

Overview

The KEMET MPEV metal composite inductors are ideal for use in DC to DC switching power supplies for automotive applications. The metal composite core has high saturation characteristics maintaining functionality with high current transients and is characterized by temperature stable inductance. The high heat resistance propriety of the inductor has been further improved and allows for operating temperature up to +180°C.

Applications

Automotive ECU applications such as:

- LED headlights
- Meter cluster panels
- Head-up displays (HUD)
- Electric water pumps (EWP)
- Electric oil pumps (EOP)
- Electric power steering (EPS)

Benefits

- Metal composite powder
- Shielded construction, SMD configuration
- Inductance range from 0.47 – 47.00 μH
- Operating temperature up to +180°C
- Low acoustic noise
- Low magnetic flux leakage
- AEC-Q200 qualified



Part Number System

MPEV	1	D0630	L	1R5
Series	Version	Size Code	Inductor	Inductance Code μH
MPEV	1	D0630 = 6x6x3.0 mm D1040 = 10x10x4.0 mm		<p>The first two digits represent the inductance value. The third digit indicates the number of zeros to be added. R = decimal point</p> <p>Examples: 100 = 10.00 μH R68 = 0.68 μH 1R5 = 1.50 μH 101 = 100.00 μH</p>

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
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Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
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Екатеринбург (343)384-55-89
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Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Казахстан +7(7172)727-132

Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Киргизия +996(312)96-26-47

Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Саранск (8342)22-96-24
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35

Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
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Уфа (347)229-48-12
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Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to +180°C (including self-temperature rise)
Rated Inductance Range	0.47 – 47.00 µH at 100 kHz, 1 mA
Inductance Tolerance	±20%
Rated DC Resistance Range	2.4 – 186.3 mΩ maximum
Rated Current Range	2.7 – 26.4 A

Table 1 – Ratings & Part Number Reference

Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	Rated Current (A)			Self-Resonance Frequency (MHz)
					I _{rms} ¹ (Reference)	I _{sat} ² (Reference)	I _{sat} ³ (Reference)	
MPEV1D0630LR47	0.47	±20%	3.50	4.00	18.7	15.0	21.0	70.0
MPEV1D0630LR68	0.68	±20%	5.30	6.20	15.1	11.5	17.0	55.0
MPEV1D0630L1R0	1.00	±20%	7.10	8.20	13.1	9.0	13.0	43.0
MPEV1D0630L1R5	1.50	±20%	11.00	12.70	10.5	7.0	11.0	38.0
MPEV1D0630L2R2	2.20	±20%	15.90	18.30	8.7	6.5	9.0	30.0
MPEV1D0630L3R3	3.30	±20%	26.30	30.30	6.8	5.0	7.0	26.0
MPEV1D0630L4R7	4.70	±20%	31.80	36.70	6.2	4.5	6.5	21.0
MPEV1D0630L6R8	6.80	±20%	44.20	50.90	5.2	4.0	5.5	16.0
MPEV1D0630L100	10.00	±20%	67.80	78.00	4.2	3.5	4.5	15.0
MPEV1D0630L150	15.00	±20%	113.20	130.20	3.3	3.0	4.0	13.0
MPEV1D0630L220	22.00	±20%	162.00	186.30	2.7	2.5	3.5	9.6
MPEV1D1040LR47	0.47	±20%	2.10	2.40	26.4	29.0	42.0	65.0
MPEV1D1040LR68	0.68	±20%	2.70	3.20	23.1	23.0	34.5	47.0
MPEV1D1040L1R0	1.00	±20%	3.30	3.80	21.1	19.5	29.0	35.0
MPEV1D1040L1R5	1.50	±20%	4.60	5.40	17.7	18.0	26.0	30.0
MPEV1D1040L2R2	2.20	±20%	6.80	7.90	14.6	13.0	18.5	23.0
MPEV1D1040L3R3	3.30	±20%	11.10	12.80	11.4	11.0	15.0	18.0
MPEV1D1040L4R7	4.70	±20%	13.80	15.90	10.3	10.0	14.0	17.0
MPEV1D1040L6R8	6.80	±20%	20.90	24.10	8.3	8.0	11.5	14.0
MPEV1D1040L100	10.00	±20%	29.60	34.10	7.0	7.5	10.5	11.0
MPEV1D1040L150	15.00	±20%	44.50	51.20	5.7	5.5	8.5	8.0
MPEV1D1040L220	22.00	±20%	66.20	76.10	4.7	5.0	7.0	7.0
MPEV1D1040L330	33.00	±20%	104.10	119.70	3.7	3.5	5.0	5.0
MPEV1D1040L470	47.00	±20%	158.80	182.60	3.0	3.0	4.0	4.5
Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	I _{rms} ¹	I _{sat} ²	I _{sat} ³	Self-Resonance Frequency (MHz)
					Rated Current (A)			

