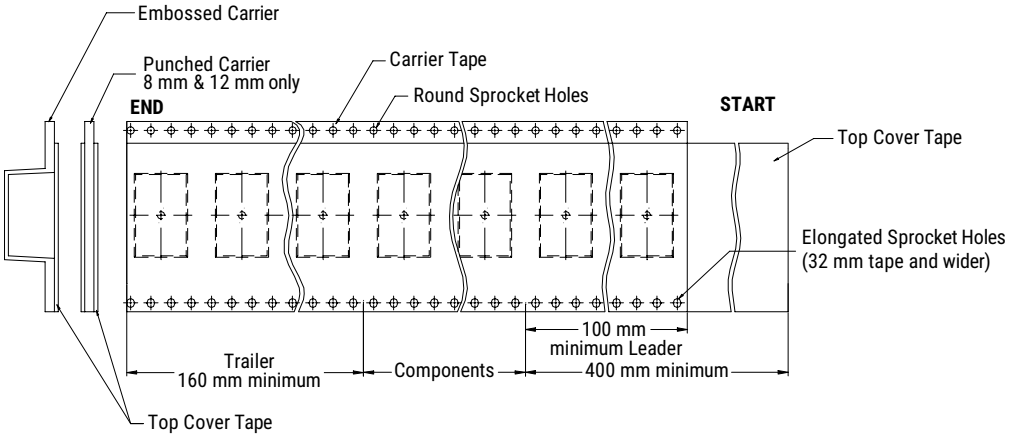
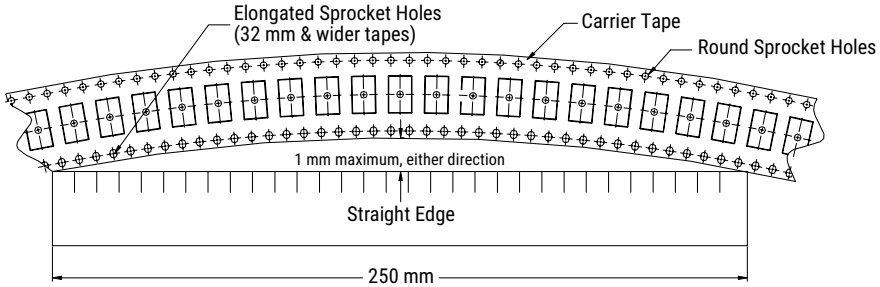


Figure 7 – Maximum Camber



Tantalum Surface Mount Capacitors – High Temperature

T502 MnO_2 230°C

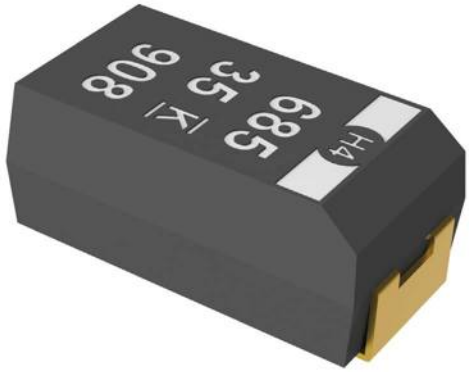
Overview

The KEMET T502 is a high temperature product that offers optimum performance characteristics in applications with operating temperatures up to 230°C. The T502 is classified as moisture sensitivity level (MSL) 1 under J STD 020: unlimited floor life time at ≤ 30°C/85% RH.

Due to the potential use of high melting point solders, KEMET has taken the initiative to package this product in moisture barrier bags with desiccant and a humidity indicator card.

Benefits

- F-Tech and 100% SBDS (KEMET's patented Simulated Breakdown Voltage Screening)
- 3 Sigma Screening for iL, DF, and ESR
- Qualified at 1,000 hours of life test at 230°C at 0.33 Vr
- Voltage derating of 67% at 230°C
- Unique high temperature material set
- Meets or exceeds EIA standard 535BAAC
- Standard gold-plated terminations
- RoHS compliant
- Operating temperature range of −55ºC to +230ºC
- Voltage derating applies
- Taped and reeled per EIA 481
- Meets MSL 1 requirements for Pb-free assembly according to JEDEC J–STD–020
- Packaged in moisture barrier bags with desiccant and a humidity indicator card
- Surge current options available



Applications

Typical applications include decoupling and filtering for very high temperature environments such as measurement-while-drilling (MWD) in down-hole applications.

Ordering Information

T	502	D	685	M	035	A	G	61	10	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate/ Design	Termination Finish	Performance	ESR	Packaging (C-Spec)
T = Tantalum	High temperature 230°C	B C D	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	016 = 16 020 = 20 025 = 25 035 = 35	A = N/A	G = Gold-plated	61 = Surge none 62 = Surge at 25°C 63 = Surge −55°C and +85°C	10 = Standard ESR	Blank = 7" reel 7280 = 13" reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 230°C
Rated Capacitance Range	4.7 – 33 µF at 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	16 – 35 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

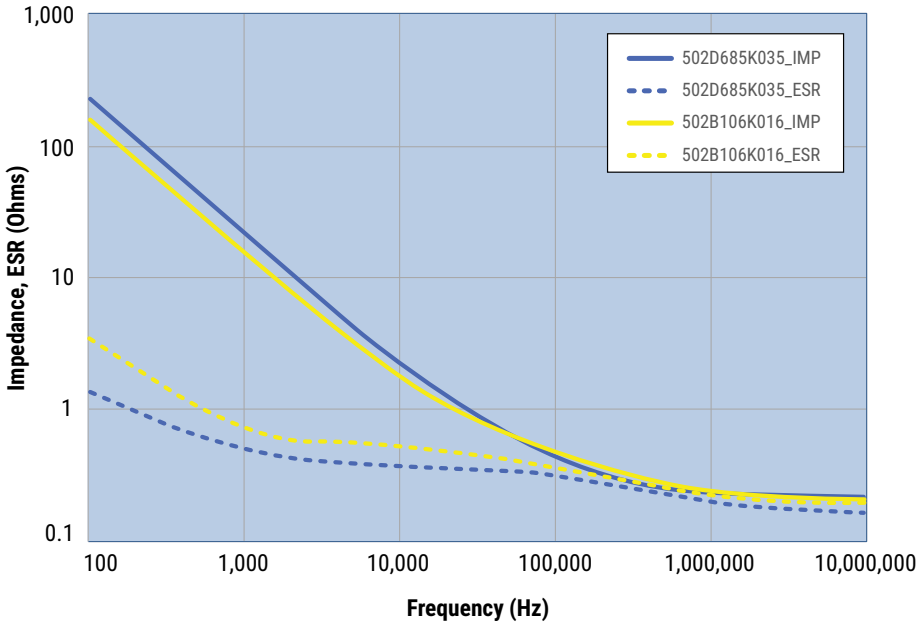
Qualification

Test	Condition		Characteristics			
Endurance	230°C at 1/3 rated voltage, 500 hours		Δ C/C	Within ±10% of initial value		
			DF	Within 1.5 x initial limits		
			DCL	1 mAmp maximum		
			ESR	Within 2.0 x initial limits		
Storage Life	230°C at 0 volts, 1,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within 1.5 x initial limits		
			DCL	1 mAmp maximum		
			ESR	Within 2.0 x initial limits		
Humidity	85°C, 85% RH, 0 V, 500 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, −55°C, +25°C, +85°C, +150°C, +25°C		+25°C	−55°C	+85°C	+150°C
		Δ C/C	IL*	±10%	±10%	±20%
		DF	IL	IL	1.5 x IL	1.5 x IL
		DCL	IL	N/A	10 x IL	12 x IL
Mechanical Shock/ Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, 10 Hz to 2,000 Hz, 5G for 20 minutes, 12 cycles each of 3 orientations		Δ C/C	Within ±10 of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

