EMI Cores

B-20 Bead Cores for Round Cables for Low & High Frequency (Bare & coated)

Overview

The KEMET B-20 series bead cores are designed to use on round cables. The wide range of Manganese Zinc (MnZn) and Nickel Zinc (NiZn) options allows for targeting specific 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

- Computers
- Telecommunications
- Industrial equipment
- Adapters
- Consumer electronics

Benefits

- MnZn ≤ 10 MHz (AM band range) and NiZn ≤ 500 MHz (FM band range) options available
- Solid construction
- Bare and coated types available

Part Number System

B-20	L-	48	B-A
Series	Core Material	Core Size Outer Dimension (mm)	Type
B-20	F = Mn-Zn L = Ni-Zn	xx = x.x mm	Blank = Bare B / B-A = Coated (except 48B) B-L = Insulation resistance testing

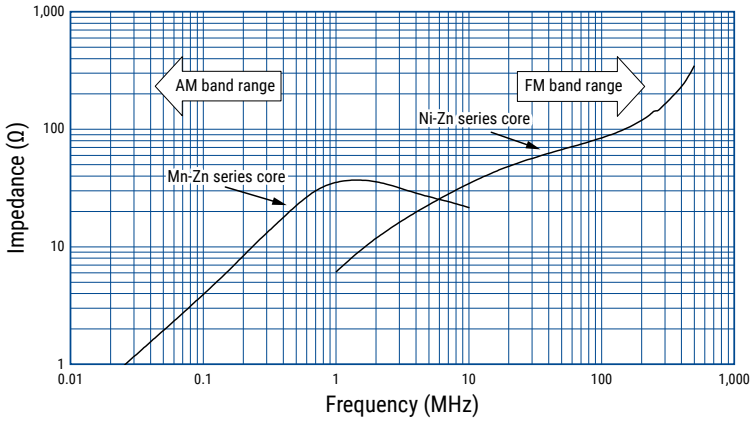
Core Material and Effective Frequency Range

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)

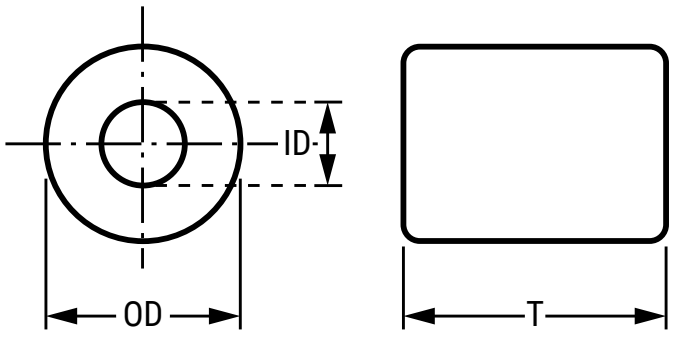


Environmental Compliance

All KEMET EMI cores are RoHS compliant.

RoHS

Dimensions – Millimeters



See Table 1 for dimensions

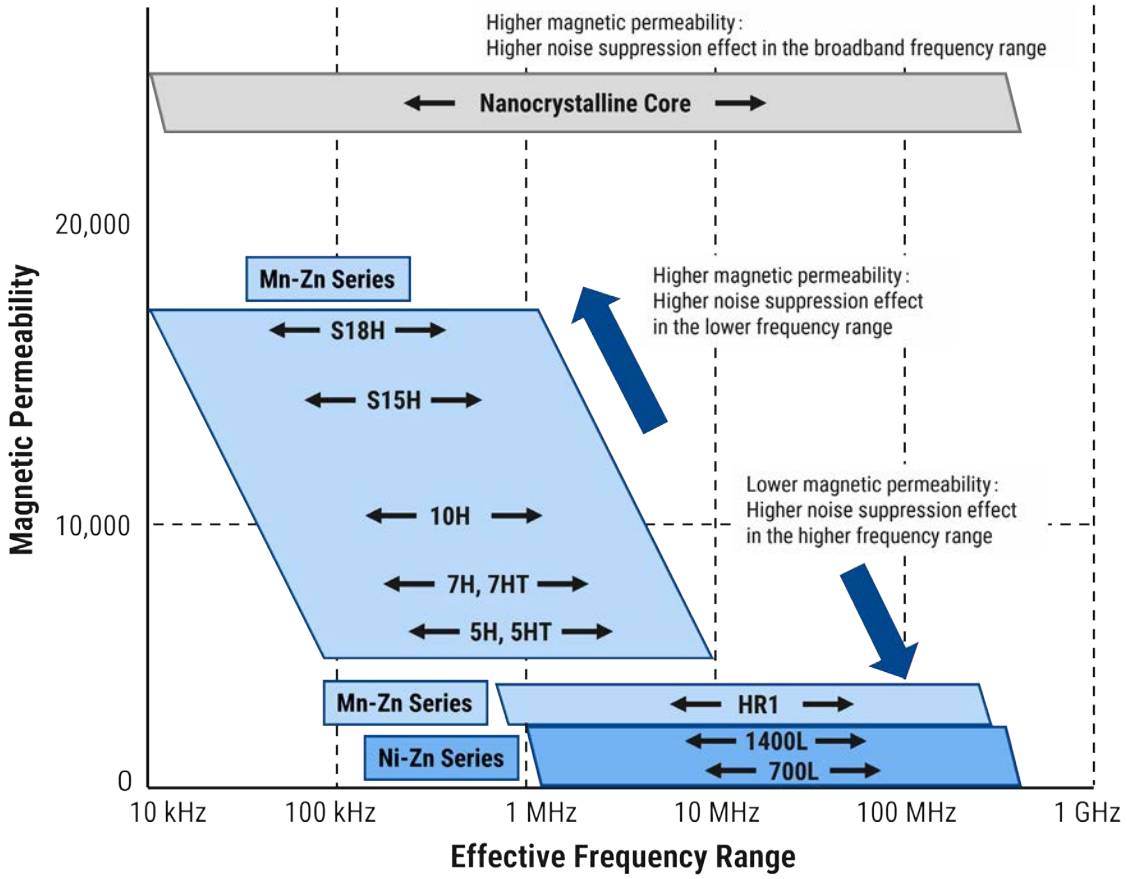
Magnetic Permeability of Ferrite Material

