

ESD-FPL Series Solid Cores for Flat Cables for High Frequency (Bare)

Overview

The KEMET ESD-FPL Series solid cores are designed for use on flat cables. A wide range of Nickel Zinc (NiZn) options are available in bare type and allows for targeting of specific high frequency ranges.

EMI cores are part of a family of passive components which address the issues of noise or electromagnetic interference (EMI) in circuits or systems.

Applications

- Office equipment
- Home appliances
- Inkjet printers
- Consumer electronics
- Industrial equipment
- Test and measurement equipment
- Medical equipment
- Audio-visual equipment

Benefits

- NiZn \leq 300 MHz (FM band range) options available
- Solid construction
- Wide range of products available
- Thin and minimal gap solutions available



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
 Владикавказ (8672)28-90-48
 Владимир (4922)49-43-18
 Волгоград (844)278-03-48
 Вологда (8172)26-41-59
 Воронеж (473)204-51-73
 Екатеринбург (343)384-55-89

Россия +7(495)268-04-70

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
 Улан-Удэ (3012)59-97-51
 Уфа (347)229-48-12
 Хабаровск (4212)92-98-04
 Чебоксары (8352)28-53-07
 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

Part Number System

ESD-	FPL-	14.5-	3
Series	Form Type	Core Size Outer Length Code (mm)	Core Size Thickness (mm)
ESD-	Solid	See Table 1	See Table 1

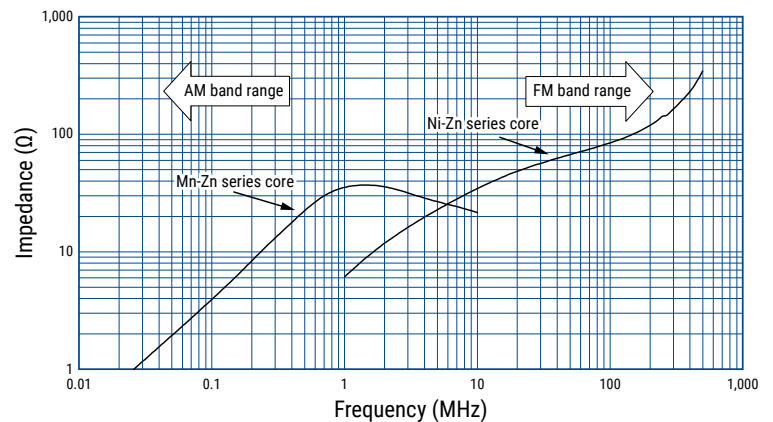
Core Material and Effective Frequency Range

There are two ferrite material options for KEMET EMI Cores: Nickel-Zinc (NiZn) and Manganese Zinc (MnZn). Each core material has a different resistance and effective frequency range. The MnZn core material has a lower resistance compared to the NiZn; therefore, adequate insulation is required before use.

The NiZn core material is typically effective for frequencies in the MHz band range such as the FM-band, while the MnZn core material is typically effective for the kHz band range such as the AM-band. See Figure 1.

It is recommended to measure the actual frequency range effectiveness in the target application.

Figure 1 – Effective band range of Mn-Zn and Ni-Zn ferrite core material. (Representative example, measured with same-dimension ring core)



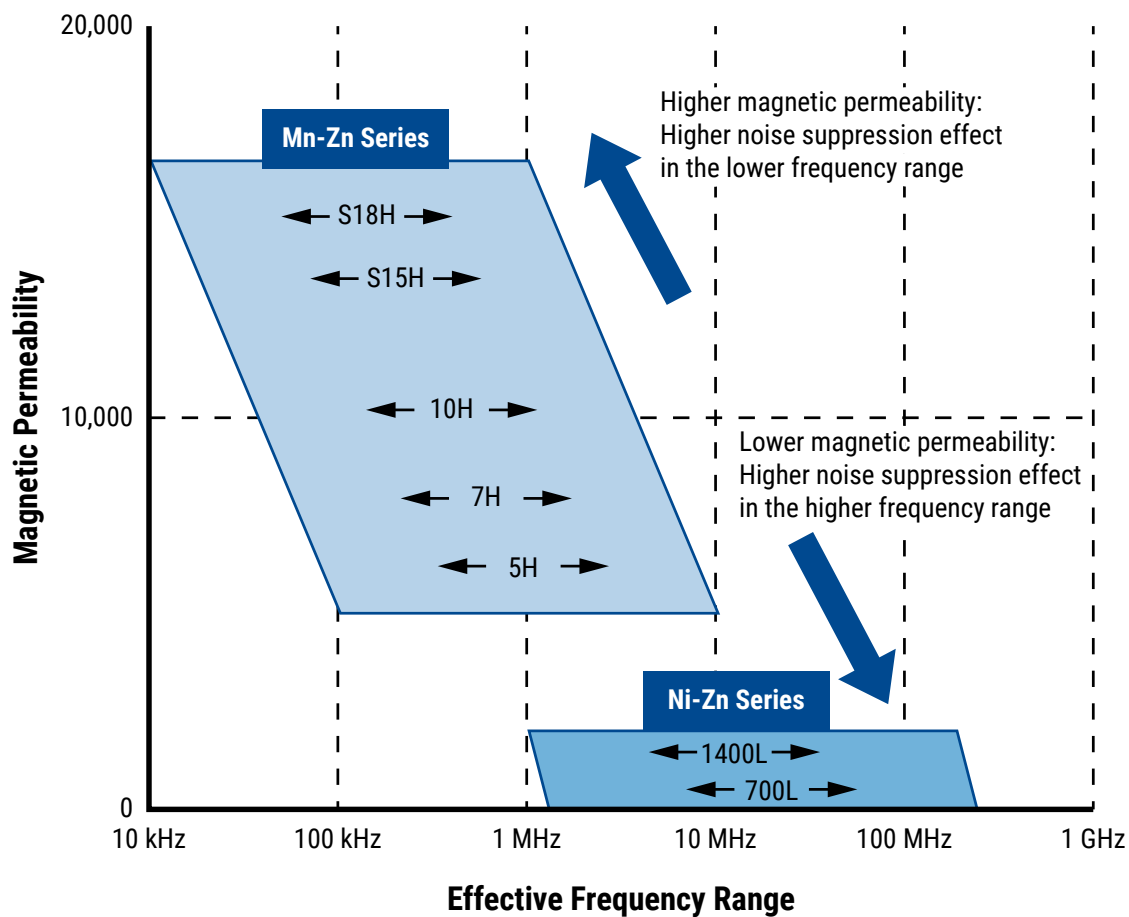
Magnetic Permeability of Ferrite Material

In order to achieve most efficient noise reduction, it is important to select the material according to the target frequency band. Depending on its magnetic permeability, a particular ferrite material will be effective in a certain frequency band. A schematic representation of the relationship between the magnetic permeability of each material and the corresponding effective band range is shown in Figure 1. Materials with higher magnetic permeability are effective in the lower frequency range, while those with lower magnetic permeability are effective in the higher frequency range. Thus, Mn-Zn products are mainly used for reducing conduction noise, while Ni-Zn products are commonly used for radiation noise countermeasures.

The effective frequency range varies depending on core shape, size and number of windings. This frequency dependence of the magnetic permeability as shown in the figure serves for reference purposes only and it should be tested on the actual device to determine its effectiveness.

S18H, S15H, 10H, 7H, 5H, 1400L and 700L are KEMET's proprietary ferrite material names. Other materials can also be available on request.

Figure 2 - Relationship between the magnetic permeability of each material and its effective frequency range



Environmental Compliance

All KEMET EMI cores are RoHS compliant.