**IL = Initial limit*

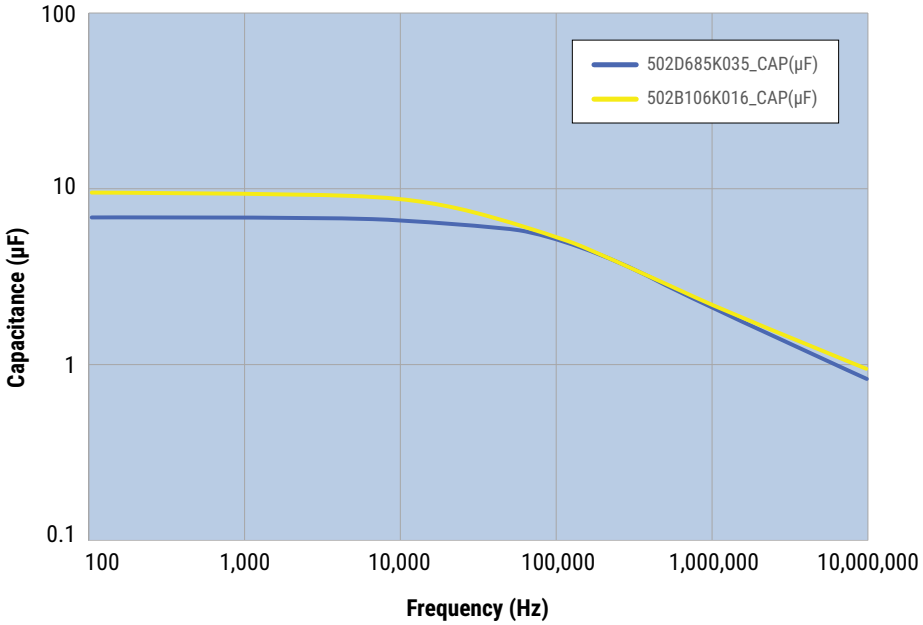
Electrical Characteristics

Impedance & ESR vs. Frequency



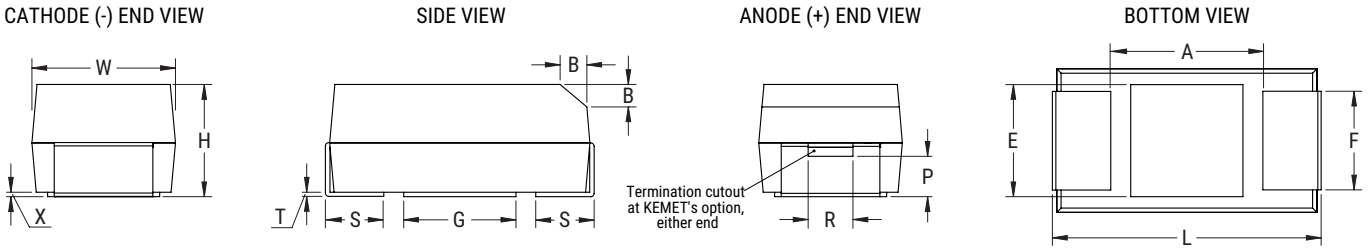
The measurements were taken at room temperature (25°C)

Capacitance vs. Frequency



The measurements were taken at room temperature (25°C)

Dimensions – Millimeters



Case Size		Component Dimensions						
KEMET	EIA	L	W	H	F	S	B (Ref)	X (Ref)
B	3528-21	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.9 ±0.2 (0.075 ±0.008)	2.2 ±0.1 (0.087 ±0.004)	0.80 +0.1/-0.3 (0.032 +0.004/-0.012)	0.4 ±0.15 (0.016 ±0.006)	0.10 ±0.10 (0.004 ±0.004)
C	6032-28	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.3 (0.126 ±0.012)	2.5 ±0.3 (0.098 ±0.012)	2.2 ±0.1 (0.087±0.004)	1.3 (0.051) ±0.3 (0.012)	0.5 ±0.15 (0.020 ±0.006)	0.10 ±0.10 (0.004 ±0.004)
D	7343-31	7.3 ±0.3 (0.287 ±0.012)	4.3 ± 0.3 (0.169 ±0.012)	2.8 ± 0.3 (0.110 ±0.012)	2.4 ±0.1 (0.094 ±0.004)	1.3 ±0.3 (0.051 ±0.012)"	0.5 ±0.15 (0.020 ±0.006)	0.10 ± 0.10 (0.004 ±0.004)

Case Size		Component Dimensions						
KEMET	EIA	P (Ref)	R (Ref)	T (Ref)	A (Minimum)	G (Ref)	E (Ref)	Typical Weight (mg)
B	3528-21	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.9 (0.075)	1.8 (0.071)	2.2 (0.087)	53.17
C	6032-28	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.9 (0.114)	2.8 (0.110)	2.4 (0.094)	98.30
D	7343-31	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)	193.46

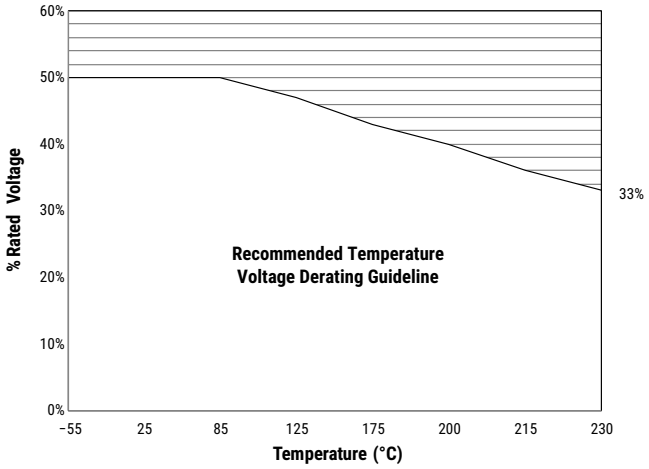
Notes: (Ref) – Dimensions provided for reference only.
These weights are provided as reference. If exact weights are needed, please contact your KEMET Sales Representative