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 4.
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 turns.
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, 7HT, 5H, 5HT, HR1, 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



Performance Characteristics

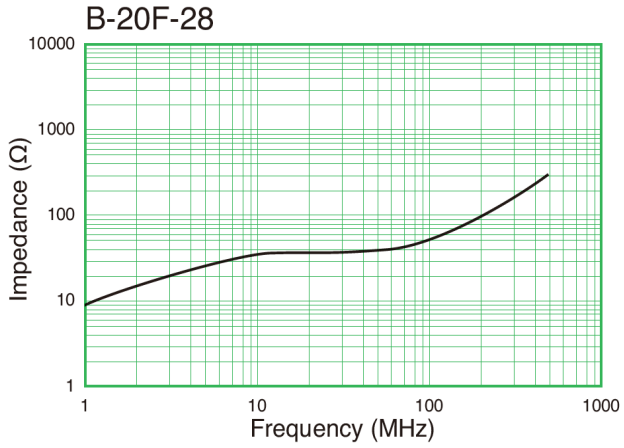
Item	Performance Characteristics
Operating temperature	–25°C to +85°C
Frequency range	Low frequency and high frequency
Outer diameter	2.5 – 9.7 mm
Inner diameter	0.8 – 4.8 mm
Thickness	1.2 – 8.0 mm
Type	Bare and coated

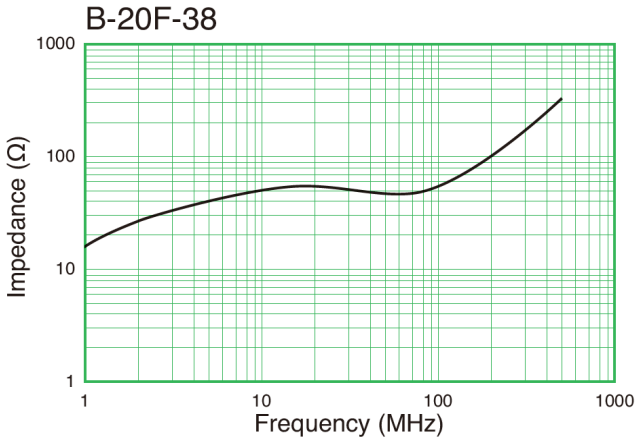
Table 1 – Ratings & Part Number Reference

Part Number	Dimensions (mm)			Weight	Type	Frequency Range[1]	
	OD	ID	T	(g)		≤ 10 MHz (AM band range)	≤ 500 MHz (FM band range)
B-20F-28	2.8 ±0.3	1.3 ±0.3	3.0 ±0.3	0.07	Bare	X	
B-20F-38	3.8 ±0.3	1.5 ±0.3	4.3 ±0.3	0.21	Bare	X	
B-20F-46	4.6 ±0.3	1.5 ±0.3	4.3 ±0.3	0.30	Bare	X	
B-20F-57	5.7 ±0.3	1.5 ±0.3	8.0 ±0.3	0.91	Bare	X	
B-20L-25	2.5 ±0.3	1.0 ±0.3	1.2 ±0.3	0.03	Bare		X
B-20L-34	3.4 ±0.3	0.8 ±0.3	4.4 ±0.3	0.19	Bare		X
B-20L-44	4.4 ±0.3	1.6 ±0.3	7.0 ±0.3	0.46	Bare		X
B-20L-48B	4.8 ±0.3	2.4 ±0.3	4.8 ±0.3	0.34	Bare		X
B-20L-48B-L	4.8 ±0.3	2.4 ±0.3	4.8 ±0.3	0.34	Bare		X
B-20L-48B-A	4.8 ±0.3	2.4 ±0.3	4.8 ±0.3	0.34	Coated		X
B-20L-95B	9.7 ±0.5	4.8 ±0.5	4.2 ±0.5	1.09	Coated		X

