

Chip Beads

For signal line

MMZ series

Type: MMZ0402 0402[01005 inch]*

MMZ0603 0603[0201 inch]
MMZ1005 1005[0402 inch]
MMZ1608 1608[0603 inch]
MMZ2012 2012[0805 inch]
MMZ1005-E 1005[0402 inch]

* Dimensions Code JIS[EIA]

Issue date: November 2011

[•] All specifications are subject to change without notice.

[•] Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

&TDK

Chip Beads For Signal Line

Conformity to RoHS Directive

MMZ Series MMZ0402

FEATURES

- It is super small size(L0.4×W0.2×T0.2mm).
- It prevents radiated noise from high-speed signal lines.
- Maintain impedance to high frequency band.
- Because it adopts silver in internal electrode, it is low DC resistance.
- Because it is not generate of cross talk with closed magnetic circuit structural design, high density assembly is possible.
- It is a product conforming to RoHS directive.

APPLICATIONS

Removal of signal line noises of cellular phones, portable audio players, various modules, etc.

PRODUCT IDENTIFICATION

MMZ	0402	S	121	С	Т	
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- (1) Series name
- (2) Dimensions L×W
- (3) Type name
- (4) Impedance

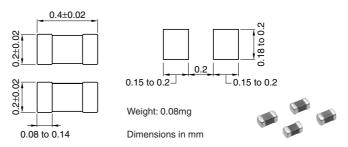
121:120 Ω at 100MHz

- (5) Characteristic type
- (6) Packaging style
 - T: Taping
- (7) TDK internal code

HANDLING AND PRECAUTIONS

- Before soldering, be sure to preheat components. The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
- · Do not expose the inductors to stray magnetic fields.
- Avoid static electricity discharge during handling.

SHAPES AND DIMENSIONS/RECOMMENDED PC BOARD PATTERN



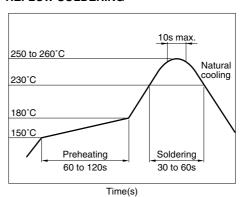
TEMPERATURE RANGES

Operating/storage	-55 to +125°C	

PACKAGING STYLE AND QUANTITIES

Packaging style	Quantity
Taping	20000 pieces/reel

RECOMMENDED SOLDERING CONDITION REFLOW SOLDERING



ELECTRICAL CHARACTERISTICS

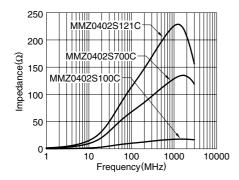
Part No.	Impedance $(\Omega)[100MHz]^*$	DC resistance (Ω) max.	Rated current (mA)max.
	(22)[1001/1112]	(52)IIIax.	(IIIA)IIIax.
MMZ0402S100C	10±5Ω	0.10	500
MMZ0402S700C	70±25%	0.45	260
MMZ0402S121C	120±25%	0.70	210

Test equipment: E4991A or equivalent
 Test tool: 16197 or equivalent
 Test temperature: 25±10°C

- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.
- Please contact our Sales office when your application is considered the following:
 The device's failure or malfunction may directly endanger human life (e.g. application for automobile/aircraft/medical/nuclear power devices, etc.)



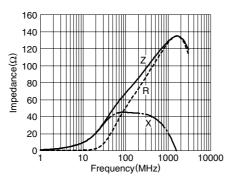
TYPICAL ELECTRICAL CHARACTERISTICS Z FREQUENCY CHARACTERISTICS(DIFFERS ACCORDING TO SERIES) MMZ0402S SERIES



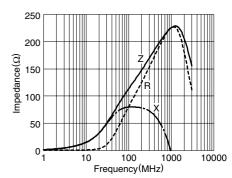
Z, X, R vs. FREQUENCY CHARACTERISTICS

MMZ0402S100C 20 15 15 2 R R 10 10 100 1000 10000 Frequency(MHz)

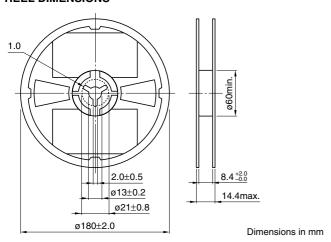
MMZ0402S700C



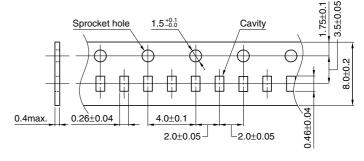
MMZ0402S121C

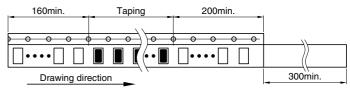


PACKAGING STYLES REEL DIMENSIONS



TAPE DIMENSIONS





Dimensions in mm

[•] All specifications are subject to change without notice.



Chip Beads For Signal Line

Conformity to RoHS Directive

MMZ Series MMZ0603

FEATURES

- This is a multilayered chip bead product with dimensions of L0.6×W0.3×T0.3mm.
- The product is magnetically shielded, allowing high density mounting.
- We refined the rules for internal conductor design to reduce floating capacity between conductors, which in turn has contributed to a dramatic improvement in high frequency characteristics. We have also been able to expand and reinforce the EMI suppression in the GHz range.
- · It is a product conforming to RoHS directive.

APPLICATIONS

Removal of signal line noises of cellular phones, portable audio players, various modules, DSCs, portable game machines, etc.

PRODUCT IDENTIFICATION

MMZ	0603	S	121	С	Т	
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- (1) Series name
- (2) Dimensions L×W
- (3) Type name
- (4) Impedance
 - 121:120Ω at 100MHz
- (5) Characteristic type
- (6) Packaging styleT:Taping
- (7) TDK internal code

HANDLING AND PRECAUTIONS

- Before soldering, be sure to preheat components. The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
- Do not expose the inductors to stray magnetic fields.
- Avoid static electricity discharge during handling.
- When hand soldering, apply the soldering iron to the printed circuit board only. Temperature of the iron tip should not exceed 350°C. Soldering time should not exceed 3 seconds.

MATERIAL CHARACTERISTICS

S material: Standard type that features impedance characteristics similar to those of a typical ferrite core.

For signal line applications in which the blocking region is near 100MHz. Impedance values selected for effectiveness at 40 to 300MHz.

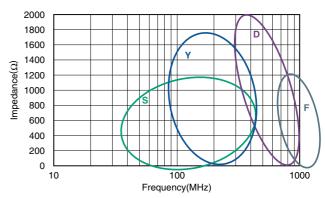
Y material: High frequency range type intended for the 100MHz region and above.

For signal line applications in which the signal frequency is far from the cutoff frequency. Impedance values selected for effectiveness at 80 to 400MHz.

D material: For applications calling for low insertion loss at low frequencies and sharply increasing impedance at high frequencies. Designed for high impedance at high frequencies (300MHz to 1GHz) for signal line applications.

F material: This new product inherits the characteristic of our D-material, namely its sharp impedance rise time, and its impedance peak frequency has been shifted higher into range. The product offers excellent noise suppression from 600MHz to as high as in the GHz range.

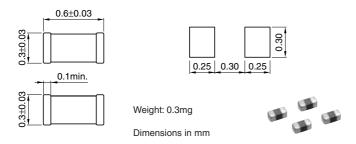
TYPICAL MATERIAL CHARACTERISTICS



- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.
- Please contact our Sales office when your application is considered the following:
 The device's failure or malfunction may directly endanger human life (e.g. application for automobile/aircraft/medical/nuclear power devices, etc.)



SHAPES AND DIMENSIONS/RECOMMENDED PC BOARD PATTERN



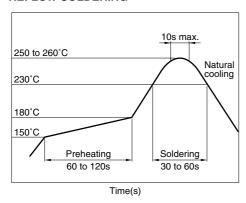
TEMPERATURE RANGES

Operating/storage	-55 to +125°C	

PACKAGING STYLE AND QUANTITIES

Packaging style	Quantity
Taping	15000 pieces/reel

RECOMMENDED SOLDERING CONDITION REFLOW SOLDERING

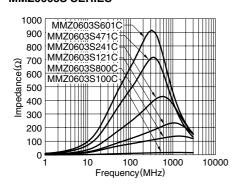


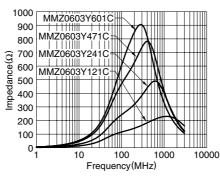
ELECTRICAL CHARACTERISTICS

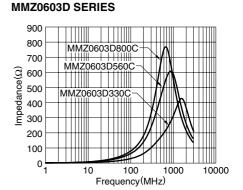
-		50	
Part No.	Impedance	DC resistance	Rated current
i ait ivo.	$(\Omega)[100MHz]^*$	(Ω) max.	(mA)max.
MMZ0603S100C	10±5Ω	0.09	500
MMZ0603S800C	80±25%	0.30	200
MMZ0603S121C	120±25%	0.45	200
MMZ0603S241C	240±25%	0.57	200
MMZ0603S471C	470±25%	1.30	100
MMZ0603S601C	600±25%	1.45	100
MMZ0603Y121C	120±25%	0.39	200
MMZ0603Y241C	240±25%	0.80	200
MMZ0603Y471C	470±25%	1.40	200
MMZ0603Y601C	600±25%	1.50	200
MMZ0603D330C	33±25%	0.70	100
MMZ0603D560C	56±25%	0.95	100
MMZ0603D800C	80±25%	1.25	100
MMZ0603F100C	10±5Ω	0.50	200
MMZ0603F220C	22±25%	1.00	200
MMZ0603F330C	33±25%	1.30	150

 Test equipment: E4991A or equivalent Test tool: 16197 or equivalent Test temperature: 25±10°C

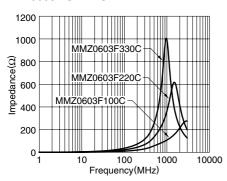
TYPICAL ELECTRICAL CHARACTERISTICS Z FREQUENCY CHARACTERISTICS(DIFFERS ACCORDING TO SERIES) MMZ0603S SERIES MMZ0603Y SERIES







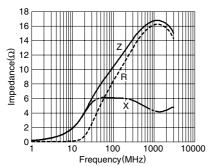
MMZ0603F SERIES



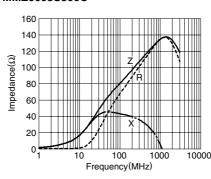
[•] All specifications are subject to change without notice.



