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ESD-R Series Toroidal Cores

Overview

The KEMET ESD-R Series solid toroidal cores are designed for use on round cable. A wide range of MnZn and NiZn options are available in Bare, Coated, and Case types.

Benefits

- MnZn (≤ 100 MHz, AM band range) and NiZn (≤ 300 MHz, FM band range) options available
- Solid construction
- Bare, Coated, and Case types available

Applications

- Consumer electronics

Turns and Impedance Characteristics

When the desired performance of an EMI core cannot be obtained with a single pass through the core, the impedance characteristics can be changed with multiple turns.

A turn is counted by the number of lead-wire windings which pass through the inner hole of the core. Windings on the outside of the core do not count. See Figure 1 for examples of one, two, and three turns.

Adding turns will result in higher impedance while also lowering the effective frequency range. See Figure 2 for an example.

Figure 1 – How to count turns

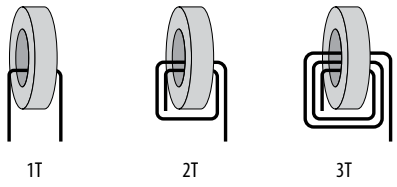
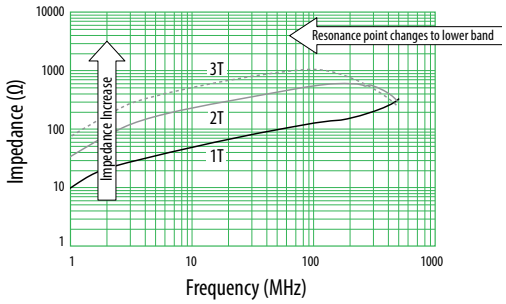


Figure 2 – Relationship between impedance and turn count. (Representative example: ESD-R-16C)



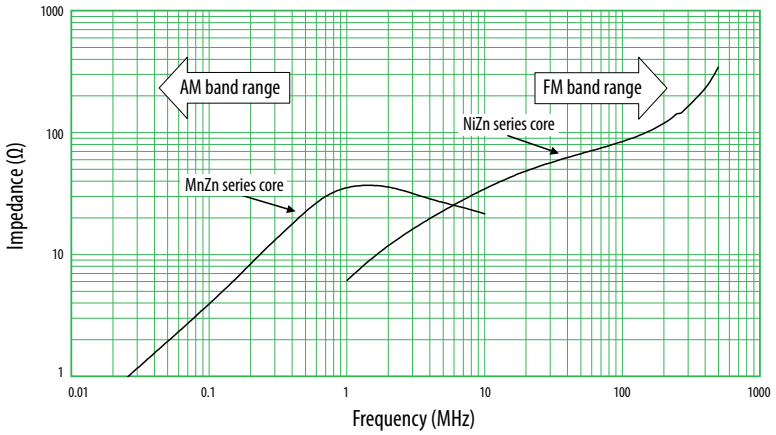
Core Material and Effective Frequency Range

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

For reference, the Ni-Zn core material is typically effective for the frequencies in the MHz band range such as the FM-band, while the Mn-Zn core material is typically effective for the kHz band range such as the AM-band. See Figure 3.

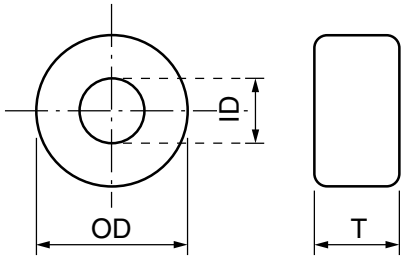
It is recommended to verify actual effectiveness in the target application with measurements.

Figure 3 – Effective band range of Mn-Zn and Ni-Zn ferrite core material. (Representative example, measured with same-dimension ring core)

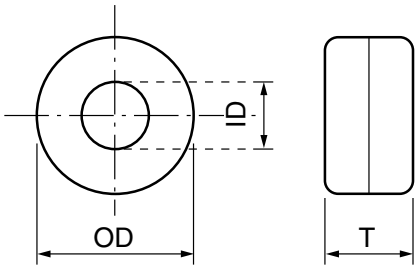


Dimensions – Millimeters

Bare and Coated Types

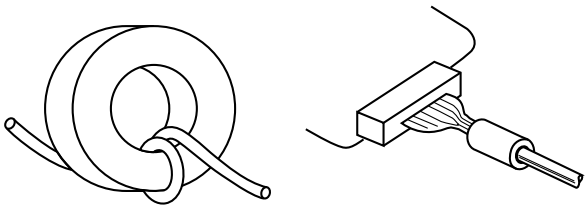


Case Type



See Table 1 for dimensions

Installation Examples



Environmental Compliance

All KEMET EMI cores are RoHS Compliant.