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (rms)	Maximum Operating Temp.
VDC at 85°C	µF	KEMET/EIA	(See below for part options)	µA at 25°C Max/ 5 Minutes	% at 25°C 120 Hz Max	Ω at 25°C 100 kHz Max	mA at +45°C 100 kHz	°C
16	10	B/3528-21	T502B106(1)016AG(2)10	1.6	6	2.8	174	230
16	33	D/7343-31	T502D336(1)016AG(2)10	5.3	6	0.7	460	230
20	4.7	C/6032-28	T502C475(1)020AG(2)10	0.9	6	2.0	235	230
20	10	C/6032-28	T502C106(1)020AG(2)10	2.0	6	1.5	271	230
20	22	D/7343-31	T502D226(1)020AG(2)10	4.4	6	0.7	460	230
20	33	D/7343-31	T502D336(1)020AG(2)10	6.6	6	0.7	460	230
25	4.7	C/6032-28	T502C475(1)025AG(2)10	1.2	6	2.0	235	230
25	6.8	C/6032-28	T502C685(1)025AG(2)10	1.7	6	1.9	271	230
25	10	C/6032-28	T502C106(1)025AG(2)10	2.5	6	1.5	271	230
25	10	D/7343-31	T502D106(1)025AG(2)10	2.5	6	1.8	289	230
25	15	D/7343-31	T502D156(1)025AG(2)10	3.8	6	0.7	460	230
25	22	D/7343-31	T502D226(1)025AG(2)10	5.5	6	0.7	460	230
25	33	D/7343-31	T502D336(1)025AG(2)10	8.3	6	0.7	460	230
35	4.7	C/6032-28	T502C475(1)035AG(2)10	1.7	6	2.0	235	230
35	6.8	D/7343-31	T502D685(1)035AG(2)10	2.4	6	1.8	289	230
35	10	D/7343-31	T502D106(1)035AG(2)10	3.5	6	1.0	390	230
35	15	D/7343-31	T502D156(1)035AG(2)10	5.3	6	0.7	460	230
35	22	D/7343-31	T502D226(1)035AG(2)10	7.7	6	0.7	460	230

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles −55°C +85°C Designates surge current option.
Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines



Rated Voltage	Working Voltage					
	25°C	85°C	125°C	200°C	215°C	230°C
16	16	16	13.1	7.5	6.4	5.3
20	20	20	16.4	9.4	8.0	6.6
25	25	25	20.5	11.8	10	8.3
35	35	35	28.7	16.5	14	11.6

Note: Additional reliability can be obtained through the derating of voltage

Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 200°C	200 ≥ 220°C	220 ≥ 230°C
1.00	0.70	0.30

T = Environmental temperature

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (Pmax) mWatts at 25°C with +20°C Rise
B	3528–21	85
C	6032–28	110
D	7343–31	150

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

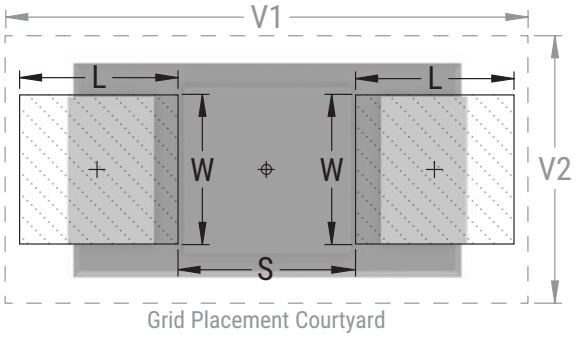
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe, plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the below table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032-28	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] *Height of these chips may create problems in wave soldering.*



Soldering Process

The KEMET families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

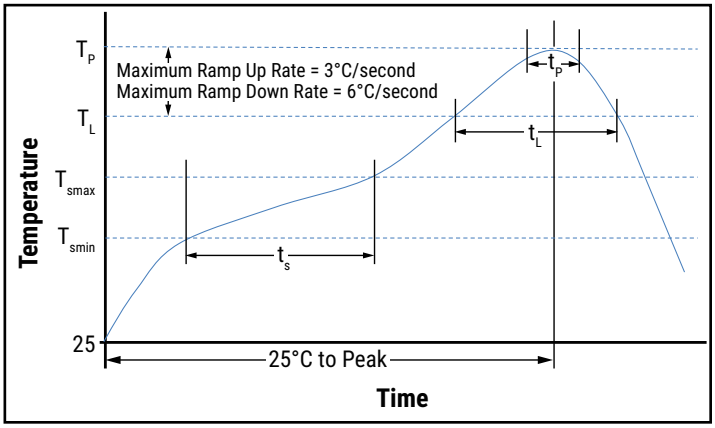
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

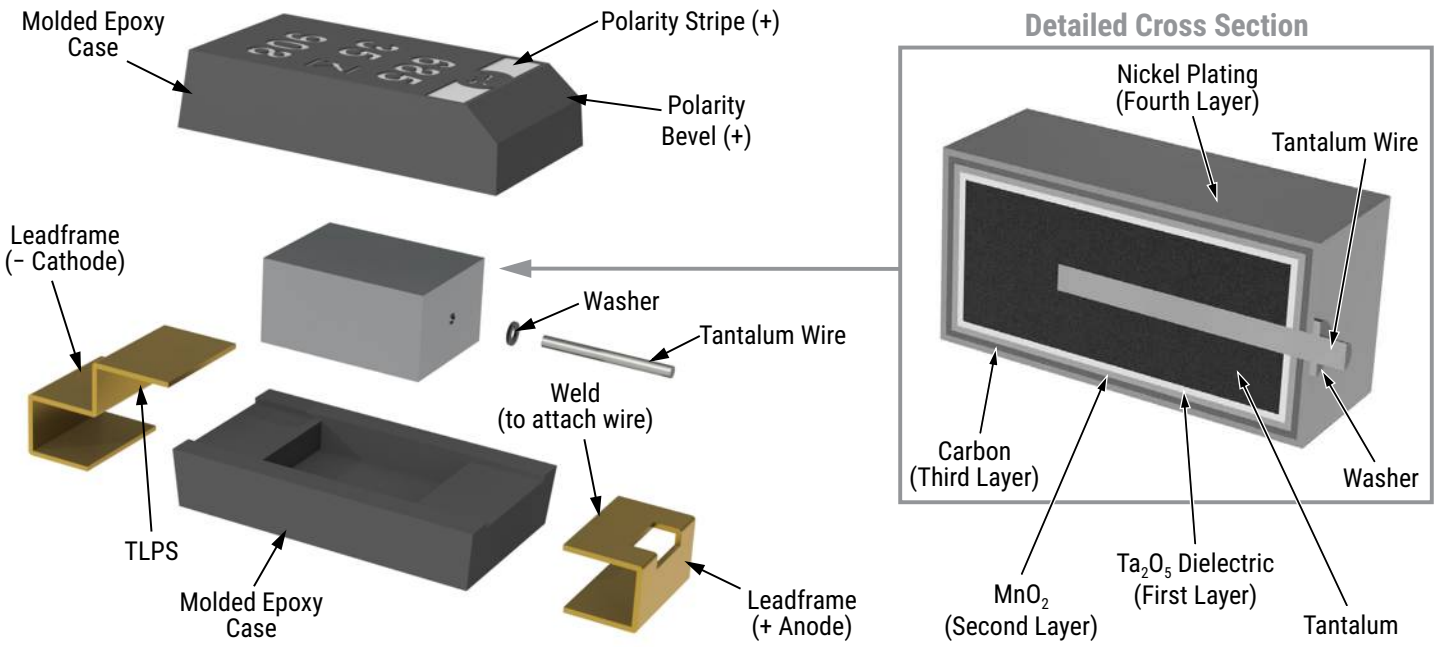
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
** For Case Size height > 2.5 mm*
*** For Case Size height ≤ 2.5 mm*