Dimensions – Millimeters

Figure 1

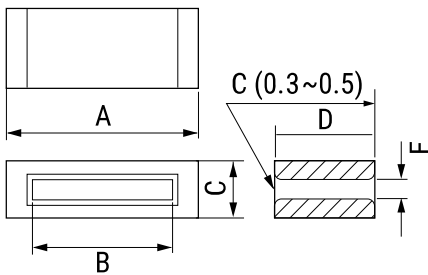


Figure 2

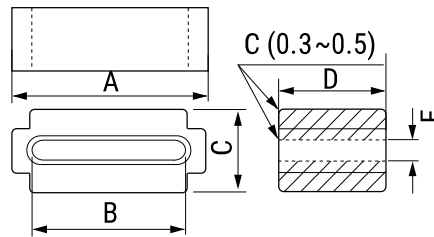
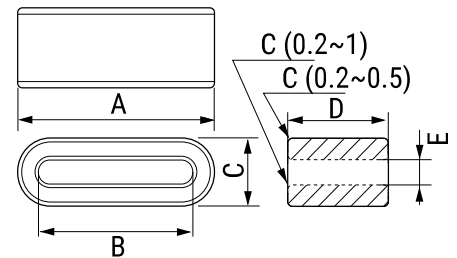
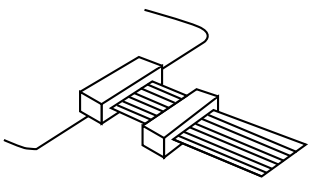


Figure 3



See Table 1 for dimensions

Installation Example



Performance Characteristics

Item	Performance Characteristics
Operating temperature	-25°C to +85°C
Frequency range	High frequency
Outer length	14.5 – 80.0 mm
Outer width	2.75 – 12.0 mm
Inner length	11.0 – 68.6 mm
Inner width	0.7 – 2.2 mm
Thickness	3.0 – 15.0 mm
Type	Bare
Material	NiZn 700L

Table 1A – Ratings & Part Number Reference

Part Number	Dimensions (mm)					Weight (g)	Applicable Cable	Shape	Remarks	Frequency Range ¹	Material	
	A	B	C	D	E					≤ 300 MHz (FM band range)	MnZn	NiZn
ESD-FPL-14.5-3	14.5±0.5	11.0±0.7	2.75±0.3	3.0±0.3	0.80±0.15	3.80	FPC, FFC	Figure 3	Thin type	X	-	700L
ESD-FPL-14.5-5	14.5±0.7	11.0±0.8	2.75±0.4	5.0±0.5	0.80±0.30	3.90	FPC, FFC	Figure 3	Thin type	X	-	700L
ESD-FPL-14.5-8	14.5±0.7	11.0±0.8	2.75±0.4	8.0±0.5	0.80±0.30	4.20	FPC, FFC	Figure 3	Thin type	X	-	700L
ESD-FPL-14.5-10	14.5±0.6	11.0±0.8	2.75±0.4	10.0±0.5	0.80±0.20	4.20	FPC, FFC	Figure 3	Thin type	X	-	700L
ESD-FPL-16-12	16.0±0.5	11.5±0.3	4.5±0.3	12.0±0.4	0.85±0.15	3.40	8 Core	Figure 3		X	-	700L
ESD-FPL-18-8	18.0±1.0	14.0±0.6	5.0±0.4	8.0±0.5	1.00±0.20	2.90	10 Core	Figure 3		X	-	700L
ESD-FPL-18-12	18.0±0.7	14.0±0.5	5.0±0.3	12.0±0.3	1.00±0.15	8.20	FPC, FFC	Figure 3		X	-	700L
ESD-FPL-18.7-3	18.7±0.6	15.0±0.6	2.75±0.4	3.0±0.5	0.70±0.20	3.40	FPC, FFC	Figure 3	Thin type	X	-	700L
ESD-FPL-18.7-12	18.7±0.6	15.0±0.6	2.75±0.4	12.0±0.5	0.70±0.20	6.00	FPC, FFC	Figure 3	Thin type	X	-	700L
ESD-FPL-21-8	21.0±0.8	17.0±0.7	5.0±0.3	8.0±0.3	0.80±0.30	3.50	FPC, FFC	Figure 3		X	-	700L
ESD-FPL-13	23.8±0.7	18.8±0.5	6.3±0.5	15.0±0.6	1.10±0.50	9.30	13 Core	Figure 3		X	-	700L
ESD-FPL-24.5-8	24.5±1.0	20.0±0.8	4.5±0.5	8.0±0.5	0.90±0.20	6.60	FPC, FFC	Figure 3		X	-	700L
ESD-FPL-25-12	25.0±0.9	21.0±0.8	5.0±0.5	12.0±0.6	0.85±0.35	5.70	16 Core	Figure 3		X	-	700L
ESD-FPL-27-8	27.0±1.0	22.0±0.7	6.5±0.3	8.0±0.2	1.30±0.15	8.40	16 Core	Figure 3		X	-	700L
ESD-FPL-7	28.0±0.6	23.5±0.5	7.7±0.3	7.0±0.6	1.50±0.25	5.80	16 Core	Figure 2		X	-	700L
ESD-FPL-15	28.0±0.5	23.0±0.4	7.7±0.3	14.6±0.4	1.50±0.20	12.40	16 Core	Figure 2		X	-	700L
ESD-FPL-28-10	28.0±1.0	24.0±0.8	5.0±0.5	10.0±0.5	0.80±0.50,-0.30	7.20	FPC, FFC	Figure 3		X	-	700L
ESD-FPL-32-8	32.0±1.0	28.0±0.7	5.0±0.3	8.0±0.3	0.80±0.15	5.40	FPC, FFC	Figure 3		X	-	700L
ESD-FPL-32-12	32.0±1.0	28.0±0.7	5.0±0.3	12.0±0.3	0.80±0.15	7.40	FPC, FFC	Figure 3		X	-	700L
ESD-FPL-20-12	33.2±1.0	27.0±1.0	8.0±0.6	12.0±0.6	1.50±0.60	12.20	20 Core	Figure 3		X	-	700L
Part Number	A	B	C	D	E	(g)	Applicable Cable	Shape	Remarks	≤ 300 MHz (FM band range)	MnZn	NiZn
	Dimensions					Weight				Frequency Range ¹	Material	

¹ Frequency range is for reference only. Please test with actual device before use.

* Other sizes available on request. Please contact KEMET.

Table 1A – Ratings & Part Number Reference cont.