RoHS Compliant

Table 1 – Ratings & Part Number Reference

Part Number	Dimensions (mm)			Frequency Range[1]		Type	Color	Compatible Toroidal Core (Bare Type)
	OD	ID	T	≤ 100 MHz (AM band range)	≤ 300 MHz (FM band range)			
ESD-R-10D	9.5	5.0	10.0		X	Bare	–	–
ESD-R-10E	10.0	5.0	5.0		X	Bare	–	–
ESD-R-10S	10.5	5.5	20.0		X	Bare	–	–
ESD-R-12C	11.8	7.3	15.0		X	Bare	–	–
ESD-R-12E	11.8	7.3	8.0		X	Bare	–	–
ESD-R-12F	12.0	8.5	15.0		X	Bare	–	–
ESD-R-12S	12.0	7.0	5.5		X	Bare	–	–
ESD-R-14C	14.0	7.0	3.0		X	Bare	–	–
ESD-R-14E	14.0	10.0	8.0		X	Bare	–	–
ESD-R-14S	14.3	6.3	28.5		X	Bare	–	–
ESD-R-15C-1	15.0	10.5	12.0		X	Bare	–	–
ESD-R-16	15.8	11.6	8.4	X		Bare	–	–
ESD-R-16C	16.0	9.0	17.0		X	Bare	–	–
ESD-R-17S	17.5	9.5	28.5		X	Bare	–	–
ESD-R-18SD	18.0	10.0	6.0		X	Bare	–	–
ESD-R-19S	18.5	10.0	10.0	X		Bare	–	–
ESD-R-19SD	18.5	10.0	10.0		X	Bare	–	–
ESD-R-22SD	22.5	13.8	6.4		X	Bare	–	–
ESD-R-25SD	25.0	15.0	12.0		X	Bare	–	–
ESD-R-25S	25.0	15.0	12.0	X		Bare	–	–
ESD-R-26S	26.0	13.0	28.5		X	Bare	–	–
ESD-R-28C	28.0	16.0	13.0		X	Bare	–	–
ESD-R-31C	31.0	19.0	8.0		X	Bare	–	–
ESD-R-38D	38.1	19.0	12.7	X		Bare	–	–
ESD-R-12C-2	12.0	7.3	15.3		X	Coated	Blue	–
ESD-R-14A	15.0	6.2	3.5	X		Coated	Green	–
ESD-R-14C-2	14.0	7.0	3.0		X	Coated	Blue	ESD-R-14C
ESD-R-15C	15.2	10.5	12.5		X	Coated	Blue	ESD-R-15C-1
ESD-R-17S-1	17.7	9.4	28.8		X	Coated	Blue	ESD-R-17S
ESD-R-19E-1	19.0	10.7	5.3		X	Coated	Blue	–
ESD-R-25D-8	25.0	15.0	8.0		X	Coated	Blue	–
ESD-R-25L-A	25.3	15.1	12.1		X	Coated	Blue	ESD-R-25SD
ESD-R-28C-1	28.2	15.8	13.2		X	Coated	Blue	–
ESD-R-31C-1	32.0	18.5	9.0		X	Coated	Green	ESD-R-31C
ESD-R-31-P	32.0	19.0	15.8	X		Coated	Green	–
ESD-R-12D	12.9	6.0	6.4		X	Case[2]	Black	ESD-R-12S
ESD-R-19	19.0	9.0	11.0	X		Case[2]	White	ESD-R-19S
ESD-R-19D	19.0	9.0	11.0		X	Case[2]	Black	ESD-R-19SD
ESD-R-25	26.0	14.0	15.0	X		Case[2]	White	ESD-R-25S
ESD-R-25D	26.0	14.0	15.0		X	Case[2]	Black	ESD-R-25SD
ESD-R-38	39.0	17.5	14.0	X		Case[2]	White	ESD-R-38D
ESD-R-38C-1	39.0	17.5	14.0		X	Case[2]	White w/ tape (black)	–
ESD-R-47	48.0	25.5	16.0	X		Case[2]	White	–
ESD-R-47D-1	48.0	25.5	16.0		X	Case[2]	White w/ tape (black)	–
ESD-R-57	61.0	32.4	24.0	X		Case[2]	White	–
ESD-R-57D-1	61.0	32.4	24.0		X	Case[2]	White w/ tape (black)	–