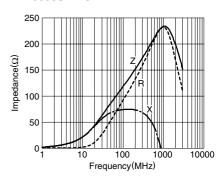
MMZ0603S100C



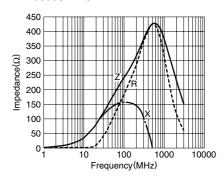
MMZ0603S800C



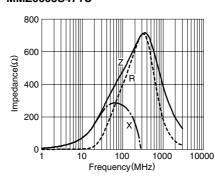
MMZ0603S121C



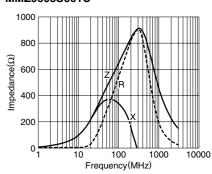
MMZ0603S241C



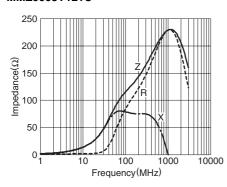
MMZ0603S471C



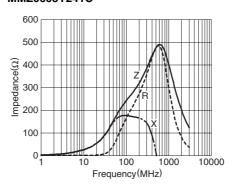
MMZ0603S601C



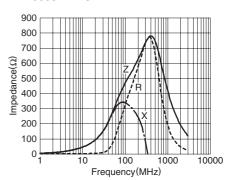
MMZ0603Y121C



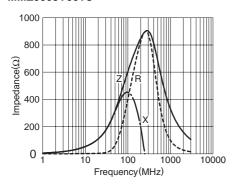
MMZ0603Y241C



MMZ0603Y471C



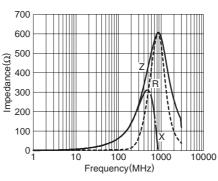
MMZ0603Y601C



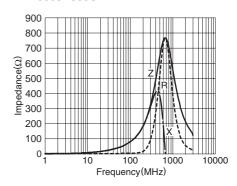
[•] All specifications are subject to change without notice.

MMZ0603D330C 500 400 200 100 100 1000 10000 Frequency(MHz)

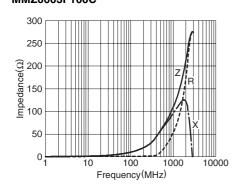
MMZ0603D560C



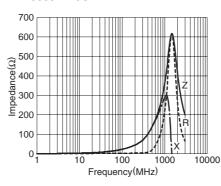
MMZ0603D800C



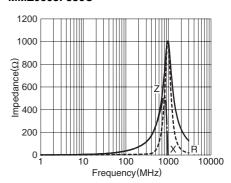
MMZ0603F100C



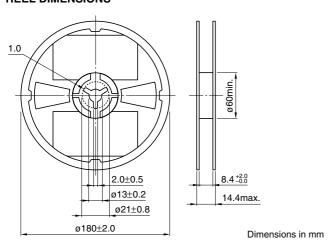
MMZ0603F220C



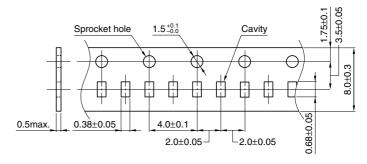
MMZ0603F330C

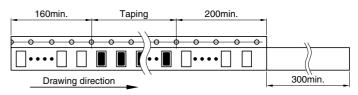


PACKAGING STYLES REEL DIMENSIONS



TAPE DIMENSIONS





Dimensions in mm

[•] All specifications are subject to change without notice.



Chip Beads For Signal Line

Conformity to RoHS Directive

MMZ Series MMZ1005

FEATURES

- Size standardized for use by automatic assembly equipment.
 No preferred orientation.
- Electroplated terminal electrodes accommodate reflow soldering.
- High reliability due to an entirely monolithic structure.
- Closed magnetic circuit structure allows high-density installation while preventing crosstalk between circuits.
- Low DC resistance structure of electrode prevents wasteful electric power consumption.
- It is a product conforming to RoHS directive.

APPLICATIONS

Removal of signal line noises of cellular phones, PCs, note PCs, TVs, TV tuners, STBs, audio players, DVDs, DSCs, DVCs, game machines, digital photo frames, car navigation system, PNDs, etc.

PRODUCT IDENTIFICATION

MMZ	1005	S	121	С	Т	
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- (1) Series name
- (2) Dimensions L×W
- (3) Type name
- (4) Impedance

121:120 Ω at 100MHz

- (5) Characteristic type
- (6) Packaging style
 - T:Taping
- (7) TDK internal code

HANDLING AND PRECAUTIONS

- Before soldering, be sure to preheat components. The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
- Do not expose the inductors to stray magnetic fields.
- · Avoid static electricity discharge during handling.
- When hand soldering, apply the soldering iron to the printed circuit board only. Temperature of the iron tip should not exceed 350°C. Soldering time should not exceed 3 seconds.

MATERIAL CHARACTERISTICS

B material: This type is perfectly suited for fast digital signals. By equalizing R components and X components that beads possess at a frequency of 5MHz, it is able to suppress overshooting, undershooting and ringing of fast digital signals.

S material: Standard type that features impedance characteristics similar to those of a typical ferrite core.

For signal line applications in which the blocking region is near 100MHz. Impedance values selected for effectiveness at 40 to 300MHz.

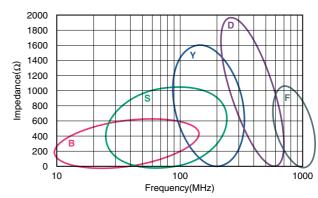
Y material: High frequency range type intended for the 100MHz region and above.

For signal line applications in which the signal frequency is far from the cutoff frequency. Impedance values selected for effectiveness at 80 to 400MHz.

D material: For applications calling for low insertion loss at low frequencies and sharply increasing impedance at high frequencies. Designed for high impedance at high frequencies (300MHz to 1GHz) for signal line applications.

F material: This new product inherits the characteristic of our D-material, namely its sharp impedance rise time, and its impedance peak frequency has been shifted higher into range. The product offers excellent noise suppression from 600MHz to as high as in the GHz range.

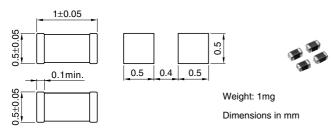
TYPICAL MATERIAL CHARACTERISTICS



- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.
- Please contact our Sales office when your application is considered the following:
 The device's failure or malfunction may directly endanger human life (e.g. application for automobile/aircraft/medical/nuclear power devices, etc.)

ATDK

SHAPES AND DIMENSIONS/RECOMMENDED PC BOARD PATTERN



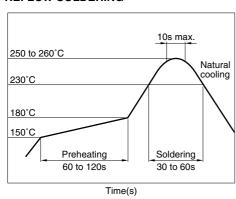
TEMPERATURE RANGES

Operating/storage	-55 to +125°C	
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PACKAGING STYLE AND QUANTITIES

Packaging style	Quantity
Taping	10000 pieces/reel

RECOMMENDED SOLDERING CONDITION REFLOW SOLDERING

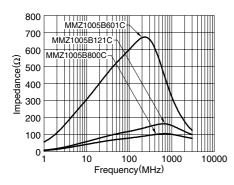


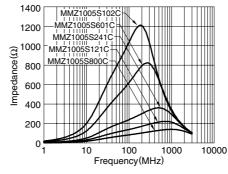
ELECTRICAL CHARCTERISTICS

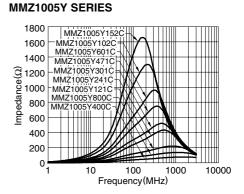
Part No.	Impedance	DC resistance	Rated current
ran No.	$(\Omega)[100MHz]^*$	(Ω) max.	(mA)max.
MMZ1005B800C	80±25%	0.19	450
MMZ1005B121C	120±25%	0.25	400
MMZ1005B601C	600±25%	0.85	200
MMZ1005S800C	80±25%	0.12	500
MMZ1005S121C	120±25%	0.22	500
MMZ1005S241C	240±25%	0.28	400
MMZ1005S601C	600±25%	0.52	300
MMZ1005S102C	1000±25%	0.75	200
MMZ1005Y400C	40±25%	0.10	550
MMZ1005Y800C	80±25%	0.17	450
MMZ1005Y121C	120±25%	0.18	400
MMZ1005Y241C	240±25%	0.26	300
MMZ1005Y301C	300±25%	0.38	250
MMZ1005Y471C	470±25%	0.47	250
MMZ1005Y601C	600±25%	0.54	250
MMZ1005Y102C	1000±25%	0.70	200
MMZ1005Y152C	1500±25%	1.00	100
MMZ1005D100C	10±5Ω	0.10	500
MMZ1005D220C	22±25%	0.17	400
MMZ1005D330C	33±25%	0.24	400
MMZ1005D680C	68±25%	0.38	400
MMZ1005D121C	120±25%	0.60	350
MMZ1005D241C	240±25%	0.90	200
MMZ1005F330C	33±25%	0.50	200
MMZ1005F470C	47±25%	0.60	100
MMZ1005F560C	56±25%	0.70	100

* Test equipment: E4991A or equivalent Test tool: 16192A or equivalent Test temperature: 25±10°C

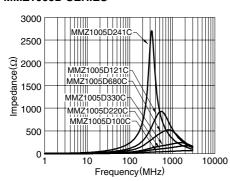
TYPICAL ELECTRICAL CHARACTERISTICS Z FREQUENCY CHARACTERISTICS(DIFFERS ACCORDING TO SERIES) MMZ1005B SERIES MMZ1005S SERIES



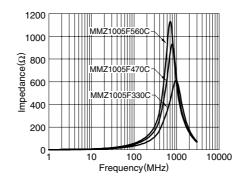




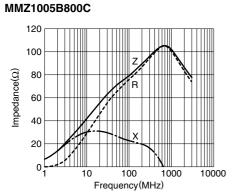
MMZ1005D SERIES



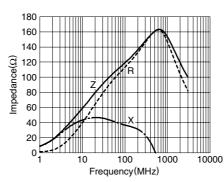
MMZ1005F SERIES



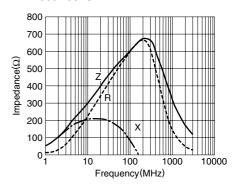
[•] All specifications are subject to change without notice.



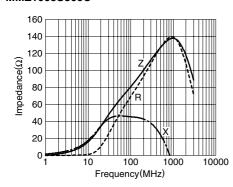




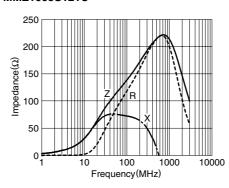
MMZ1005B601C



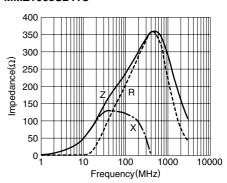




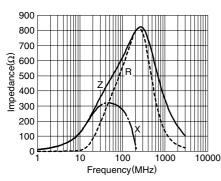
MMZ1005S121C



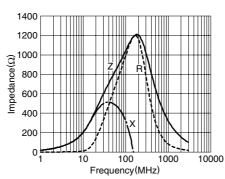
MMZ1005S241C



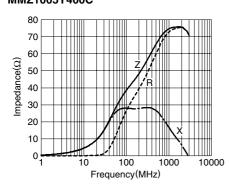
MMZ1005S601C



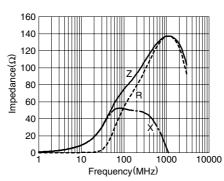
MMZ1005S102C



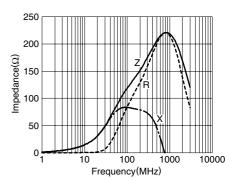
MMZ1005Y400C



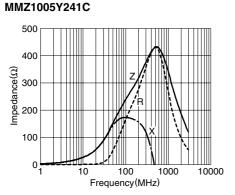
MMZ1005Y800C



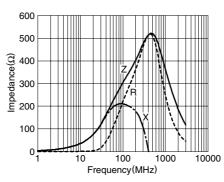
MMZ1005Y121C



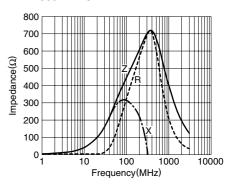
[•] All specifications are subject to change without notice.