Part Number	Dimensions (mm)					Weight (g)	Applicable Cable	Shape	Remarks	Frequency Range ¹	Material	
	A	B	C	D	E					≤ 300 MHz (FM band range)	MnZn	NiZn
ESD-FPL-20-15	33.2±0.8	27.0±0.8	8.0±0.5	15.0±0.4	1.50±0.50	15.40	20 Core	Figure 3		X	-	700L
ESD-FPL-33.5-8	33.5±1.0	27.5±0.8	6.5±0.5	8.0±0.4	1.50±0.40	7.00	20 Core	Figure 3		X	-	700L
ESD-FPL-34-15	34.0±1.0	30.0±0.7	6.0±0.3	15.0±0.3	0.80±0.15	12.60	FPC, FFC	Figure 3		X	-	700L
ESD-FPL-35-8	35.0±1.5	30.0±1.0	8.0±0.5	8.0±0.8	1.30±0.35	8.40	22 Core	Figure 3		X	-	700L
ESD-FPL-16	37.0±0.8	25.4±0.8	12.0±0.4	12.7±0.4	1.90±0.20	24.90	16 Core	Figure 1		X	-	700L
ESD-FPL-38-12	38.0±1.2	34.0±0.8	5.0±0.5	12.0±0.5	0.80±0.30	8.80	FPC, FFC	Figure 3		X	-	700L
ESD-FPL-38.5-8	38.5±1.2	35.0±0.8	4.0±0.5	8.0±0.5	0.80±0.25	7.50	FPC, FFC	Figure 3		X	-	700L
ESD-FPL-38.5-12	38.5±1.2	35.0±0.8	4.0±0.5	12.0±0.6	0.80±0.30	8.50	FPC, FFC	Figure 3		X	-	700L
ESD-FPL-40-10	40.0±1.5	34.8±1.0	6.5±0.5	10.0±0.5	1.30±0.30	8.00	26 Core	Figure 3		X	-	700L
ESD-FPL-40-12	40.0±1.5	34.8±1.5	6.5±0.5	12.0±0.8	1.30±0.55	6.90	26 Core	Figure 3		X	-	700L
ESD-FPL-40-15	40.0±1.0	34.8±1.0	6.5±0.5	15.0±0.6	1.30±0.25	7.70	26 Core	Figure 3		X	-	700L
ESD-FPL-26	41.2±1.0	35.0±1.0	7.7±0.6	15.0±0.4	1.50±0.40	18.20	26 Core	Figure 3		X	-	700L
ESD-FPL-45.2-8	45.2±1.2	40.0±1.0	6.5±0.5	8.0±0.5	1.30±0.30	8.50	30 Core	Figure 3		X	-	700L
ESD-FPL-45-12	45.2±1.0	40.0±1.0	6.5±0.6	12.0±0.6	1.50±0.40	13.70	30 Core	Figure 3		X	-	700L
ESD-FPL-49.6-12	49.6±1.2	44.5±1.0	6.5±0.7	12.0±0.5	1.30±0.40	8.50	32 Core	Figure 3		X	-	700L
ESD-FPL-57.6-12	57.6±1.2	52.0±1.0	6.5±0.8	12.0±0.7	1.30±0.70	8.80	40 Core	Figure 3		X	-	700L
ESD-FPL-34	60.0±0.8	48.5±0.8	12.0±0.8	12.7±0.5	2.20±0.30	37.70	34 Core	Figure 1		X	-	700L
ESD-FPL-50	80.0±1.0	68.6±1.0	12.0±0.8	12.7±0.5	1.90±0.30	51.20	50 Core	Figure 1		X	-	700L
Part Number	A	B	C	D	E	(g)	Applicable Cable	Shape	Remarks	≤ 300 MHz (FM band range)	MnZn	NiZn
	Dimensions					Weight				Frequency Range ¹	Material	

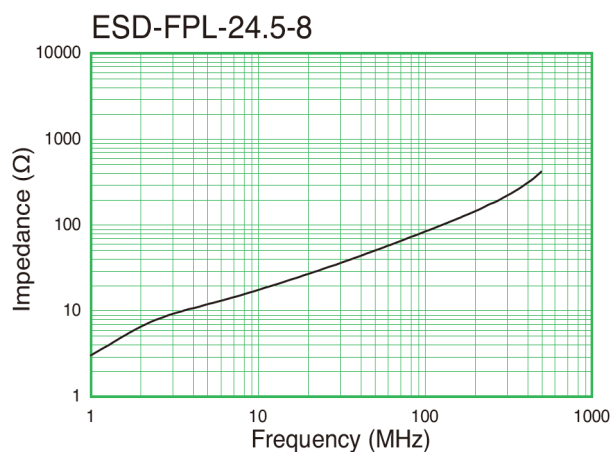
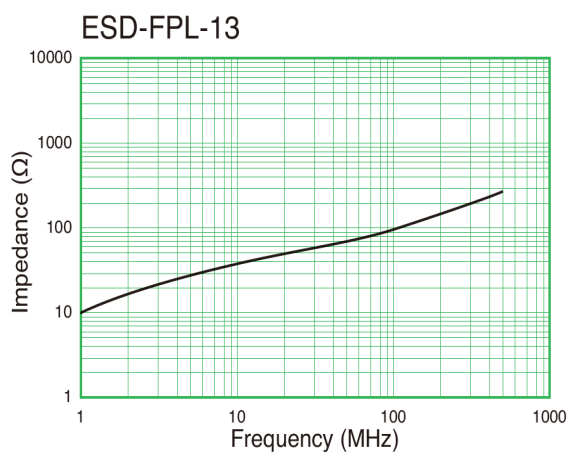
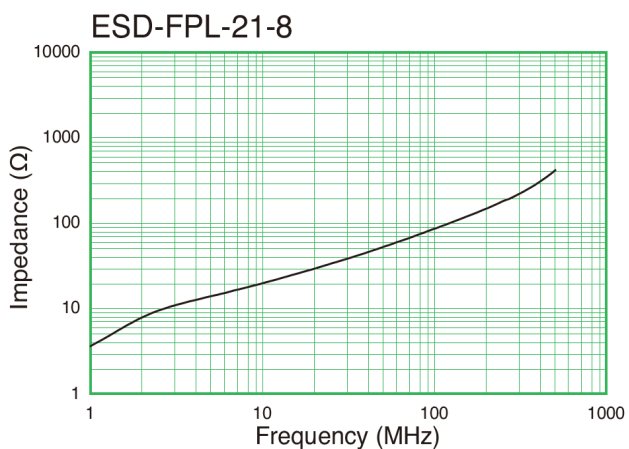
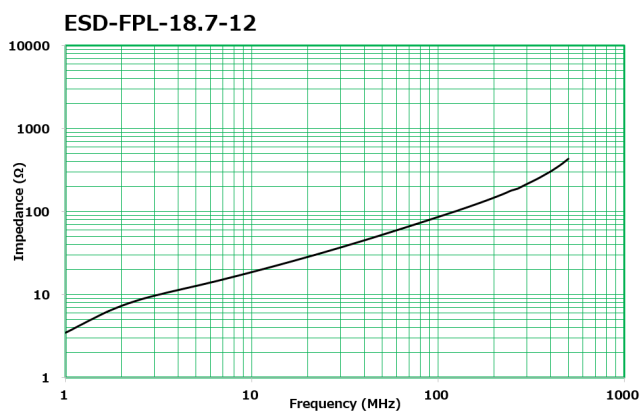
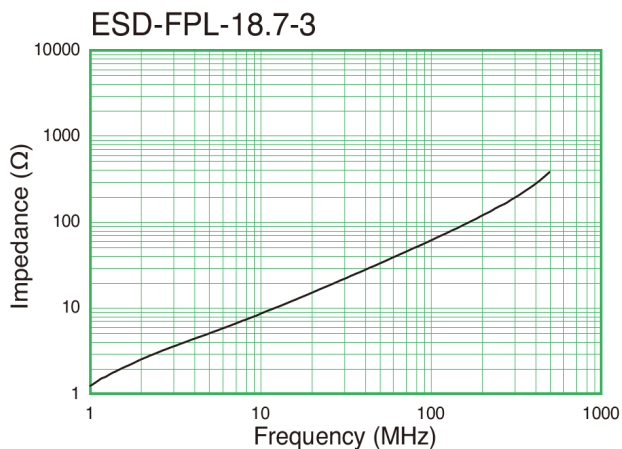
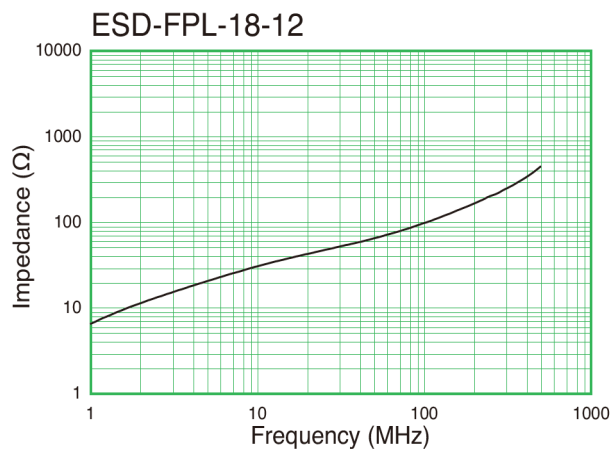
¹ Frequency range is for reference only. Please test with actual device before use.