¹ T = 40 K rise at rated current

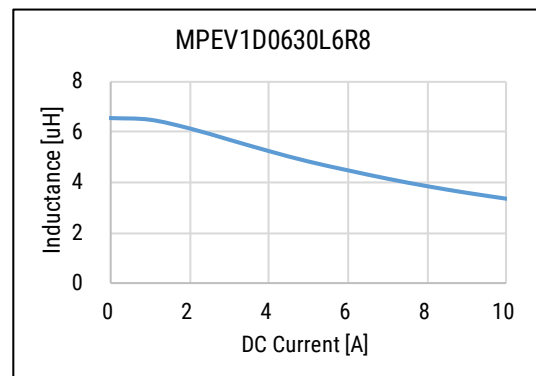
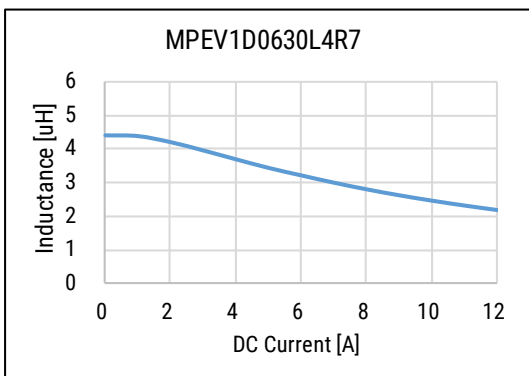
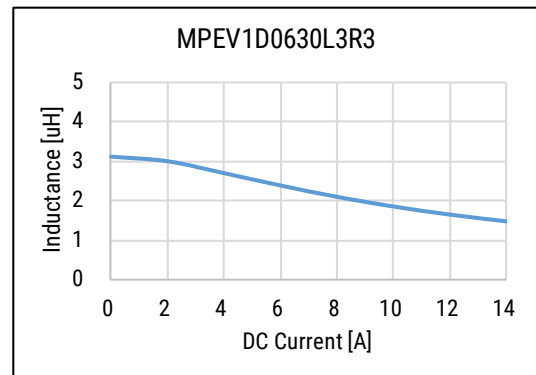
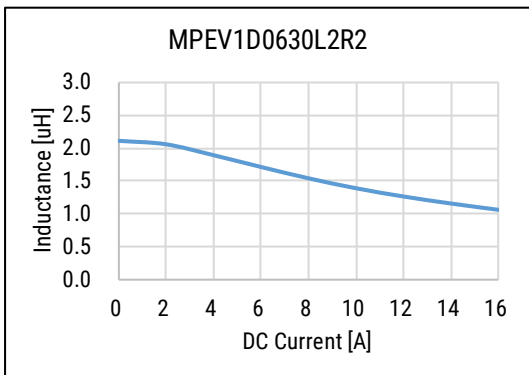
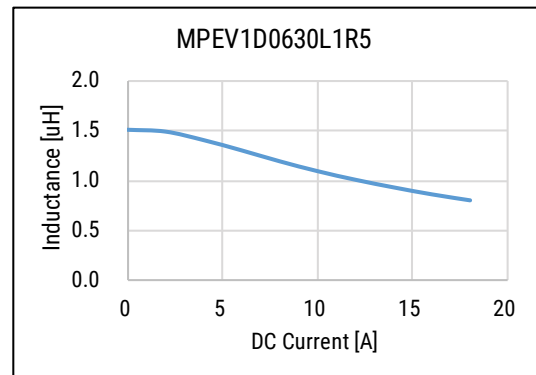
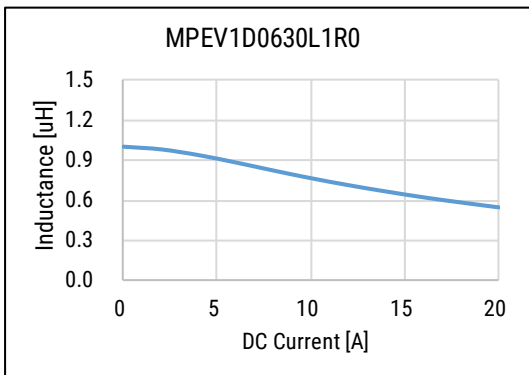
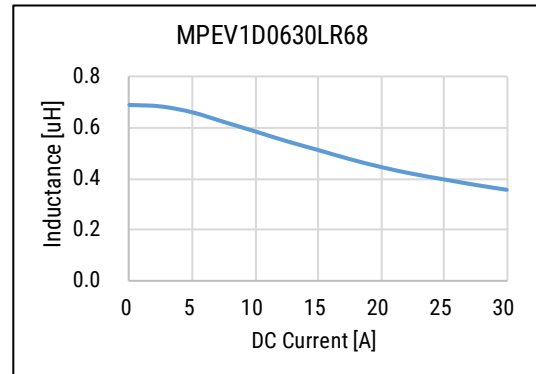
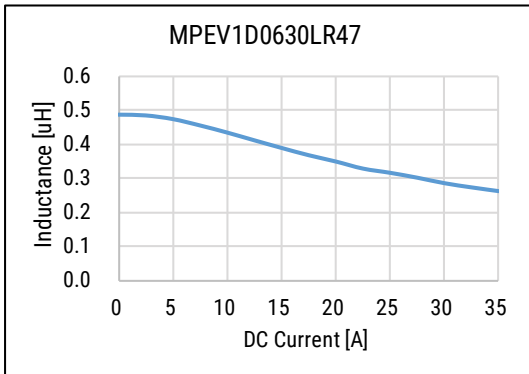
² Inductance drop 20% at rated current

³ Inductance drop 30% at rated current

All electrical characteristics data is referenced to 25°C.

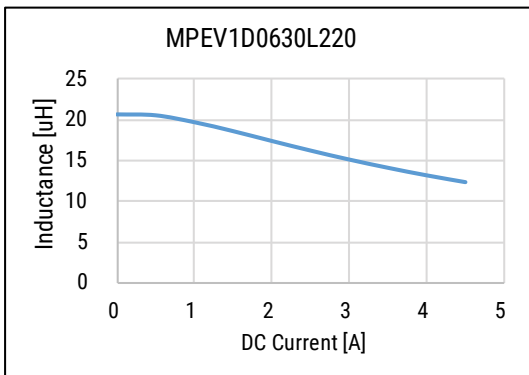
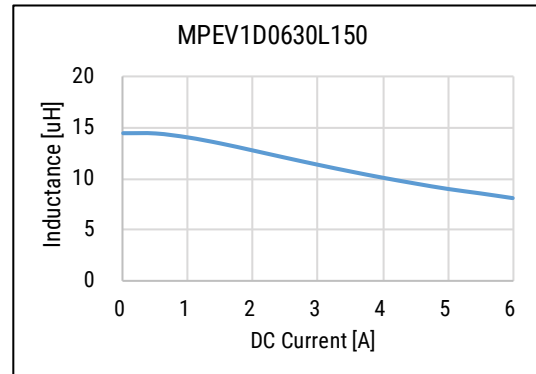
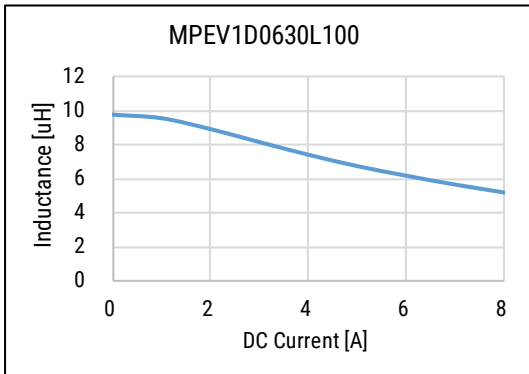
DC-Superposed Characteristics