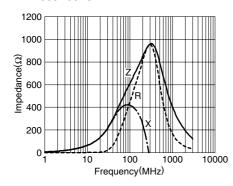
MMZ1005Y301C



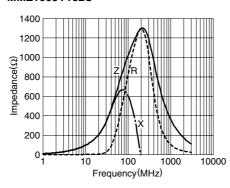
MMZ1005Y471C



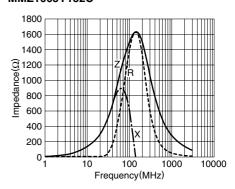
MMZ1005Y601C



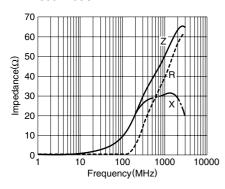
MMZ1005Y102C



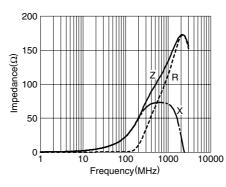
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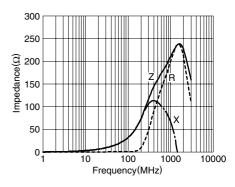
MMZ1005D100C



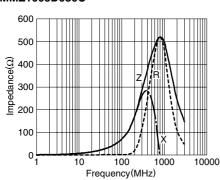
MMZ1005D220C



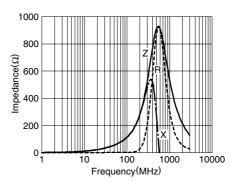
MMZ1005D330C



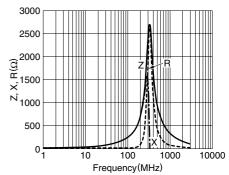
MMZ1005D680C



MMZ1005D121C



MMZ1005D241C



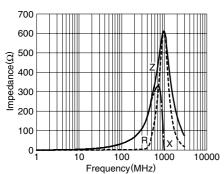
[•] All specifications are subject to change without notice.



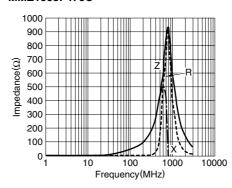
TYPICAL ELECTRICAL CHARACTERISTICS

Z, X, R vs. FREQUENCY CHARACTERISTICS

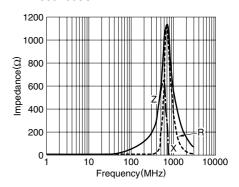
MMZ1005F330C



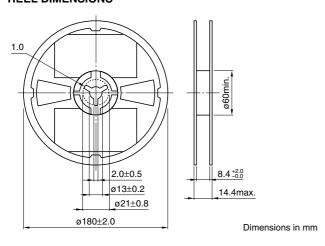
MMZ1005F470C



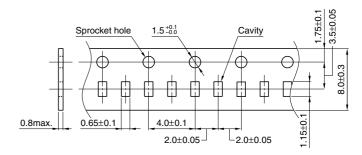
MMZ1005F560C

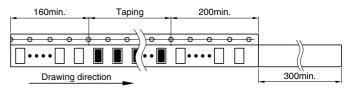


PACKAGING STYLES REEL DIMENSIONS



TAPE DIMENSIONS





Dimensions in mm

[•] All specifications are subject to change without notice.

&TDK

Chip Beads For Signal Line

Conformity to RoHS Directive

MMZ Series MMZ1608

FEATURES

- Chip bead(impeder), MMZ series offers 8 construction materials.
- Size standardized for use by automatic assembly equipment.
 No preferred orientation.
- Either flow or reflow soldering methods can be used due to electroplating of the terminal electrodes.
- High reliability due to an entirely monolithic structure.
- Closed magnetic circuit structure allows high-density installation while preventing crosstalk between circuits.
- Low DC resistance structure of electrode prevents wasteful electric power consumption.
- The products contain no lead and also support lead-free soldering.
- It is a product conforming to RoHS directive.

APPLICATIONS

Removal of signal line noises of cellular phones, PCs, note PCs, TVs, TV tuners, STBs, audio players, DVDs, DSCs, DVCs, game machines, digital photo frames, car navigation system, PNDs, etc.

PRODUCT IDENTIFICATION

MMZ	1608	R	121	Α	Т	
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- (1) Series name
- (2) Dimensions L×W
- (3) Type name
- (4) Impedance121:120Ω at 100MHz
- (5) Characteristic type
- (6) Packaging style T:Taping
- (7) TDK internal code

HANDLING AND PRECAUTIONS

- Before soldering, be sure to preheat components. The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
- · Do not expose the inductors to stray magnetic fields.
- · Avoid static electricity discharge during handling.
- When hand soldering, apply the soldering iron to the printed circuit board only. Temperature of the iron tip should not exceed 350°C. Soldering time should not exceed 3 seconds.

SHAPES AND DIMENSIONS/RECOMMENDED PC BOARD PATTERN



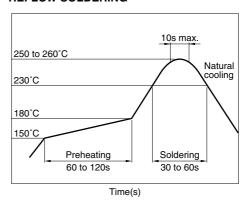
TEMPERATURE RANGES

Operating/storage	−55 to +125°C

PACKAGING STYLE AND QUANTITIES

Packaging style	Quantity
Taping	4000 pieces/reel

RECOMMENDED SOLDERING CONDITION REFLOW SOLDERING



[•] Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

Please contact our Sales office when your application is considered the following:
 The device's failure or malfunction may directly endanger human life (e.g. application for automobile/aircraft/medical/nuclear power devices, etc.)

公TDK

MATERIAL CHARACTERISTICS

B material: This type is perfectly suited for fast digital signals.

By equalizing R components and X components that beads possess at a frequency of 5MHz, it is able to suppress overshooting, undershooting and ringing of fast digital signals.

R material: For wide frequency applications calling for broad impedance characteristics.

For digital signal line applications calling requiring good waveform integrity. Impedance values selected for effectiveness at 10 to 200MHz.

S material: Standard type that features impedance characteristics similar to those of a typical ferrite core.

For signal line applications in which the blocking region

For signal line applications in which the blocking region is near 100MHz. Impedance values selected for effectiveness at 40 to 300MHz.

Y material: High frequency range type intended for the 100MHz region and above.

For signal line applications in which the signal frequency is far from the cutoff frequency. Impedance values selected for effectiveness at 80 to 400MHz.

A material: This high-impedance product is based on the impedance frequency characteristics of our Y-material. The product offers excellent impedance characteristics, which is greater than 2500Ω , in the vicinity of 100MHz range (MMZ1608A252B).

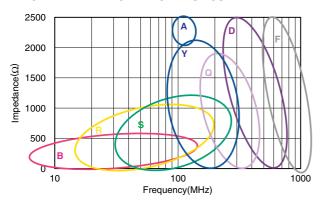
Q material: For high-band applications designed for 100MHz and above. Impedance values selected for effectiveness at 100 to 800MHz.

D material: For applications calling for low insertion loss at low frequencies and sharply increasing impedance at high frequencies. Designed for high impedance at high frequencies (300MHz to 1GHz) for signal line applications.

F material: This new product inherits the characteristic of our D-material, namely its sharp impedance rise time, and its impedance peak frequency has been shifted higher into range.

The product offers excellent noise suppression from 600MHz to as high as in the GHz range.