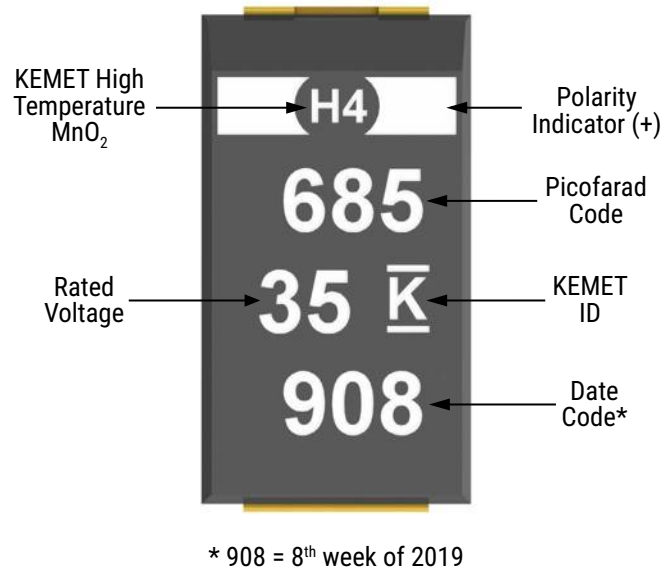
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 908 = 8th week of 2019

Date Code *	
1st digit = Last number of Year	9 = 2019 0 = 2020 1 = 2021 2 = 2022 3 = 2023
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Tape & Reel Packaging Information

KEMET's molded chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

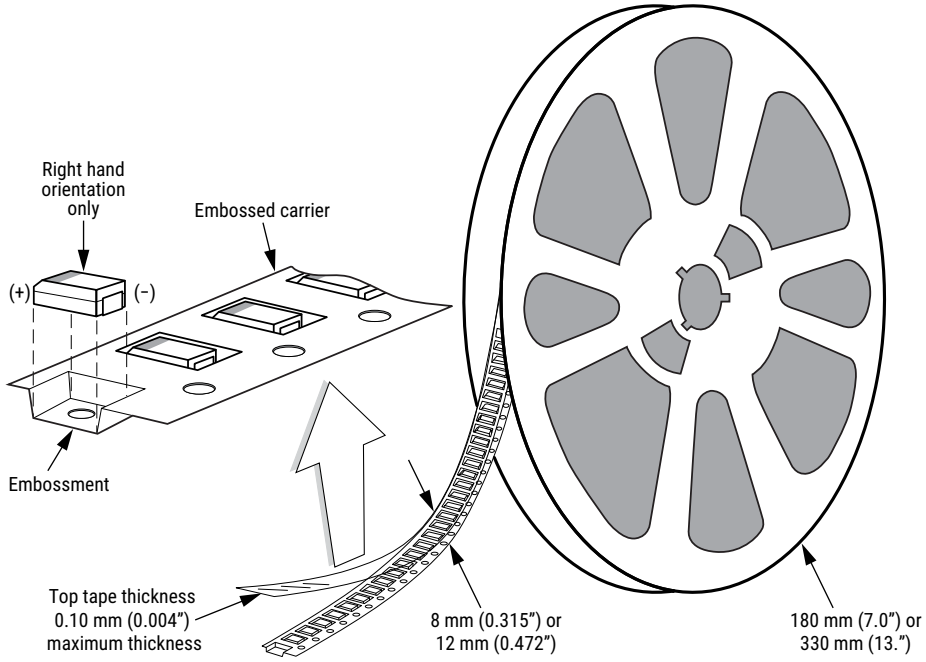


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	3,000	10,000
M	3528-15	8	2,500	8,000
U	6032-15	12	1,000	5,000
W	7343-15	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000

** No C-Spec required for 7" reel packaging. C-7280 required for 13" reel packaging.*

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

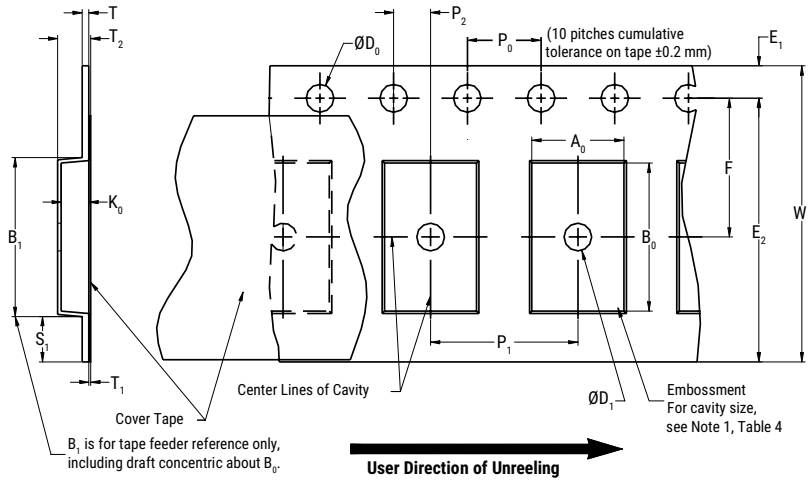


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/−0.0 (0.059 +0.004/−0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) and Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

1. Cover tape break force: 1.0 kg minimum.
2. Cover tape peel strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 newton (10 to 100 gf)
12 mm	0.1 to 1.3 newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624*.