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

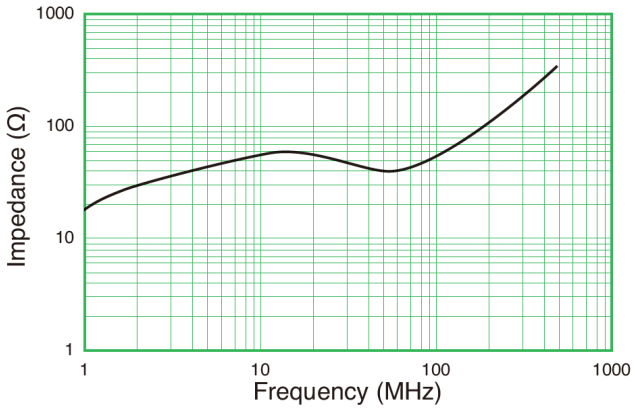
Impedance vs. Frequency



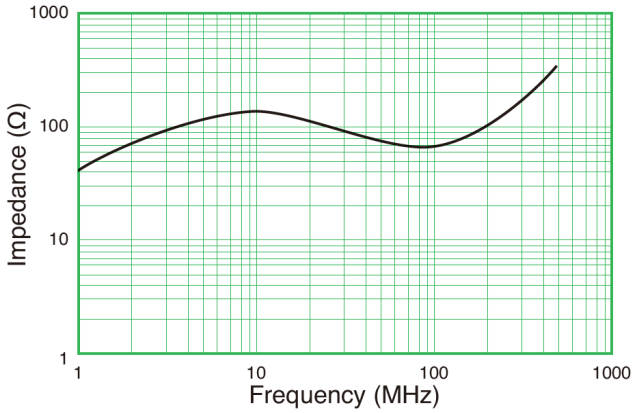


Impedance vs. Frequency cont.

B-20F-46



B-20F-57



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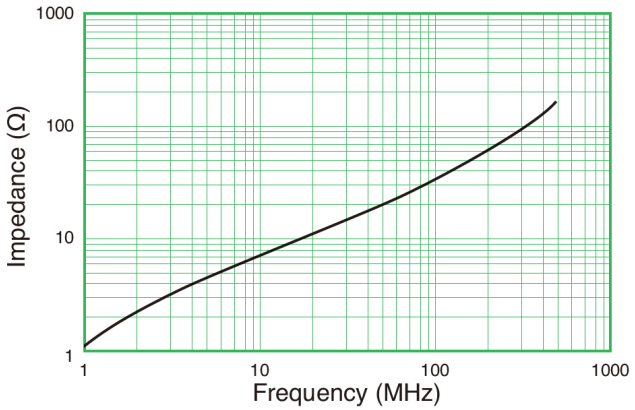

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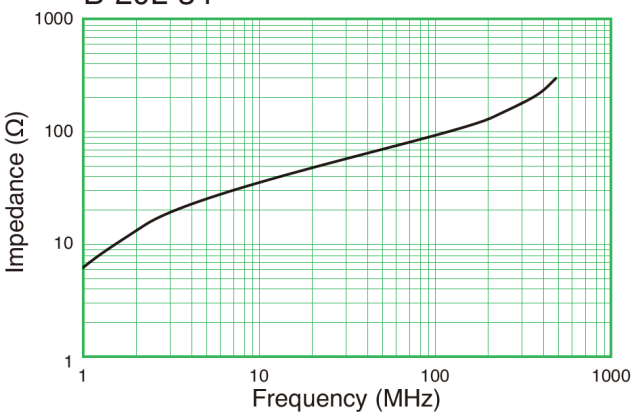