TYPICAL MATERIAL CHARACTERISTICS

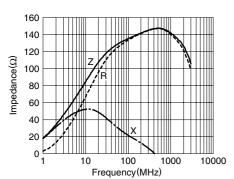


ELECTRICAL CHARACTERISTICS

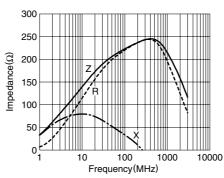
Impedance Co resistance	ELECTRICAL CHARACTERIOTICS				
Part No. (12) (10)Max. (-	DC resistance		
INDIMIPIES CONTINUES CONTINUES CONTINUES	Part No.	` '			
MMZ1608B221C 220±25% 0.25 500 0.6 MMZ1608B301C 300±25% 0.25 500 0.6 MMZ1608B471C 470±25% 0.30 500 0.6 MMZ1608B601C 600±25% 0.40 500 0.6 MMZ1608B102C 1000±25% 0.60 300 0.8 MMZ1608R102A 15±25% 0.05 1500 0.8 MMZ1608R300A 30±25% 0.05 1500 0.8 MMZ1608R300A 30±25% 0.10 800 0.8 MMZ1608R301A 30±25% 0.25 500 0.8 MMZ1608R301A 300±25% 0.25 500 0.8 MMZ1608R301A 300±25% 0.50 400 0.8 MMZ1608R301A 300±25% 0.50 400 0.8 MMZ1608R301A 300±25% 0.50 400 0.8 MMZ1608S400A 40±25% 0.10 600 0.8 MMZ1608S400A 40±25% 0.10 600 0.8 MMZ1608S181A 180±25% 0.15 500 0.8 MMZ1608S181A 180±25% 0.20 500 0.8 MMZ1608S301A 300±25% 0.20 500 0.8 MMZ1608S301A 300±25% 0.20 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S471A 470±25% 0.30 500 0.8 MMZ1608S471A 470±25% 0.30 500 0.8 MMZ1608S401A 470±25% 0.30 500 0.8 MMZ1608S202A 200±25% 0.50 400 0.8 MMZ1608S401B 50±25% 0.50 400 0.8 MMZ1608S401B 30±25% 0.50 500 0.8 MMZ1608S401B 30±25% 0.50 400 0.8 MMZ1608Y401B 30±25% 0.50 400 0.8 MMZ1608C421B 20±25% 0.50 400 0.8				` '	
MMZ1608B301C 300±25% 0.25 500 0.6 MMZ1608B471C 470±25% 0.30 500 0.6 MMZ1608B601C 470±25% 0.40 500 0.6 MMZ1608B102C 1000±25% 0.60 300 0.8 MMZ1608R150A 15±25% 0.05 1500 0.8 MMZ1608R150A 15±25% 0.10 800 0.8 MMZ1608R00A 60±25% 0.10 800 0.8 MMZ1608R301A 300±25% 0.10 800 0.8 MMZ1608R301A 300±25% 0.25 500 0.8 MMZ1608R471A 470±25% 0.30 500 0.8 MMZ1608R400A 40±25% 0.10 600 0.8 MMZ1608S400A 40±25% 0.15 500 0.8 MMZ1608S8121A 120±25% 0.15 500 0.8 MMZ1608S121A 20±25% 0.20 500 0.8 MMZ1608S21A 20±25% 0.20 500 <t< td=""><td></td><td></td><td></td><td></td><td></td></t<>					
MMZ1608B471C	MMZ1608B221C	220±25%	0.25	500	0.6
MMZ1608B601C 600±25% 0.40 500 0.6 MMZ1608B102C 1000±25% 0.60 300 0.8 MMZ1608B102A 15±25% 0.05 1500 0.8 MMZ1608B300A 30±25% 0.10 800 0.8 MMZ1608B300A 30±25% 0.10 800 0.8 MMZ1608B301A 30±25% 0.25 500 0.8 MMZ1608B301A 30±25% 0.25 500 0.8 MMZ1608B301A 30±25% 0.25 500 0.8 MMZ1608B301A 30±25% 0.30 500 0.8 MMZ1608B301A 30±25% 0.40 500 0.8 MMZ1608B401A 470±25% 0.30 500 0.8 MMZ1608B401A 40±25% 0.10 600 0.8 MMZ1608B400A 40±25% 0.10 600 0.8 MMZ1608S400A 40±25% 0.15 500 0.8 MMZ1608S401A 20±25% 0.15 500 0.8 MMZ1608S41A 120±25% 0.20 500 0.8 MMZ1608S21A 20±25% 0.20 500 0.8 MMZ1608S21A 20±25% 0.20 500 0.8 MMZ1608S41A 300±25% 0.30 500 0.8 MMZ1608S401A 300±25% 0.30 500 0.8 MMZ1608S401A 470±25% 0.30 500 0.8 MMZ1608S401A 470±25% 0.35 500 0.8 MMZ1608S401A 400±25% 0.35 500 0.8 MMZ1608S401A 400±25% 0.35 500 0.8 MMZ1608S401A 400±25% 0.35 500 0.8 MMZ1608S401A 470±25% 0.35 500 0.8 MMZ1608S401A 470±25% 0.35 500 0.8 MMZ1608S401A 470±25% 0.30 500 0.8 MMZ1608S401A 470±25% 0.30 500 0.8 MMZ1608Y201B 20±25% 0.05 1500 0.8 MMZ1608Y21B 20±25% 0.05 1500 0.8 MMZ1608Y21B 20±25% 0.05 1500 0.8 MMZ1608Y21B 20±25% 0.30 500 0.8 MMZ1608Y21B 20±25% 0.30 500 0.8 MMZ1608Y21B 20±25% 0.30 500 0.8 MMZ1608Y12B 20±25% 0.40 500 0.8 MMZ1608Y12B 20±25% 0.30 500 0.8 MMZ1608Y12B 100±25% 0.50 400 0.8 MMZ1608Y12B 100±25% 0.50 400 0.8 MMZ1608Y12B 20±25% 0.30 500 0.8 MMZ1608D40B 20±25% 0.30 500 0.8 MMZ1608D40B 20±25%	MMZ1608B301C	300±25%	0.25		0.6
MMZ1608B102C	MMZ1608B471C	470±25%	0.30	500	0.6
MMZ1608R300A 15±25% 0.05 1500 0.8 MMZ1608R300A 30±25% 0.10 800 0.8 MMZ1608R300A 60±25% 0.10 800 0.8 MMZ1608R301A 300±25% 0.18 500 0.8 MMZ1608R301A 300±25% 0.25 500 0.8 MMZ1608R471A 470±25% 0.30 500 0.8 MMZ1608R471A 470±25% 0.30 500 0.8 MMZ1608R471A 470±25% 0.50 400 0.8 MMZ1608R102A 1000±25% 0.50 400 0.8 MMZ1608R400A 40±25% 0.10 600 0.8 MMZ1608S400A 40±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.20 500 0.8 MMZ1608S121A 220±25% 0.20 500 0.8 MMZ1608S21A 220±25% 0.30 500 0.8 MMZ1608S401A 470±25% 0.30 500 0.8 MMZ1608S401A 470±25% 0.30 500 0.8 MMZ1608S401A 470±25% 0.30 500 0.8 MMZ1608S401A 600±25% 0.35 500 0.8 MMZ1608S401A 600±25% 0.35 500 0.8 MMZ1608S401A 600±25% 0.30 500 0.8 MMZ1608S401A 600±25% 0.90 200 0.8 MMZ1608S401A 600±25% 0.90 200 0.8 MMZ1608Y12B 15±25% 0.05 1500 0.8 MMZ1608Y12B 220±25% 0.30 500 0.8 MMZ1608Y12B 220±25% 0.30 500 0.8 MMZ1608Y12B 220±25% 0.30 500 0.8 MMZ1608Y12B 200±25% 0.40 500 0.8 MMZ1608Y12B 200±25% 0.40 500 0.8 MMZ1608Y15B 1500±25% 0.40 500 0.8 MMZ1608Y15B 1500±25% 0.40 500 0.8 MMZ1608Y16B 100±25% 0.40 500 0.8 MMZ1608O12B 100±25% 0.40 500 0.8 MMZ1608O12B 100±25% 0.40 500 0.8 MMZ1608O12B 100±25% 0.30 500 0.8 MMZ1608D100C 0±525% 0.30 500 0.8	MMZ1608B601C	600±25%	0.40	500	0.6
MMZ1608R300A 30±25% 0.05 1500 0.8 MMZ1608R600A 60±25% 0.10 800 0.8 MMZ1608R121A 120±25% 0.18 500 0.8 MMZ1608R301A 300±25% 0.25 500 0.8 MMZ1608R401A 470±25% 0.30 500 0.8 MMZ1608R601A 600±25% 0.40 500 0.8 MMZ1608R400A 40±25% 0.10 600 0.8 MMZ1608S400A 80±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.20 500 0.8 MMZ1608S121A 220±25% 0.20 500 0.8 MMZ1608S21A 20±25% 0.30 500 0.8 MMZ1608S301A 300±25% 0.35 500 0.8 MMZ1608S471A 470±25% 0.30 500 0.8 MMZ1608S102A 100±25% 0.50 400 <	MMZ1608B102C	1000±25%	0.60	300	0.8
MMZ1608R600A 60±25% 0.10 800 0.8 MMZ1608R121A 120±25% 0.18 500 0.8 MMZ1608R301A 300±25% 0.25 500 0.8 MMZ1608R471A 470±25% 0.30 500 0.8 MMZ1608R601A 600±25% 0.40 500 0.8 MMZ1608R102A 100±25% 0.10 600 0.8 MMZ1608S800A 80±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.15 500 0.8 MMZ1608S21A 220±25% 0.20 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S102A 400±25% 0.35 500 0.8 MMZ1608S102A 100±25% 0.35 500 0.8 MMZ1608S102A 200±25% 0.50 400 0.8 MMZ1608S102A 200±25% 0.50 1500	MMZ1608R150A	15±25%	0.05	1500	8.0
MMZ1608R121A 120±25% 0.18 500 0.8 MMZ1608R801A 300±25% 0.25 500 0.8 MMZ1608R401A 470±25% 0.30 500 0.8 MMZ1608R601A 600±25% 0.40 500 0.8 MMZ1608R102A 100±25% 0.50 400 0.8 MMZ1608S400A 40±25% 0.10 600 0.8 MMZ1608S400A 40±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.20 500 0.8 MMZ1608S21A 300±25% 0.30 500 0.8 MMZ1608S471A 470±25% 0.30 500 0.8 MMZ1608S601A 600±25% 0.35 500 0.8 MMZ1608Y30B 30±25% 0.05 1500 0.8 MMZ1608Y30B 30±25% 0.05 1500 <	MMZ1608R300A	30±25%	0.05	1500	0.8
MMZ1608R301A 300±25% 0.25 500 0.8 MMZ1608R471A 470±25% 0.30 500 0.8 MMZ1608R102A 100±25% 0.40 500 0.8 MMZ1608S400A 40±25% 0.10 600 0.8 MMZ1608S400A 40±25% 0.15 500 0.8 MMZ1608S21A 120±25% 0.15 500 0.8 MMZ1608S21A 120±25% 0.20 500 0.8 MMZ1608S21A 220±25% 0.20 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S301A 400±25% 0.30 500 0.8 MMZ1608S102A 1000±25% 0.35 500 0.8 MMZ1608S102A 1000±25% 0.50 400 0.8 MMZ1608S102A 1000±25% 0.90 200 0.8 MMZ1608S102B 15±25% 0.90 200	MMZ1608R600A	60±25%	0.10	800	0.8
MMZ1608R471A 470±25% 0.30 500 0.8 MMZ1608R601A 600±25% 0.40 500 0.8 MMZ1608R102A 1000±25% 0.50 400 0.8 MMZ1608S400A 40±25% 0.10 600 0.8 MMZ1608S20A 80±25% 0.15 500 0.8 MMZ1608S21A 120±25% 0.20 500 0.8 MMZ1608S21A 20±25% 0.20 500 0.8 MMZ1608S21A 20±25% 0.20 500 0.8 MMZ1608S201A 20±25% 0.20 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S202A 200±25% 0.35 500 0.8 MMZ1608S202A 200±25% 0.90 200 0.8 MMZ1608Y150B 15±25% 0.05 1500 0.8 MMZ1608Y121B 12±25% 0.05 1500	MMZ1608R121A	120±25%	0.18	500	0.8
MMZ1608R601A 600±25% 0.40 500 0.8 MMZ1608R102A 1000±25% 0.50 400 0.8 MMZ1608S800A 40±25% 0.10 600 0.8 MMZ1608S800A 80±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.20 500 0.8 MMZ1608S181A 180±25% 0.20 500 0.8 MMZ1608S221A 220±25% 0.20 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S471A 470±25% 0.30 500 0.8 MMZ1608S601A 600±25% 0.35 500 0.8 MMZ1608S102A 1000±25% 0.50 400 0.8 MMZ1608Y30B 15±25% 0.05 1500 0.8 MMZ1608Y30B 30±25% 0.05 1500 0.8 MMZ1608Y121B 10±2±25% 0.20 500 0.8 MMZ1608Y301B 300±25% 0.30 500	MMZ1608R301A	300±25%	0.25	500	0.8
MMZ1608R102A 1000±25% 0.50 400 0.8 MMZ1608S400A 40±25% 0.10 600 0.8 MMZ1608S800A 80±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.15 500 0.8 MMZ1608S21A 120±25% 0.20 500 0.8 MMZ1608S21A 20±25% 0.20 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S471A 470±25% 0.30 500 0.8 MMZ1608S102A 1000±25% 0.35 500 0.8 MMZ1608S102A 1000±25% 0.50 400 0.8 MMZ1608S202A 2000±25% 0.90 200 0.8 MMZ1608Y30B 30±25% 0.05 1500 0.8 MMZ1608Y30B 30±25% 0.30 500 0.8 MMZ1608Y30B 30±25% 0.30 500 0.8 MMZ1608Y321B 120±25% 0.30 500 <t< td=""><td>MMZ1608R471A</td><td>470±25%</td><td>0.30</td><td>500</td><td>0.8</td></t<>	MMZ1608R471A	470±25%	0.30	500	0.8
MMZ1608R102A 1000±25% 0.50 400 0.8 MMZ1608S400A 40±25% 0.10 600 0.8 MMZ1608S800A 80±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.15 500 0.8 MMZ1608S21A 120±25% 0.20 500 0.8 MMZ1608S21A 20±25% 0.20 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S471A 470±25% 0.30 500 0.8 MMZ1608S102A 1000±25% 0.35 500 0.8 MMZ1608S102A 1000±25% 0.50 400 0.8 MMZ1608S202A 2000±25% 0.90 200 0.8 MMZ1608Y30B 30±25% 0.05 1500 0.8 MMZ1608Y30B 30±25% 0.30 500 0.8 MMZ1608Y30B 30±25% 0.30 500 0.8 MMZ1608Y321B 120±25% 0.30 500 <t< td=""><td>MMZ1608R601A</td><td>600±25%</td><td>0.40</td><td>500</td><td>0.8</td></t<>	MMZ1608R601A	600±25%	0.40	500	0.8