Figure 2 – Maximum Component Rotation

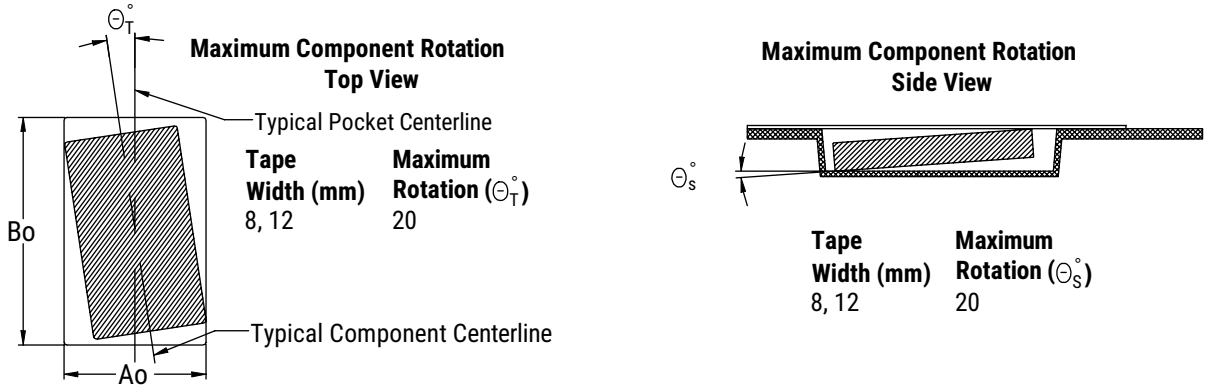


Figure 3 – Maximum Lateral Movement

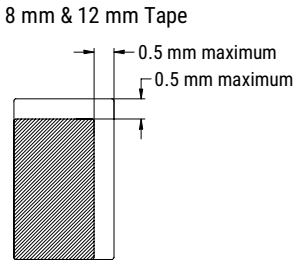


Figure 4 – Bending Radius

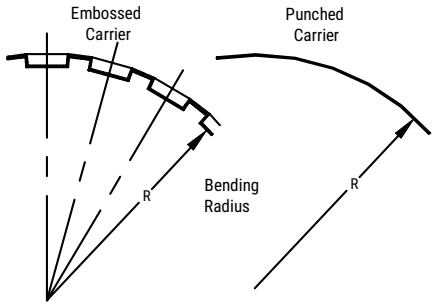
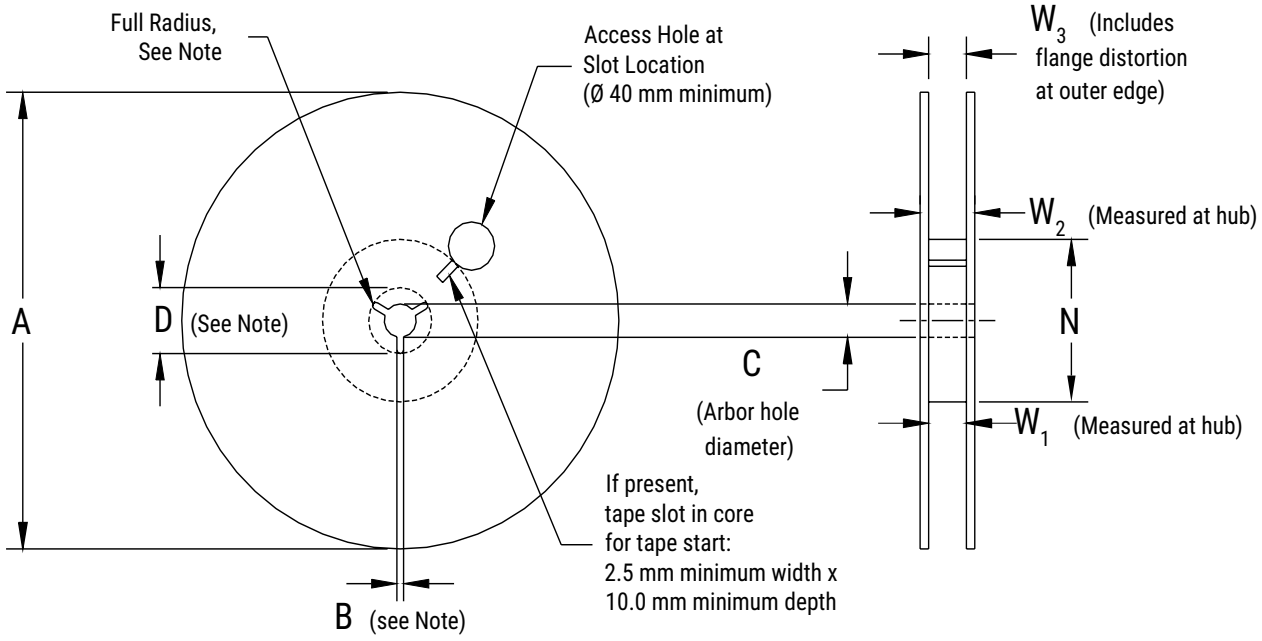


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/−0.2 (0.521 +0.02/−0.008)	20.2 (0.795)
12 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/−0.0 (0.331 +0.059/−0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/−0.0 (0.488 +0.078/−0.0)	18.4 (0.724)	

Figure 6 – Tape Leader & Trailer Dimensions

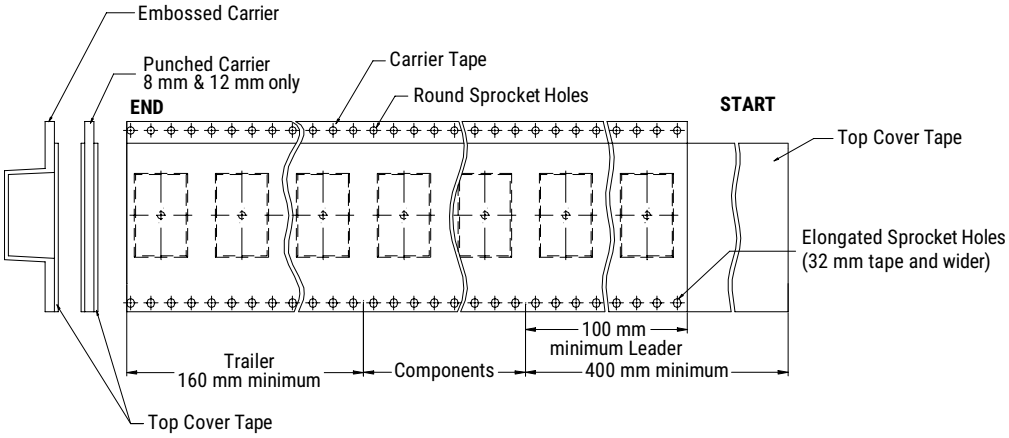
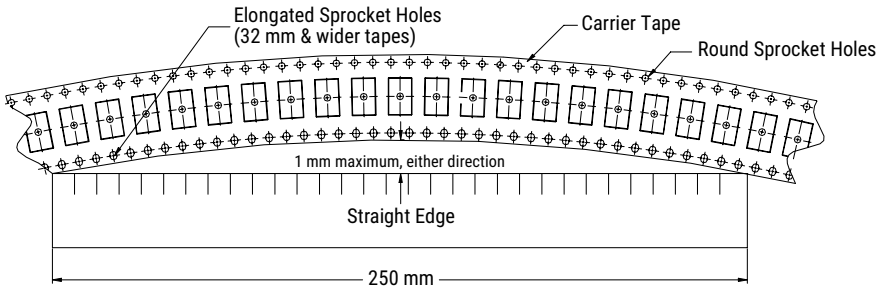


Figure 7 – Maximum Camber



T266 Axial MIL–PRF–39003/11 Space Grade (CSS21 Style)

Overview

The T266 Capacitor (CSS21 Style) is qualified to MIL-PRF-39003/11. Similar to KEMET's T216 and T256 (MIL-PRF-39003/10; CSS13 and CSS33), the T266 is designed for use in harsh environments such as space applications or other equally demanding environments.

Applications

These capacitors provide circuit designers an excellent choice for blocking, bypass, decoupling, filtering, and timing applications.