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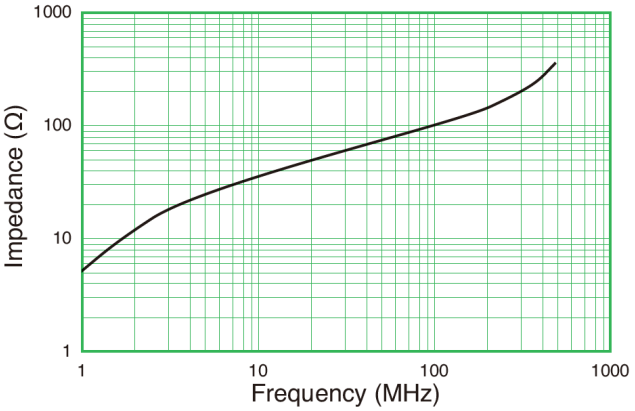
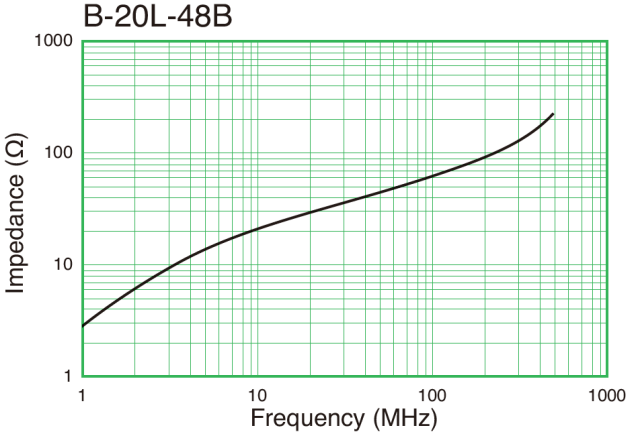
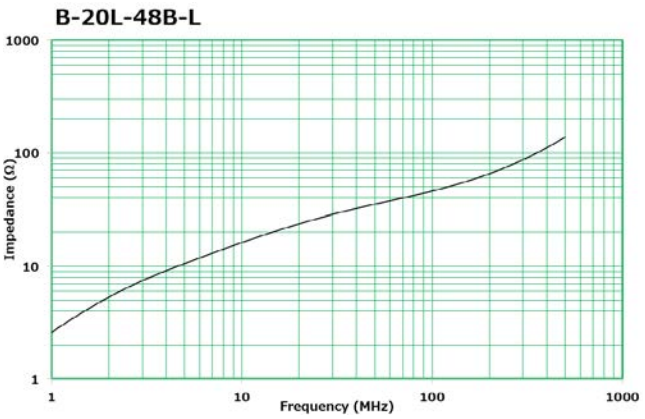
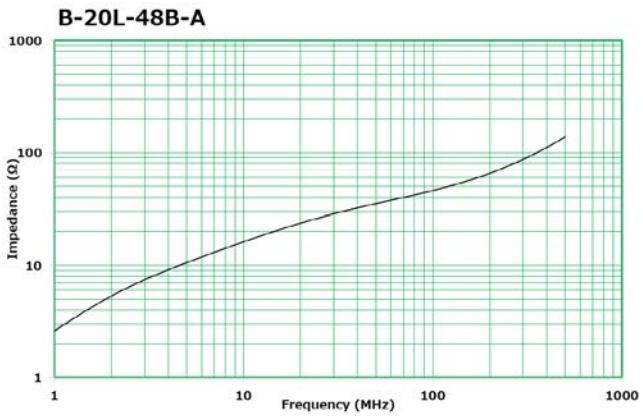


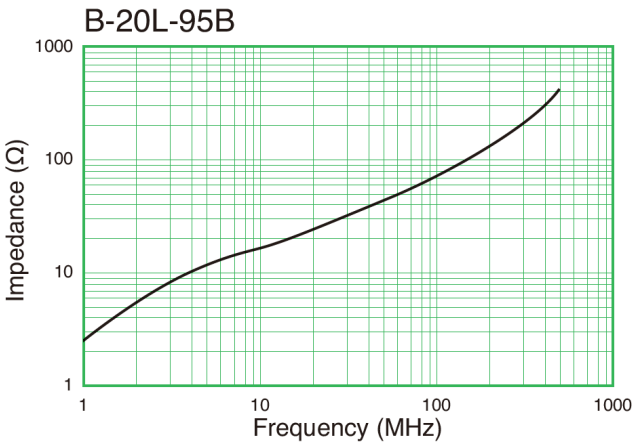
B-20L-48B



Impedance vs. Frequency cont.







Packaging

Part Number	Packaging Type	Pieces per Box
B-20F-28	Bulk	60,000
B-20F-38		30,000
B-20F-46		
B-20F-57		15,000
B-20L-25		30,000
B-20L-34		
B-20L-44		
B-20L-48B		
B-20L-48B-L		
B-20L-48B-A		
B-20L-95B		15,000

Handling Precautions

EMI Cores should be stored in normal working environments. While the EMI Cores themselves are quite robust in other environments, avoid exposure to high temperatures, high humidity, corrosive atmospheres and long term storage for case, snap-on and split types.

KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 75% relative humidity. Atmospheres should be free of chlorine, sulfur and alkali bearing compounds. Avoid also storage near strong magnetic fields as this might magnetize the product.

Temperature fluctuations should be minimized to avoid condensation or cracks on the parts. Mechanical shocks can bring to cracks as well.

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