MPEV1D0630



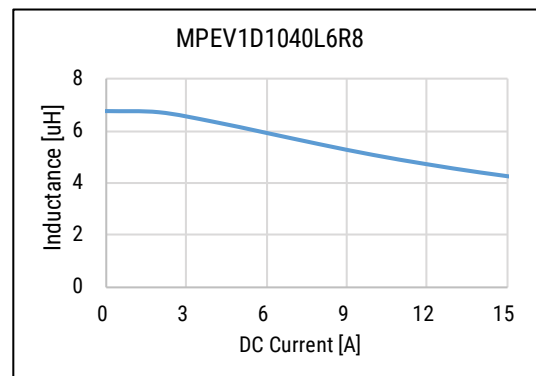
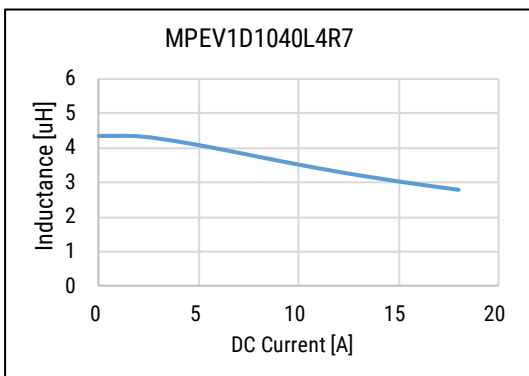
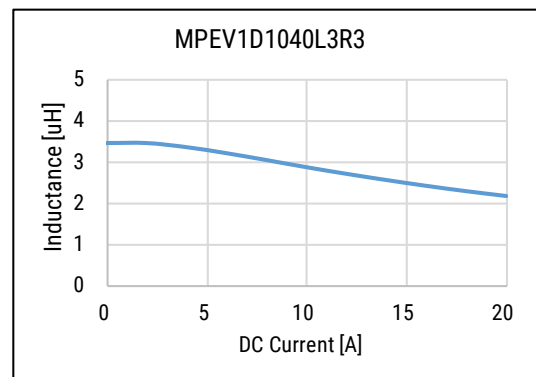
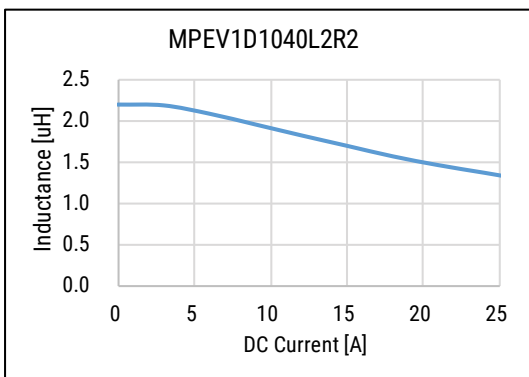
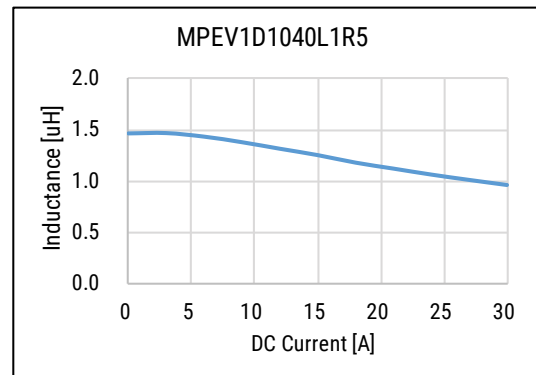
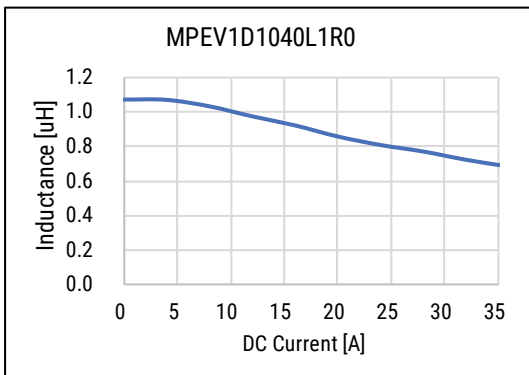
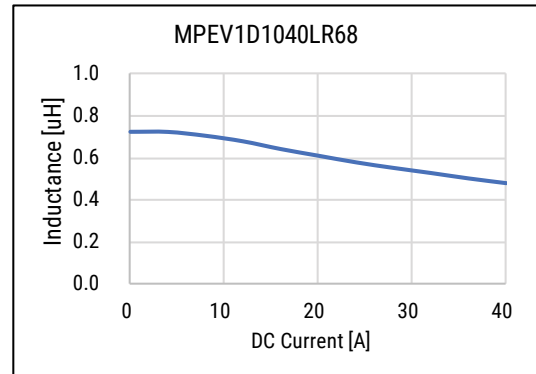
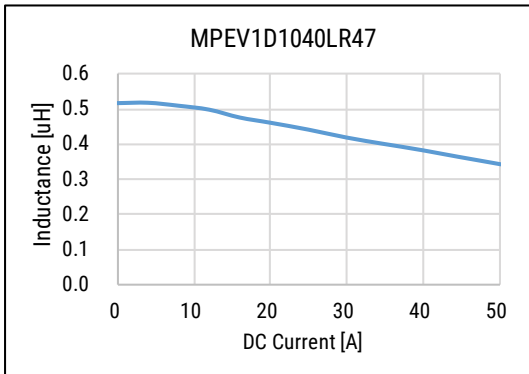
DC-Superposed Characteristics cont.

MPEV1D0630 cont.