Benefits

- Taped and reeled per EIA Specification RS-296
- Marking per MIL–STD–1285
- Qualified to MIL–PRF–39003, Style CSS21
- Low ESR
- Failure rate graded options: B, C
- Case sizes: C and D
- Operating temperature range of −55°C to +125°C
- Surge current tested at −55°C and +85°C (10 cycles)

Ordering Information – T266

T	266	D	826	K	020	B	S	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Failure Rate	Termination Finish	C-Spec
T = Tantalum	266 (MIL–PRF–39003/11, CSS21)	C D	First two digits represent significant figures. Third digit specifies number of zeros to follow.	J = ±5% K = ±10% M = ±20%	006 = 6 010 = 10 015 = 15 020 = 20	Graded: B = 0.1%/k hours C = 0.01%/k hours	S = Standard (Solder-coated nickel)	Blank = Sleeved/Bulk 0100 = Unsleeved/Bulk 7200 = Tape & Reel All capacitors are sleeved unless specified.

Ordering Information – T266 (CSS21 Style)

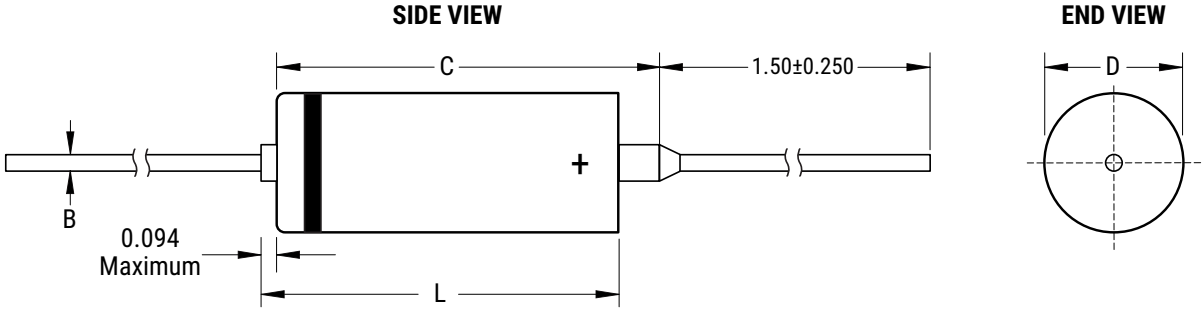
MIL product

M39003	/11	2049	S
Capacitor Class	Slash	Dash Number	Sleeving option
Military Specification Number	Specification Sheet Number	Failure Rate Level	S = Sleeved U = Unsleeved use C–0100

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	−55°C to 125°C
Rated Capacitance Range	27 – 330 µF at 1 kHz/25°C
Capacitance Tolerance	J Tolerance (±5%) , K Tolerance (±10%), and M Tolerance (±20%)
Rated Voltage Range	6 – 20 V
DF (1 kHz at 25°C)	Refer to Part Number Electrical Specification Table
ESR (100 kHz at 25°C)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table (rated voltage up to +125°C)
Failure Rate	Approved failure rate: B (0.1%/k hours) ,C (0.01%/k hours) - Graded

Dimensions – Inches (Millimeters)



Case Size	Uninsulated		Insulated			
	D +0.016, −0.015 +(0.41), −(0.38)	L ±0.031 ±(0.79)	D +0.016, −0.015 +(0.41), −(0.38)	L ±0.031 ±(0.79)	B ±0.002 ±(0.05)	C Maximum
C	0.279 (7.09)	0.650 (16.51)	0.289 (7.34)	0.686 (17.42)	0.025 (0.64)	0.822 (20.88)
D	0.341 (8.66)	0.750 (19.05)	0.351 (8.92)	0.786 (19.96)	0.025 (0.64)	0.922 (23.42)

Table 1 – T266 Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Size Code	DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003/11		
						Failure Rate Level (%/1,000 Hours)		KEMET Equivalent Military
						Graded		
(V) 85°C	1 kHz/25°C µF		µA at 25°C Maximum/5 Minutes	1 kHz Maximum	Ω at 25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
6	150	C	4.5	10	0.065	2001(1)	3001(1)	T266C157J006(2)S
6	150	C	4.5	10	0.065	2002(1)	3002(1)	T266C157K006(2)S
6	150	C	4.5	10	0.065	2003(1)	3003(1)	T266C157M006(2)S
6	180	C	5.5	10	0.06	2004(1)	3004(1)	T266C187J006(2)S
6	180	C	5.5	10	0.06	2005(1)	3005(1)	T266C187K006(2)S
6	270	D	6.5	10	0.05	2006(1)	3006(1)	T266D277J006(2)S
6	270	D	6.5	10	0.05	2007(1)	3007(1)	T266D277K006(2)S
6	330	D	7.5	12	0.045	2008(1)	3008(1)	T266D337J006(2)S
6	330	D	7.5	12	0.045	2009(1)	3009(1)	T266D337K006(2)S
6	330	D	7.5	12	0.045	2010(1)	3010(1)	T266D337M006(2)S
10	82	C	4	8	0.085	2011(1)	3011(1)	T266C826J010(2)S
10	82	C	4	8	0.085	2012(1)	3012(1)	T266C826K010(2)S
10	100	C	5	8	0.075	2013(1)	3013(1)	T266C107J010(2)S
10	100	C	5	8	0.075	2014(1)	3014(1)	T266C107K010(2)S
10	100	C	5	8	0.075	2015(1)	3015(1)	T266C107M010(2)S
10	120	C	6	8	0.07	2016(1)	3016(1)	T266C127J010(2)S
10	120	C	6	8	0.07	2017(1)	3017(1)	T266C127K010(2)S
10	180	D	9	8	0.06	2018(1)	3018(1)	T266D187J010(2)S
10	180	D	9	8	0.06	2019(1)	3019(1)	T266D187K010(2)S
10	220	D	10	10	0.055	2020(1)	3020(1)	T266D227J010(2)S
10	220	D	10	10	0.055	2021(1)	3021(1)	T266D227K010(2)S
10	220	D	10	10	0.055	2022(1)	3022(2)	T266D227M010(2)S
15	56	C	4	6	0.1	2023(1)	3023(1)	T266C566J015(2)S
15	56	C	4	6	0.1	2024(1)	3024(1)	T266C566K015(2)S
15	68	C	5	6	0.095	2025(1)	3025(1)	T266C686J015(2)S
15	68	C	5	6	0.095	2026(1)	3026(1)	T266C686K015(2)S
15	68	C	5	6	0.095	2027(1)	3027(1)	T266C686M015(2)S
15	120	D	9	8	0.07	2028(1)	3028(1)	T266D127J015(2)S
15	120	D	9	8	0.07	2029(1)	3029(1)	T266D127K015(2)S
15	150	D	10	8	0.065	2030(1)	3030(1)	T266D157J015(2)S
15	150	D	10	8	0.065	2031(1)	3031(1)	T266D157K015(2)S
15	150	D	10	8	0.065	2032(1)	3032(1)	T266D157M015(2)S
20	27	C	2.5	5	0.145	2033(1)	3033(1)	T266C276J020(2)S
20	27	C	2.5	5	0.145	2034(1)	3034(1)	T266C276K020(2)S
20	33	C	3.5	5	0.13	2035(1)	3035(1)	T266C336J020(2)S
20	33	C	3.5	5	0.13	2036(2)	3036(1)	T266C336K020(2)S
20	33	C	3.5	5	0.13	2037(1)	3037(1)	T266C336M020(2)S
20	39	C	4	5	0.12	2038(1)	3038(1)	T266C396J020(2)S
20	39	C	4	5	0.12	2039(1)	3039(1)	T266C396K020(2)S
20	47	C	4.5	6	0.11	2040(1)	3040(1)	T266C476J020(2)S
20	47	C	4.5	6	0.11	2041(1)	3041(1)	T266C476K020(2)S
20	47	C	4.5	6	0.11	2042(1)	3042(1)	T266C476M020(2)S
20	56	D	5.5	6	0.1	2043(1)	3043(1)	T266D566J020(2)S
20	56	D	5.5	6	0.1	2044(1)	3044(1)	T266D566K020(2)S
20	68	D	7	6	0.095	2045(1)	3045(1)	T266D686J020(2)S
20	68	D	7	6	0.095	2046(1)	3046(1)	T266D686K020(2)S
20	68	D	7	6	0.095	2047(1)	3047(1)	T266D686M020(2)S
20	82	D	8	6	0.085	2048(1)	3048(1)	T266D826J020(2)S
20	82	D	8	6	0.085	2049(1)	3049(1)	T266D826K020(2)S
20	100	D	10	8	0.075	2050(1)	3050(1)	T266D107J020(2)S
20	100	D	10	8	0.075	2051(1)	3051(1)	T266D107K020(2)S
20	100	D	10	8	0.075	2052(1)	3052(1)	T266D107M020(2)S
(V) 85°C	µF	Case Size Code	µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)	Part Number
Rated Voltage	Rated Capacitance		DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS13 Style)		