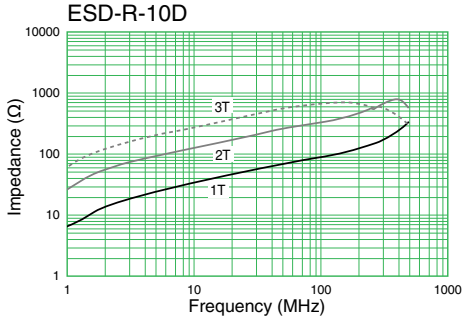
[1] Frequency range is for reference only. Please test with actual device before use.

[2] Case flame resistant rating: UL94V-2

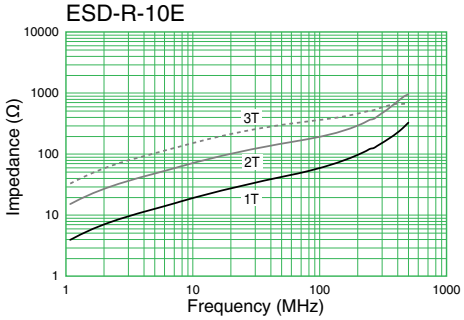
**Other sizes available. Please contact KEMET.*

Impedance vs. Frequency – Bare Type

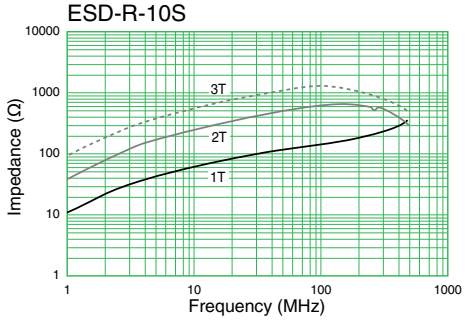
ESD-R-10D



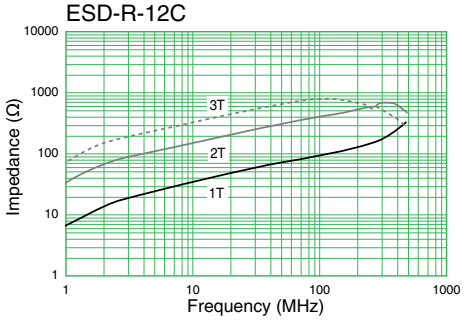
ESD-R-10E



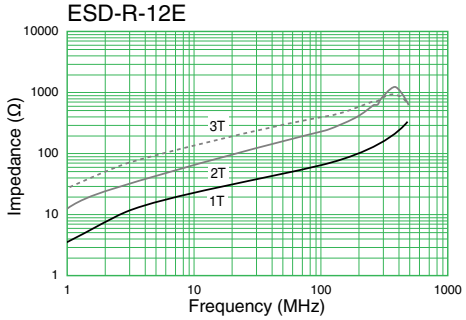
ESD-R-10S



