Ferrite Beads

Signal Line Multilayer Ferrite Chip Beads Z-SMS

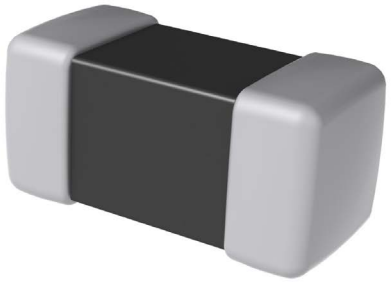
Overview

KEMET Z-SMS Signal Line Multilayer Ferrite Chip Beads are ideal for high frequency noise countermeasures for digital product clock lines and general signal lines. The small size of this ferrite bead makes it suitable for mobile equipement that requires tight space both in dimension and in height. The internal silver printed layer structure creates a closed magnetic circuit which acts as a magnetic shield to minimize heat generation and crosstalk.

Using different type of materials enables to further specialize the function and characteristics of the chip bead:
1) Material “A” for broadband noise suppression. Low R-XL frequency cross point and large resistance part work as damping function, suppress unnecessary resonance and keep signal integrity.
2) Material “B” for noise suppression above 20 MHz, with increased attenuation. For general use especially effective for video signal lines.
3) Material “C” for high frequency noise suppression above 100 MHz. For high speed signal line, effective for clock line.
4) Material “D” for noise suppression around 200 MHz, effective for EMC regulations.
5) Material “E” for strongly suppressing unnecessary resonance from low frequency range, due to lower R-XL frequency cross point compared to material “A”.
6) Material “F” for noise countermeasures around LSI power supplies. This is a low DC resistance version of material “A”.

Applications

- PC, tablet, peripherals
- Interfaces, harness connectors
- Mobile and portable equipment



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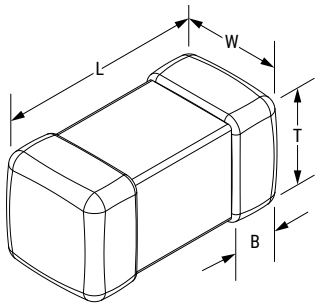
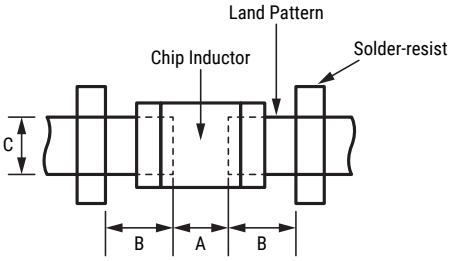
Benefits

- Miniature and low profile
- No grounding needed for flexible circuit design
- Prevents interference between circuits in mobile systems
- Broad range of impedance values
- Impedance value from 10 – 2,500 Ω
- Rated current range from 0.1 – 1.5 A
- Operating temperature range from –55°C to +125°C

Part Number System

Z	0201	C	800	A	SMS	T
Ferrite Bead	EIA Case Size (L" x W")	Specification	Impedance Value (Ω) at 100 MHz	Material	Series	Packaging
	0201 (0603 in mm) 0402 (1005 in mm) 0603 (1608 in mm) 0805 (2012 in mm)	C = Commercial	The first two digits represent the impedance value. The third digit inidcates the number of zeros to be added. Examples: 800 = 80 Ω 101 = 100 Ω 102 = 1000 Ω	A = for broadband noise suppression B = for noise suppression above 20 MHz, with increased attenuation C = for high frequency noise suppression above 100 MHz D = for noise suppression around 200 MHz E = for strongly suppressing unnecessary resonance from low frequency range, lower R-XL frequency cross point version of A F = for noise countermeasures around LSI power supplies, low DCR version of A	SMS = Signal Line Multilayer Ferrite Chip Beads	T = Tape & Reel

Dimensions – Millimeters (Inches)

Dimensions - Millimeters (Inches)						Land Pattern - Millimeters		
								
EIA Size Code	**Metric Size Code**	**L Length**	**W Width**	**T Thickness**	**B Bandwidth**	**A**	**B**	**C**
0201	0603	0.60 (0.024) ±0.03 (0.001)	0.30 (0.012) ±0.03 (0.001)	0.30 (0.012) ±0.03 (0.001)	0.15 (0.006) ±0.05 (0.002)	0.20 ~ 0.30	0.20 ~ 0.30	0.25 ~ 0.40
0402	1005	1.00 (0.039) ±0.05 (0.002)	0.50 (0.020) ±0.05 (0.002)	0.50 (0.020) ±0.05 (0.002)	0.25 (0.010) ±0.10 (0.004)	0.45 ~ 0.55	0.40 ~ 0.50	0.45 ~ 0.55
0630	1608	1.60 (0.063) ±0.15 (0.006)	0.80 (0.031) ±0.15 (0.006)	0.80 (0.031) ±0.15 (0.006)	0.30 (0.012) ±0.20 (0.008)	0.80 ~ 1.00	0.60 ~ 0.80	0.60 ~ 0.80
0805	2012	2.00 (0.079) +0.30/-0.10 (+0.012/-0.004)	1.25 (0.049) ±0.20 (0.008)	0.85 (0.033) ±0.2 (0.008) 1.25 (0.049) ±0.2 (0.008)	0.50 (0.020) ±0.30 (0.012)	0.80 ~ 1.20	0.80 ~ 1.20	0.90 ~ 1.60

Performance Characteristics

Item	Performance Characteristics
Impedance Range at 100 MHz	10 – 2,500 Ω
Impedance Tolerance at 100 MHz	±25%
Rated Current Range	0.1 – 1.5 A maximum
Rated DC Resistance Range	0.03 – 1.5 Ω maximum
Operating Temperature Range	–55°C to +125°C (includes self temperature rise)

Environmental Compliance

All KEMET Ferrite Beads are RoHS and REACH Compliant.





Table 1 – Ratings & Part Number Reference

Part Number	Impedance (Ω) at 100 MHz	Impedance Tolerance	Rated Current (A) Maximum	DC Resistance (Ω) Maximum
Z0201C220ASMST	22	± 25 %	0.500	0.065
Z0201C330ASMST	33	± 25 %	0.500	0.070
Z0201C800ASMST	80	± 25 %	0.200	0.400
Z0201C121ASMST	120	± 25 %	0.200	0.450
Z0201C241ASMST	240	± 25 %	0.200	0.650
Z0201C601ASMST	600	± 25 %	0.150	1.200
Z0201C600BSMST	60	± 25 %	0.200	0.250
Z0201C121BSMST	120	± 25 %	0.200	0.400
Z0201C241BSMST	240	± 25 %	0.200	0.800
Z0201C471BSMST	470	± 25 %	0.100	1.050
Z0201C100CSMST	10	± 25 %	0.200	0.250
Z0201C220CSMST	22	± 25 %	0.200	0.450
Z0201C330CSMST	33	± 25 %	0.150	0.550
Z0201C470CSMST	47	± 25 %	0.150	0.700
Z0201C560CSMST	56	± 25 %	0.100	1.000
Z0201C121CSMST	120	± 25 %	0.100	1.500
Z0402C680ESMST	68	± 25 %	0.500	0.170
Z0402C121ESMST	120	± 25 %	0.450	0.240
Z0402C241ESMST	240	± 25 %	0.400	0.310
Z0402C431ESMST	430	± 25 %	0.350	0.500
Z0402C601ESMST	600	± 25 %	0.300	0.600
Z0402C100ASMST	10	± 25 %	1.000	0.030
Z0402C330ASMST	33	± 25 %	0.700	0.060
Z0402C680ASMST	68	± 25 %	0.700	0.100
Z0402C800ASMST	80	± 25 %	0.700	0.100
Z0402C121ASMST	120	± 25 %	0.500	0.200
Z0402C241ASMST	240	± 25 %	0.400	0.300
Z0402C431ASMST	430	± 25 %	0.350	0.450
Z0402C601ASMST	600	± 25 %	0.300	0.550
Z0402C102ASMST	1,000	± 25 %	0.300	0.580
Z0402C121BSMST	120	± 25 %	0.300	0.180
Z0402C241BSMST	240	± 25 %	0.300	0.300
Part Number	**Impedance**	**Impedance Tolerance**	**Rated Current**	**DC Resistance**

Table 1 – Ratings & Part Number Reference cont.

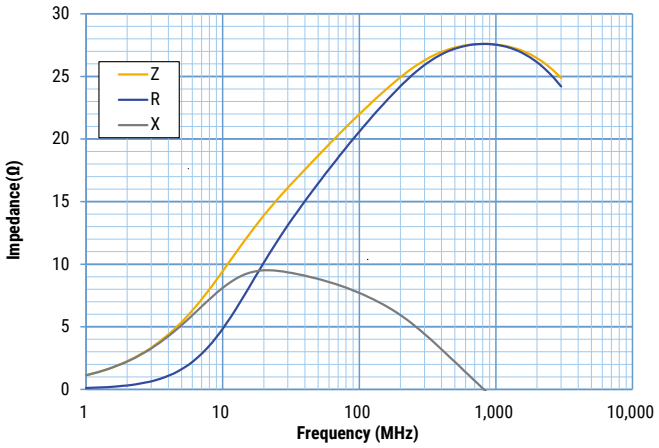
Part Number	Impedance (Ω) at 100 MHz	Impedance Tolerance	Rated Current (A) Maximum	DC Resistance (Ω) Maximum
Z0402C471BSMST	470	± 25 %	0.250	0.450
Z0402C601BSMST	600	± 25 %	0.250	0.500
Z0402C102BSMST	1,000	± 25 %	0.150	0.700
Z0402C100CSMST	10	± 25 %	0.500	0.110
Z0402C220CSMST	22	± 25 %	0.400	0.180
Z0402C330CSMST	33	± 25 %	0.400	0.250
Z0402C470CSMST	47	± 25 %	0.350	0.330
Z0402C680CSMST	68	± 25 %	0.400	0.310
Z0402C121CSMST	120	± 25 %	0.350	0.450
Z0402C181CSMST	180	± 25 %	0.300	0.500
Z0402C241CSMST	240	± 25 %	0.250	0.700
Z0402C182DSMST	1,800	± 25 %	0.120	0.900
Z0603C121ESMST	120	± 25 %	0.600	0.150
Z0603C241ESMST	240	± 25 %	0.450	0.250
Z0603C431ESMST	430	± 25 %	0.400	0.300
Z0603C601ESMST	600	± 25 %	0.300	0.400
Z0603C220ASMST	22	± 25 %	1.500	0.050
Z0603C330ASMST	33	± 25 %	1.200	0.080
Z0603C470ASMST	47	± 25 %	0.900	0.100
Z0603C600ASMST	60	± 25 %	0.800	0.100
Z0603C800ASMST	80	± 25 %	0.600	0.100
Z0603C121ASMST	120	± 25 %	0.500	0.180
Z0603C241ASMST	240	± 25 %	0.400	0.250
Z0603C601ASMST	600	± 25 %	0.350	0.450
Z0603C102ASMST	1,000	± 25 %	0.300	0.600
Z0603C121BSMST	120	± 25 %	0.350	0.200
Z0603C241BSMST	240	± 25 %	0.300	0.350
Z0603C471BSMST	470	± 25 %	0.250	0.450
Z0603C601BSMST	600	± 25 %	0.250	0.600
Z0603C102BSMST	1,000	± 25 %	0.200	0.700
Z0603C300CSMST	30	± 25 %	0.500	0.200
Z0603C470CSMST	47	± 25 %	0.400	0.300
Z0603C560CSMST	56	± 25 %	0.400	0.300
Z0603C680CSMST	68	± 25 %	0.300	0.350
Z0603C121CSMST	120	± 25 %	0.300	0.500
Z0603C181CSMST	180	± 25 %	0.250	0.650
Z0603C241CSMST	240	± 25 %	0.250	0.800
Z0603C331CSMST	330	± 25 %	0.200	0.850
Z0603C431CSMST	430	± 25 %	0.200	0.850
Z0603C511CSMST	510	± 25 %	0.200	0.900
Z0603C681CSMST	680	± 25 %	0.150	1.000
Z0603C751DSMST	750	± 25 %	0.300	0.600
Z0603C152DSMST	1,500	± 25 %	0.250	0.750
Z0603C182DSMST	1,800	± 25 %	0.200	0.850
Z0603C252DSMST	2,500	± 25 %	0.200	1.100
Z0603C431FSMST	430	± 25 %	0.400	0.273
Part Number	**Impedance**	**Impedance Tolerance**	**Rated Current**	**DC Resistance**

Table 1 – Ratings & Part Number Reference cont.

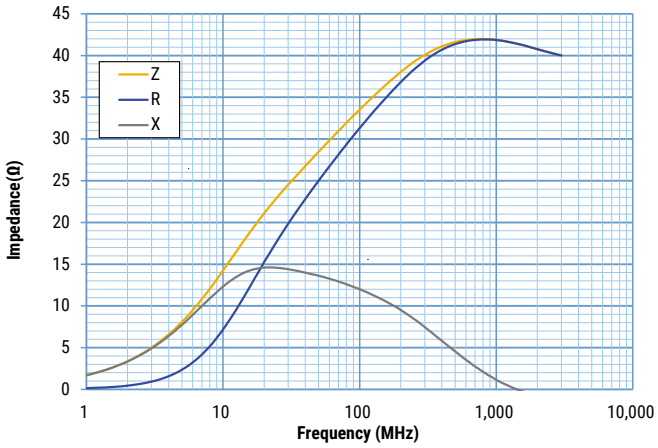
Part Number	Impedance (Ω) at 100 MHz	Impedance Tolerance	Rated Current (A) Maximum	DC Resistance (Ω) Maximum
Z0603C601FSMST	600	± 25 %	0.350	0.351
Z0603C102FSMST	1,000	± 25 %	0.300	0.390
Z0805C150ASMST	15	± 25 %	1.200	0.050
Z0805C220ASMST	22	± 25 %	1.200	0.050
Z0805C330ASMST	33	± 25 %	1.200	0.050
Z0805C470ASMST	47	± 25 %	1.000	0.050
Z0805C750ASMST	75	± 25 %	1.000	0.100
Z0805C101ASMST	100	± 25 %	0.900	0.100
Z0805C121ASMST	120	± 25 %	0.800	0.150
Z0805C241ASMST	240	± 25 %	0.600	0.200
Z0805C431ASMST	430	± 25 %	0.500	0.250
Z0805C601ASMST	600	± 25 %	0.500	0.300
Z0805C102ASMST	1,000	± 25 %	0.300	0.400
Z0805C121BSMST	120	± 25 %	0.800	0.150
Z0805C241BSMST	240	± 25 %	0.600	0.200
Z0805C471BSMST	470	± 25 %	0.500	0.250
Z0805C601BSMST	600	± 25 %	0.500	0.250
Z0805C102BSMST	1,000	± 25 %	0.400	0.350
Z0805C560CSMST	56	± 25 %	0.600	0.200
Z0805C121CSMST	120	± 25 %	0.400	0.300
Z0805C241CSMST	240	± 25 %	0.300	0.350
Z0805C751DSMST	750	± 25 %	0.400	0.300
Z0805C152DSMST	1,500	± 25 %	0.400	0.350
Z0805C182DSMST	1,800	± 25 %	0.300	0.450
Z0805C252DSMST	2,500	± 25 %	0.200	0.750
Part Number	**Impedance**	**Impedance Tolerance**	**Rated Current**	**DC Resistance**