(1) To complete MIL–PRF–39003 dash part number, insert S for sleeved or U for unsleeved. If "U" ordered also use C0100.
(2) To complete KEMET Part Number (T216, T256), insert Graded failure rate - B for .1%/k hours, C for .01%/k hours. Designates reliability level.

Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.
Thermal capacities for the various case sizes have been determined empirically and are listed below.

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Permissible AC ripple current can be determined by the following:

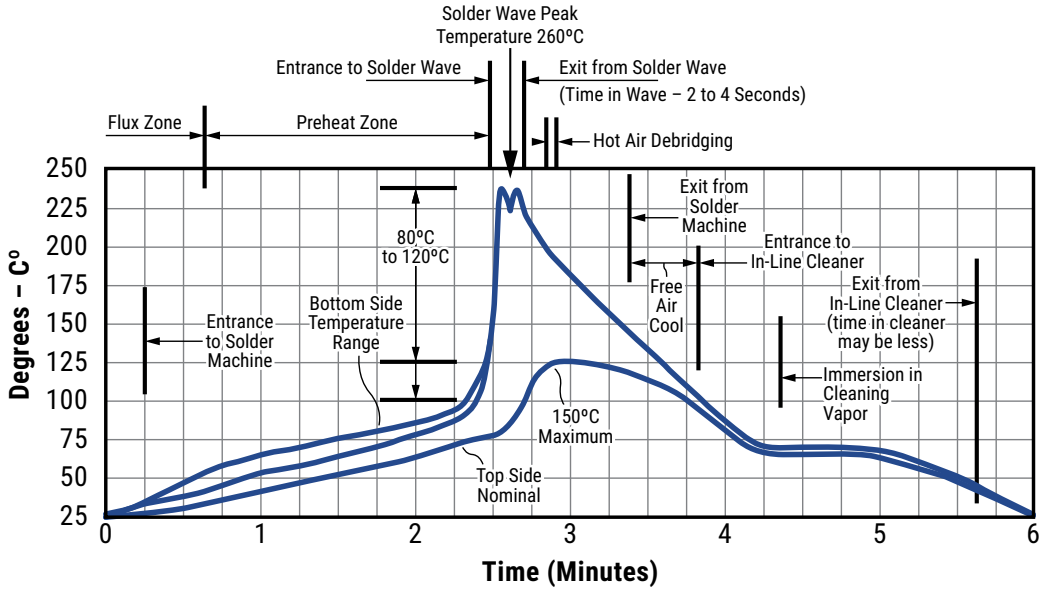
$$I(max) = Z\sqrt{P\ max/R}$$

P max = maximum watts
R = ESR at specified frequency (ohms)
I = rms ripple current (amperes)
Z = capacitor impedance in ohms at the specified frequency

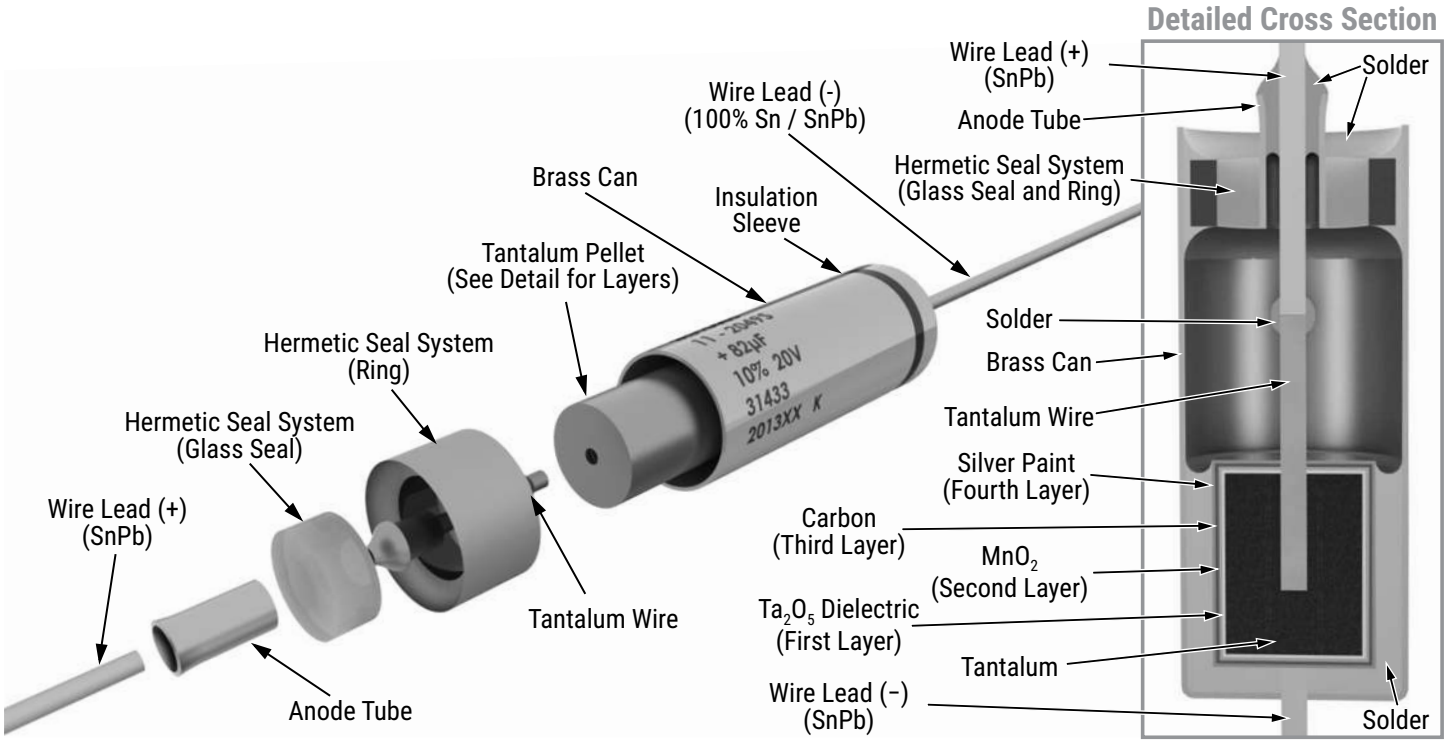
Case Size	Maximum Power Dissipation (Pmax) Watts at 25°C	T2XX
A	0.09	0.070
B	0.100	0.090
C	0.125	–
D	0.180	–