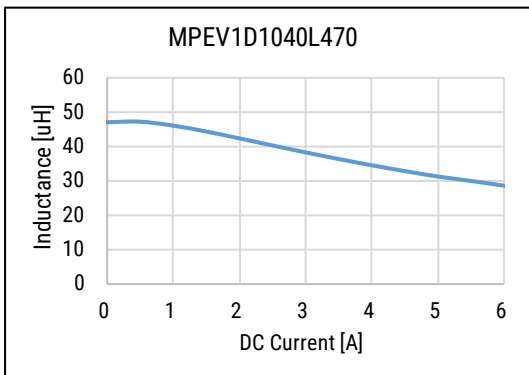
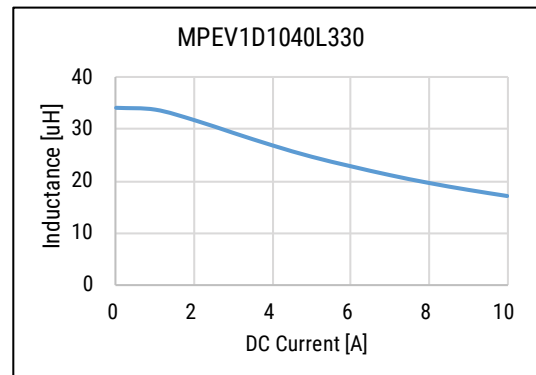
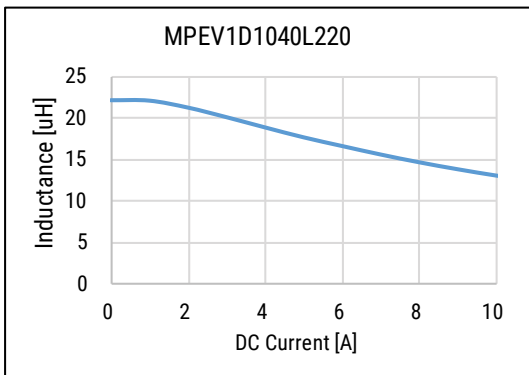
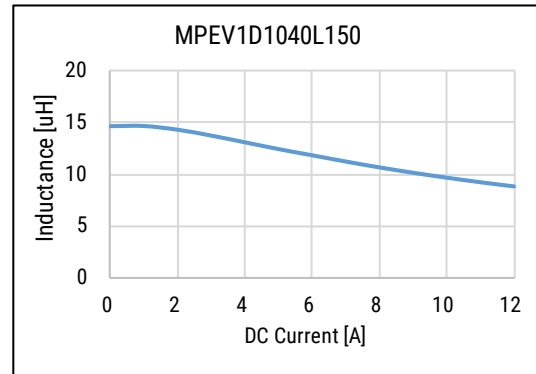
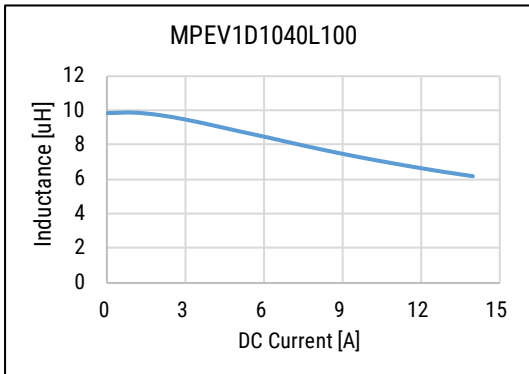
DC-Superposed Characteristics cont.

MPEV1D1040



DC-Superposed Characteristics cont.

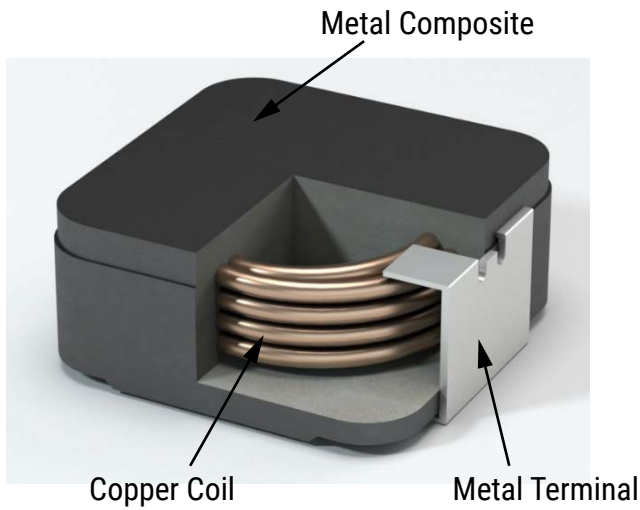
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Dimensions

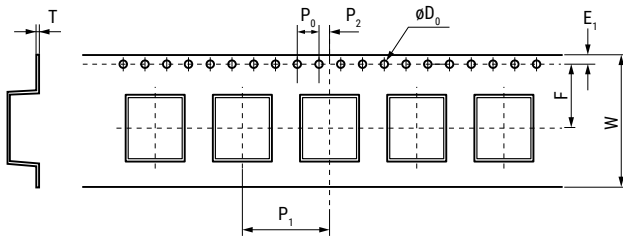
Case Size	Dimensions (mm)	Land Pattern (mm)
MPEV1D0630	<p>Technical drawings for MPEV1D0630 showing top, side, and end views with dimensions: 7.0 ± 0.25, 3.0 Maximum, (1.3), (1.3), 6.5 ± 0.2, 3.2 ± 0.3.</p>	<p>Land pattern diagram for MPEV1D0630 showing dimensions: 8.255, 3.429, 3.429.</p>
MPEV1D1040 For values up to 1.5 μH or below	<p>Technical drawings for MPEV1D1040 (low inductance) showing top, side, and end views with dimensions: 10.8 ± 0.30, 4.0 Maximum, (2.0), (2.0), 10.0 ± 0.2, 4.7 ± 0.3.</p>	<p>Land pattern diagram for MPEV1D1040 (low inductance) showing dimensions: 12.192, 4.953, 5.842.</p>
MPEV1D1040 For values from 2.2 μH or above	<p>Technical drawings for MPEV1D1040 (high inductance) showing top, side, and end views with dimensions: 10.8 ± 0.3, 4.0 Maximum, (2.0), (2.0), 10.0 ± 0.2, 3.0 ± 0.3.</p>	<p>Land pattern diagram for MPEV1D1040 (high inductance) showing dimensions: 12.065, 3.251, 5.817.</p>

Construction



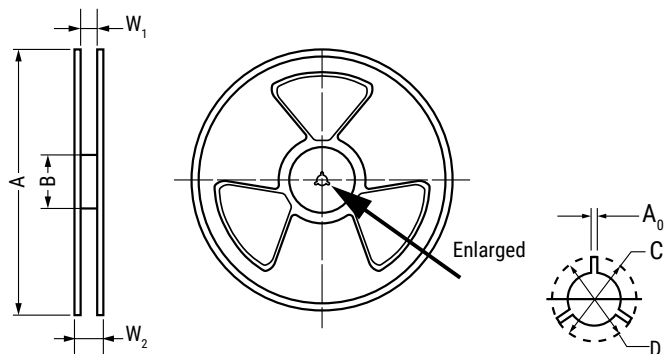
Taping Specification

Dimensions of Indented Square Hole Plastic Tape



Case Size	Reel Quantity		Dimensions (mm)							
			W	F	E ₁	P ₁	P ₂	P ₀	øD ₀	T
MPEV1D0630	1,500	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05
		Nominal	16.00	7.50	1.75	12.00	2.00	4.00	1.55	0.40
MPEV1D1040	500	Tolerance	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05
		Nominal	24.00	11.50	1.75	16.00	2.00	4.00	1.55	0.40