MMZ1608S400A 40±25% 0.10 600 0.8 MMZ1608S800A 80±25% 0.15 500 0.8 MMZ1608S121A 120±25% 0.15 500 0.8 MMZ1608S181A 180±25% 0.20 500 0.8 MMZ1608S201A 300±25% 0.30 500 0.8 MMZ1608S301A 300±25% 0.30 500 0.8 MMZ1608S471A 470±25% 0.30 500 0.8 MMZ1608S601A 600±25% 0.35 500 0.8 MMZ1608S02A 2000±25% 0.50 400 0.8 MMZ1608Y20B 15±25% 0.90 200 0.8 MMZ1608Y300B 30±25% 0.95 1500 0.8 MMZ1608Y21B 120±25% 0.05 1500 0.8 MMZ1608Y301B 30±25% 0.30 500 0.8 MMZ1608Y301B 30±25% 0.30 500 0.8 MMZ1608Y471B 470±25% 0.35 500 <t< td=""><td></td><td></td><td></td><td></td><td></td></t<>					
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MMZ1608Y471B 470±25% 0.35 500 0.8 MMZ1608Y601B 600±25% 0.40 500 0.8 MMZ1608Y751B 750±25% 0.45 500 0.8 MMZ1608Y102B 1000±25% 0.50 400 0.8 MMZ1608Y152B 1500±25% 0.60 300 0.8 MMZ1608A182B 1800±25% 0.80 200 0.8 MMZ1608A222B 2200±25% 0.80 200 0.8 MMZ1608A252B 2500±25% 0.80 200 0.8 MMZ1608Q121B 120±25% 0.80 200 0.8 MMZ1608Q21B 220±25% 0.40 500 0.8 MMZ1608Q331B 330±25% 0.50 400 0.8 MMZ1608Q601B 600±25% 0.80 200 0.8 MMZ1608Q601B 600±25% 0.80 200 0.8 MMZ1608D100C 5±2Ω 0.05 700 0.8 MMZ1608D20C 22±25% 0.20 500	MMZ1608Y221B	220±25%	0.30	500	0.8
MMZ1608Y601B 600±25% 0.40 500 0.8 MMZ1608Y751B 750±25% 0.45 500 0.8 MMZ1608Y102B 1000±25% 0.50 400 0.8 MMZ1608Y152B 1500±25% 0.60 300 0.8 MMZ1608A182B 1800±25% 0.80 200 0.8 MMZ1608A222B 2200±25% 0.80 200 0.8 MMZ1608A252B 2500±25% 0.80 200 0.8 MMZ1608Q121B 120±25% 0.30 500 0.8 MMZ1608Q221B 220±25% 0.40 500 0.8 MMZ1608Q331B 330±25% 0.50 400 0.8 MMZ1608Q471B 470±25% 0.70 300 0.8 MMZ1608Q601B 600±25% 0.80 200 0.8 MMZ1608D102B 1000±25% 1.00 200 0.8 MMZ1608D100C 10±5Ω 0.10 500 0.6 MMZ1608D500C 50±25% 0.20 500	MMZ1608Y301B	300±25%	0.30	500	0.8
MMZ1608Y751B 750±25% 0.45 500 0.8 MMZ1608Y102B 1000±25% 0.50 400 0.8 MMZ1608Y152B 1500±25% 0.60 300 0.8 MMZ1608A182B 1800±25% 0.80 200 0.8 MMZ1608A222B 2200±25% 0.80 200 0.8 MMZ1608A252B 2500±25% 0.80 200 0.8 MMZ1608Q121B 120±25% 0.30 500 0.8 MMZ1608Q221B 220±25% 0.40 500 0.8 MMZ1608Q331B 330±25% 0.50 400 0.8 MMZ1608Q471B 470±25% 0.70 300 0.8 MMZ1608Q601B 600±25% 0.80 200 0.8 MMZ1608D102B 1000±25% 1.00 200 0.8 MMZ1608D100C 5±2Ω 0.05 700 0.8 MMZ1608D20C 22±25% 0.20 500 0.6 MMZ1608D800C 80±25% 0.30 500	MMZ1608Y471B	470±25%	0.35	500	0.8
MMZ1608Y102B 1000±25% 0.50 400 0.8 MMZ1608Y152B 1500±25% 0.60 300 0.8 MMZ1608A182B 1800±25% 0.80 200 0.8 MMZ1608A222B 2200±25% 0.80 200 0.8 MMZ1608A252B 2500±25% 0.80 200 0.8 MMZ1608Q121B 120±25% 0.30 500 0.8 MMZ1608Q221B 220±25% 0.40 500 0.8 MMZ1608Q331B 330±25% 0.50 400 0.8 MMZ1608Q471B 470±25% 0.70 300 0.8 MMZ1608Q601B 600±25% 0.80 200 0.8 MMZ1608Q102B 1000±25% 1.00 200 0.8 MMZ1608D100C 5±2Ω 0.05 700 0.8 MMZ1608D20C 22±25% 0.20 500 0.6 MMZ1608D800C 80±25% 0.25 500 0.6 MMZ1608D800B 80±25% 0.30 500	MMZ1608Y601B	600±25%	0.40	500	0.8
MMZ1608Y152B 1500±25% 0.60 300 0.8 MMZ1608A182B 1800±25% 0.80 200 0.8 MMZ1608A222B 2200±25% 0.80 200 0.8 MMZ1608A252B 2500±25% 0.80 200 0.8 MMZ1608Q121B 120±25% 0.30 500 0.8 MMZ1608Q221B 220±25% 0.40 500 0.8 MMZ1608Q331B 330±25% 0.50 400 0.8 MMZ1608Q471B 470±25% 0.70 300 0.8 MMZ1608Q601B 600±25% 0.80 200 0.8 MMZ1608Q102B 1000±25% 1.00 200 0.8 MMZ1608D100C 5±2Ω 0.05 700 0.8 MMZ1608D20C 2±2±25% 0.20 500 0.6 MMZ1608D800C 80±25% 0.20 500 0.6 MMZ1608D800B 80±25% 0.30 500 0.6 MMZ1608D121C 120±25% 0.30 400	MMZ1608Y751B	750±25%	0.45	500	0.8
MMZ1608A182B 1800±25% 0.80 200 0.8 MMZ1608A222B 2200±25% 0.80 200 0.8 MMZ1608A252B 2500±25% 0.80 200 0.8 MMZ1608Q121B 120±25% 0.30 500 0.8 MMZ1608Q221B 220±25% 0.40 500 0.8 MMZ1608Q331B 330±25% 0.50 400 0.8 MMZ1608Q471B 470±25% 0.70 300 0.8 MMZ1608Q601B 600±25% 0.80 200 0.8 MMZ1608Q102B 1000±25% 1.00 200 0.8 MMZ1608D100C 5±2Ω 0.05 700 0.8 MMZ1608D20C 22±25% 0.20 500 0.6 MMZ1608D500C 50±25% 0.25 500 0.6 MMZ1608D800B 80±25% 0.30 500 0.6 MMZ1608D121C 120±25% 0.30 400 0.6 MMZ1608D241C 240±25% 0.30 400	MMZ1608Y102B	1000±25%	0.50	400	0.8
MMZ1608A222B 2200±25% 0.80 200 0.8 MMZ1608A252B 2500±25% 0.80 200 0.8 MMZ1608Q121B 120±25% 0.30 500 0.8 MMZ1608Q221B 220±25% 0.40 500 0.8 MMZ1608Q331B 330±25% 0.50 400 0.8 MMZ1608Q471B 470±25% 0.70 300 0.8 MMZ1608Q601B 600±25% 0.80 200 0.8 MMZ1608Q102B 1000±25% 1.00 200 0.8 MMZ1608D050C 5±2Ω 0.05 700 0.8 MMZ1608D100C 10±5Ω 0.10 500 0.6 MMZ1608D220C 22±25% 0.20 500 0.6 MMZ1608D800C 80±25% 0.30 500 0.6 MMZ1608D800B 80±25% 0.30 500 0.6 MMZ1608D121C 120±25% 0.30 400 0.6 MMZ1608D241C 240±25% 0.60 300 <	MMZ1608Y152B	1500±25%	0.60	300	0.8
MMZ1608A222B 2200±25% 0.80 200 0.8 MMZ1608A252B 2500±25% 0.80 200 0.8 MMZ1608Q121B 120±25% 0.30 500 0.8 MMZ1608Q221B 220±25% 0.40 500 0.8 MMZ1608Q331B 330±25% 0.50 400 0.8 MMZ1608Q471B 470±25% 0.70 300 0.8 MMZ1608Q601B 600±25% 0.80 200 0.8 MMZ1608Q102B 1000±25% 1.00 200 0.8 MMZ1608D050C 5±2Ω 0.05 700 0.8 MMZ1608D100C 10±5Ω 0.10 500 0.6 MMZ1608D220C 22±25% 0.20 500 0.6 MMZ1608D800C 80±25% 0.30 500 0.6 MMZ1608D800B 80±25% 0.30 500 0.6 MMZ1608D121C 120±25% 0.30 400 0.6 MMZ1608D241C 240±25% 0.60 300 <	MMZ1608A182B	1800±25%	0.80	200	0.8
MMZ1608A252B 2500±25% 0.80 200 0.8 MMZ1608Q121B 120±25% 0.30 500 0.8 MMZ1608Q221B 220±25% 0.40 500 0.8 MMZ1608Q331B 330±25% 0.50 400 0.8 MMZ1608Q471B 470±25% 0.70 300 0.8 MMZ1608Q601B 600±25% 0.80 200 0.8 MMZ1608Q102B 1000±25% 1.00 200 0.8 MMZ1608D050C 5±2Ω 0.05 700 0.8 MMZ1608D100C 10±5Ω 0.10 500 0.6 MMZ1608D220C 22±25% 0.20 500 0.6 MMZ1608D500C 50±25% 0.25 500 0.6 MMZ1608D800B 80±25% 0.30 500 0.6 MMZ1608D121C 120±25% 0.30 400 0.6 MMZ1608D121B 120±25% 0.30 400 0.8 MMZ1608D301B 300±25% 0.60 300 <t< td=""><td>MMZ1608A222B</td><td></td><td>0.80</td><td>200</td><td>0.8</td></t<>	MMZ1608A222B		0.80	200	0.8
MMZ1608Q121B 120±25% 0.30 500 0.8 MMZ1608Q221B 220±25% 0.40 500 0.8 MMZ1608Q331B 330±25% 0.50 400 0.8 MMZ1608Q471B 470±25% 0.70 300 0.8 MMZ1608Q601B 600±25% 0.80 200 0.8 MMZ1608Q102B 1000±25% 1.00 200 0.8 MMZ1608D050C 5±2Ω 0.05 700 0.8 MMZ1608D100C 10±5Ω 0.10 500 0.6 MMZ1608D220C 22±25% 0.20 500 0.6 MMZ1608D800C 50±25% 0.25 500 0.6 MMZ1608D800B 80±25% 0.30 500 0.6 MMZ1608D121C 120±25% 0.30 400 0.6 MMZ1608D121B 120±25% 0.30 400 0.8 MMZ1608D301B 300±25% 0.60 300 0.8 MMZ1608F030B 3typ. 0.05 700 0	MMZ1608A252B	2500±25%			
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MMZ1608D100C 10±5Ω 0.10 500 0.6 MMZ1608D220C 22±25% 0.20 500 0.6 MMZ1608D500C 50±25% 0.25 500 0.6 MMZ1608D800C 80±25% 0.30 500 0.6 MMZ1608D800B 80±25% 0.30 500 0.8 MMZ1608D121C 120±25% 0.30 400 0.6 MMZ1608D121B 120±25% 0.30 400 0.8 MMZ1608D241C 240±25% 0.60 300 0.8 MMZ1608D301B 300±25% 0.70 300 0.8 MMZ1608F030B 3typ. 0.05 700 0.8 MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8					
MMZ1608D220C 22±25% 0.20 500 0.6 MMZ1608D500C 50±25% 0.25 500 0.6 MMZ1608D800C 80±25% 0.30 500 0.6 MMZ1608D800B 80±25% 0.30 500 0.8 MMZ1608D121C 120±25% 0.30 400 0.6 MMZ1608D121B 120±25% 0.30 400 0.8 MMZ1608D241C 240±25% 0.60 300 0.8 MMZ1608D301B 300±25% 0.70 300 0.8 MMZ1608F030B 3typ. 0.05 700 0.8 MMZ1608F470B 47±25% 0.40 500 0.8 MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8					
MMZ1608D500C 50±25% 0.25 500 0.6 MMZ1608D800C 80±25% 0.30 500 0.6 MMZ1608D800B 80±25% 0.30 500 0.8 MMZ1608D121C 120±25% 0.30 400 0.6 MMZ1608D121B 120±25% 0.30 400 0.8 MMZ1608D241C 240±25% 0.60 300 0.8 MMZ1608D301B 300±25% 0.70 300 0.8 MMZ1608F030B 3typ. 0.05 700 0.8 MMZ1608F470B 47±25% 0.40 500 0.8 MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8					
MMZ1608D800C 80±25% 0.30 500 0.6 MMZ1608D800B 80±25% 0.30 500 0.8 MMZ1608D121C 120±25% 0.30 400 0.6 MMZ1608D121B 120±25% 0.30 400 0.8 MMZ1608D241C 240±25% 0.60 300 0.8 MMZ1608D301B 300±25% 0.70 300 0.8 MMZ1608F030B 3typ. 0.05 700 0.8 MMZ1608F470B 47±25% 0.40 500 0.8 MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8					
MMZ1608D800B 80±25% 0.30 500 0.8 MMZ1608D121C 120±25% 0.30 400 0.6 MMZ1608D121B 120±25% 0.30 400 0.8 MMZ1608D241C 240±25% 0.60 300 0.8 MMZ1608D301B 300±25% 0.70 300 0.8 MMZ1608F030B 3typ. 0.05 700 0.8 MMZ1608F470B 47±25% 0.40 500 0.8 MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8					
MMZ1608D121C 120±25% 0.30 400 0.6 MMZ1608D121B 120±25% 0.30 400 0.8 MMZ1608D241C 240±25% 0.60 300 0.8 MMZ1608D301B 300±25% 0.70 300 0.8 MMZ1608F030B 3typ. 0.05 700 0.8 MMZ1608F470B 47±25% 0.40 500 0.8 MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8					
MMZ1608D121B 120±25% 0.30 400 0.8 MMZ1608D241C 240±25% 0.60 300 0.8 MMZ1608D301B 300±25% 0.70 300 0.8 MMZ1608F030B 3typ. 0.05 700 0.8 MMZ1608F470B 47±25% 0.40 500 0.8 MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8					
MMZ1608D241C 240±25% 0.60 300 0.8 MMZ1608D301B 300±25% 0.70 300 0.8 MMZ1608F030B 3typ. 0.05 700 0.8 MMZ1608F470B 47±25% 0.40 500 0.8 MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8					
MMZ1608D301B 300±25% 0.70 300 0.8 MMZ1608F030B 3typ. 0.05 700 0.8 MMZ1608F470B 47±25% 0.40 500 0.8 MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8					
MMZ1608F030B 3typ. 0.05 700 0.8 MMZ1608F470B 47±25% 0.40 500 0.8 MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8		240±25%	0.60	300	8.0
MMZ1608F470B 47±25% 0.40 500 0.8 MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8	MMZ1608D301B	300±25%	0.70	300	0.8
MMZ1608F750B 75±25% 0.55 300 0.8 MMZ1608F121B 120±25% 0.75 200 0.8	MMZ1608F030B	3typ.	0.05	700	0.8
MMZ1608F121B 120±25% 0.75 200 0.8	MMZ1608F470B	47±25%	0.40	500	0.8
	MMZ1608F750B	75±25%	0.55	300	0.8
* Test equipment: E4991A or equivalent	MMZ1608F121B	120±25%	0.75	200	0.8
	* Test equipment:	E4991A or eq	uivalent		