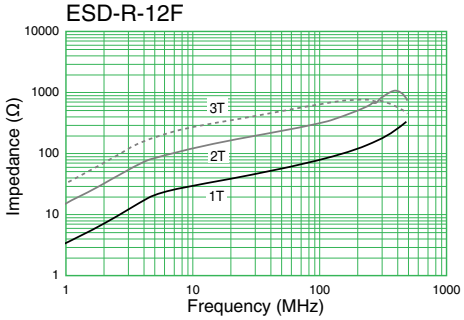
ESD-R-12C



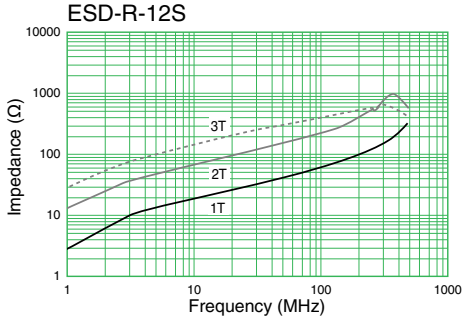
ESD-R-12E



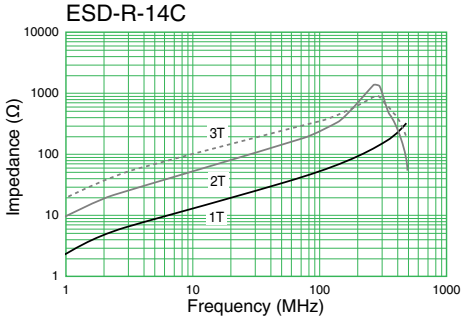
ESD-R-12F



ESD-R-12S

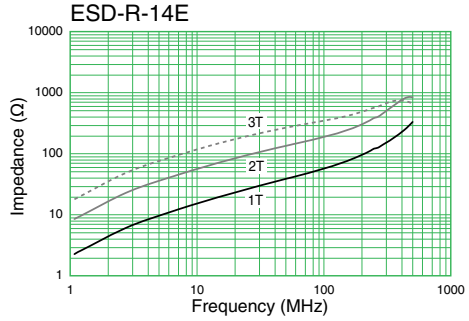


ESD-R-14C



Impedance vs. Frequency – Bare Type Cont'd

ESD-R-14E



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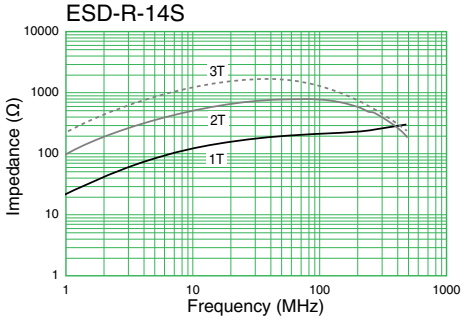
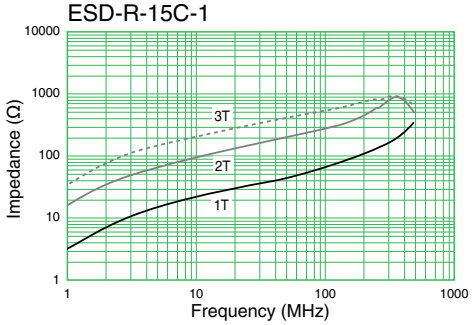
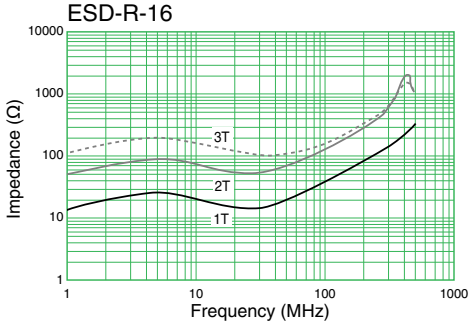