Frequency Characteristics

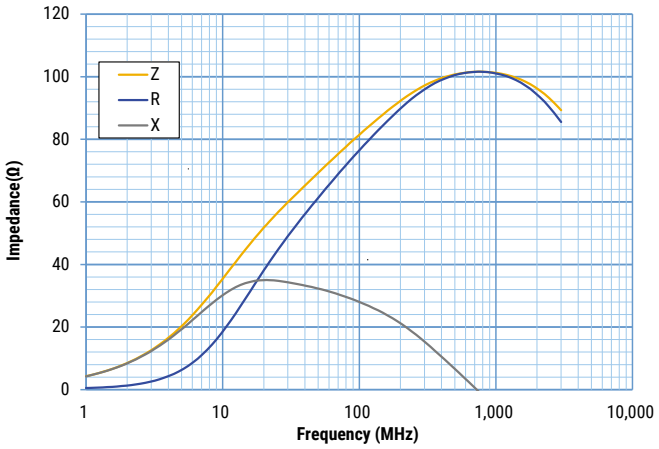
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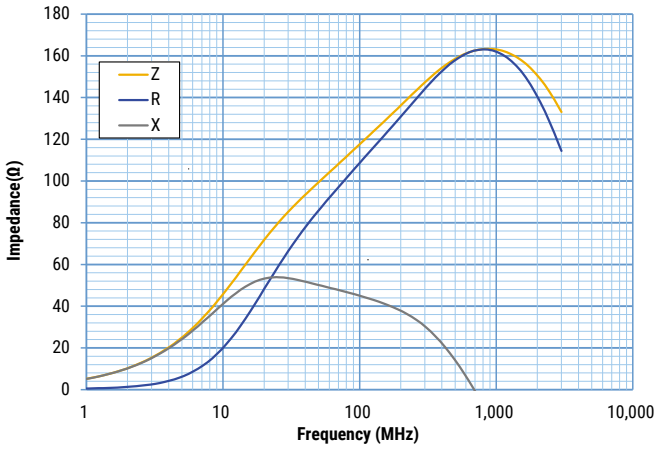
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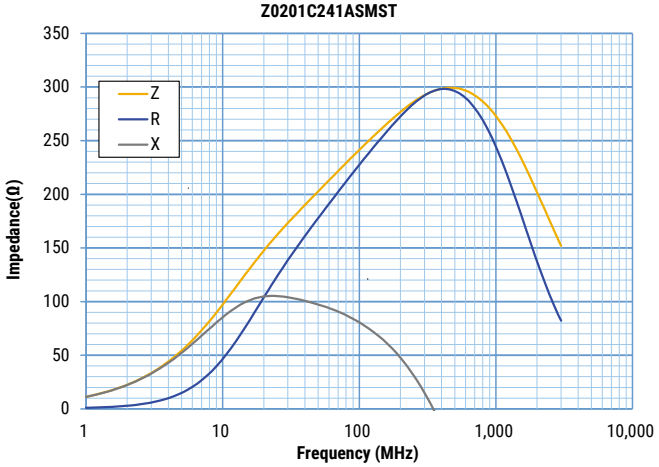
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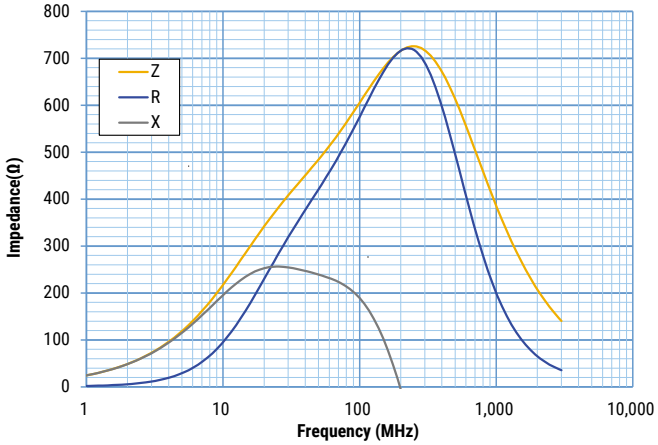
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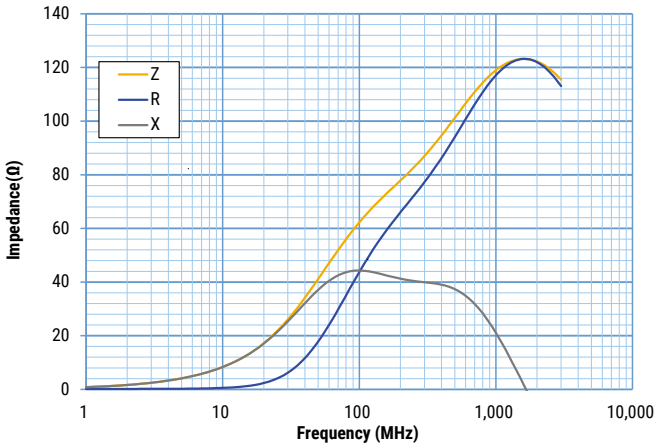


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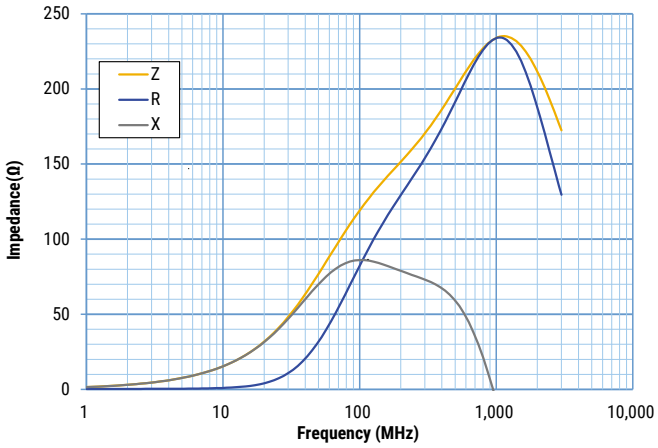


Frequency Characteristics cont.

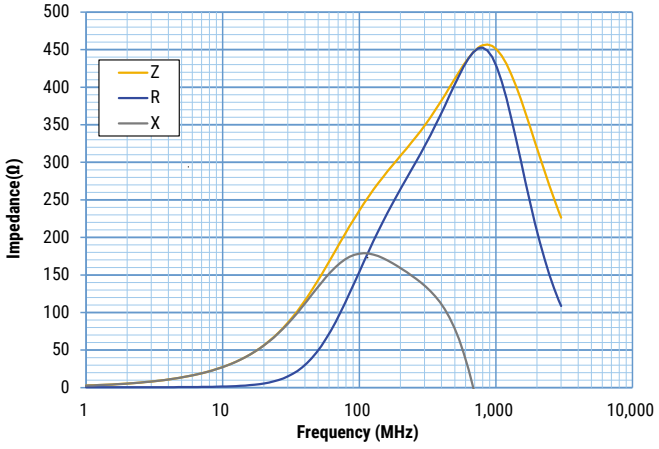
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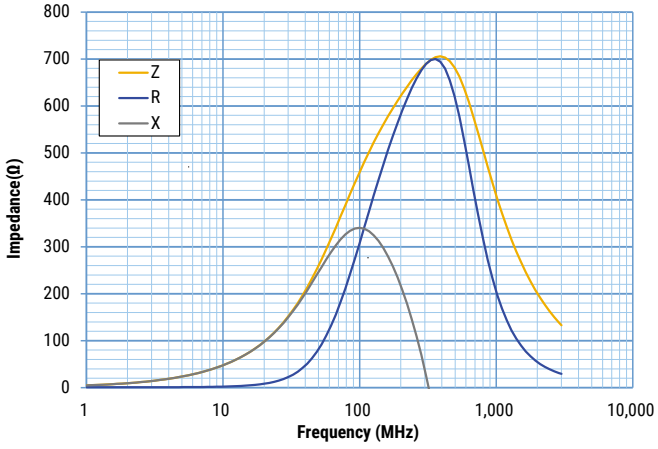
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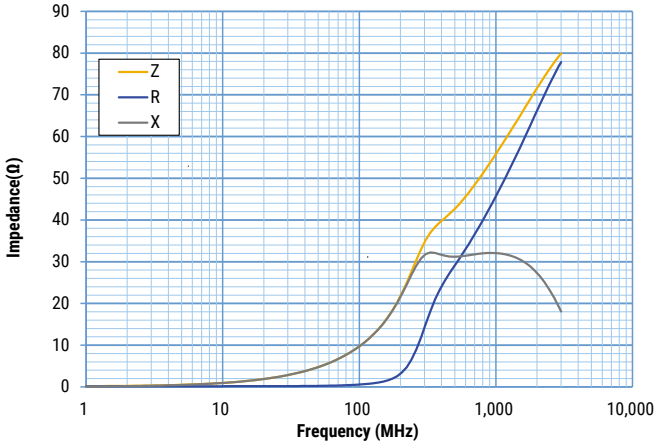
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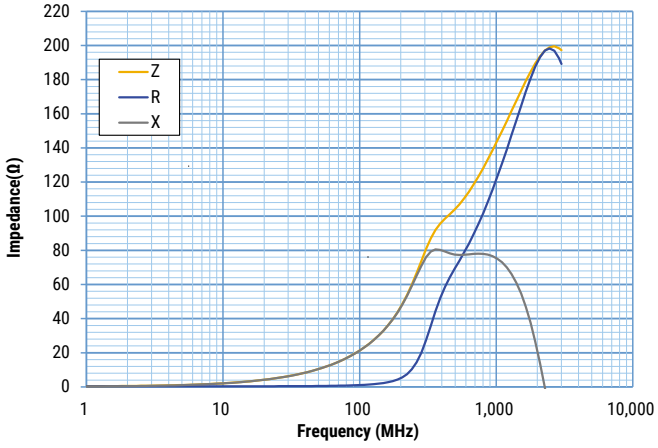
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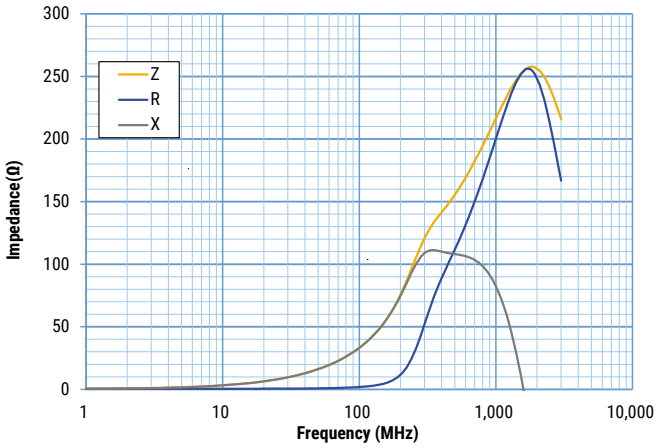


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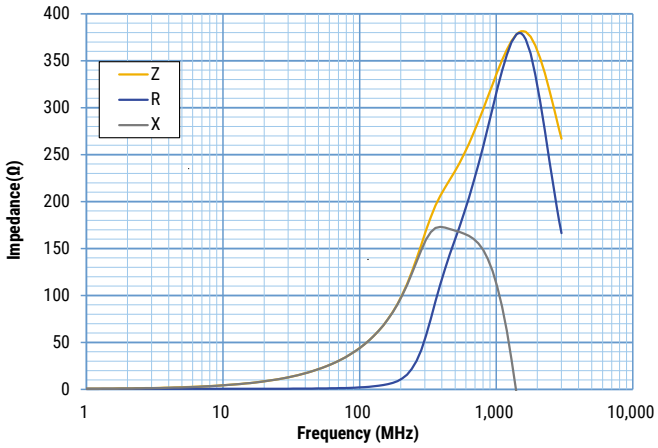


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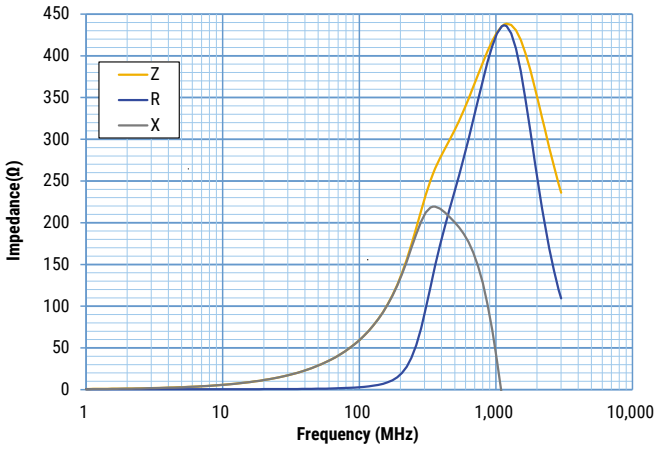
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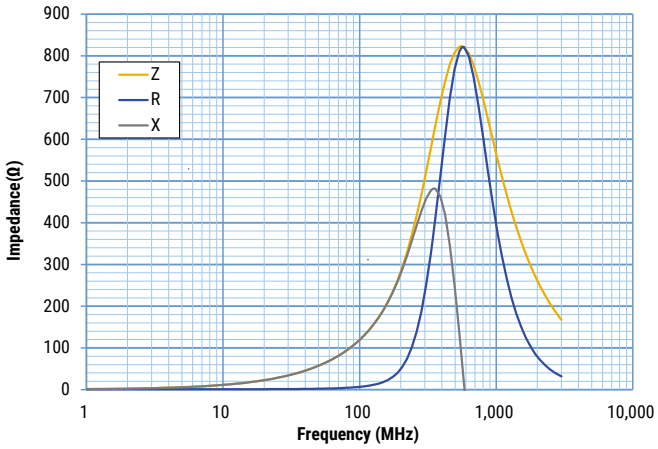
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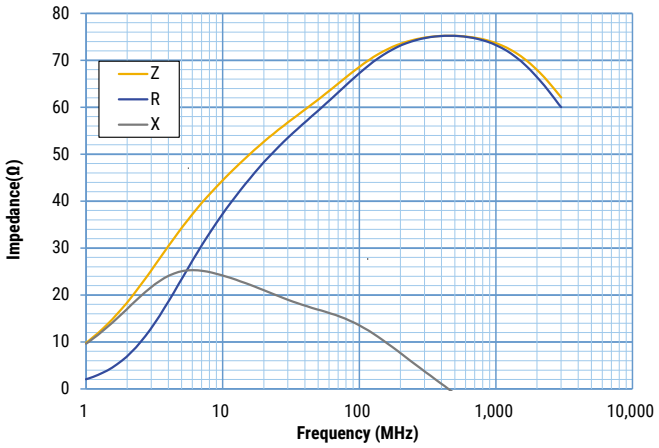
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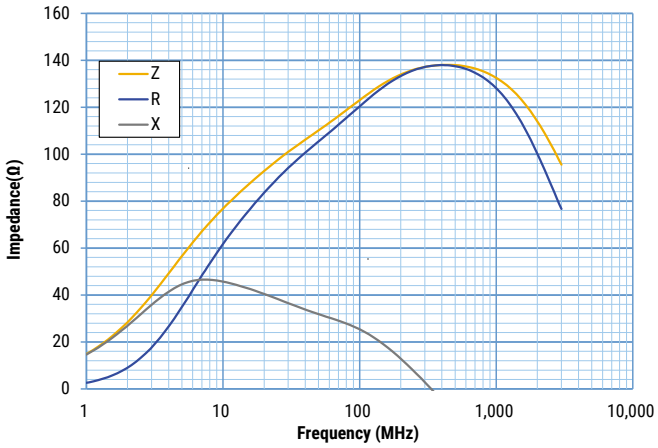
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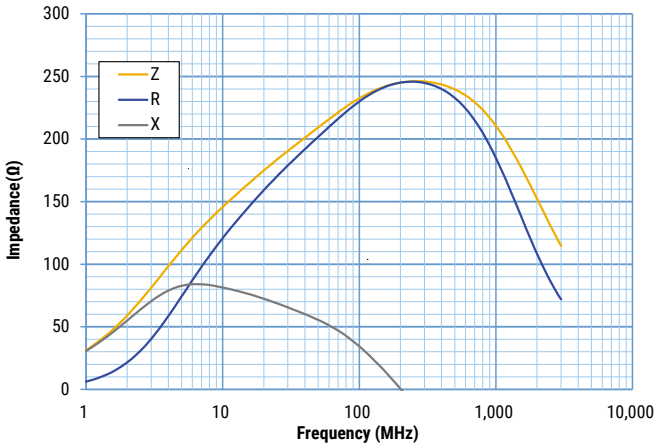