Test equipment: E4991A or equivalent
 Test tool: 16192A or equivalent
 Test temperature: 25±10°C

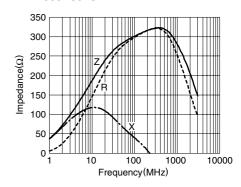
[•] All specifications are subject to change without notice.



MMZ1608B221C

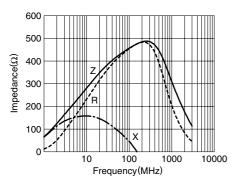


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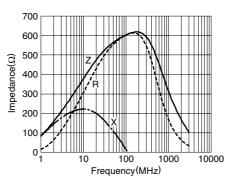




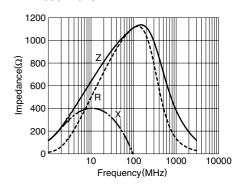
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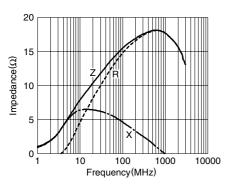
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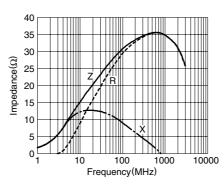
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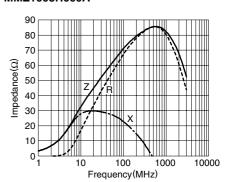
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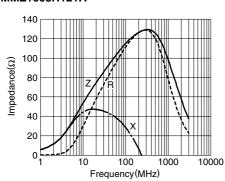
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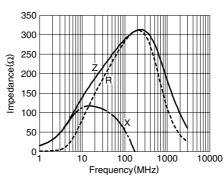
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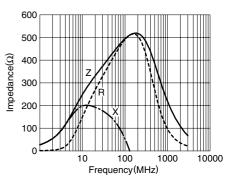
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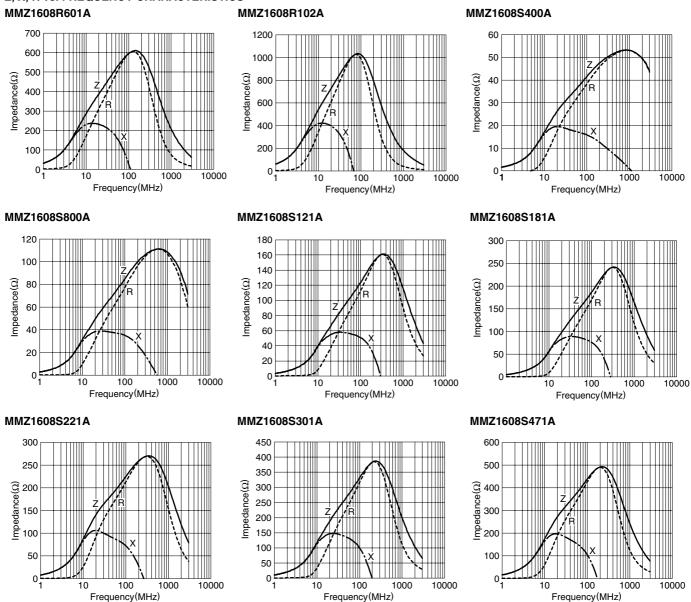
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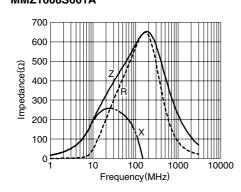
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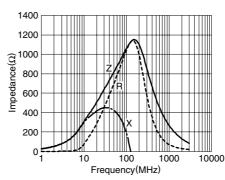
[•] All specifications are subject to change without notice.



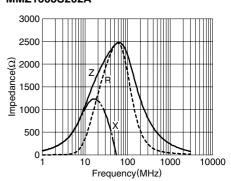
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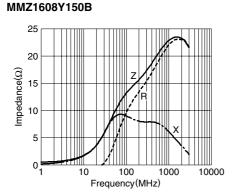
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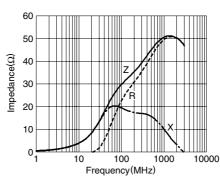
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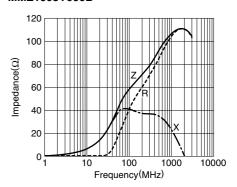
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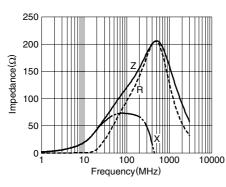
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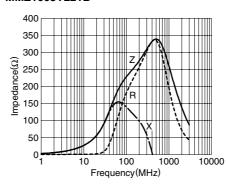
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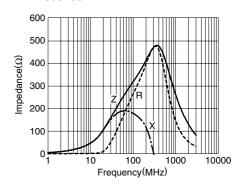
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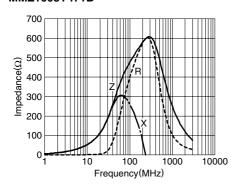
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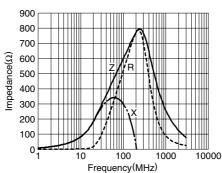
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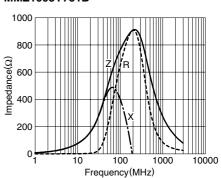
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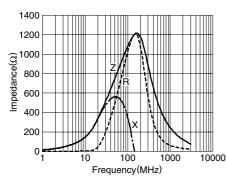
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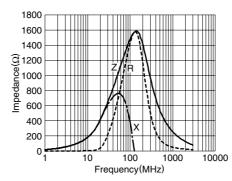
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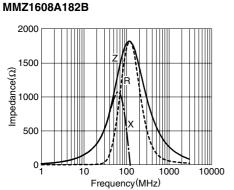
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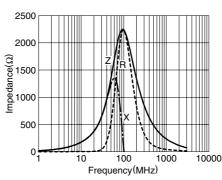
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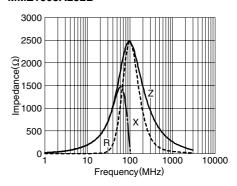
[•] All specifications are subject to change without notice.