* Other sizes available on request. Please contact KEMET.

Table 1B – Not for New Design Ratings & Part Number Reference

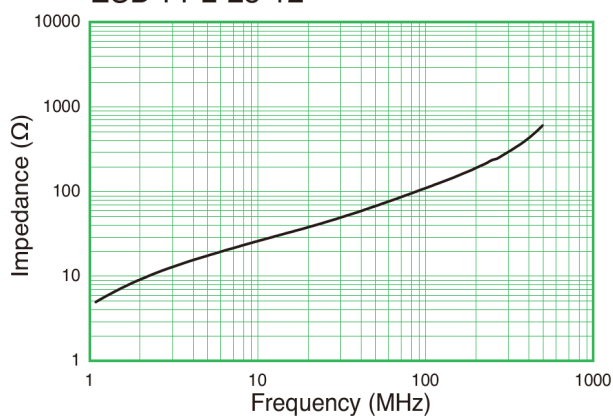
Part Number	Dimensions (mm)					Applicable Cable	Shape	Remarks
	A	B	C	D	E			
ESD-FPL-18-6	18.0	14.0	5.00	6	1.00	FPC, FFC	Figure 3	
ESD-FPL-18.7-7	18.7	15.0	2.75	7	0.70	FPC, FFC	Figure 3	Thin type
ESD-FPL-18.7-10	18.7	15.0	2.75	10	0.70	FPC, FFC	Figure 3	Thin type
ESD-FPL-18.7-12	18.7	15.0	2.75	12	0.70	FPC, FFC	Figure 3	Thin type
ESD-FPL-21.5-8	21.5	16.5	6.50	8	1.30	12 Core	Figure 3	
ESD-FPL-23.8-7	23.8	18.8	6.30	7	1.10	12 Core	Figure 3	
ESD-FPL-24-8	24.0	19.0	6.50	8	1.30	14 Core	Figure 3	
ESD-FPL-24.5-6	24.5	20.0	4.50	6	0.90	FPC, FFC	Figure 3	
ESD-FPL-31-9	31.0	27.0	5.00	9	0.55	FPC	Figure 3	Minimal gap type
ESD-FPL-31-12	31.0	27.0	5.00	12	0.55	FPC	Figure 3	Minimal gap type
ESD-FPL-33.5-10	33.5	27.5	6.50	10	1.30	20 Core	Figure 3	
ESD-FPL-33.5-12	33.5	27.5	6.50	12	1.30	20 Core	Figure 3	
ESD-FPL-35-5	35.0	30.0	8.00	5	1.30	22 Core	Figure 3	
Part Number	A	B	C	D	E	Applicable Cable	Shape	Remarks
	Dimensions							

Impedance vs. Frequency

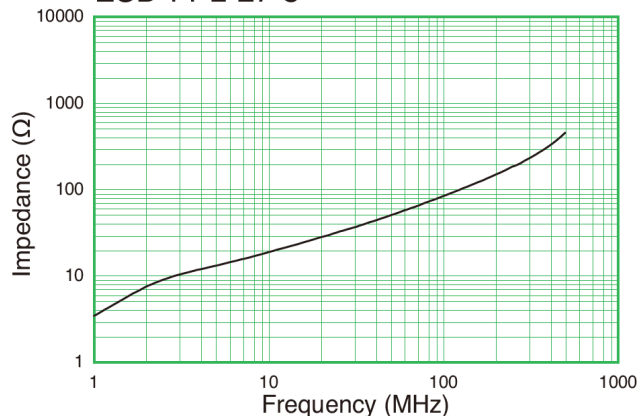


Impedance vs. Frequency cont.

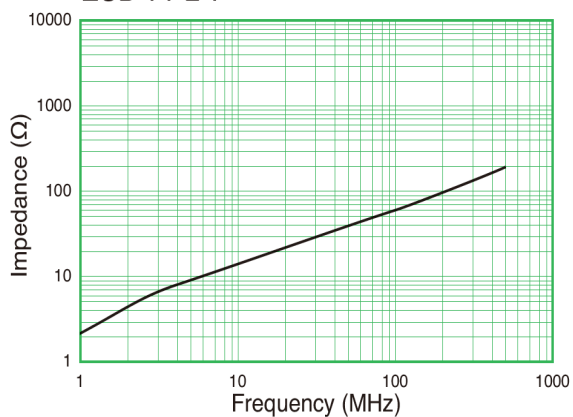
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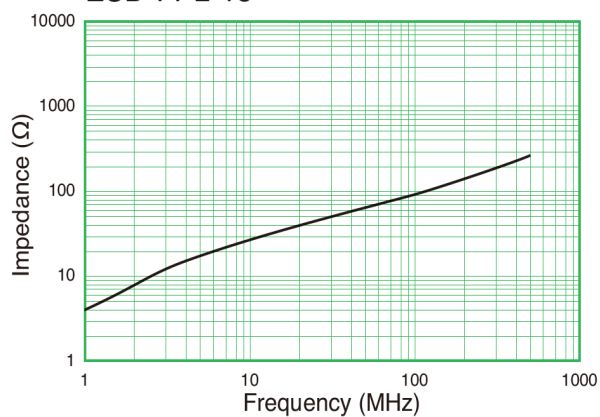
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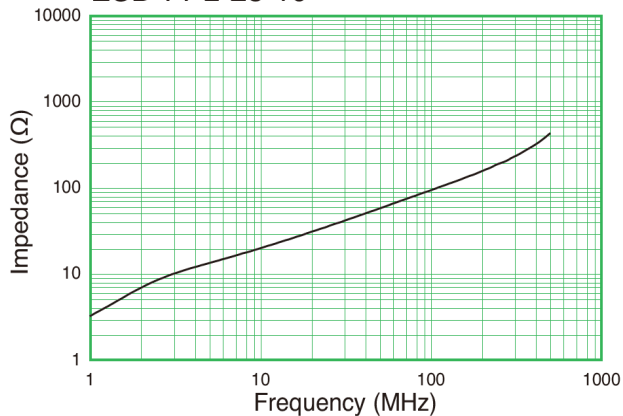
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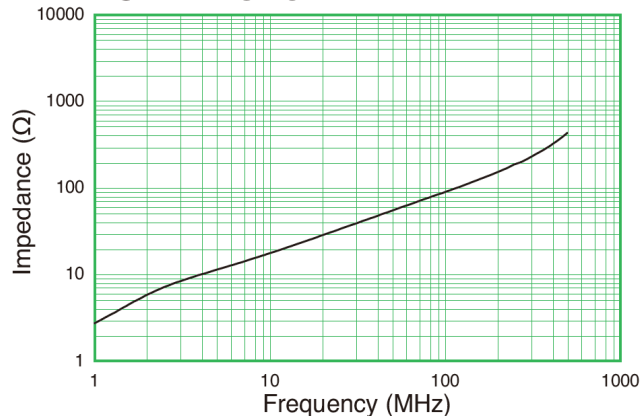
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ESD-FPL-28-10