Reel Specifications



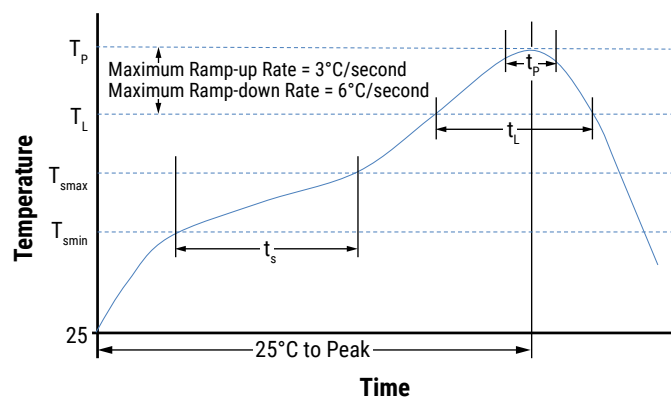
Case Size		Dimensions (mm)						
		A	B	C	D	A ₀	W ₁	W ₂
MPEV1D0630	Tolerance	±2.0	±2.0	±0.2	±0.8	±0.5		
	Nominal	∅330	∅100	∅13.2	∅21.5	2.5	16.9	21.3
MPEV1D1040	Tolerance	±3.0	±2.0	±0.5	±0.8	±0.5		
	Nominal	∅330	∅100	∅13.0	∅21.5	2.6	25.0	29.4

Soldering Process

Recommended Reflow Soldering Profile

Reference ICP/JEDEC J-STD-020E

Profile Feature	Pb-Free Assembly
Preheat/Soak	
Temperature Minimum (T_{smin})	150°C
Temperature Maximum (T_{smax})	200°C
Time (t_s) from T_{smin} to T_{smax}	60 – 120 seconds
Ramp-Up Rate (T_L to T_p)	3°C/second maximum
Liquidous Temperature (T_L)	217°C
Time Above Liquidous (t_L)	60 – 150 seconds
Peak Temperature (T_p)	250°C for MPEV1D0630 245°C for MPEV1D1040
Time within 5°C of Maximum Peak Temperature (t_p)	30 seconds maximum
Ramp-Down Rate (T_p to T_L)	6°C/second maximum
Time 25°C to Peak Temperature	8 minutes maximum





Overview

The KEMET MPGV metal composite inductors are ideal for use in DC to DC switching power supplies for automotive applications. The metal composite core has high saturation capabilities maintaining functionality with high current transients and is characterized by temperature stable inductance. The durability has been further improved and allows for vibration resistance of up to 50 G.

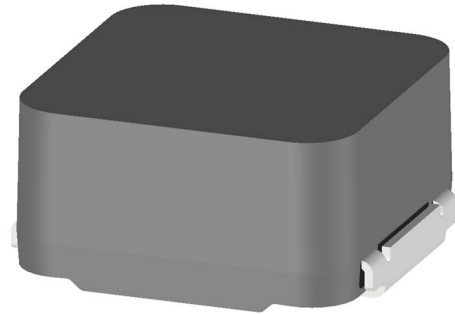
Applications

Automotive ECU applications, such as:

- LED headlights
- Meter cluster panels
- Head-up displays (HUD)
- Electric water pumps (EWP)
- Electric oil pumps (EOP)
- Electric power steering (EPS)

Benefits

- Metal composite powder
- Shielded construction, SMD configuration
- 50 G vibration resistance
- Inductance range from 0.47 – 47.00 μ H
- Operating temperature up to +155°C
- Low acoustic noise
- Low magnetic flux leakage
- AEC-Q200 qualified



Part Number System

MPGV	1	D1054	L	1R5
Series	Version	Size Code	Inductor	Inductance Code μ H
MPGV	1	D1054 = 10 x 10 x 5.4 mm		<p>The first two digits represent the inductance value. The third digit indicates the number of zeros to be added. R = decimal point</p> <p>Examples: 100 = 10.00 μH R68 = 0.68 μH 1R5 = 1.50 μH</p>

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to +155°C (including self-temperature rise)
Rated Inductance Range	0.47 – 47.00 µH at 100 kHz, 1 mA
Inductance Tolerance	±20%
Rated DC Resistance Range	1.9 – 135.2 mΩ maximum
Rated Current Range	3.6 – 30.9 A

Table 1 – Ratings & Part Number Reference

Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	Rated Current (A)			Self-Resonance Frequency (MHz)
					I _{rms} ¹ (Reference)	I _{sat} ² (Reference)	I _{sat} ³ (Reference)	
MPGV1D1054LR47	0.47	±20%	1.60	1.90	30.9	39.0	51.0	46.0
MPGV1D1054LR68	0.68	±20%	2.30	2.80	25.6	28.0	38.0	37.0
MPGV1D1054L1R0	1.00	±20%	2.80	3.20	23.2	24.0	34.0	32.0
MPGV1D1054L1R5	1.50	±20%	3.90	4.50	19.7	19.5	28.0	24.0
MPGV1D1054L2R2	2.20	±20%	5.50	6.30	16.6	19.0	26.5	21.0
MPGV1D1054L3R3	3.30	±20%	7.20	8.30	14.5	16.5	23.0	16.0
MPGV1D1054L4R7	4.70	±20%	11.80	13.60	11.3	13.0	18.5	14.0
MPGV1D1054L6R8	6.80	±20%	17.00	19.60	9.4	11.0	15.0	10.0
MPGV1D1054L100	10.00	±20%	26.00	29.90	7.6	8.5	12.5	9.5
MPGV1D1054L150	15.00	±20%	34.20	39.30	6.6	7.0	11.0	7.5
MPGV1D1054L220	22.00	±20%	44.60	51.30	5.8	5.5	8.5	6.5
MPGV1D1054L330	33.00	±20%	74.00	85.10	4.5	5.0	7.5	5.0
MPGV1D1054L470	47.00	±20%	117.60	135.20	3.6	4.0	6.0	4.0
Part Number	Inductance (µH) at 100 kHz, 1 mA	Inductance Tolerance	DC Resistance (mΩ) Typical	DC Resistance (mΩ) Maximum	I _{rms} ¹	I _{sat} ²	I _{sat} ³	Self-Resonance Frequency (MHz)
					Rated Current (A)			