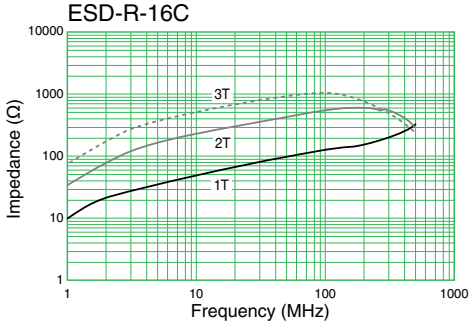
ESD-R-15C-1



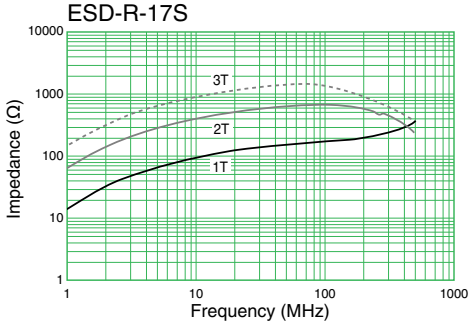
ESD-R-16



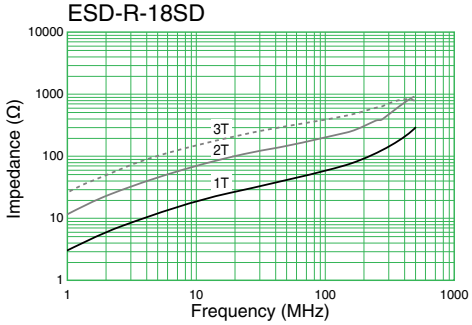
ESD-R-16C



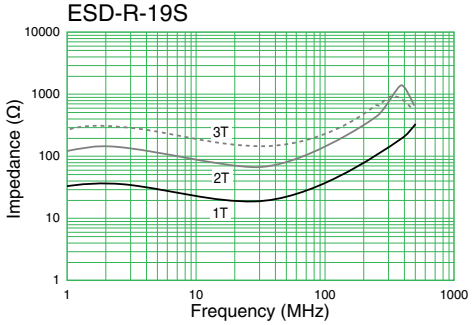
ESD-R-17S



ESD-R-18SD

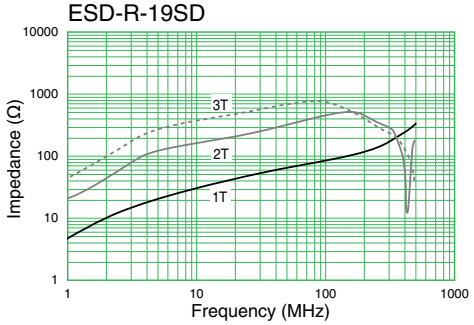


ESD-R-19S

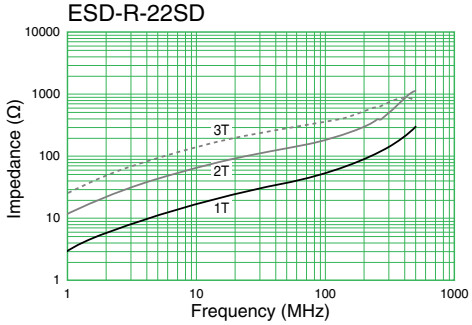


Impedance vs. Frequency – Bare Type Cont'd

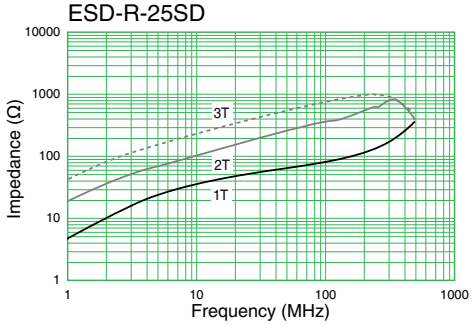
ESD-R-19SD



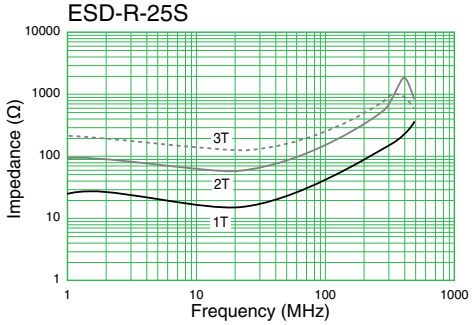
ESD-R-22SD



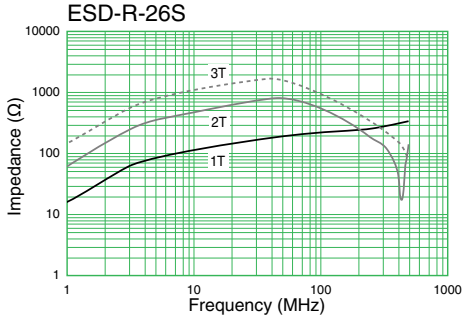
ESD-R-25SD