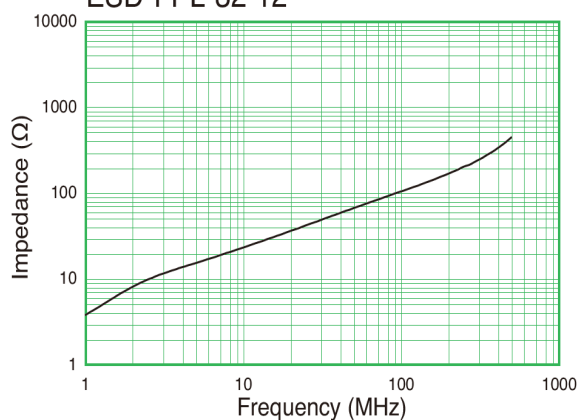


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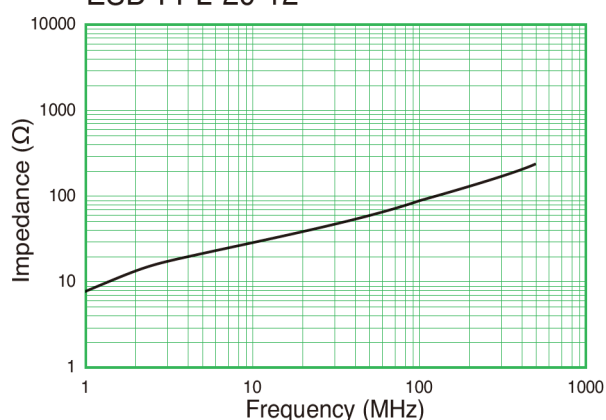


Impedance vs. Frequency cont.

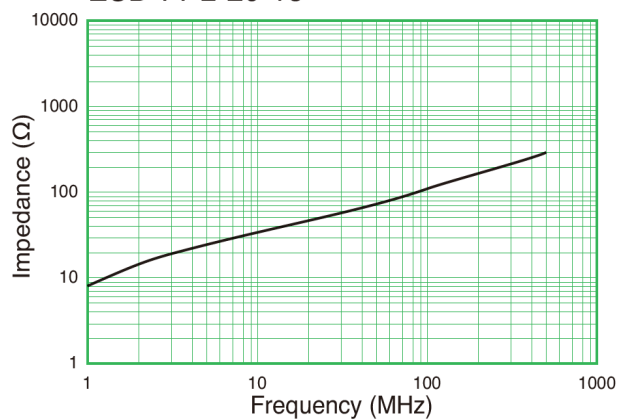
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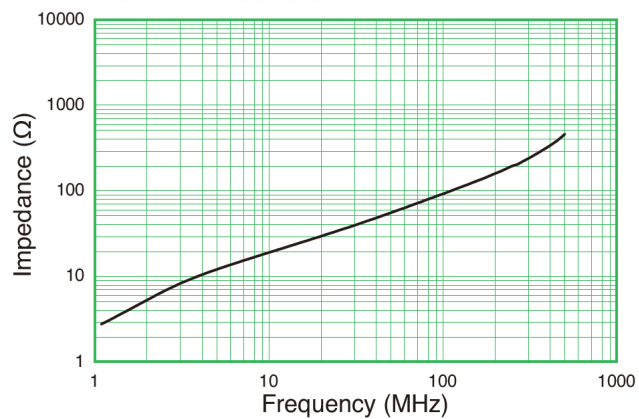
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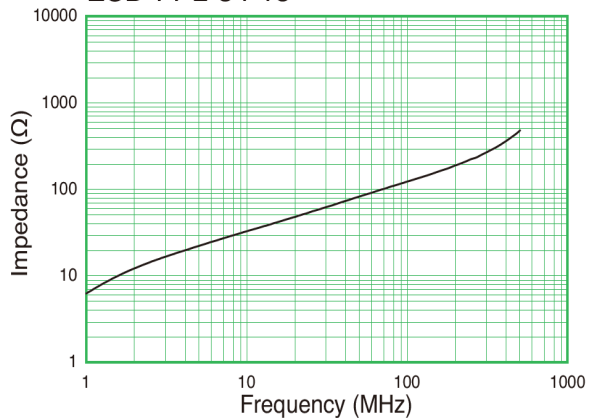
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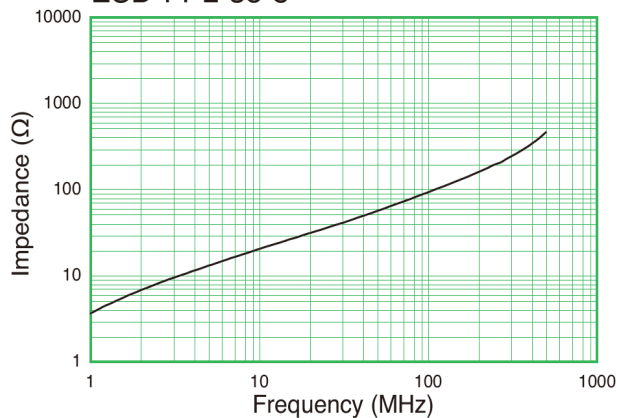
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ESD-FPL-34-15

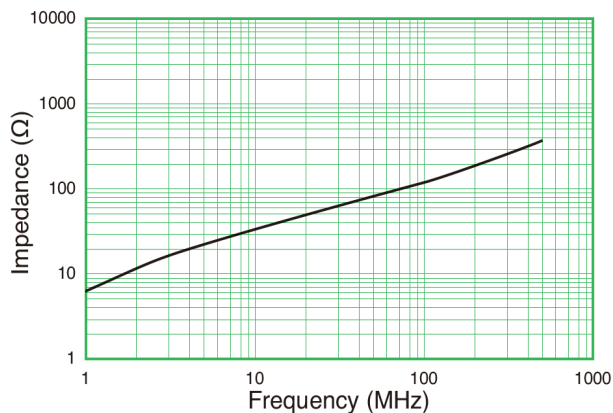


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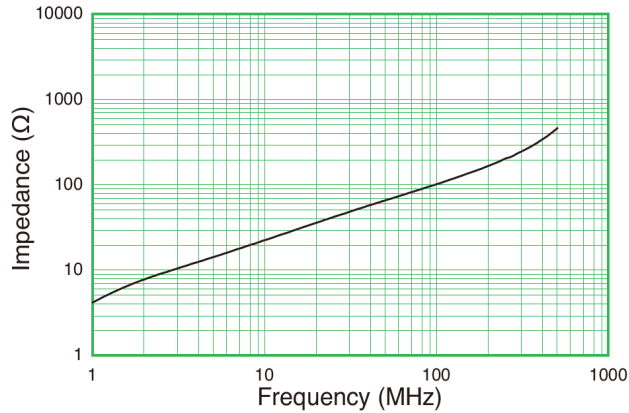


Impedance vs. Frequency cont.