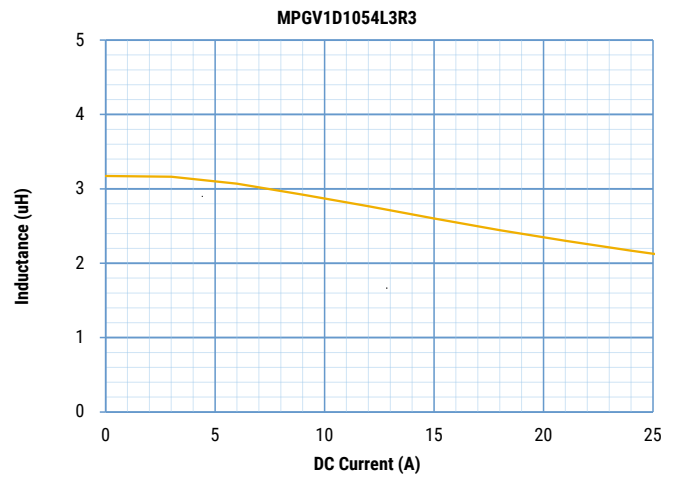
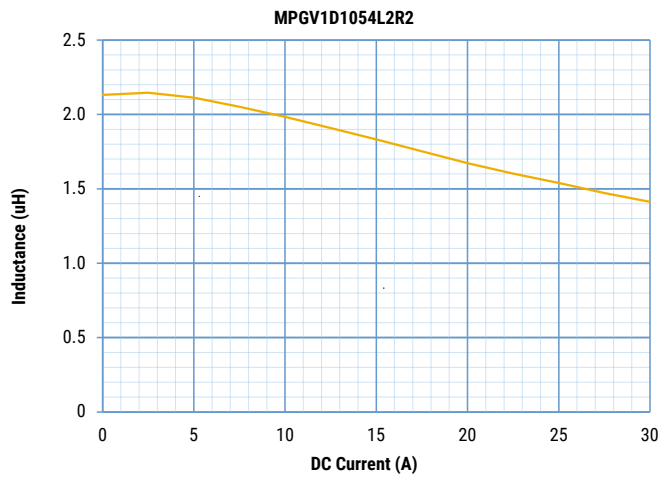
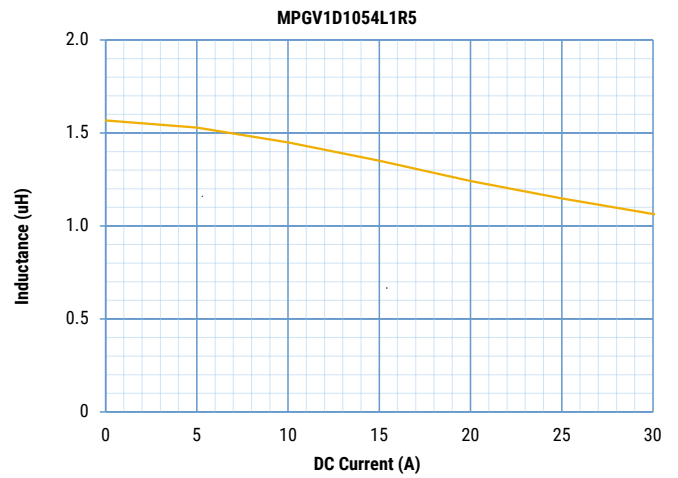
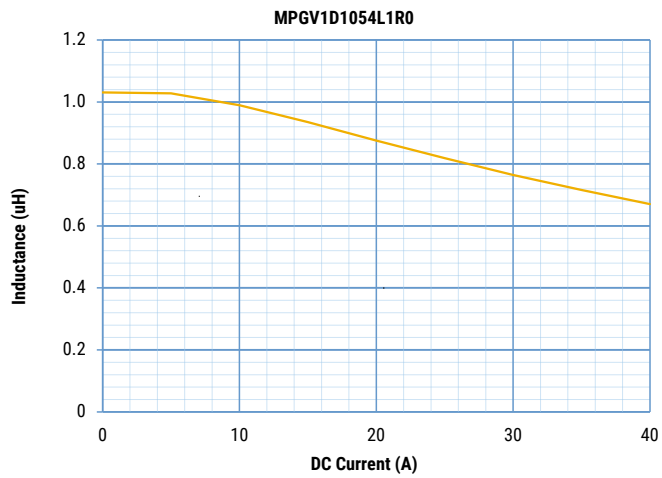
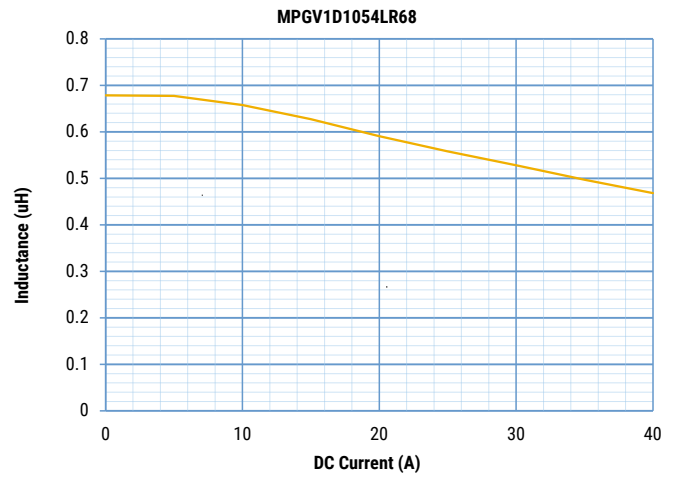
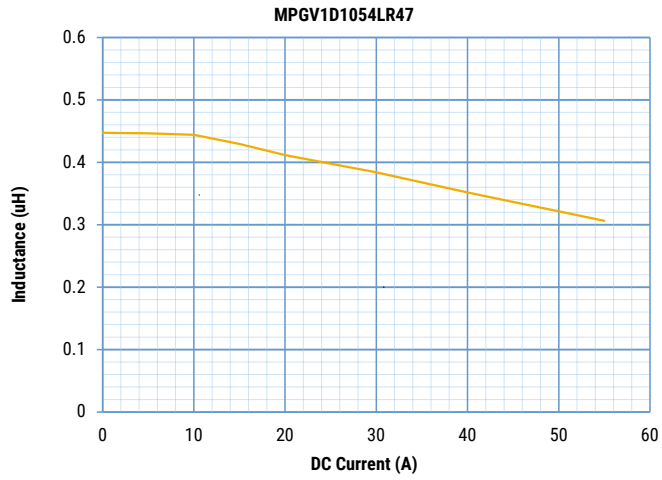
¹ T = 40 K rise at rated current