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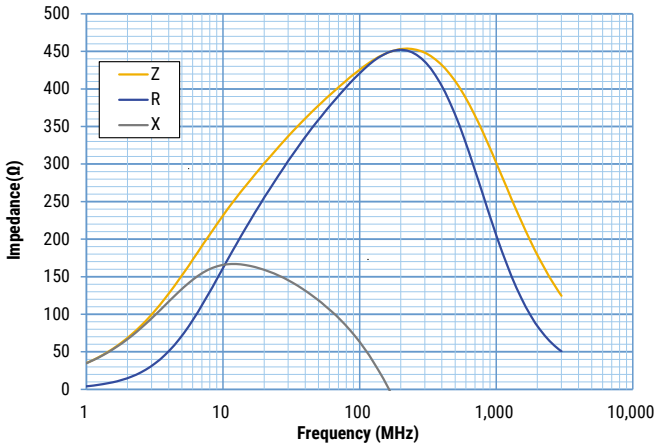


Frequency Characteristics cont.

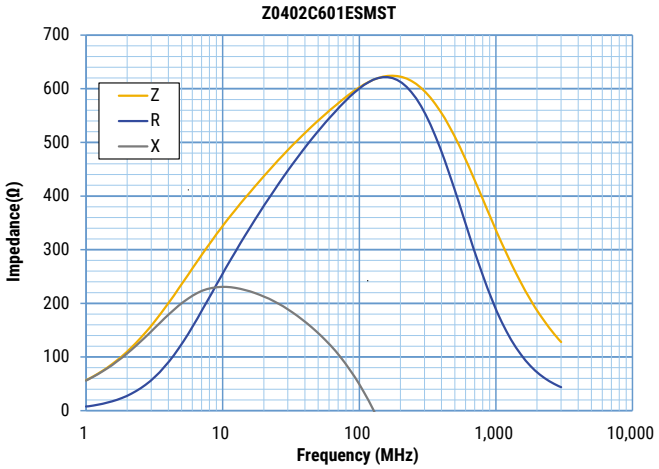
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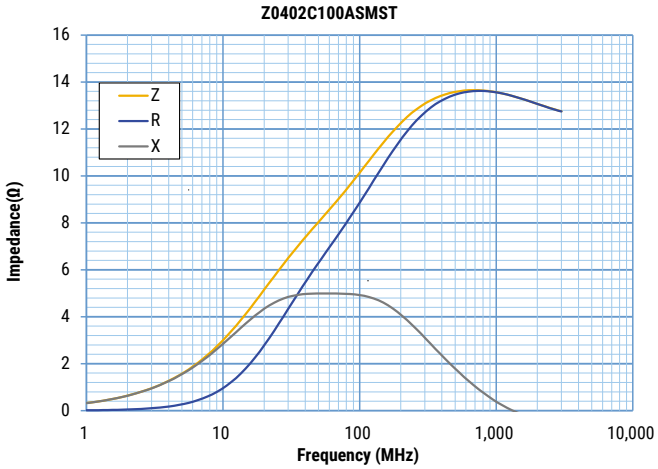
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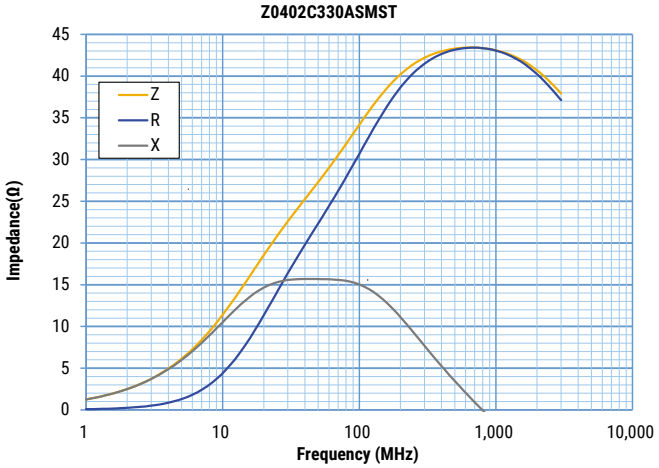
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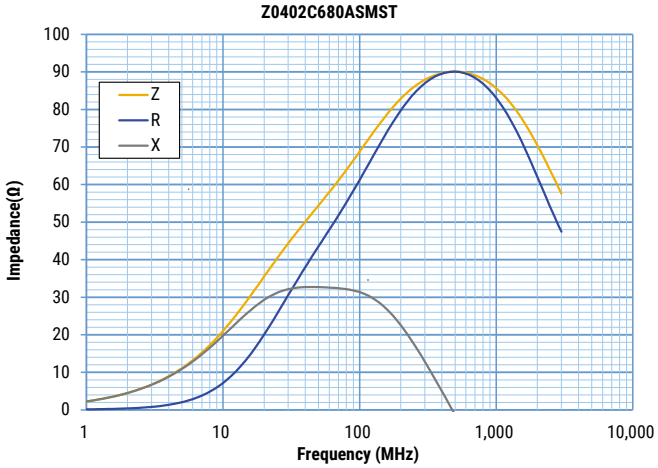
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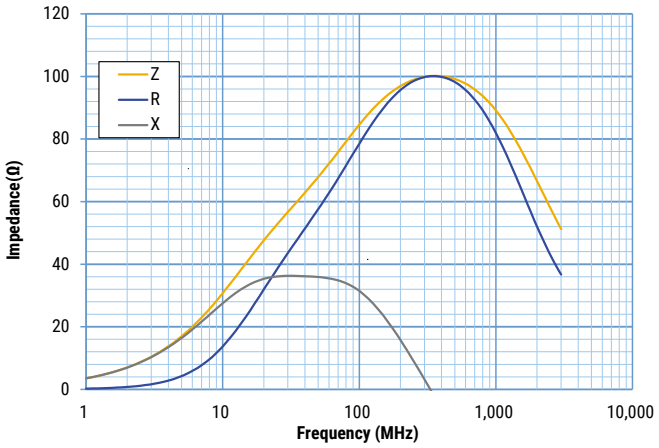


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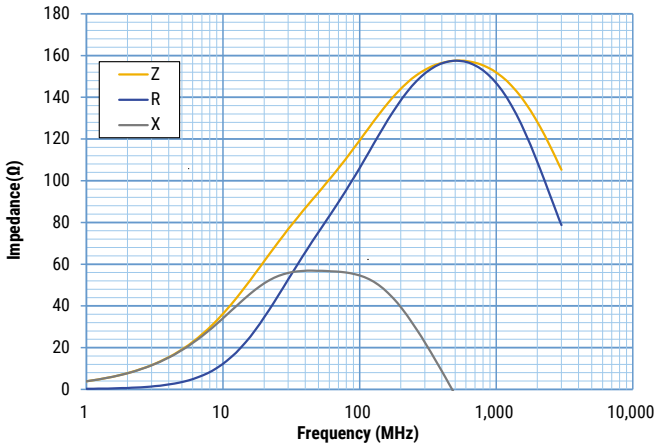


Frequency Characteristics cont.

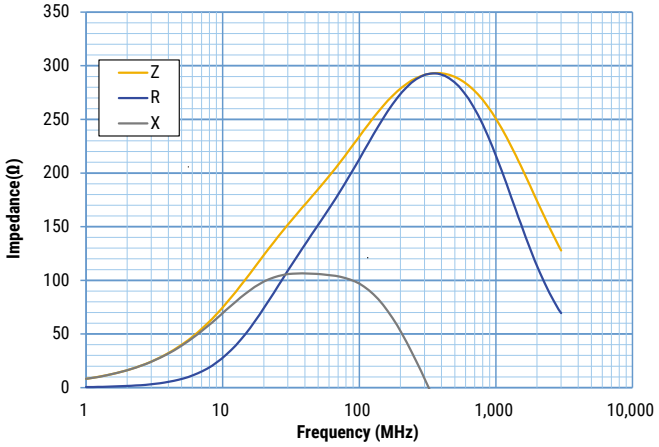
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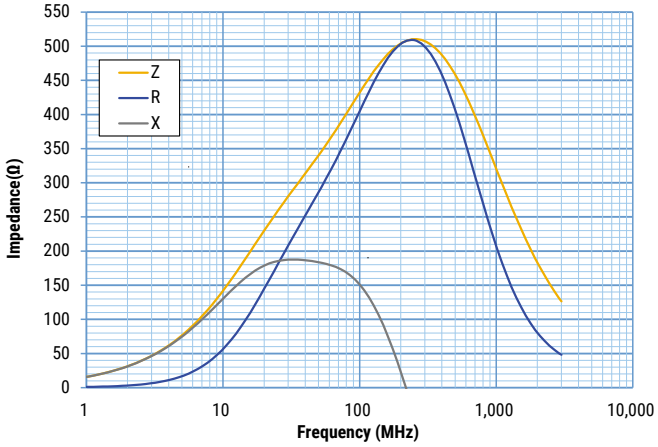
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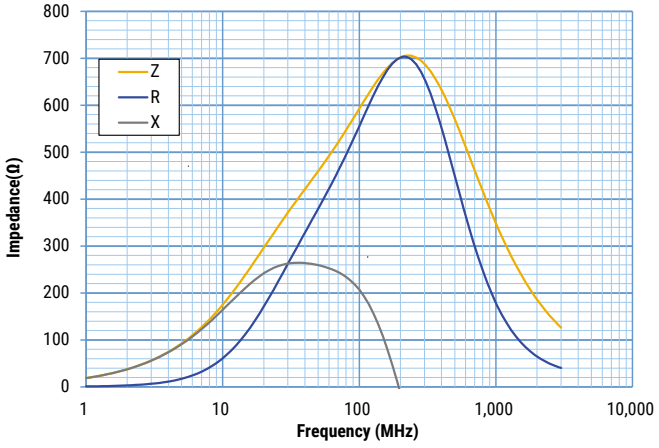
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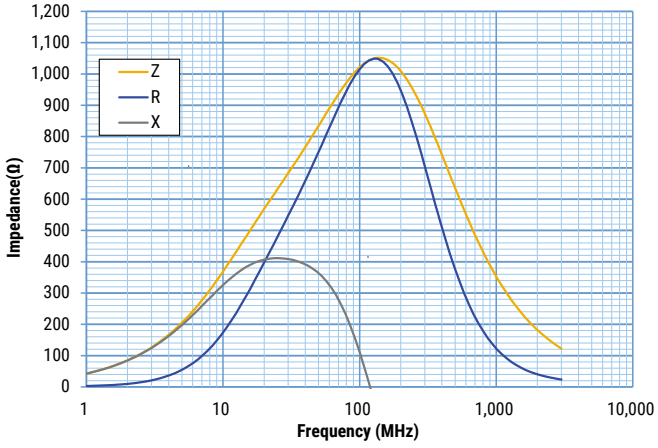
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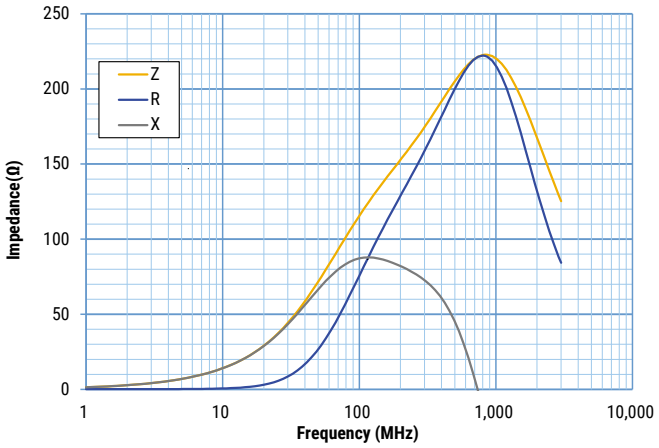


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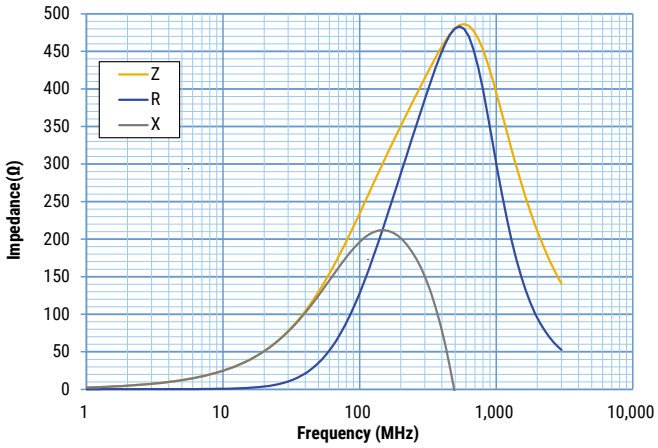