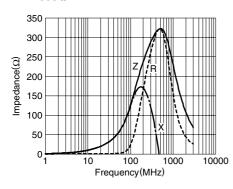




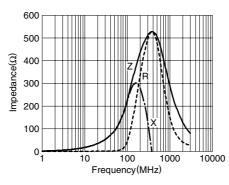
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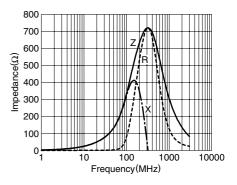
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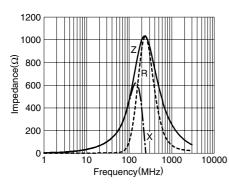
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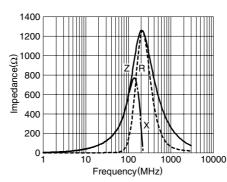
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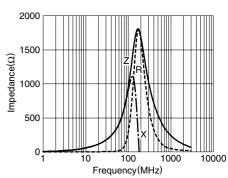
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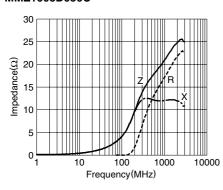
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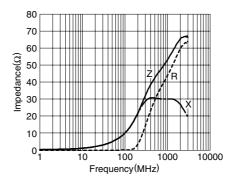
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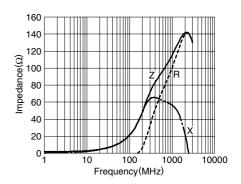
MMZ1608D050C



MMZ1608D100C



MMZ1608D220C



[•] All specifications are subject to change without notice.



MMZ1608D500C 400 300 200 RR RR

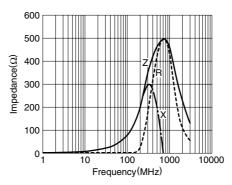
100

Frequency(MHz)

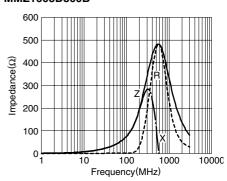
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10000





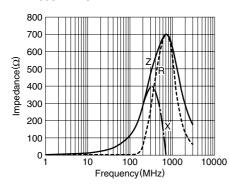
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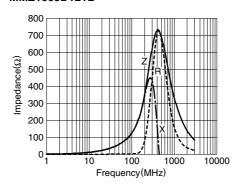
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100

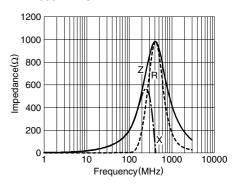
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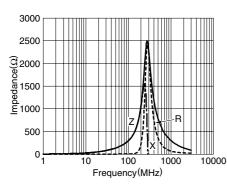
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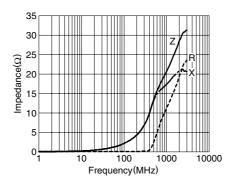
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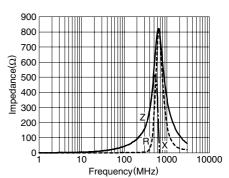
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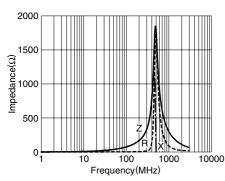
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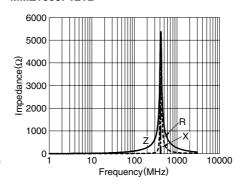
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MMZ1608F750B

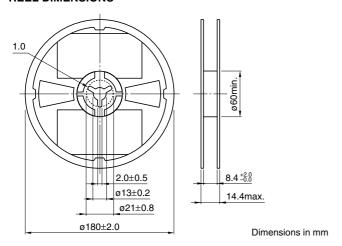


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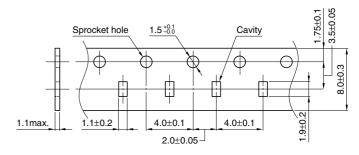


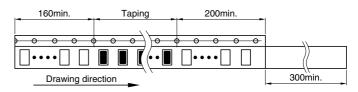
[•] All specifications are subject to change without notice.

PACKAGING STYLES REEL DIMENSIONS



TAPE DIMENSIONS





Dimensions in mm



Chip Beads For Signal Line

Conformity to RoHS Directive

MMZ Series MMZ2012

FEATURES

- Chip bead(impeder), MMZ series offers 4 construction materials.
- Size standardized for use by automatic assembly equipment.
 No preferred orientation.
- Either flow or reflow soldering methods can be used due to electroplating of the terminal electrodes.
- · High reliability due to an entirely monolithic structure.
- Closed magnetic circuit structure allows high-density installation while preventing crosstalk between circuits.
- Low DC resistance structure of electrode prevents wasteful electric power consumption.
- The products contain no lead and also support lead-free soldering.
- It is a product conforming to RoHS directive.

APPLICATIONS

Removal of signal line noises of cellular phones, PCs, note PCs, TVs, TV tuners, STBs, audio players, DVDs, DSCs, DVCs, game machines, digital photo frames, car navigation system, PNDs, etc.

PRODUCT IDENTIFICATION

 $\frac{MMZ}{(1)} \frac{2012}{(2)} \frac{R}{(3)} \frac{121}{(4)} \frac{A}{(5)} \frac{T}{(6)} \frac{\Box\Box\Box}{(7)}$

- (1) Series name
- (2) Dimensions L×W
- (3) Type name
- (4) Impedance

121:120 Ω at 100MHz

- (5) Characteristic type
- (6) Packaging style
 - T:Taping
- (7) TDK internal code

HANDLING AND PRECAUTIONS

- Before soldering, be sure to preheat components. The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
- Do not expose the inductors to stray magnetic fields.
- · Avoid static electricity discharge during handling.
- When hand soldering, apply the soldering iron to the printed circuit board only. Temperature of the iron tip should not exceed 350°C. Soldering time should not exceed 3 seconds.

MATERIAL CHARACTERISTICS

R material: For wide frequency applications calling for broad impedance characteristics.

For digital signal line applications calling requiring good waveform integrity. Impedance values selected for effectiveness at 10 to 200MHz.

S material: Standard type that features impedance characteristics similar to those of a typical ferrite core.

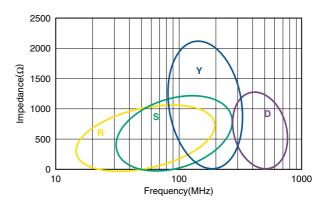
For signal line applications in which the blocking region is near 100MHz. Impedance values selected for effectiveness at 40 to 300MHz.

Y material: High frequency range type intended for the 100MHz region and above.

For signal line applications in which the signal frequency is far from the cutoff frequency. Impedance values selected for effectiveness at 80 to 400MHz.

D material: For applications calling for low insertion loss at low frequencies and sharply increasing impedance at high frequencies. Designed for high impedance at high frequencies (200 to 500MHz) for signal line applications.

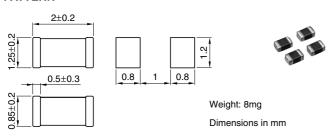
TYPICAL MATERIAL CHARACTERISTICS



- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.
- Please contact our Sales office when your application is considered the following:
 The device's failure or malfunction may directly endanger human life (e.g. application for automobile/aircraft/medical/nuclear power devices, etc.)

ATDK

SHAPES AND DIMENSIONS/RECOMMENDED PC BOARD PATTERN



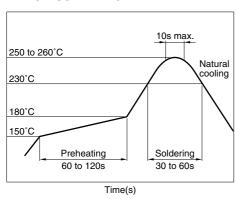
TEMPERATURE RANGES

Operating/storage -55 to +125°C	
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PACKAGING STYLE AND QUANTITIES

Packaging style	Quantity
Taping	4000 pieces/reel

RECOMMENDED SOLDERING CONDITION REFLOW SOLDERING



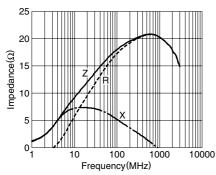
ELECTRICAL CHARACTERISTICS

Part No.	Impedance	DC resistance	Rated current
ran No.	$(\Omega)[100MHz]^*$	(Ω) max.	(mA)max.
MMZ2012R150A	15±25%	0.05	1500
MMZ2012R300A	30±25%	0.05	1500
MMZ2012R600A	60±25%	0.10	1000
MMZ2012R121A	120±25%	0.12	800
MMZ2012R301A	300±25%	0.15	600
MMZ2012R601A	600±25%	0.20	500
MMZ2012R102A	1000±25%	0.30	500
MMZ2012S400A	40±25%	0.10	1000
MMZ2012S800A	80±25%	0.10	800
MMZ2012S121A	120±25%	0.15	800
MMZ2012S181A	180±25%	0.15	600
MMZ2012S301A	300±25%	0.20	600
MMZ2012S601A	600±25%	0.30	500
MMZ2012S102A	1000±25%	0.35	500
MMZ2012Y150B	15±25%	0.05	1500
MMZ2012Y300B	30±25%	0.05	1500
MMZ2012Y600B	60±25%	0.10	1000
MMZ2012Y121B	120±25%	0.12	800
MMZ2012Y301B	300±25%	0.15	600
MMZ2012Y601B	600±25%	0.20	500
MMZ2012Y102B	1000±25%	0.30	500
MMZ2012Y152B	1500±25%	0.40	500
MMZ2012Y202B	2000±25%	0.50	400
MMZ2012D800B	80±25%	0.30	500
MMZ2012D121B	120±25%	0.30	500
MMZ2012D301B	300±25%	0.50	400

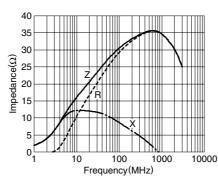
 Test equipment: E4991A or equivalent Test tool: 16192A or equivalent Test temperature: 25±10°C

TYPICAL ELECTRICAL CHARACTERISTICS Z, X, R vs. FREQUENCY CHARACTERISTICS

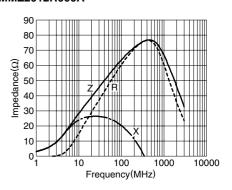
MMZ2012R150A



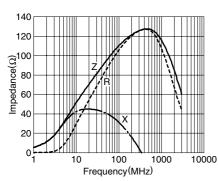
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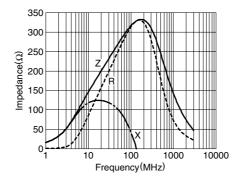
MMZ2012R600A



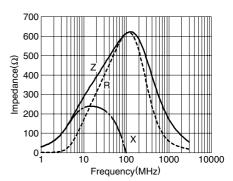
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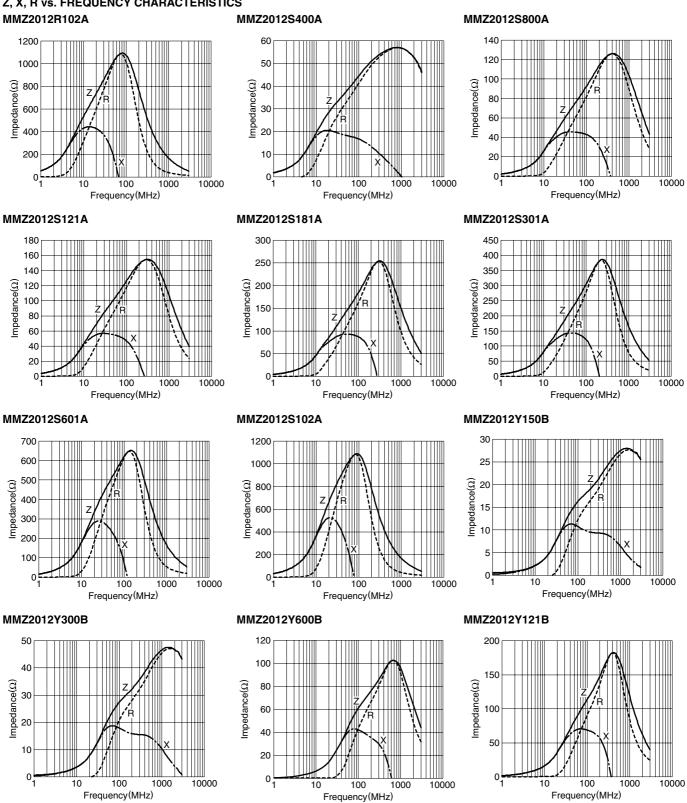
MMZ2012R301A



MMZ2012R601A



[•] All specifications are subject to change without notice.