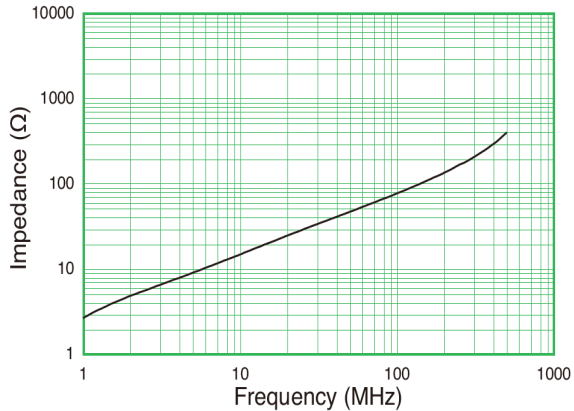
ESD-FPL-16



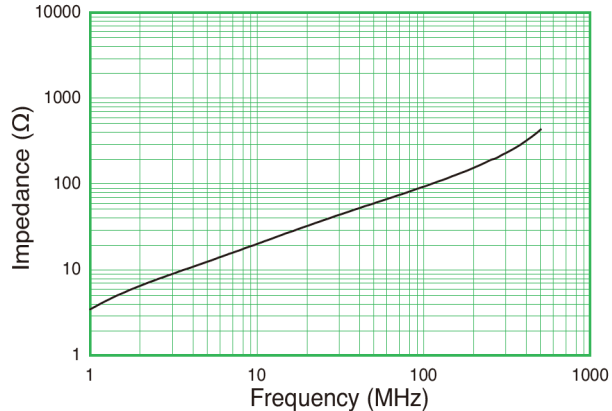
ESD-FPL-38-12



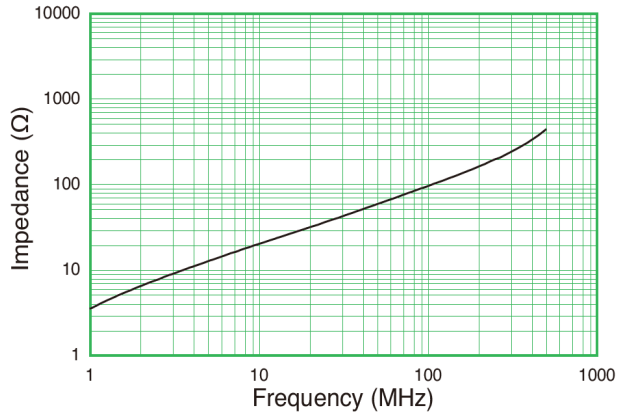
ESD-FPL-38.5-8



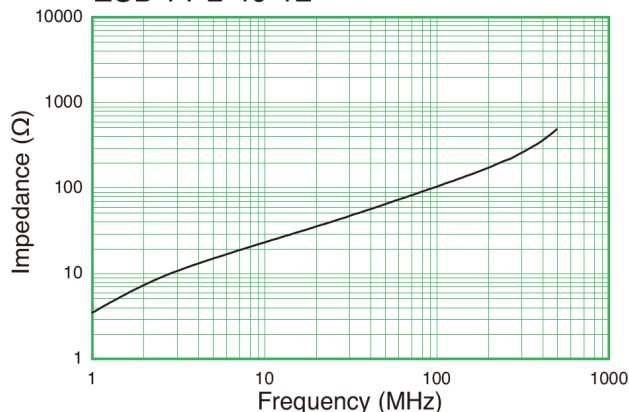
ESD-FPL-38.5-12



ESD-FPL-40-10

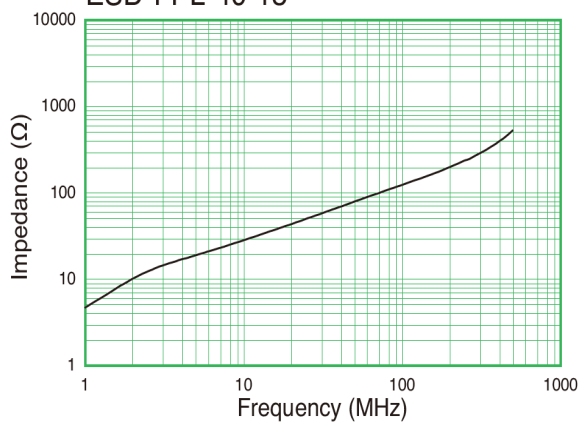


ESD-FPL-40-12

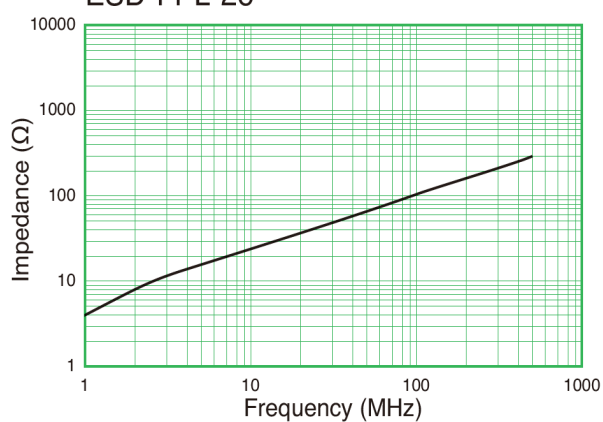


Impedance vs. Frequency cont.

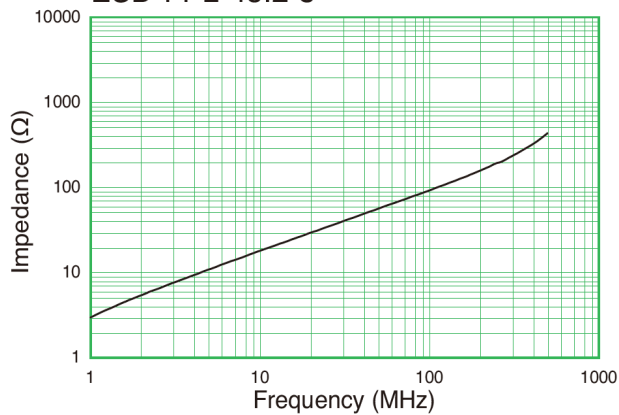
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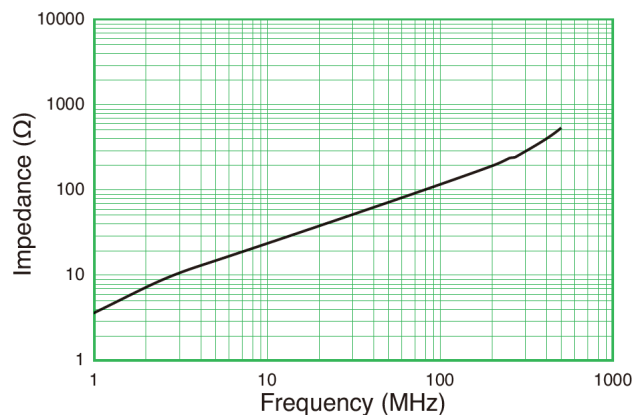
ESD-FPL-26