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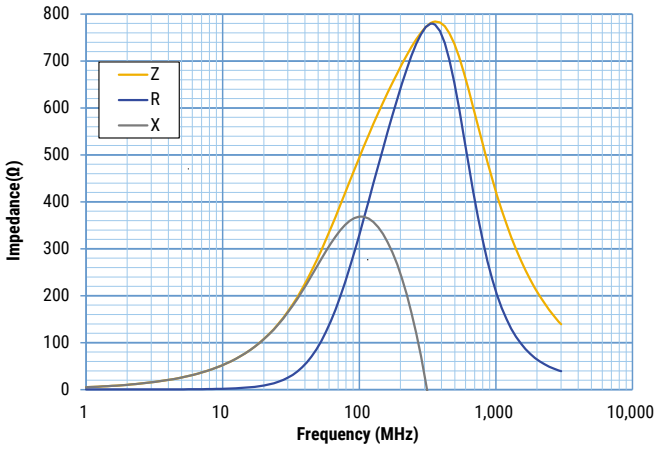
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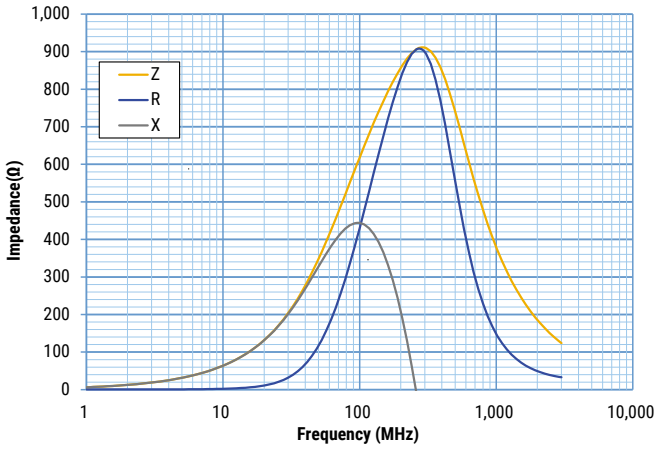
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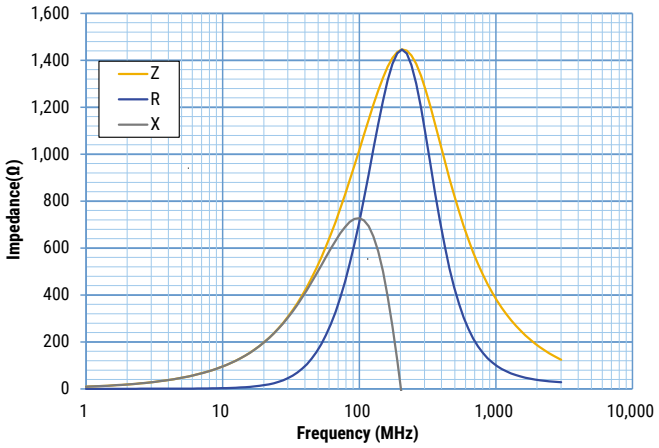
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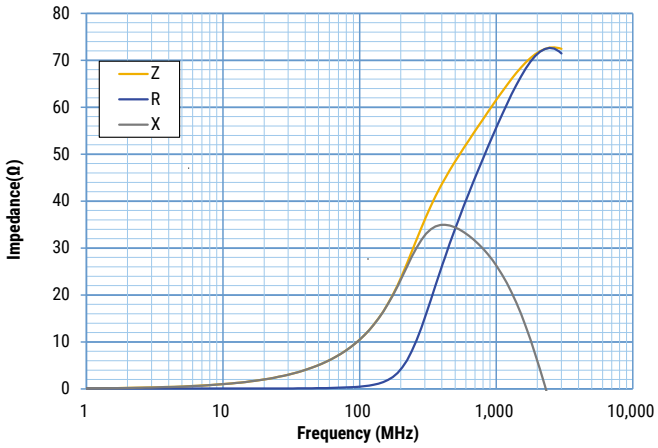
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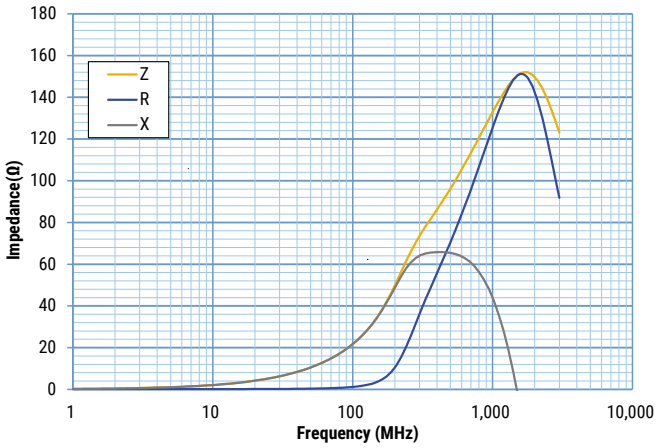


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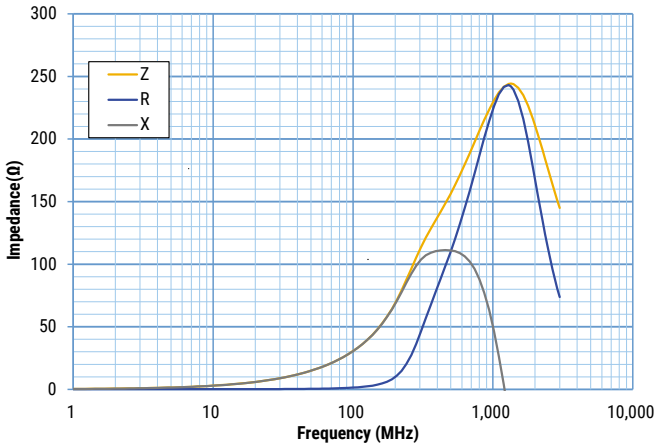


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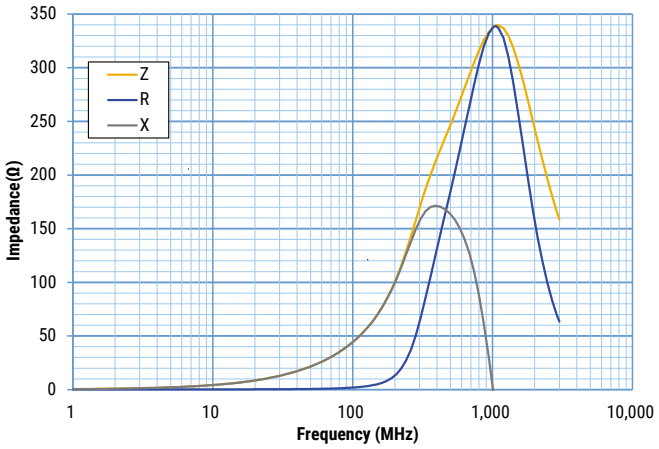
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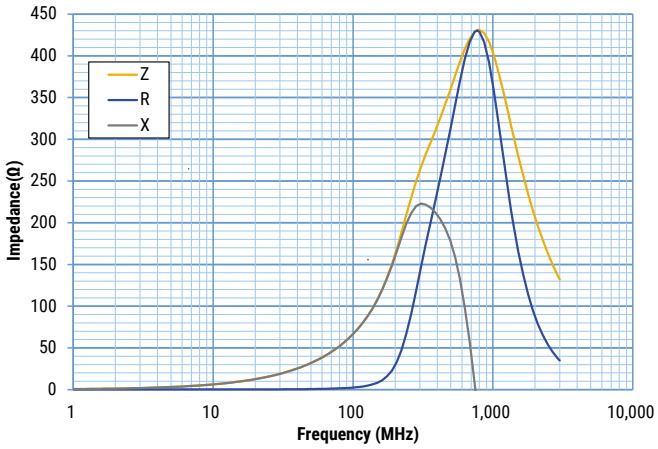
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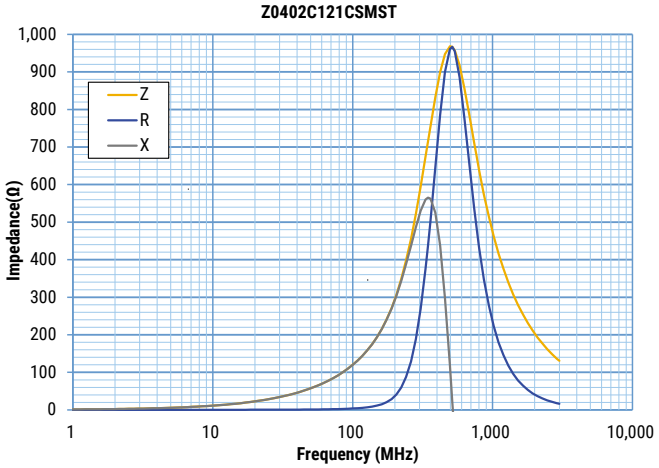
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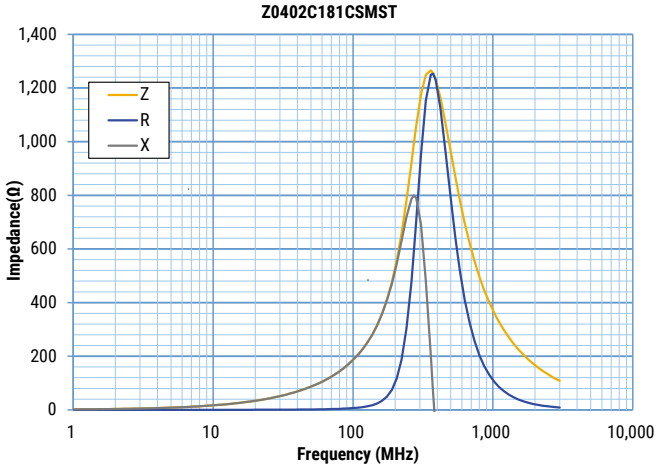
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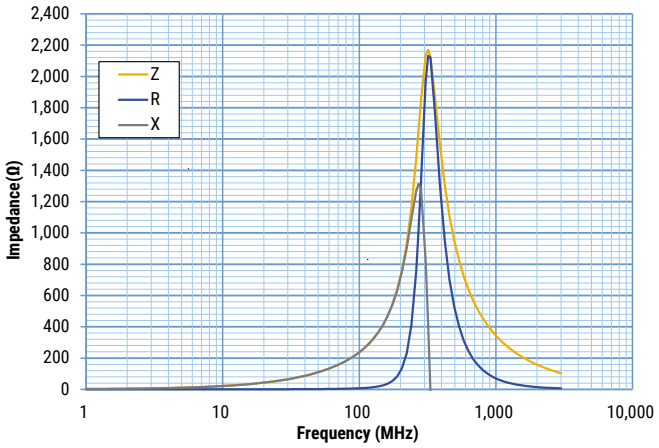


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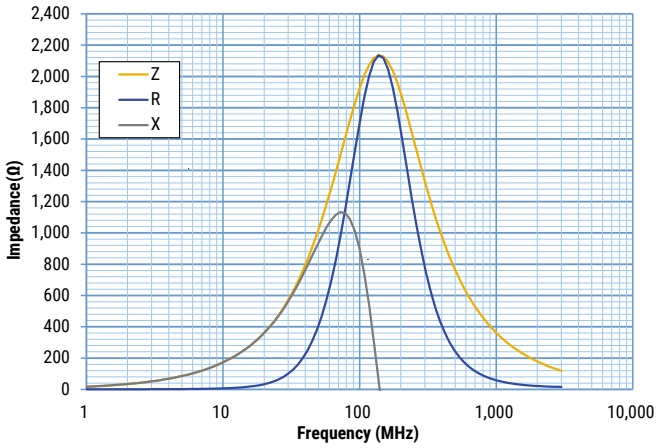


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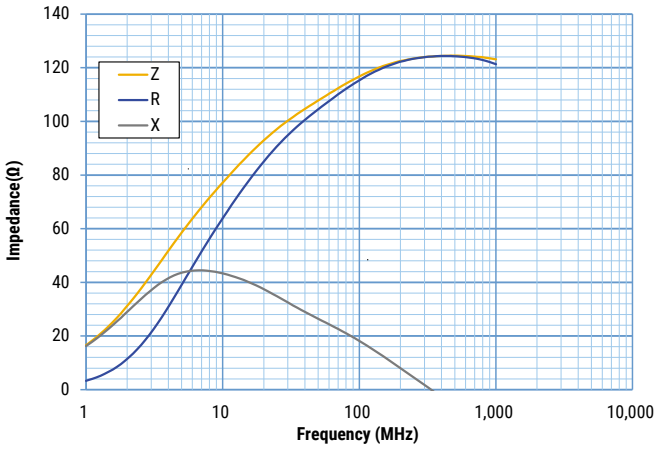
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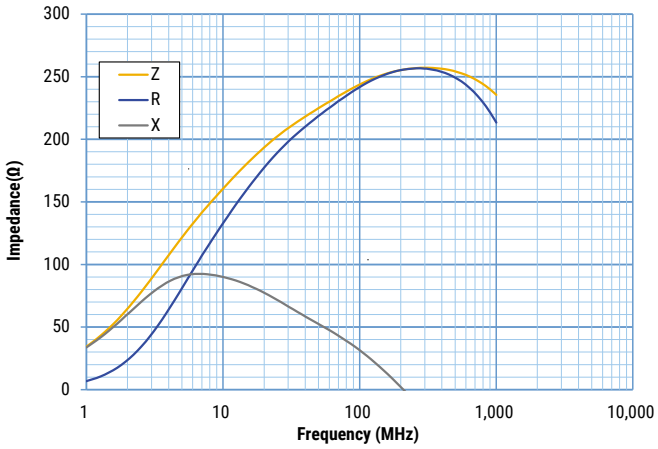
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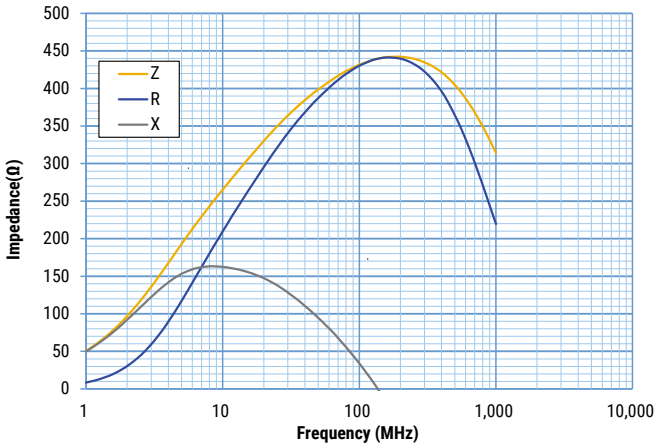
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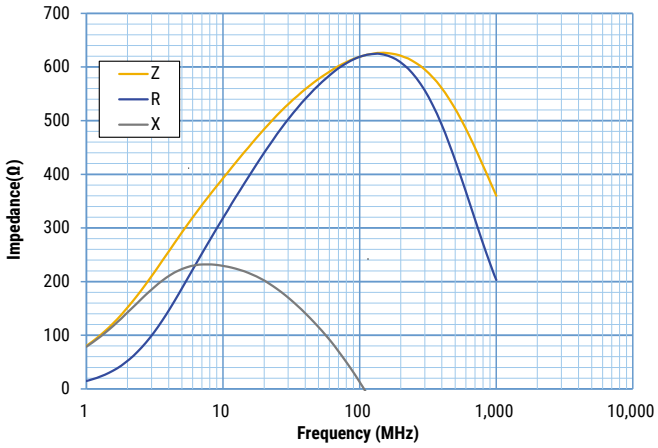
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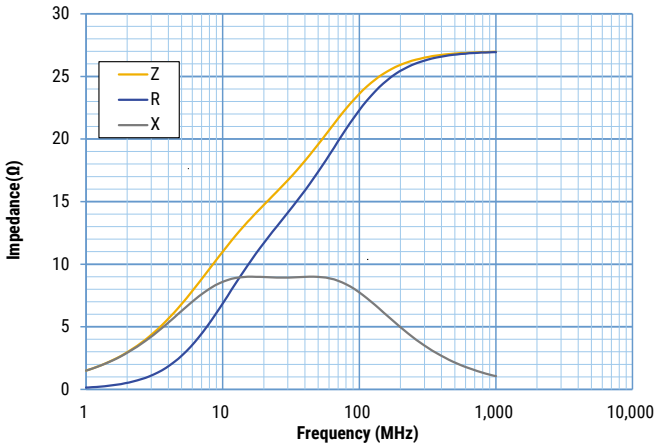