² Inductance drop 20% at rated current

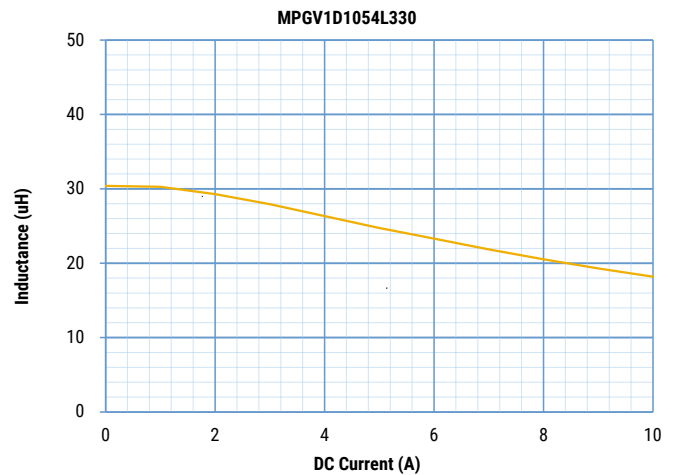
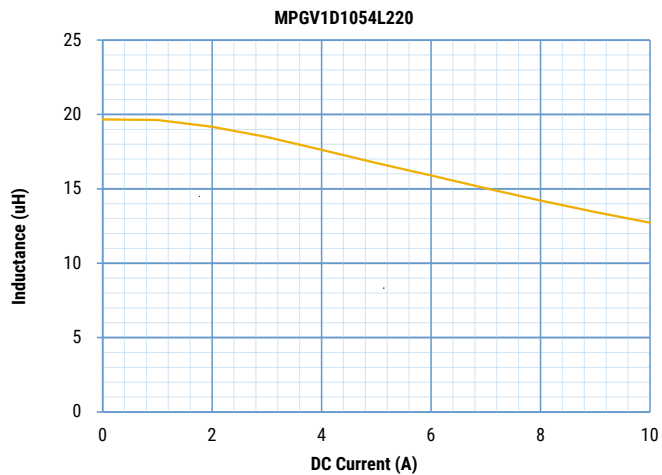
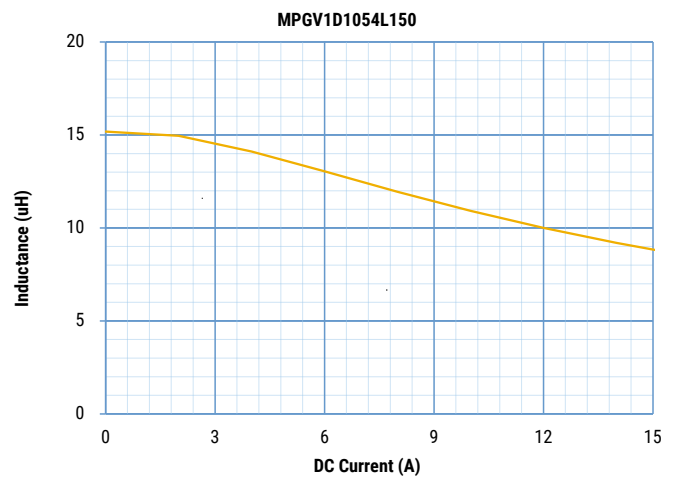
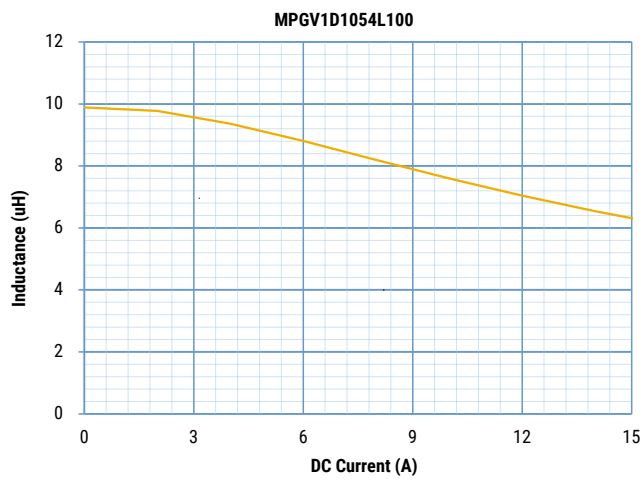
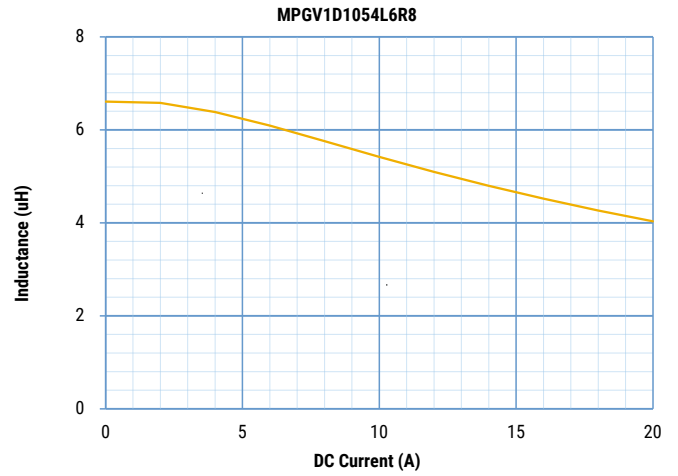
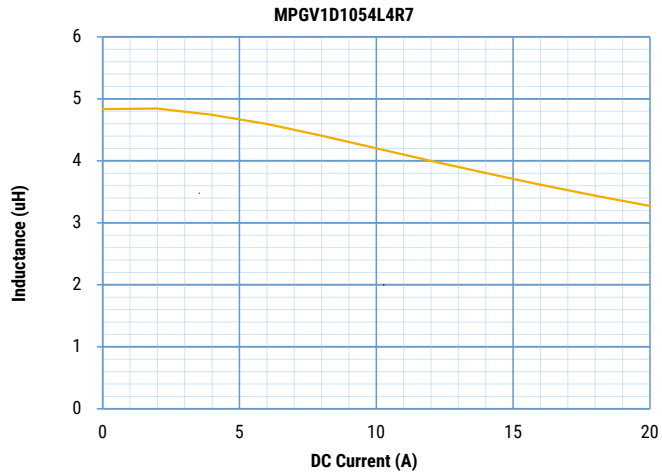
³ Inductance drop 30% at rated current

All electrical characteristics data is referenced to 25°C.