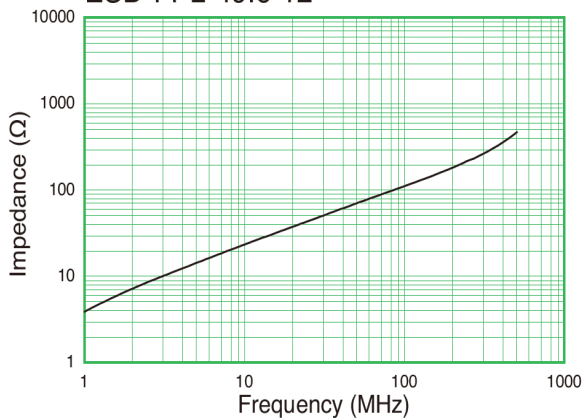
ESD-FPL-45.2-8



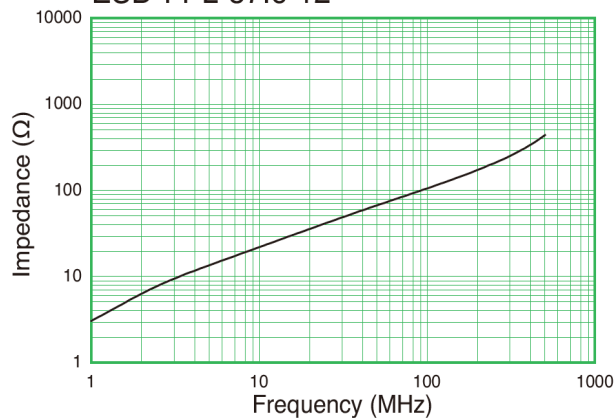
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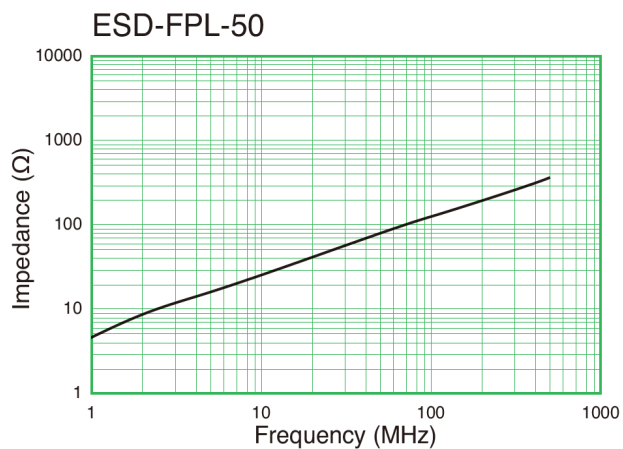
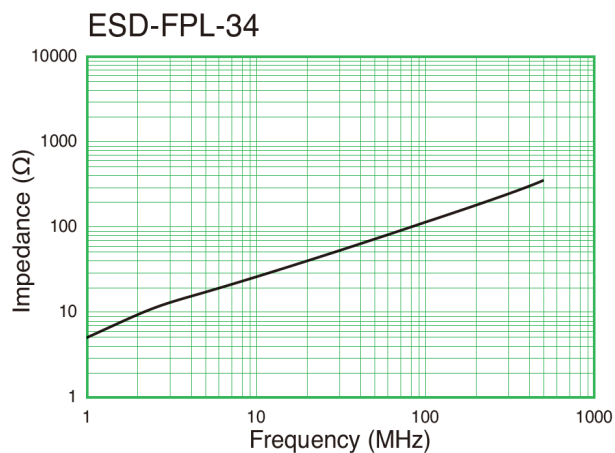
ESD-FPL-49.6-12



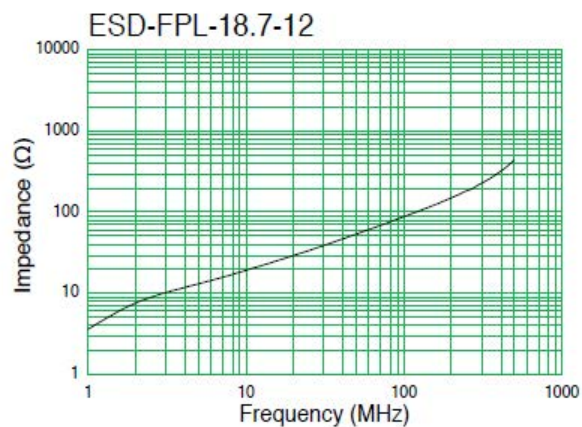
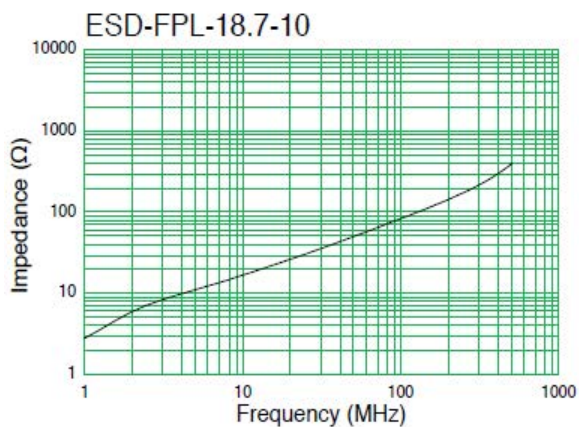
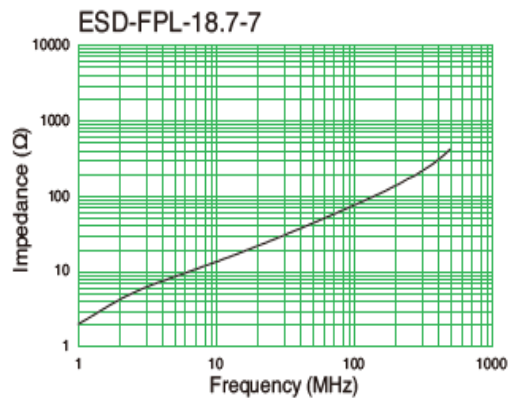
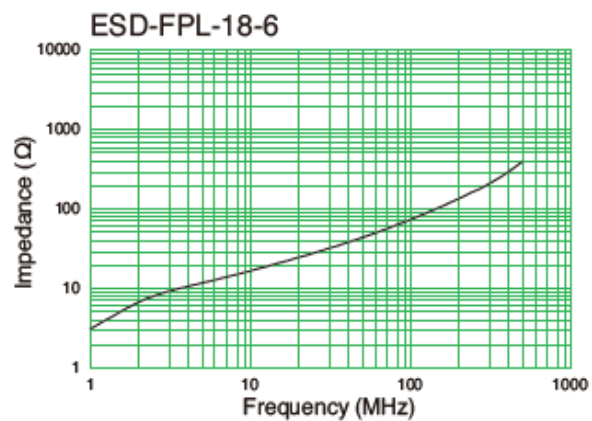
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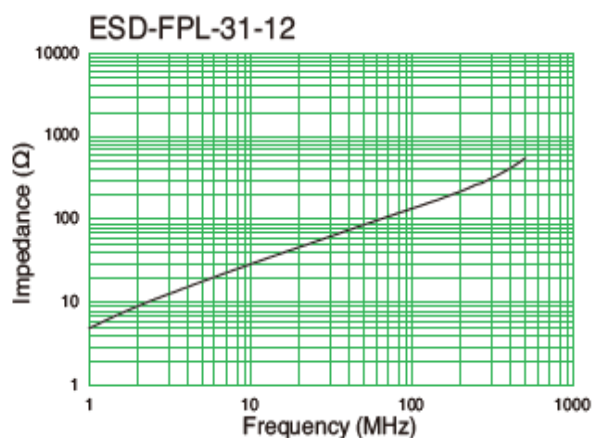
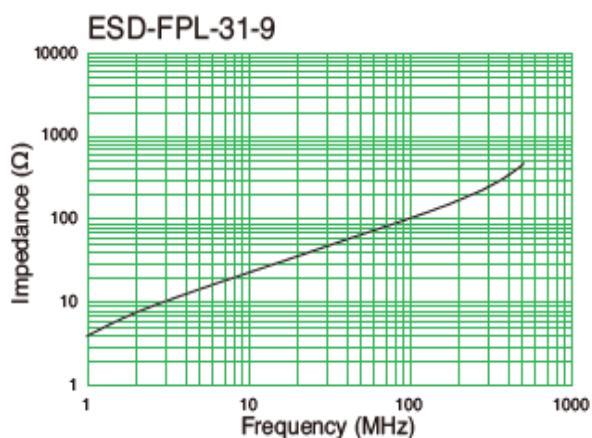
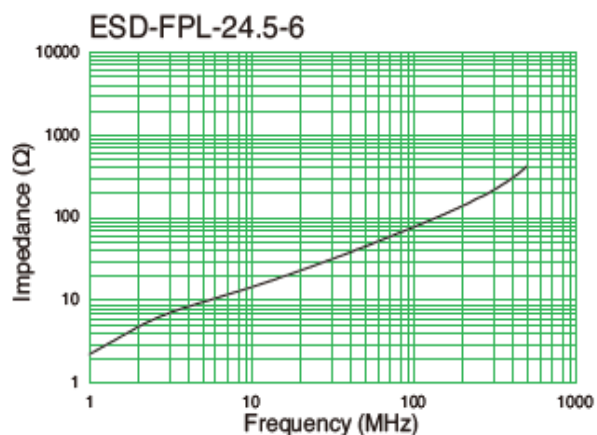
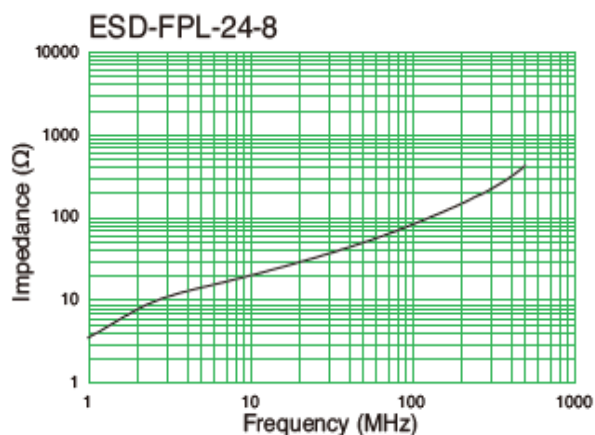
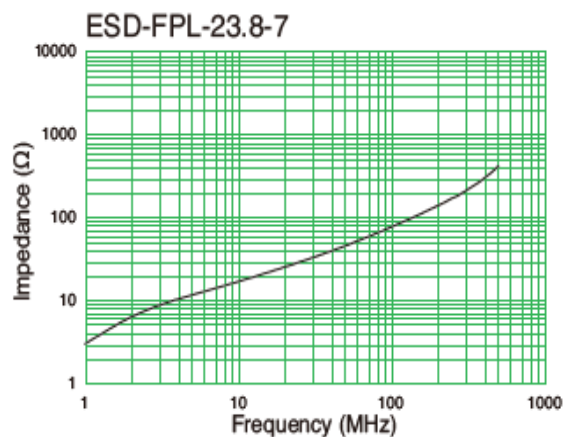
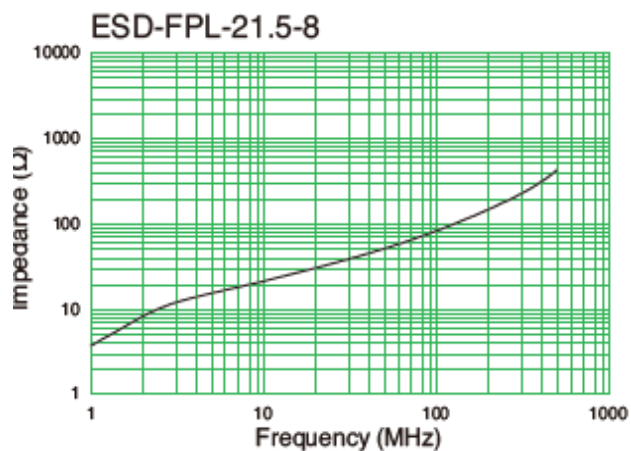
Impedance vs. Frequency cont.



