

# Ferrite Chip Beads—MPZ Series

GHZ noise countermeasure (power line) - consumer & automotive applications

Consumer Datasheets: [0603](#) [1005](#) [1608](#) [2012](#)

Automotive Datasheets: [1005](#) [1608](#) [2012](#)

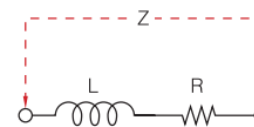


TDK's MPZ Series ferrite chip beads are used to suppress noise in both signal and power supply circuits. They are effective at reducing noise simply by being placed into the circuit in series. Multilayer chip beads consist of ferrite material and a conductive paste layered together. The equivalent circuit diagram of a chip bead consists of a reactance component, X, and a resistive component, R. The combined impedance of X and R is denoted as impedance Z. The static characteristics of a chip bead are typically described as the impedance value Z at a frequency of 100MHz. While several different chip beads could have the same impedance value at 100MHz, it is important to look at their individual frequency characteristics to determine which bead will work best for the circuit within the required frequency range. TDK offers up to five material types which provide various frequency characteristics for MPZ series chip beads in a variety of case sizes, each suited to different applications. Availability of materials varies with case size.

Features	
<ul style="list-style-type: none"> <li>Noise reduction solution for power line</li> <li>Has low direct current resistance for compatibility with large currents, optimal for low power consumption (as compared to the MMZ series)</li> <li>Various frequency characteristics with 5 materials of different features</li> <li>Conforms to RoHS directive, halogen free, &amp; compatible with lead-free soldering</li> <li>Standard operating temperature range of <math>-55^{\circ}\text{C}</math> to <math>+125^{\circ}\text{C}</math></li> <li>Storage temperature range of <math>-55^{\circ}\text{C}</math> to <math>125^{\circ}\text{C}</math> (after PC board mounting)</li> </ul>	
Consumer	Automotive
<ul style="list-style-type: none"> <li>Case sizes: 0603, 1005, 1608, &amp; 2012</li> </ul>	<ul style="list-style-type: none"> <li>Case sizes: 1005, 1608, &amp; 2012</li> <li>AEC-Q200 compliant</li> </ul>

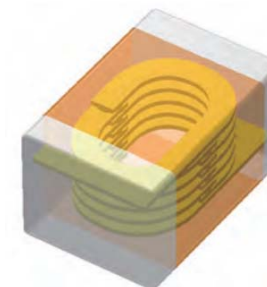
Applications	
Consumer	Automotive
<ul style="list-style-type: none"> <li>Mobile devices, including smartphone and tablet terminals</li> <li>PCs and recorders, household appliances such as STBs, smart grids, and industrial equipment</li> </ul>	<ul style="list-style-type: none"> <li>ECU's, powertrain, and body control</li> <li>Car multimedia (telematics)</li> </ul>

Equivalent Circuit Diagram of a Chip Bead



$$X = \omega L = 2\pi fL \quad f: \text{Frequency}$$

Internal Structure Diagrams of a Multilayer Chip Bead



Standard Ferrite Bead (Lengthwise Structure)

## MPZ Series Material Selection Guide

### B material

Fast Digital Signals

This material is perfectly suited for fast digital signals. By equalizing R 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

Wide Frequency &  
Good Waveform Integrity

For wide frequency applications calling for broad impedance characteristics. For digital signal line applications for requiring good waveform integrity. **Impedance values selected for effectiveness at 10 to 200MHz.**

### D material

Low Insertion Loss at Low Frequency

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

### S material

Signal line applications in which the blocking region is near 100MHz

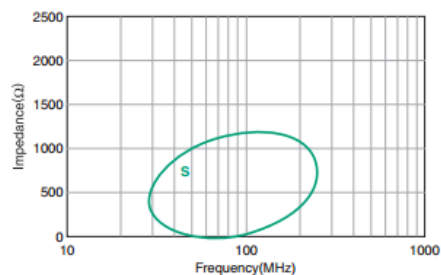
Standard type that features impedance characteristics similar to those of a typical ferrite core. For signal line applications in which the blocking region is near 100MHz. **Impedance values selected for effectiveness at 40 to 300MHz.**

### Y material

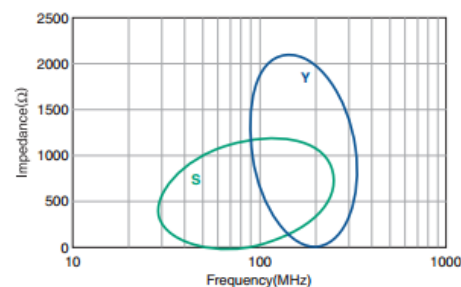
High Frequency (100MHz & Above)

High frequency range type intended for the 100MHz region and above. For single line applications in which the signal frequency is far from the cutoff frequency. **Impedance values selected for effectiveness at 80 to 400MHz.**

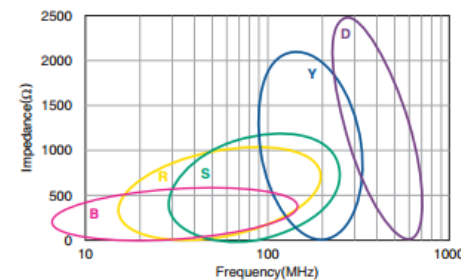
MPZ0603 Type



MPZ1005 Type



MPZ1608 Type



MPZ2012 Type