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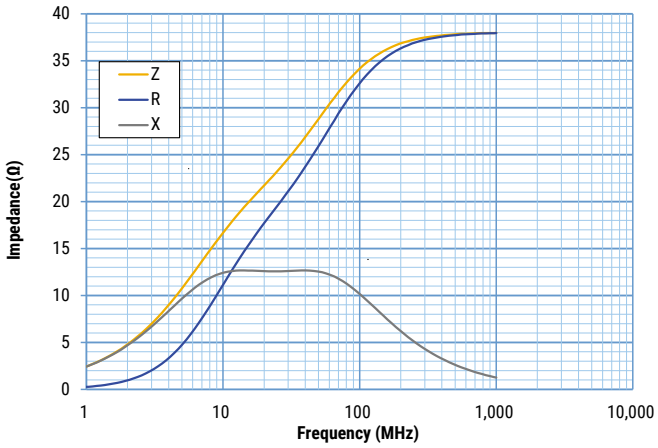


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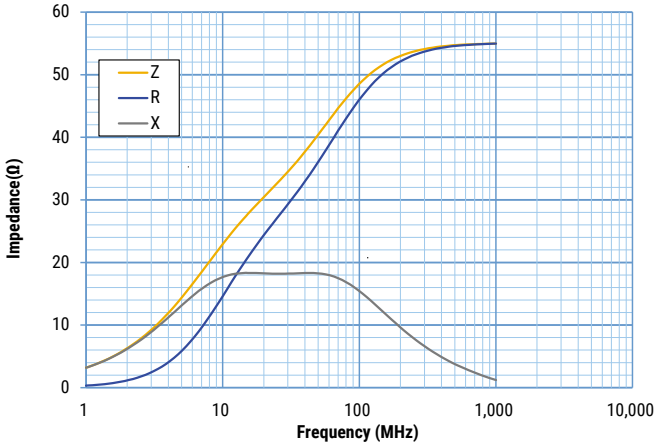
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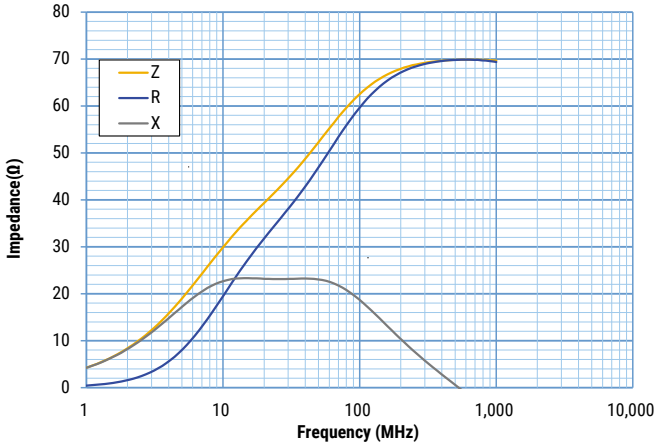
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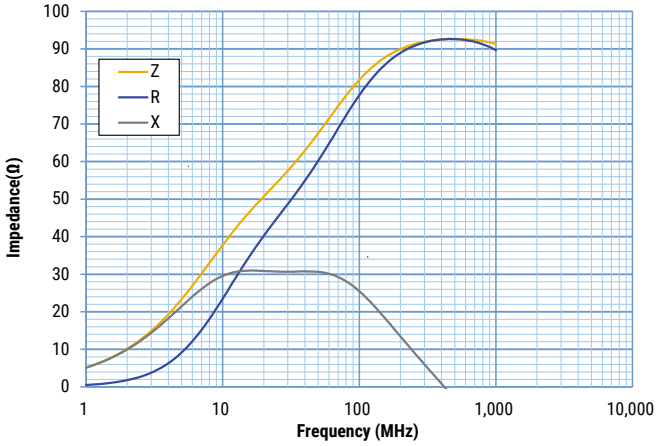
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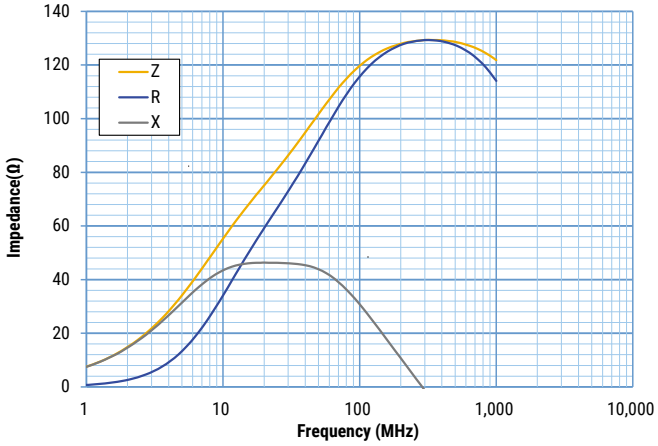
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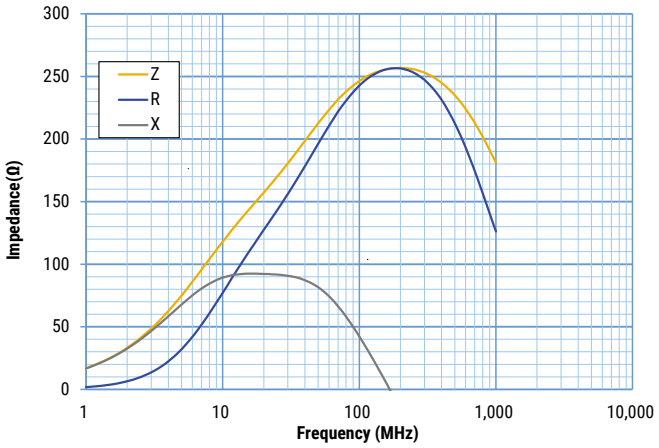


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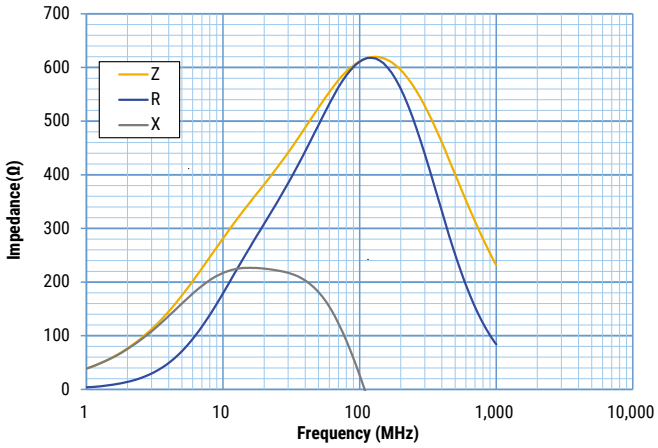


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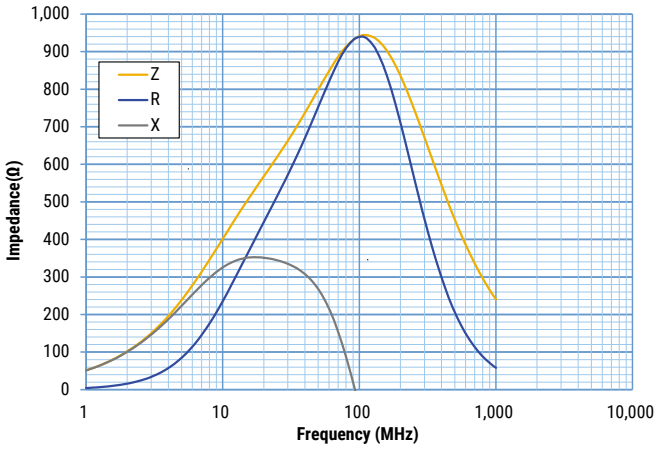
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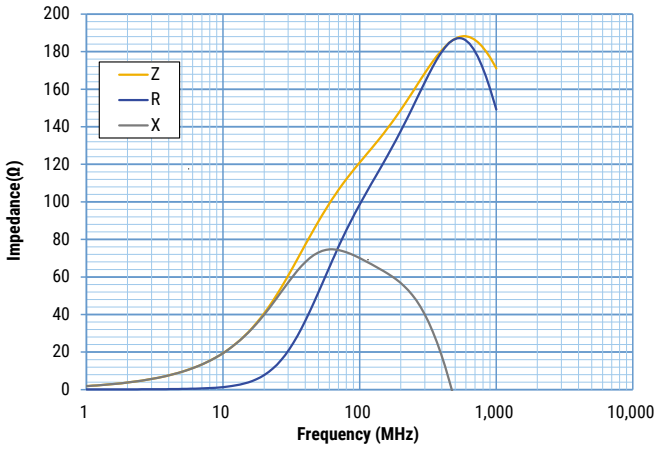
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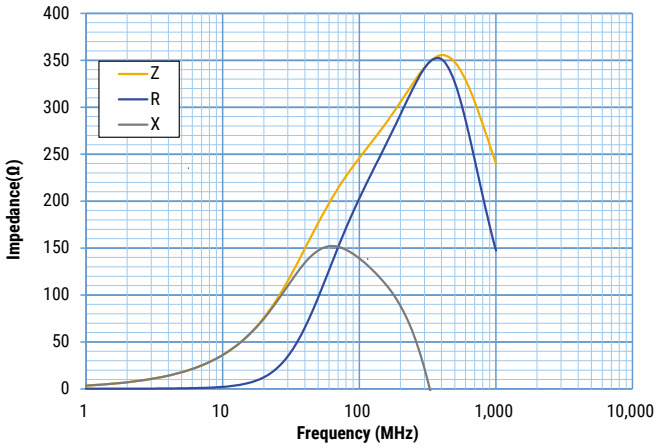
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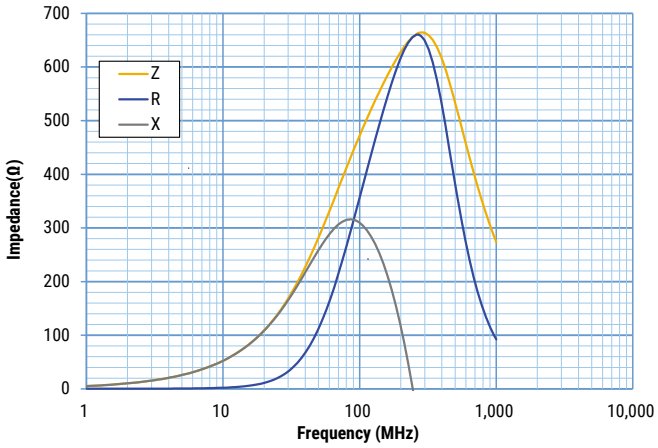
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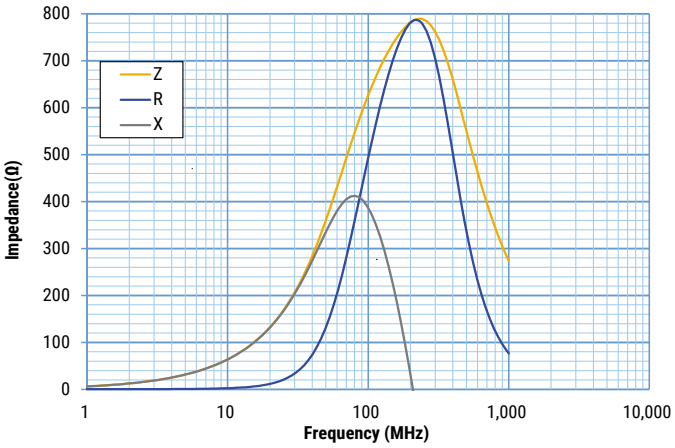


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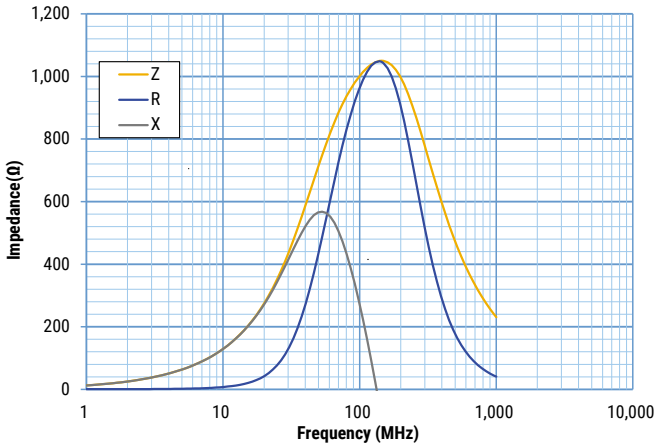