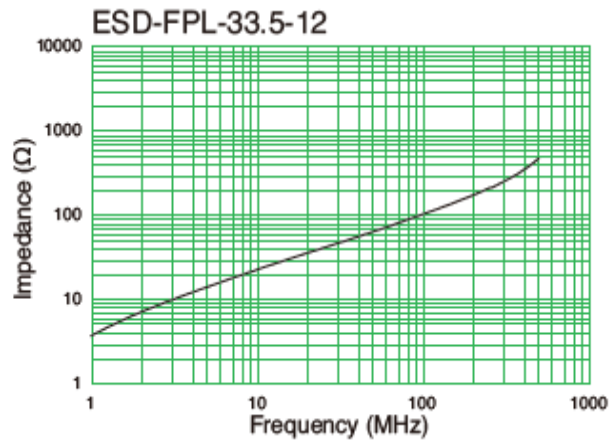
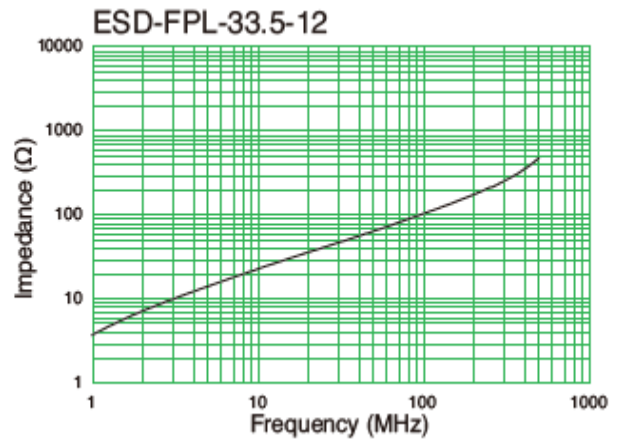
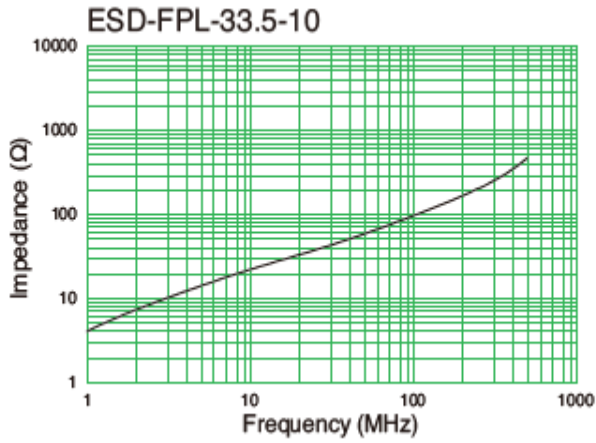
Impedance vs. Frequency - Not for New Design



Impedance vs. Frequency - Not for New Design cont.



Impedance vs. Frequency - Not for New Design cont.



Packaging

Part Number	Packaging Type	Pieces per Box
ESD-FPL-14.5-3	Tray	8,100
ESD-FPL-14.5-5		5,040
ESD-FPL-14.5-8		3,240
ESD-FPL-14.5-10		2,700
ESD-FPL-16-12		1,650
ESD-FPL-18-8		2,000
ESD-FPL-18-12		1,800
ESD-FPL-18.7-3		5,760
ESD-FPL-18.7-12		1,800
ESD-FPL-21-8		2,400
ESD-FPL-13		840
ESD-FPL-24.5-8		1,800
ESD-FPL-25-12		1,600
ESD-FPL-27-8		960
ESD-FPL-7		900
ESD-FPL-15		720
ESD-FPL-28-10		1,200
ESD-FPL-32-8		960
ESD-FPL-32-12		720
ESD-FPL-20-12		800
ESD-FPL-20-15		800
ESD-FPL-33.5-8		1,200
ESD-FPL-34-15		320
ESD-FPL-35-8		880
ESD-FPL-16		656
ESD-FPL-38-12		900
ESD-FPL-38.5-8		1,500
ESD-FPL-38.5-12		1,125
ESD-FPL-40-10		750
ESD-FPL-40-12		540
ESD-FPL-40-15		480
ESD-FPL-26		960
ESD-FPL-45.2-8		880
ESD-FPL-45-12		720
ESD-FPL-49.6-12	540	
ESD-FPL-57.6-12	480	
ESD-FPL-34	240	
ESD-FPL-50	180	

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 Барнаул (3852)73-04-60
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 Благовещенск (4162)22-76-07
 Брянск (4832)59-03-52
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 Киров (8332)68-02-04
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 Кострома (4942)77-07-48
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 Красноярск (391)204-63-61
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 Липецк (4742)52-20-81

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 Псков (8112)59-10-37
 Пермь (342)205-81-47

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