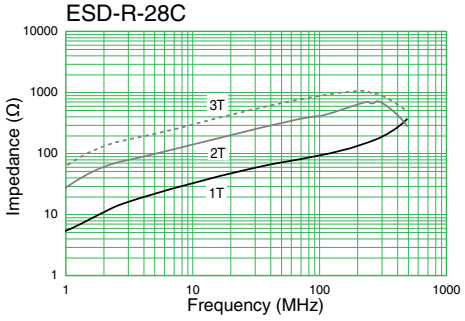
ESD-R-25S



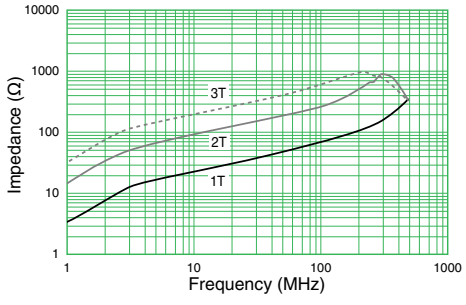
ESD-R-26S



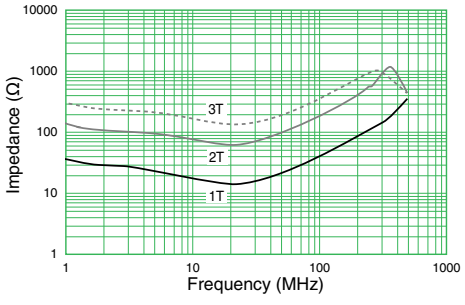
ESD-R-28C



ESD-R-31C

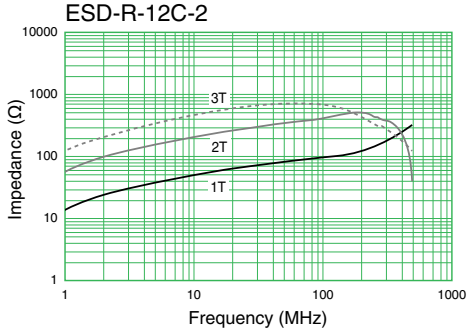


ESD-R-38D

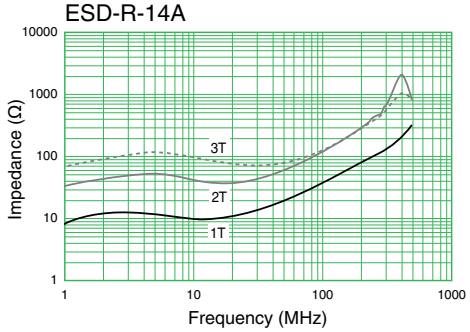


Impedance vs. Frequency – Coated Type

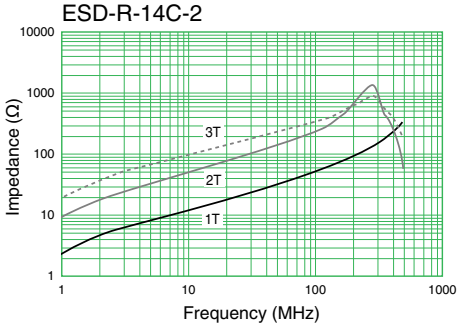
ESD-R-12C-2



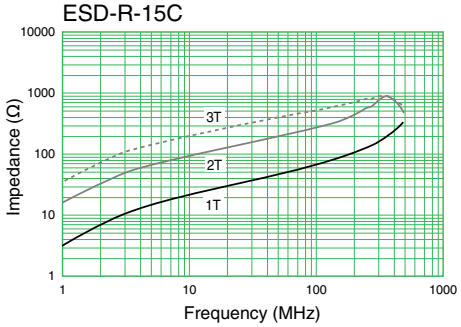
ESD-R-14A



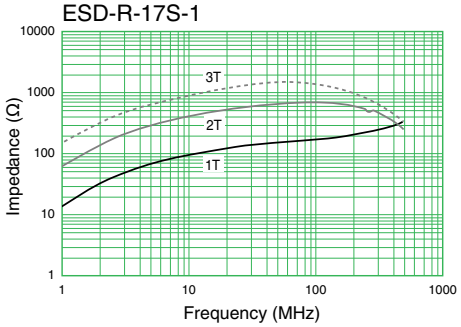
ESD-R-14C-2



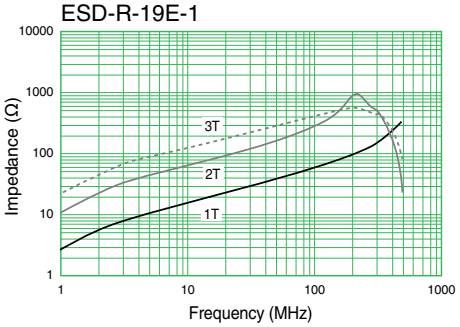
ESD-R-15C