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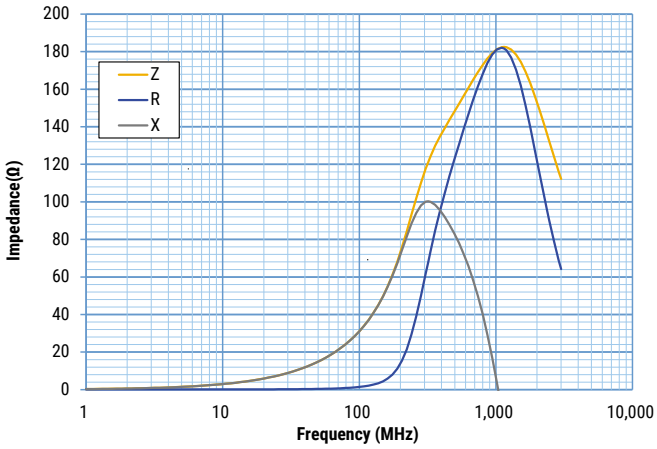
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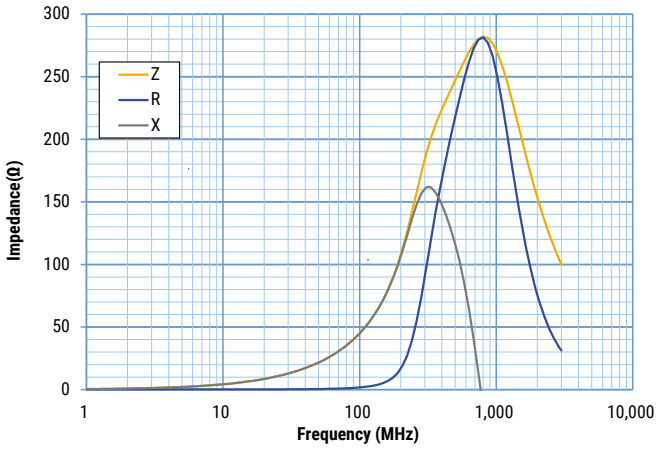
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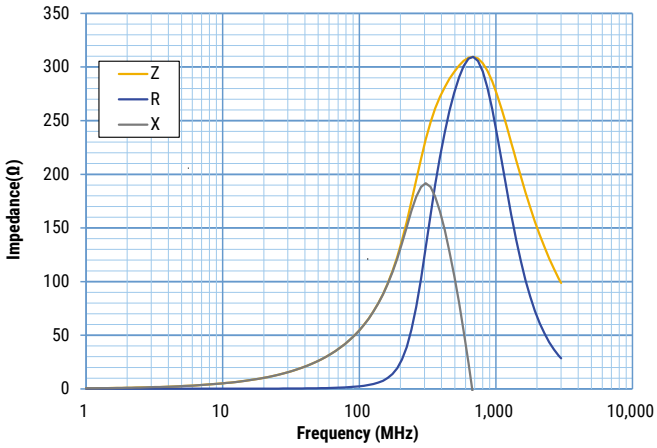
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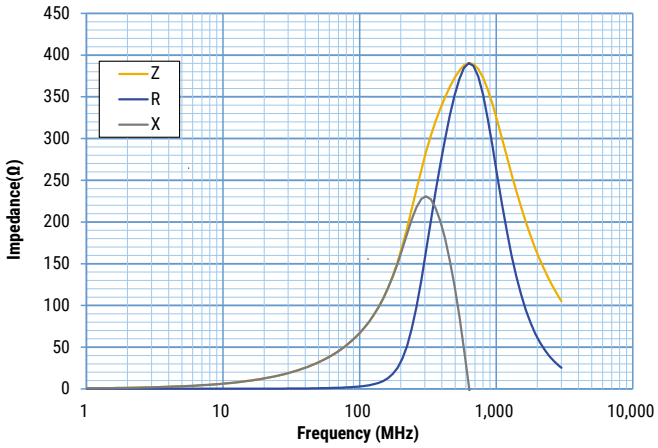
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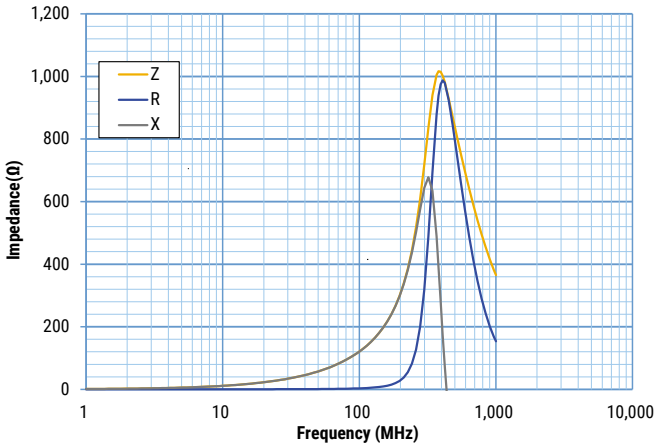


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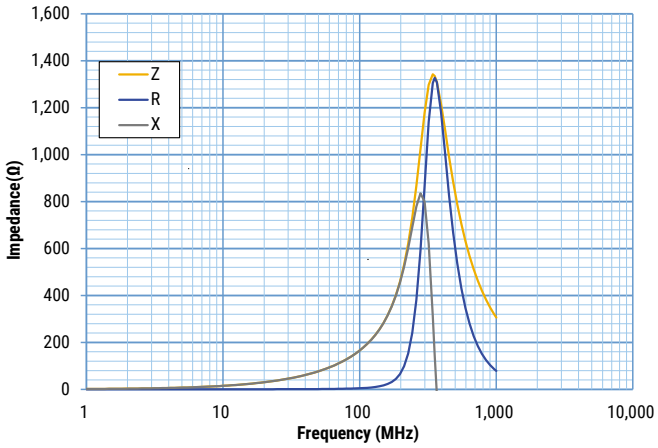


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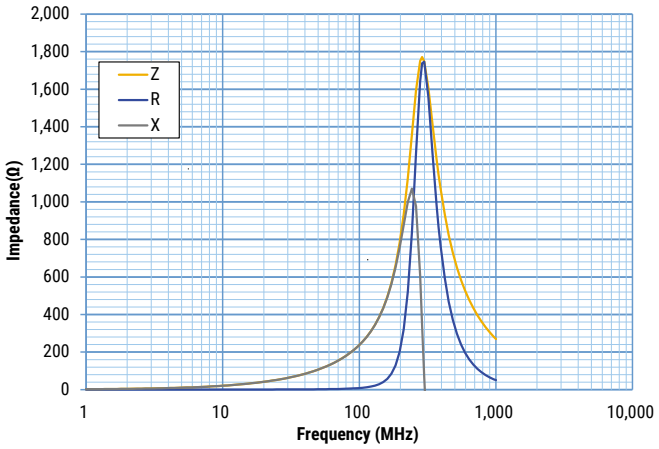
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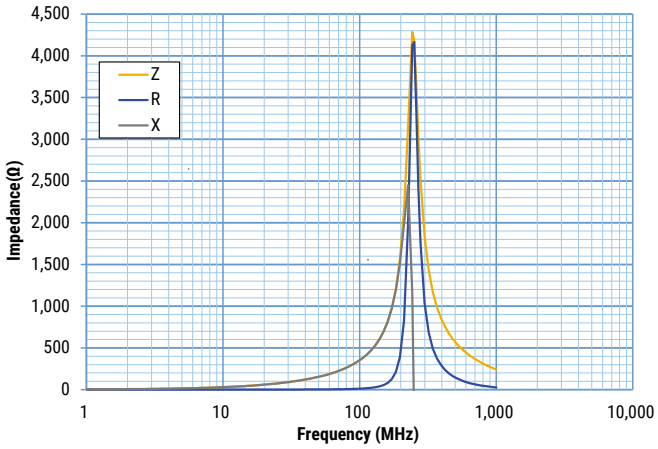
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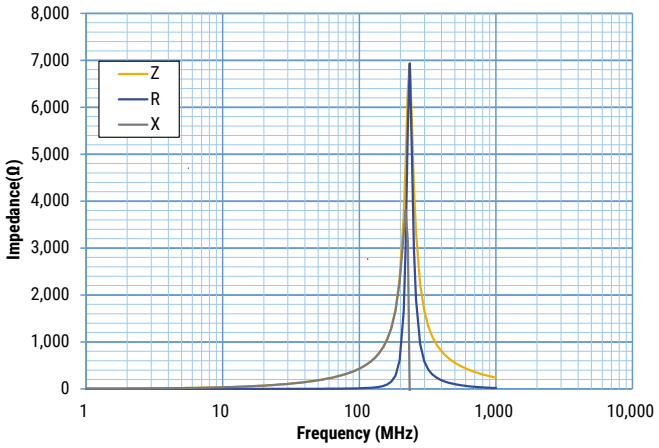
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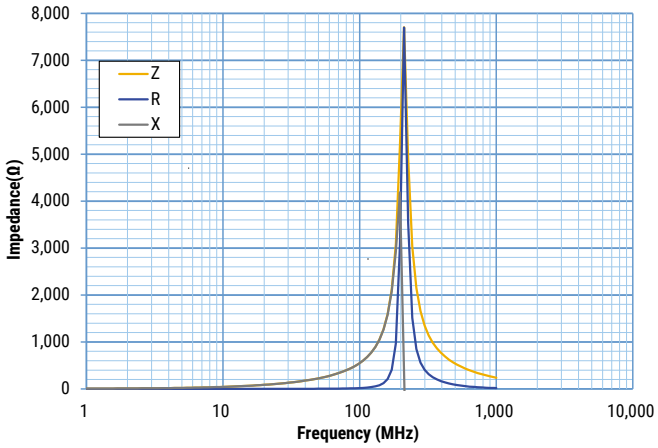
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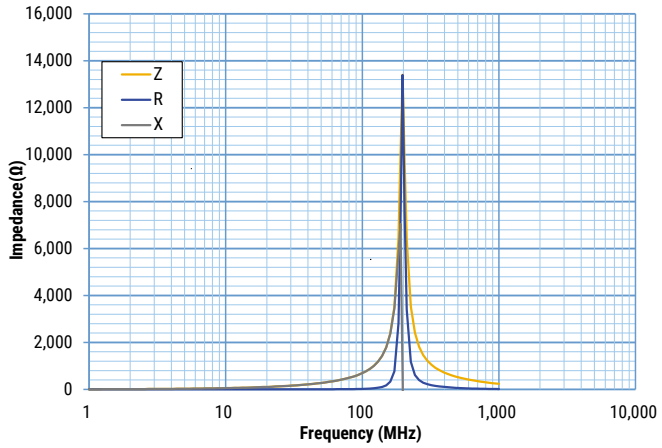


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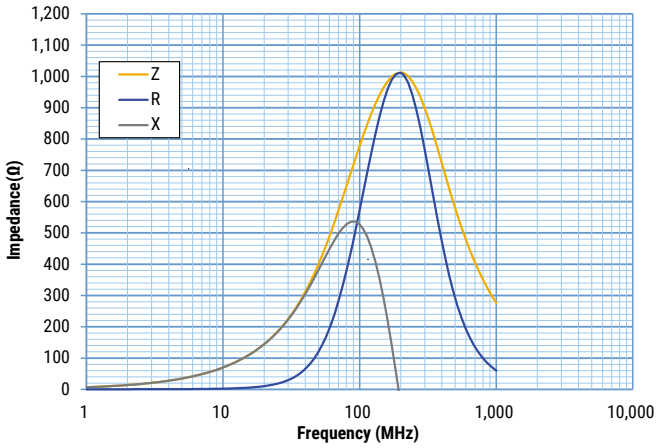


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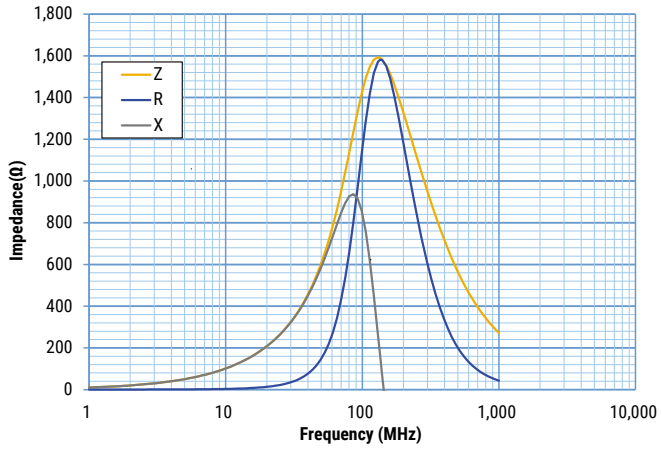
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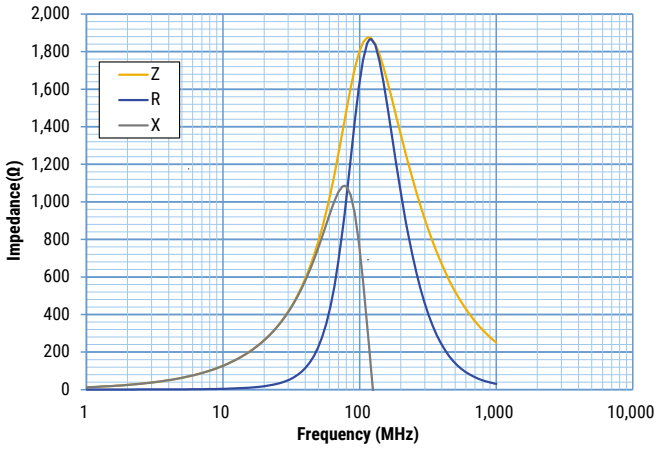
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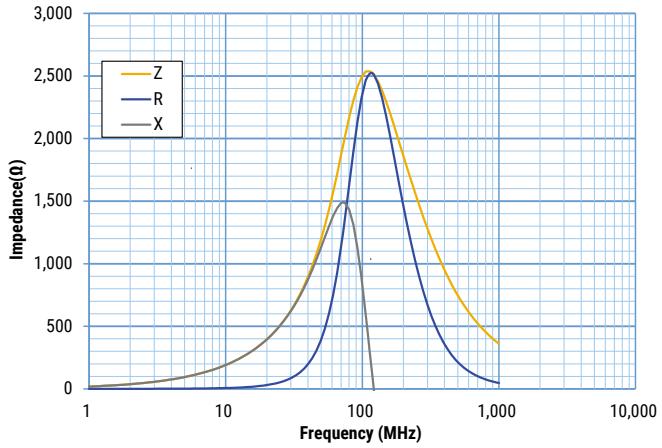
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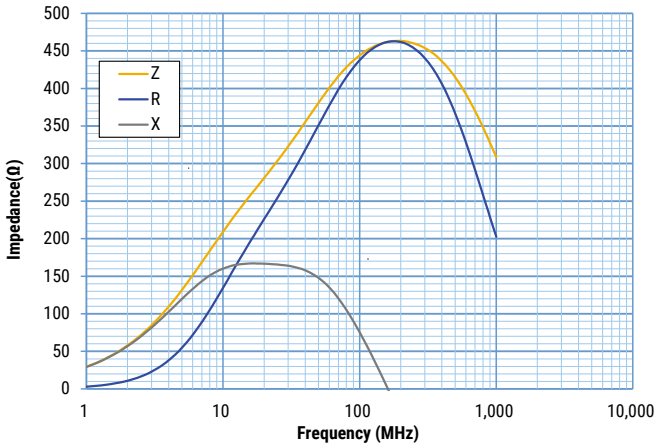
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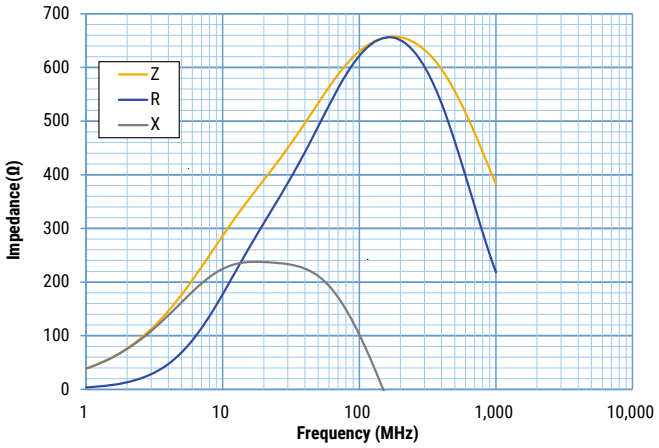


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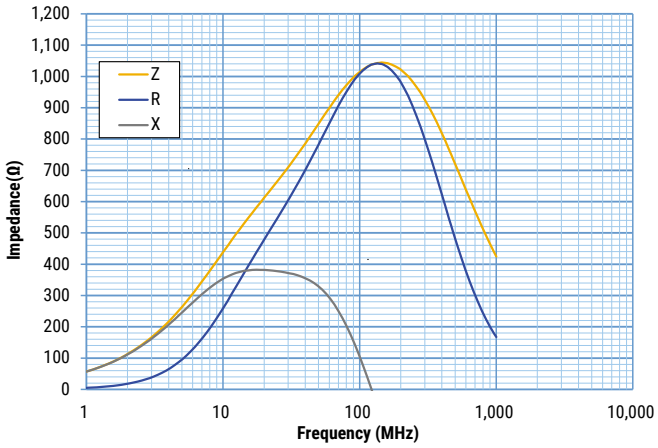