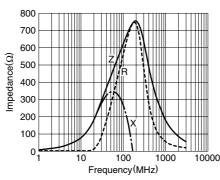


[•] All specifications are subject to change without notice.

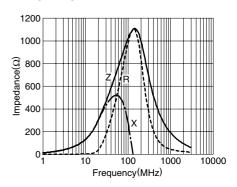


600 500 600 500 600 600 78 300 100 100 1000 1000 Frequency(MHz)



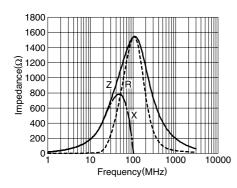


MMZ2012Y102B

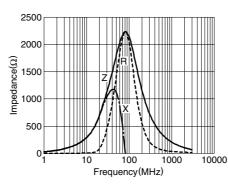


MMZ2012Y152B

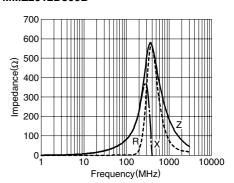
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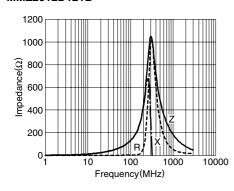
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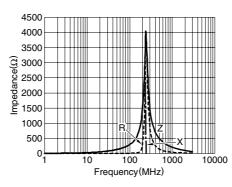
MMZ2012D800B



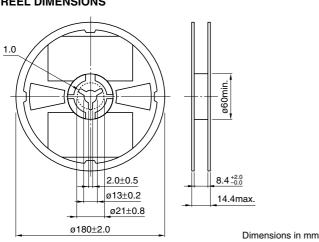
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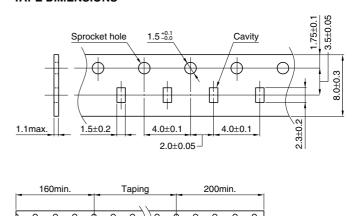
MMZ2012D301B



PACKAGING STYLES REEL DIMENSIONS



TAPE DIMENSIONS



Drawing direction 300min.

Dimensions in mm

[•] All specifications are subject to change without notice.

&TDK

Chip Beads For Signal Line

Conformity to RoHS Directive

MMZ Series MMZ1005-E

FEATURES

- Compared with the existing MMZ1005 type, this new product has broad-band impedance values for higher frequency ranges.
- Size standardized for use by automatic assembly equipment.
 No preferred orientation.
- Electroplated terminal electrodes accommodate reflow soldering.
- High reliability due to an entirely monolithic structure.
- Closed magnetic circuit structure allows high-density installation while preventing crosstalk between circuits.
- Low DC resistance structure of electrode prevents wasteful electric power consumption.
- It is a product conforming to RoHS directive.

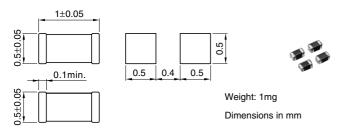
APPLICATIONS

Removal of signal line noises of cellular phones, PCs, note PCs, TVs, TV tuners, STBs, audio players, DVDs, DSCs, DVCs, game machines, digital photo frames, car navigation system, PNDs, etc.

TEMPERATURE RANGES

Operating/storage –55 to +125°C

SHAPES AND DIMENSIONS/RECOMMENDED PC BOARD PATTERN



ELECTRICAL CHARACTERISTICS

	Impedance(9	Ω)*	DC	Rated
Part No.	[100MHz]	[1GHz]	resistance	current
	[100](112]	[TGITZ]	(Ω) max.	(mA)max.
MMZ1005S601E	600±25%	1000±40%	0.65	300
MMZ1005S102E	1000±25%	1400±40%	1.00	250
MMZ1005S182E	1800±25%	1800±40%	1.50	200
MMZ1005A601E	600±25%	1400±40%	0.80	300
MMZ1005A102E	1000±25%	2000±40%	1.20	250
MMZ1005A152E	1500±25%	2300±40%	1.60	230
MMZ1005A182E	1800±25%	2700±40%	2.10	200
MMZ1005A222E	2200±25%	3000±40%	2.20	150
MMZ1005D121E	120±25%	1000±40%	0.70	300
MMZ1005D221E	220±25%	1700±40%	1.00	250
MMZ1005F470E	47±25%	800±40%	0.70	300
MMZ1005F750E	75±25%	1500±40%	1.00	250
MMZ1005F121E	120±25%	2300±40%	1.50	200

Test equipment: E4991A or equivalent Test tool: 16192A or equivalent Test temperature: 25±10°C

PRODUCT IDENTIFICATION

MMZ	1005	S	601	Ε	Т	
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- (1) Series name
- (2) Dimensions L×W
- (3) Type name
- (4) Impedance $601:600\Omega$ at 100MHz
- (5) Characteristic type
- (6) Packaging style T:Taping
- (7) TDK internal code

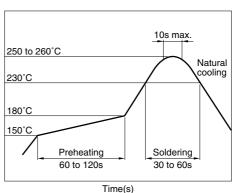
PACKAGING STYLE AND QUANTITIES

Packaging style	Quantity
Taping	10000 pieces/reel

HANDLING AND PRECAUTIONS

- Before soldering, be sure to preheat components. The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- After mounting components onto the printed circuit board, do not apply stress through board bending or mishandling.
- Do not expose the inductors to stray magnetic fields.
- Avoid static electricity discharge during handling.
- When hand soldering, apply the soldering iron to the printed circuit board only. Temperature of the iron tip should not exceed 350°C. Soldering time should not exceed 3 seconds.

RECOMMENDED SOLDERING CONDITION REFLOW SOLDERING



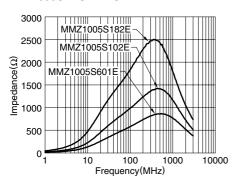
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.
- Please contact our Sales office when your application is considered the following:
 The device's failure or malfunction may directly endanger human life (e.g. application for automobile/aircraft/medical/nuclear power devices, etc.)



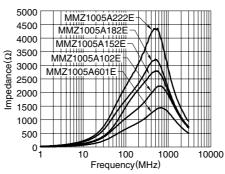
TYPICAL ELECTRICAL CHARACTERISTICS

Z FREQUENCY CHARACTERISTICS(DIFFERS ACCORDING TO SERIES)

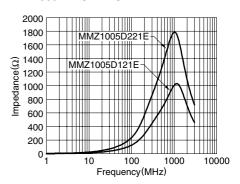
MMZ1005S-E SERIES



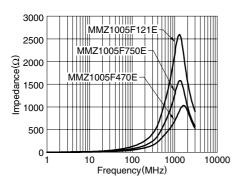
MMZ1005A-E SERIES



MMZ1005D-E SERIES

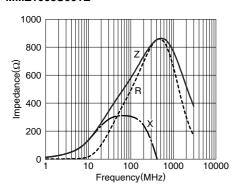


MMZ1005F-E SERIES

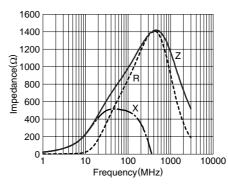


Z, X, R vs. FREQUENCY CHARACTERISTICS

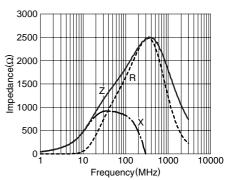
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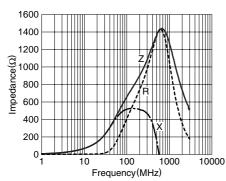
MMZ1005S102E



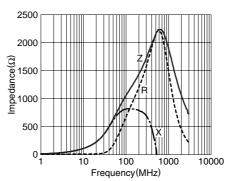
MMZ1005S182E



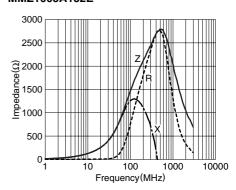
MMZ1005A601E



MMZ1005A102E



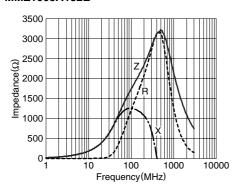
MMZ1005A152E

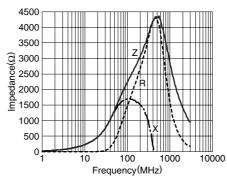


[•] All specifications are subject to change without notice.

MMZ1005A182E

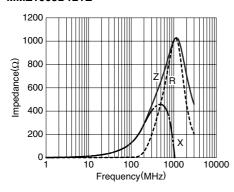
MMZ1005A222E

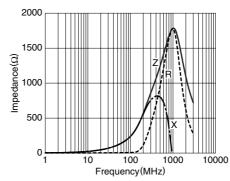




MMZ1005D121E

MMZ1005D221E

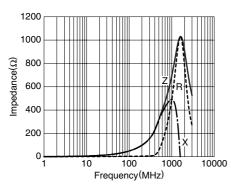


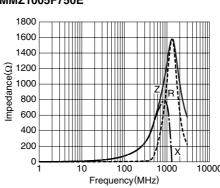


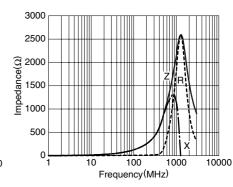
MMZ1005F470E

MMZ1005F750E

MMZ1005F121E



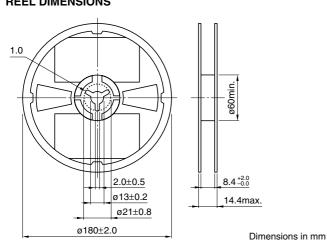


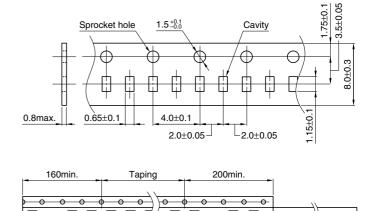


PACKAGING STYLES REEL DIMENSIONS

TAPE DIMENSIONS

Drawing direction





300min.

Dimensions in mm

[•] All specifications are subject to change without notice.