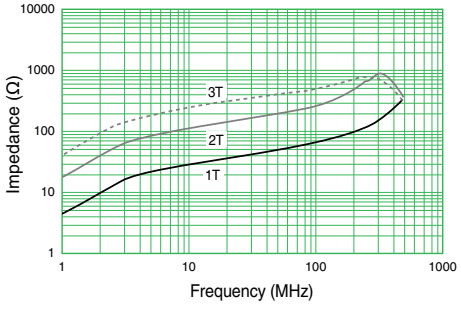
ESD-R-17S-1



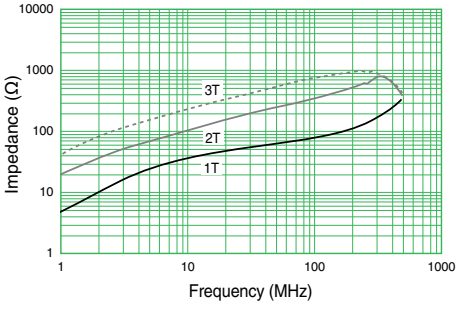
ESD-R-19E-1



ESD-R-25D-8

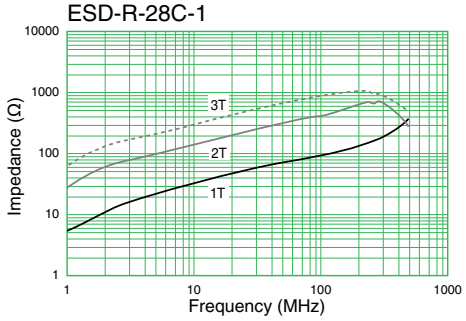


ESD-R-25L-A

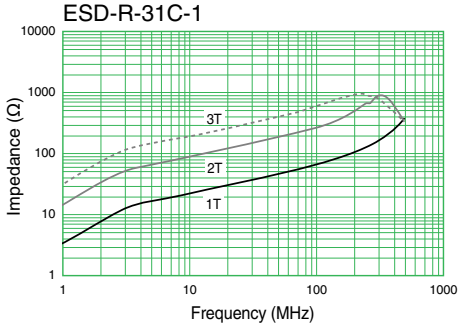


Impedance vs. Frequency – Coated Type Cont'd

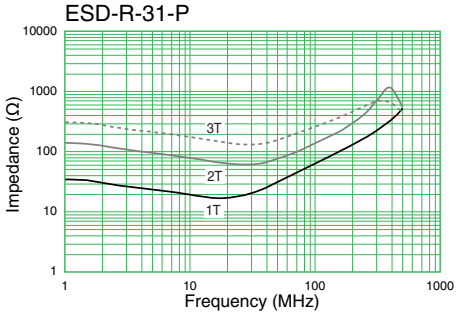
ESD-R-28C-1



ESD-R-31C-1

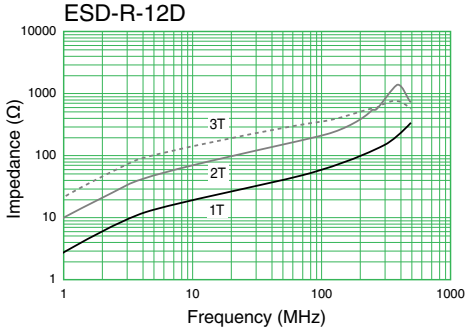


ESD-R-31-P

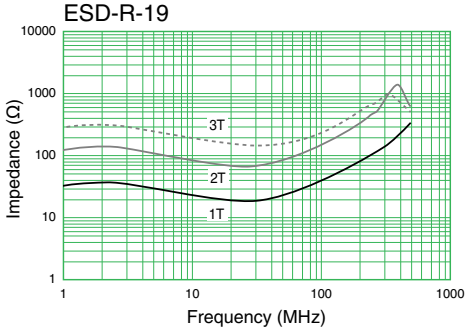


Impedance vs. Frequency – Case Type

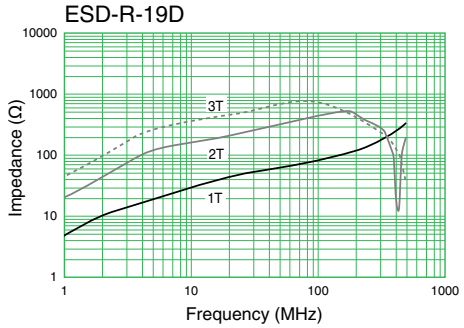
ESD-R-12D