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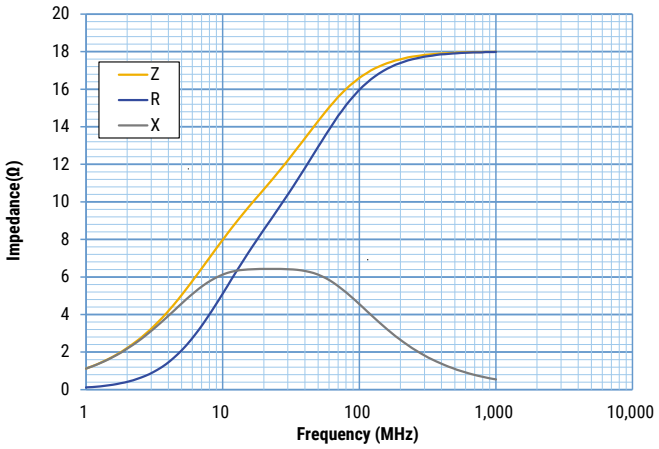
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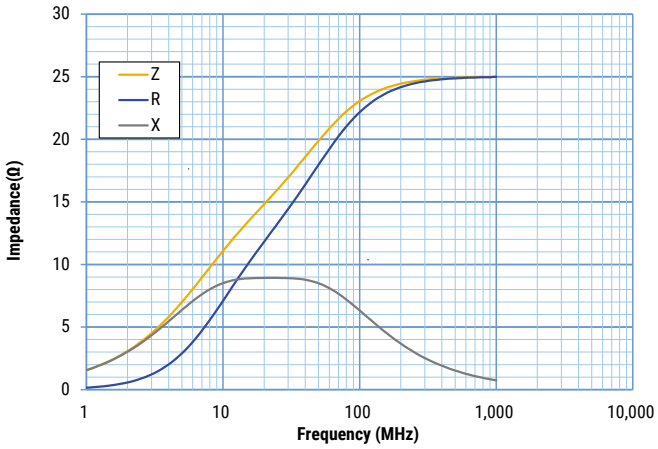
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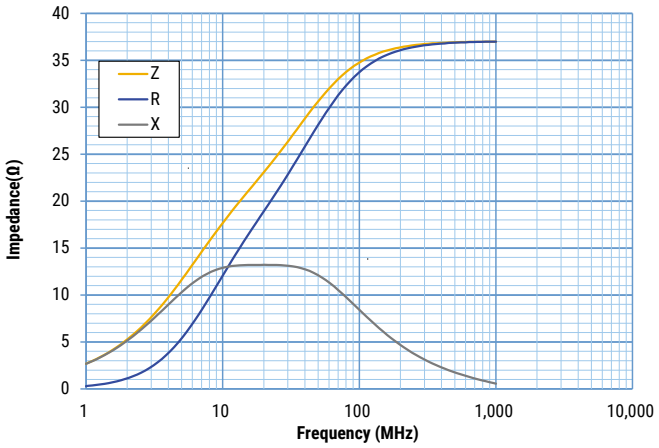
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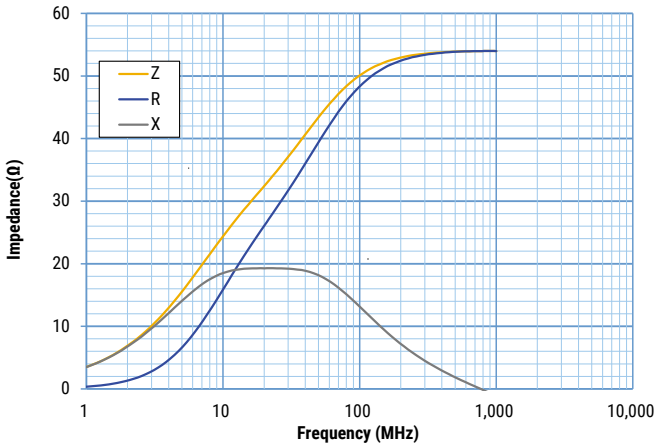
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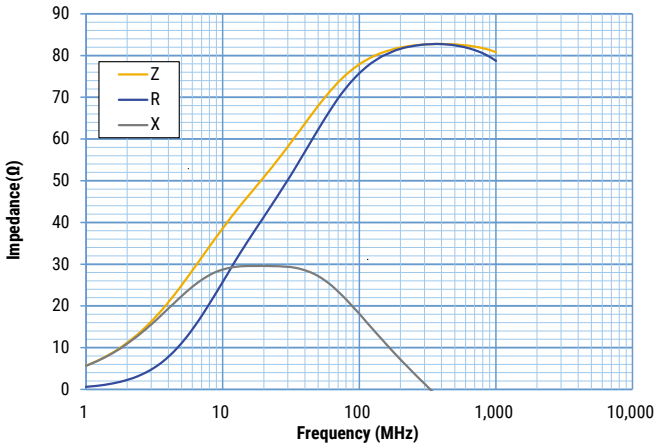


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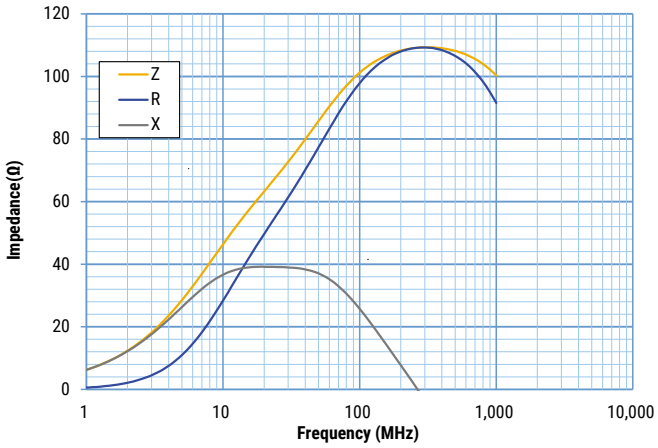


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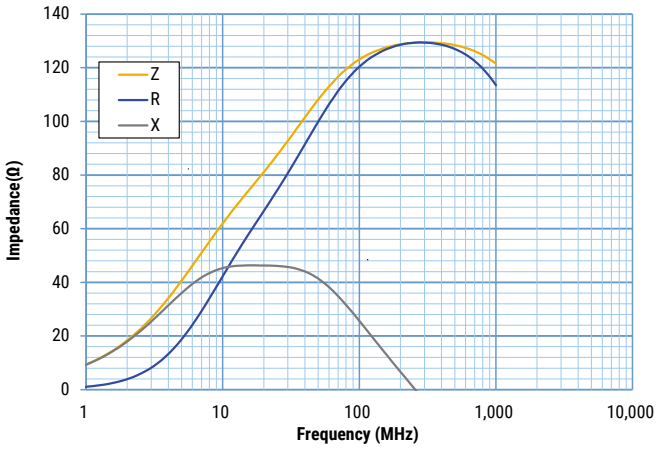
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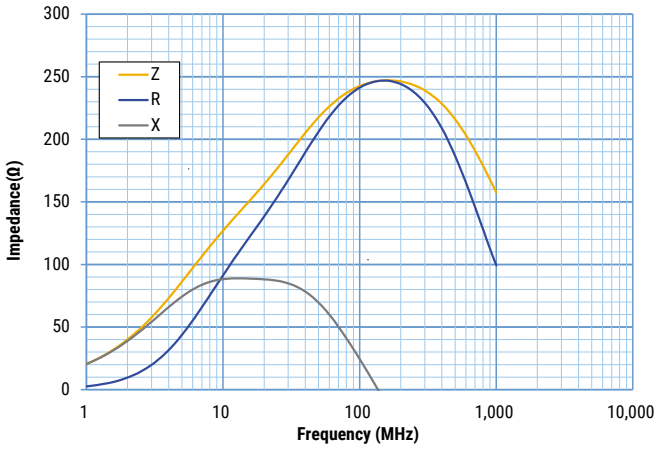
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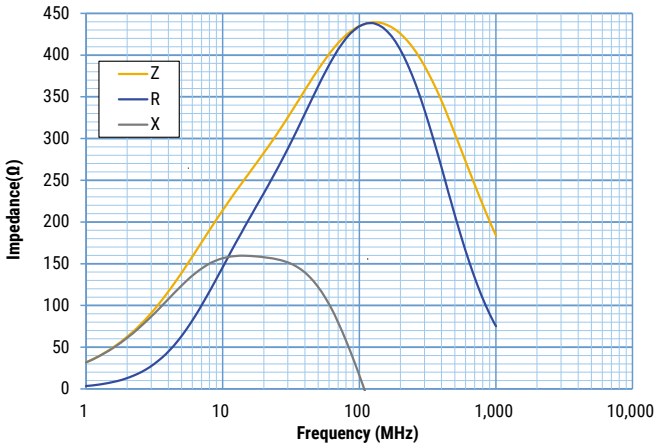
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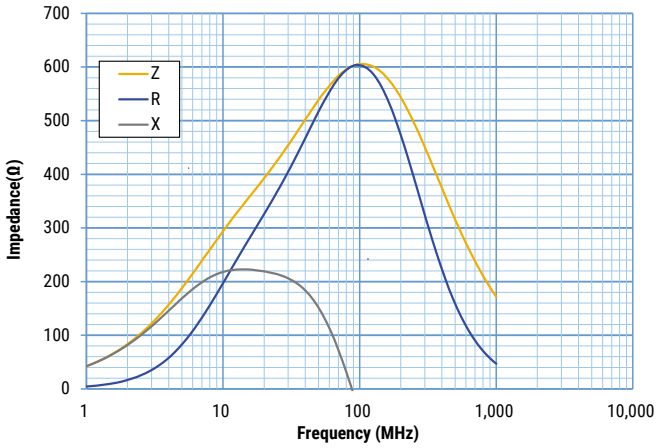
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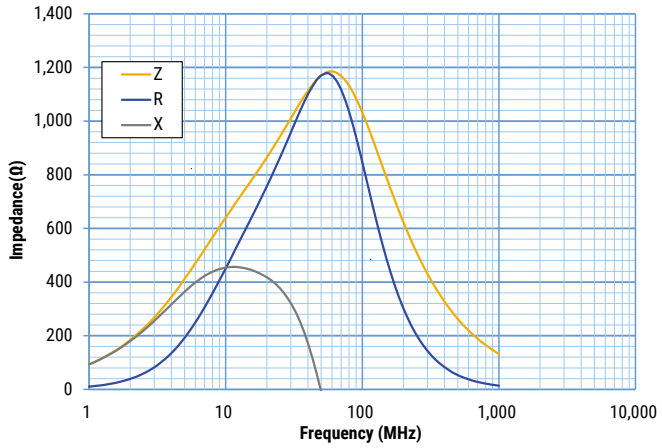


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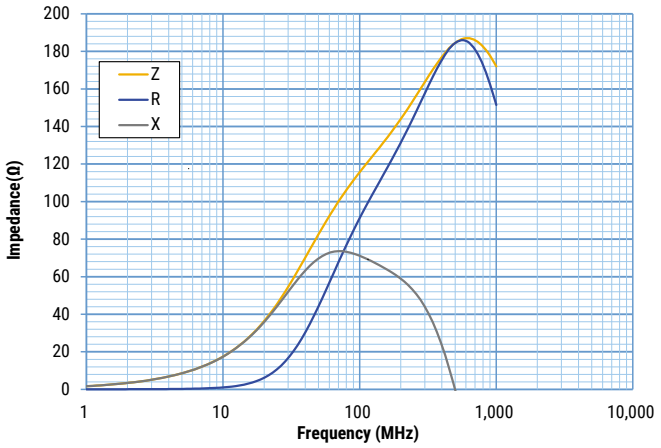


Frequency Characteristics cont.

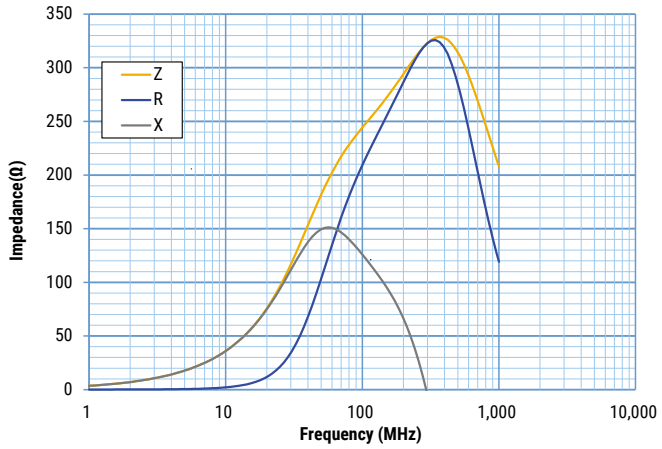
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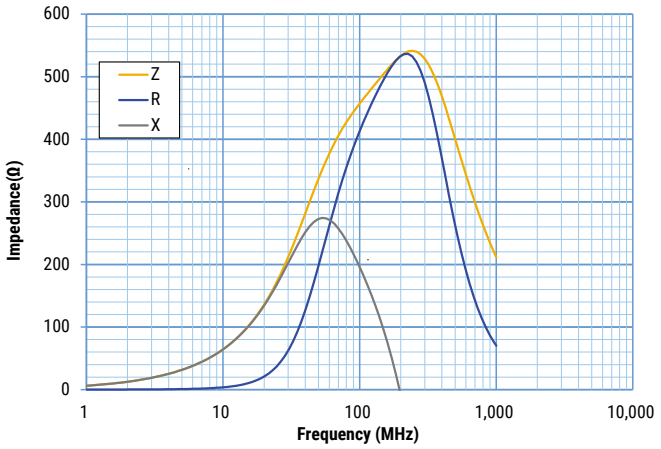
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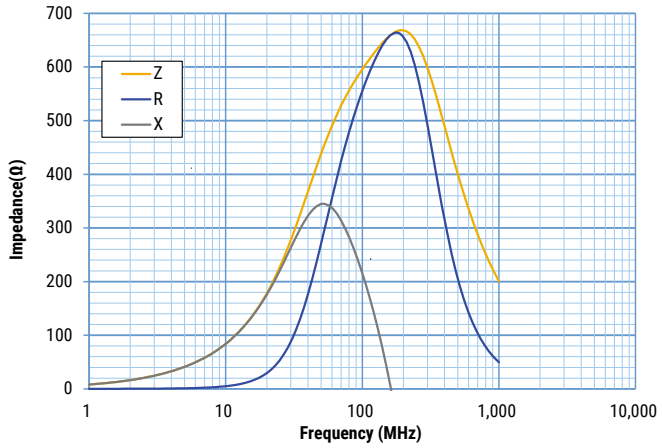
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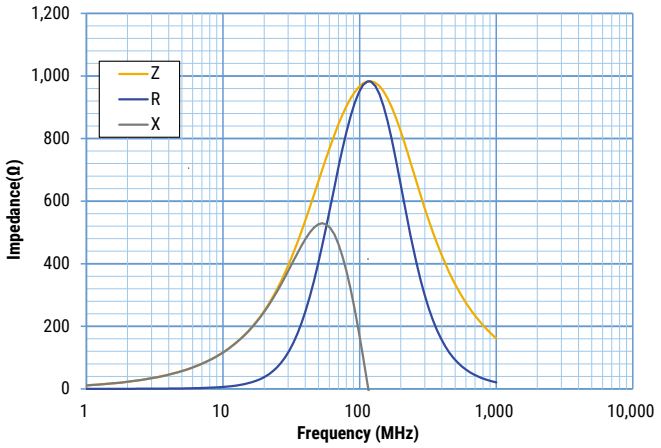
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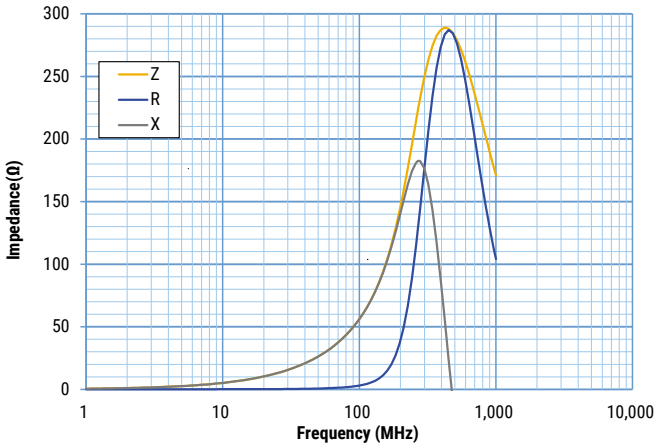