Maximum Power Dissipation: 25°C Ambient

Optimum Solder Wave Profile

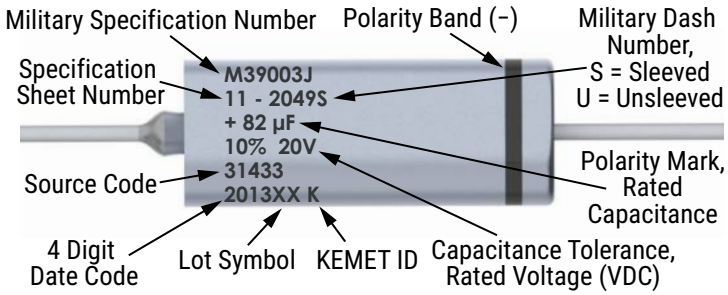


Construction



Capacitor Marking

C & D Case



Date Code	
First Two Digits	Indicates the last two digits of year 18 = 2018 19 = 2019 20 = 2020
Third & Fourth Digits	Indicates the week of the year 01 = 1st week 52 = 52nd week

Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS-296.

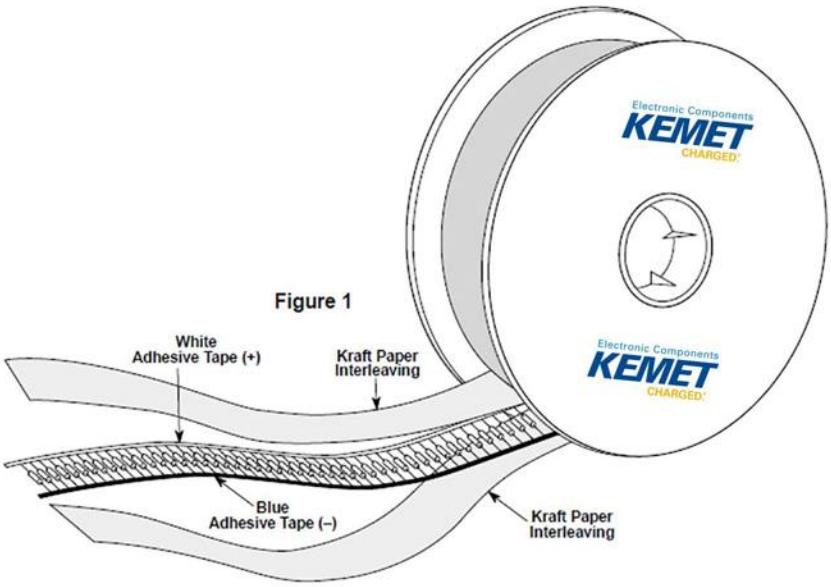


Figure 1

Table 2 – Packaging Quantity

Case Size	Standard Bulk Quantity	Standard Reel Quantity	Reel C-Spec	Ammo Pack Quantity	Ammo Pack C-Spec
A	150/Box	3,500	C–7200	1,500	C-7293
B	75/Box	2,500	C–7200	1,000	Class I
C	20/Tray	500	C–7200	250	C-7442
D	20/Tray	400	C–7200	250	Class II C-7443 Class III

Figure 2

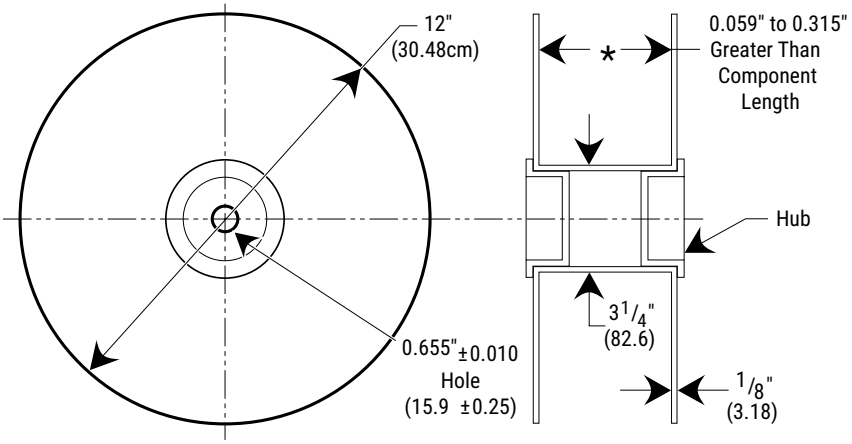


Figure 3

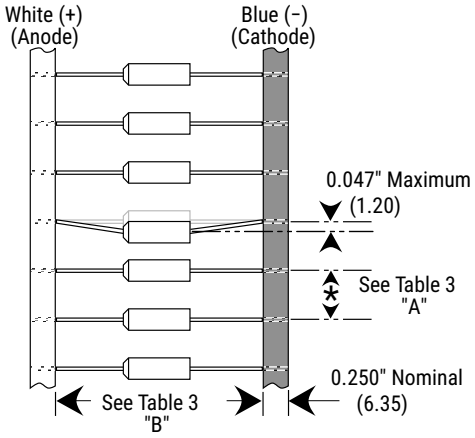


Table 3 – Tape Dimensions

Dimensions in Inches (& Millimeters)

BODY DIAMETER	A PITCH ±0.020 (0.5)	B INSIDE TAPE SPACING
≤ 0.197 (5.0)	0.200 (5.0)	2.063 (52.4) +0.079, −0.039 (+2.0, −1.0)
0.198 (5.0) to 0.394 (10.0)	0.400 or (10.0)	2.874 (73) +/0.059

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50 lbs. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lbs. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center.

Figures 1 and 2 show the KEMET standard chipboard tape reel.

A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors.

Universal splicing clips are used to connect the tape.