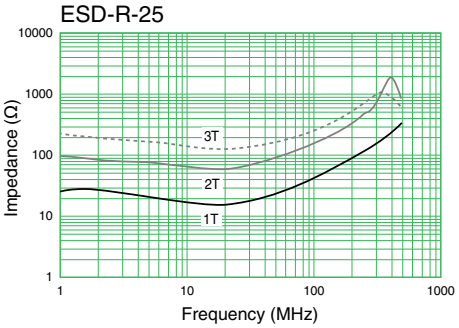
ESD-R-19



ESD-R-19D

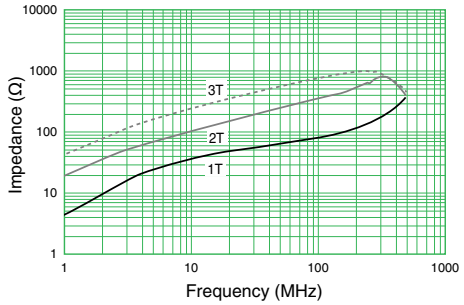


ESD-R-25

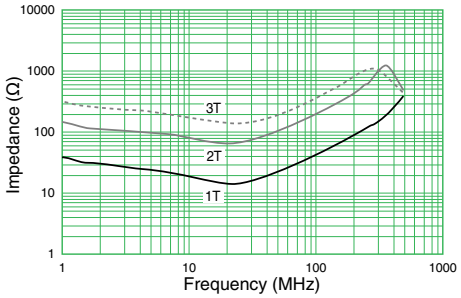


Impedance vs. Frequency – Case Type Cont'd

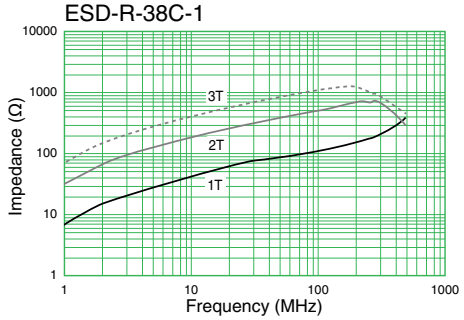
ESD-R-25D



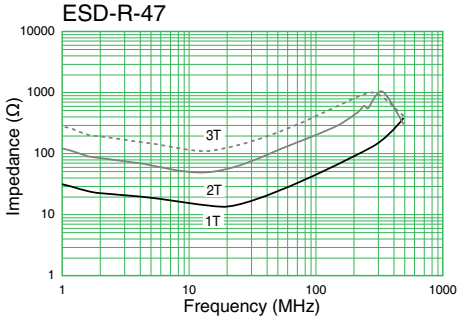
ESD-R-38



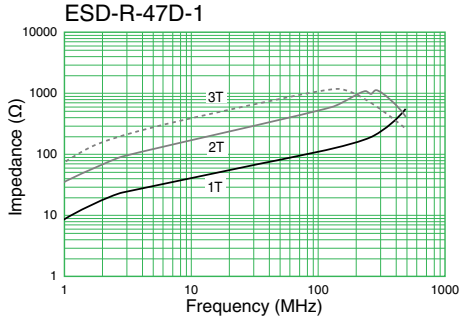
ESD-R-38C-1



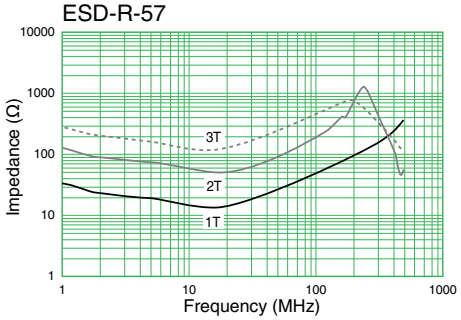
ESD-R-47



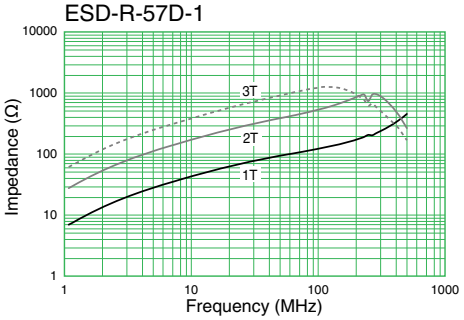
ESD-R-47D-1



ESD-R-57



ESD-R-57D-1



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