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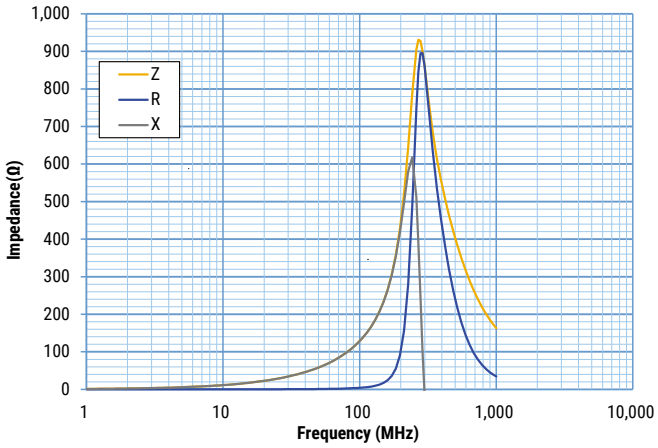


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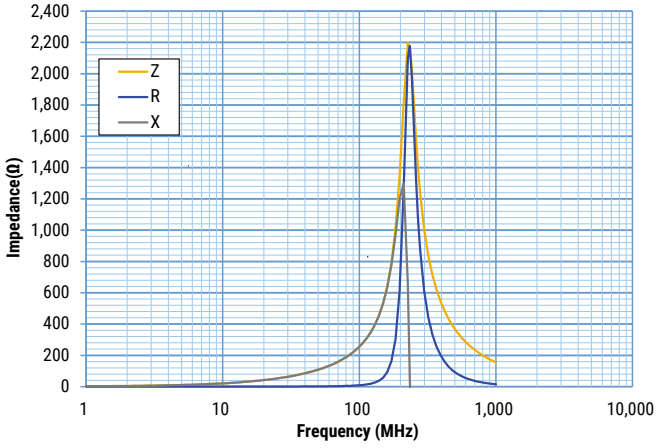
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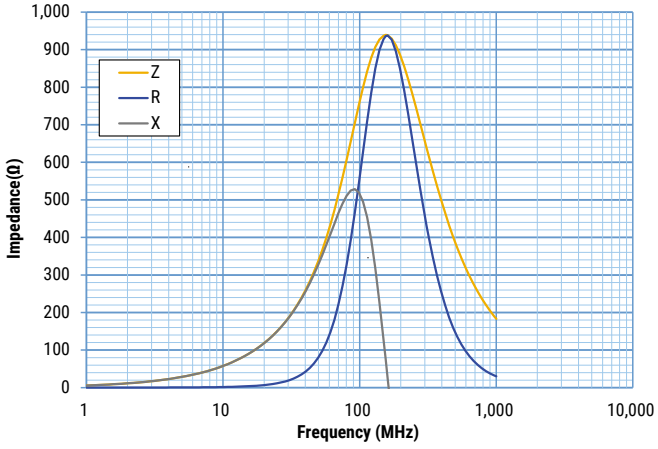
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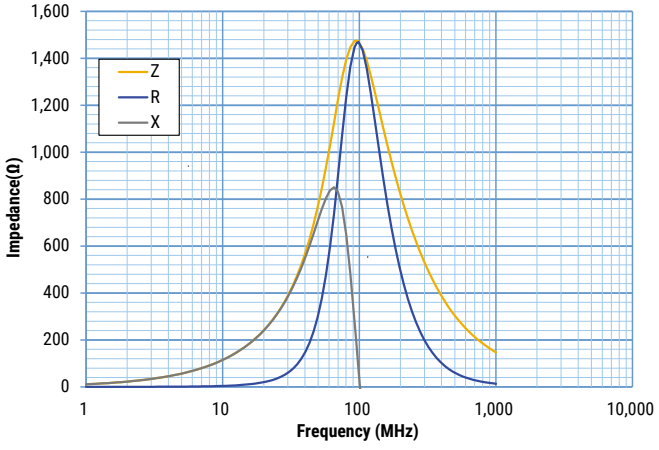
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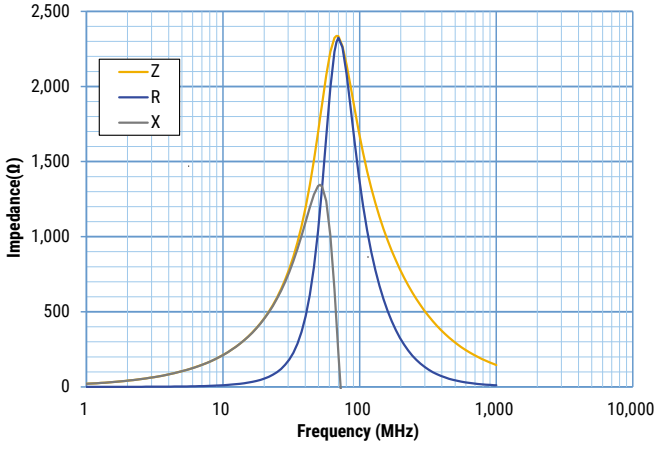
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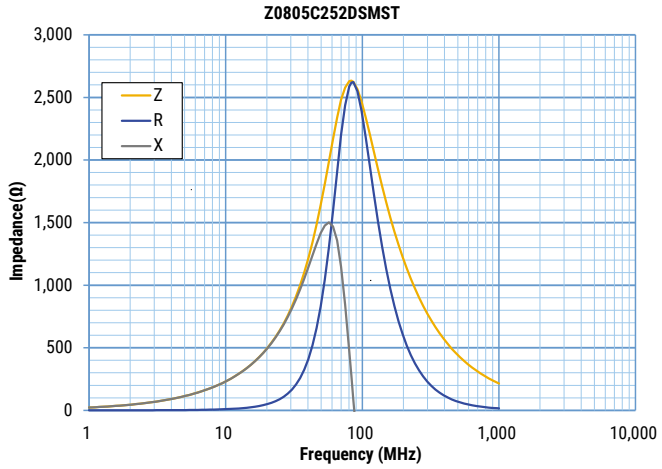
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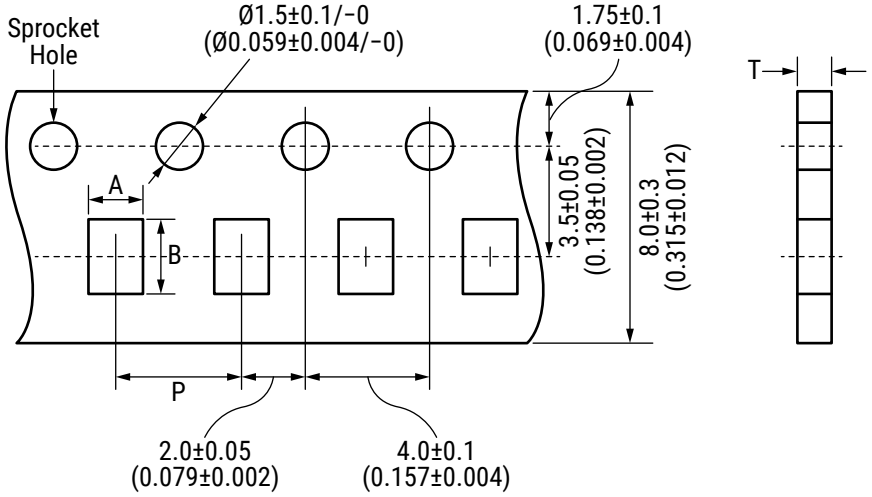


Frequency Characteristics cont.



Taping Specifications - Millimeters (Inches)

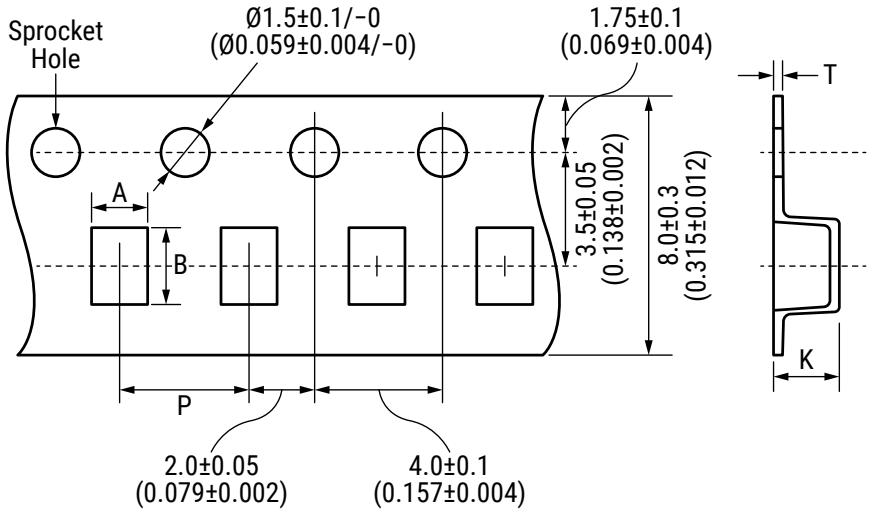
Paper Tape 8mm Width



EIA Case Size	Metric Case Size	Height	Reel Quantity		Cavity		Pitch	Thickness
					A	B	P	T
0201	0603	0.30	15,000	Nominal	0.4	0.7	2.0	0.45
				Tolerance	±0.06	±0.06	±0.05	Maximum
0402	1005	0.50	10,000	Nominal	0.65	1.15	2.0	0.8
				Tolerance	±0.1	±0.1	±0.05	Maximum
0603	1608	0.80	4,000	Nominal	1.0	1.8	4.0	1.1
				Tolerance	±0.2	±0.2	±0.1	Maximum
0805	2012	0.85	4,000	Nominal	1.5	2.3	4.0	1.1
				Tolerance	±0.2	±0.2	±0.1	Maximum

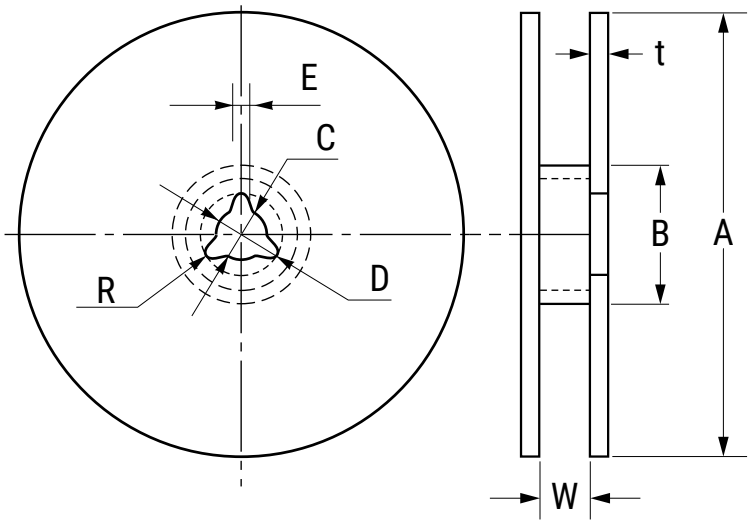
Taping Specifications - Millimeters (Inches) cont.

0805 1.25 mm Height Embossed (Plastic) Tape 8 mm Width



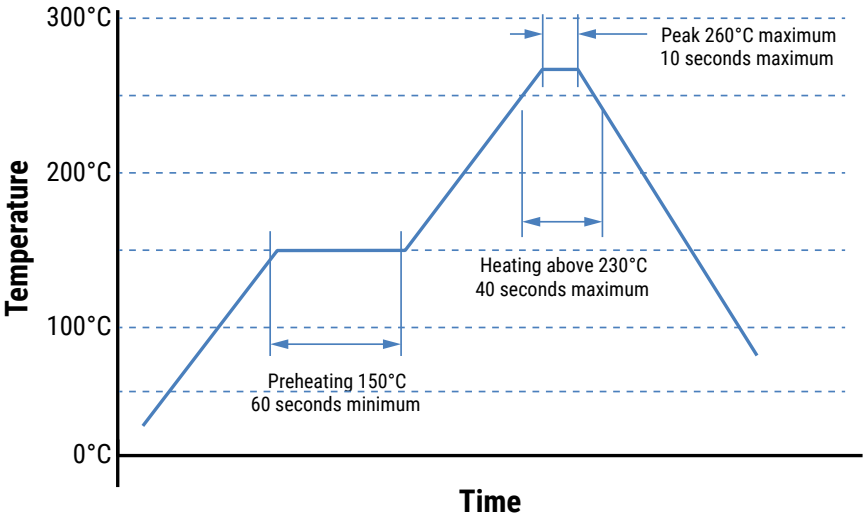
EIA Case Size	Metric Case Size	Height	Reel Quantity		Cavity		Pitch	Thickness	
					A	B	P	T	K
0805	2012	1.25	2,000	Nominal	1.5	2.3	4.0	0.3	2.0
				Tolerance	±0.2	±0.2	±0.1	Maximum	Maximum

Reel Specifications - Millimeters



EIA Size Code		Dimensions - Millimeters							
		A	B	C	D	E	R	t	W
0402 0630 0805	Nominal	ø178.0	ø60.0	ø13.0	ø21.0	2.0	1.0	2.5	10.0
	Tolerance	±2.0	Minimum	±0.2	±0.8	±0.5		Maximum	±1.5

Recommended Reflow Soldering Profile



Handling Precautions

Ferrite chip beads should be stored in normal working environments. While these beads themselves are quite robust in other environments, exposure to high temperatures, high humidity, corrosive atmospheres, and long-term storage degrades solderability.

KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 70% relative humidity. Atmospheres should be free of chlorine-bearing and sulfur-bearing compounds. Temperature fluctuations should be minimized to avoid condensation on the parts.

For optimized solderability, ferrite chip beads stock should be used promptly, preferably within six months of receipt."

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