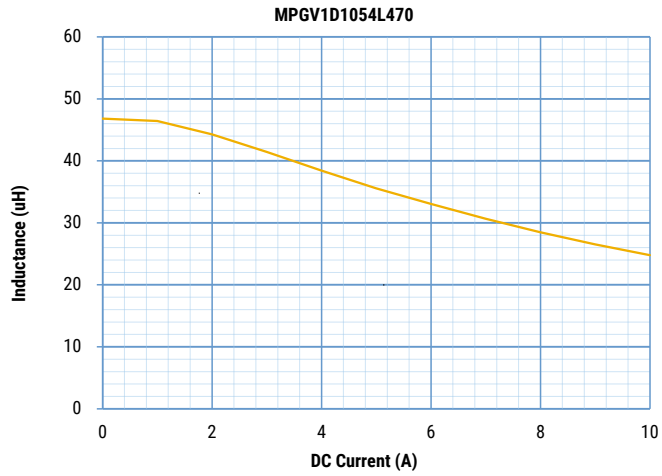
DC-Superposed Characteristics



DC-Superposed Characteristics cont.



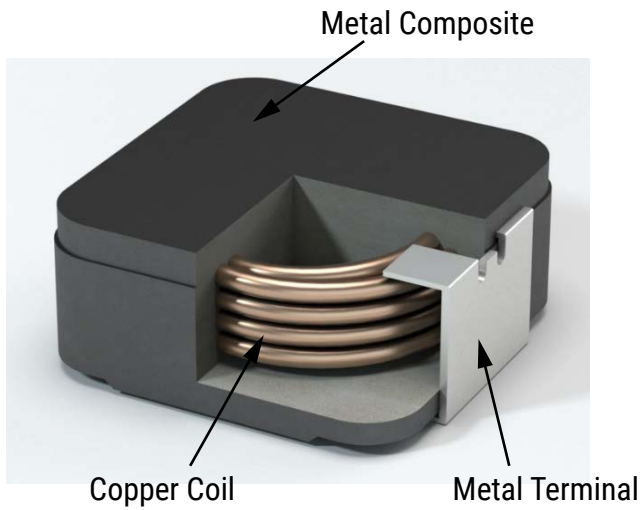
DC-Superposed Characteristics cont.



Dimensions

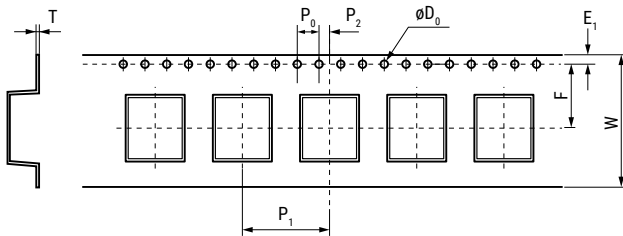
Case Size	Dimensions (mm)	Land Pattern (mm)
MPGV1D1054		

Construction



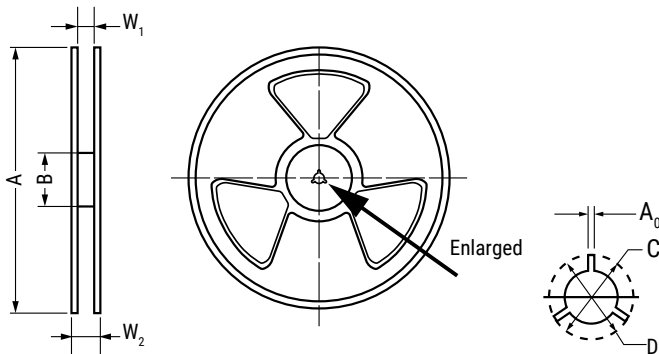
Taping Specification

Dimensions of Indented Square Hole Plastic Tape



Case Size	Reel Quantity		Dimensions (mm)								
			W	F	E ₁	P ₁	P ₂	P ₀	øD ₀	T	
MPGV1D1054	500	Tolerance	±0.3	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.05	±0.05
		Nominal	24.0	11.5	1.75	16.0	2.0	4.0	1.55	0.4	

Reel Specifications

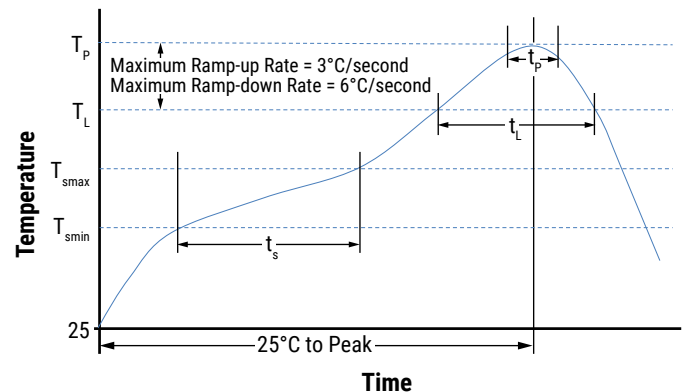


Case Size	Dimensions (mm)							
	A	B	C	D	A ₀	W ₁	W ₂	
MPGV1D1054	Tolerance	±3.0	±2.0	±0.5	±0.8	±0.5		
	Nominal	∅330	∅100	∅13.0	∅21.5	2.6	25.0	29.4

Soldering Process

Recommended Reflow Soldering Profile Reference ICP/JEDEC J-STD-020E

Profile Feature	Pb-Free Assembly
Preheat/Soak	
Temperature Minimum (T _{smin})	150°C
Temperature Maximum (T _{smax})	200°C
Time (t _s) from T _{smin} to T _{smax}	60 – 120 seconds
Ramp-Up Rate (T _L to T _p)	3°C/second maximum
Liquidous Temperature (T _L)	217°C
Time Above Liquidous (t _L)	60 – 150 seconds
Peak Temperature (T _p)	245°C for MPGV1D1054
Time within 5°C of Maximum Peak Temperature (t _p)	30 seconds maximum
Ramp-Down Rate (T _p to T _L)	6°C/second maximum
Time 25°C to Peak Temperature	8 minutes maximum



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