APPROVAL SHEET

WLBD0603
Chip Bead P SERIES

RoHS COMPLIANT

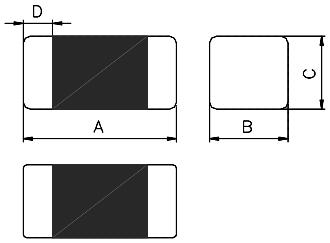
Pb Pb-Free

*Contents in this sheet are subject to change without prior notice.

FEATURES

Monolithic inorganic material construction.
Closed magnetic circuit avoids crosstalk.
S.M.T. type.
Suitable for reflow soldering.
Shapes and dimensions follow E.I.A. spec.
Available in various sizes.
Excellent solder ability and heat resistance.
High reliability.
100% Lead(Pb) & Halogen- Free and RoHS compliant.

SHAPE and DIMENSION



Chip Size	
A	0.60±0.03
B	0.30±0.03
C	0.30±0.03
D	0.1~0.2

Units: mm

Ordering Information

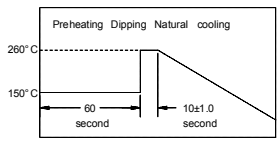
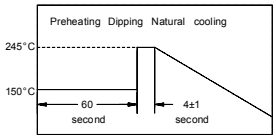
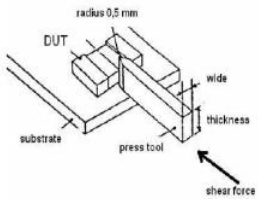
WL	BD	0603	K2	U	300	T	P
Product Code WL: Inductor	**Series** BD: Chip Bead.	**Dimensions** 0.6 * 0.3 mm 0603 :EIA 0201	**Series extension** Refer to characteristic	**Tolerance** U: ±25%	**Value** 300 =30 OHM 301 =300 OHM 102 =1000OHM	**Packing Code** T = 7" Paper Tape	P:General

PART NUMBER AND CHARACTERISTICS TABLE

WLBD0603 series

Walsin Part Number	Impedance (Ω) +/-25%	Test Frequency (MHz)	DC Resistance (Ω) max.	Rated Current (mA) max.
WLBD0603K2U220TP	22	100	0.065	500
WLBD0603K2U330TP	33	100	0.07	500
WLBD0603K2U800TP	80	100	0.40	200
WLBD0603K2U121TP	120	100	0.45	200
WLBD0603K2U241TP	240	100	0.65	200
WLBD0603K2U601TP	600	100	1.20	150
WLBD0603K2U102TP	1000	100	1.15	200
Walsin Part Number	**Impedance (Ω) +/-25%**	**Test Frequency (MHz)**	**DC Resistance (Ω) max.**	**Rated Current (mA) max.**
WLBD0603B1U600TP	60	100	0.25	200
WLBD0603B1U121TP	120	100	0.40	200
WLBD0603B1U241TP	240	100	0.80	200
WLBD0603B1U471TP	470	100	1.05	100
WLBD0603B1U601TP	600	100	1.20	100
Walsin Part Number	**Impedance (Ω) +/-25%**	**Test Frequency (MHz)**	**DC Resistance (Ω) max.**	**Rated Current (mA) max.**
WLBD0603H1U100TP	10	100	0.25	200
WLBD0603H1U220TP	22	100	0.45	200
WLBD0603H1U330TP	33	100	0.55	150
WLBD0603H1U471TP	47	100	0.70	150
WLBD0603H1U561TP	56	100	1.00	100
WLBD0603H1U800TP	80	100	1.30	100
WLBD0603H1U121TP	120	100	1.50	100

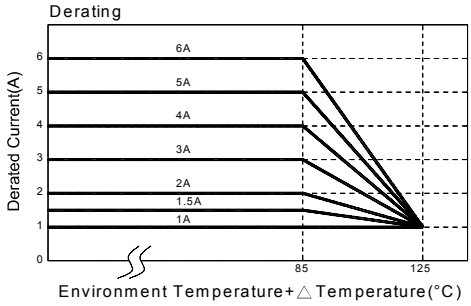
RELIABILITY AND TEST CONDITION

Test item	Test Condition	Performance
Operating Temperature		-40~+125℃ (Including self-temperature rise)
Transportation Storage Temperature	For long storage conditions, please see the Application Notice	-40~+125℃
Impedance (Z) Inductance (Ls) Q Factor	Agilent4291 Agilent E4991 Agilent4287 Agilent16192	Refer to standard electrical characteristics list
DC Resistance	Agilent 4338	
Rated Current	DC Power Supply Over Rated Current requirements, there will be some risk	
Temperature Rise Test	Applied the allowed DC current. Temperature measured by digital surface thermometer.	Rated Current < 1A ΔT 20℃Max Rated Current ≧ 1A ΔT 40℃Max
Resistance to Soldering Heat	Preheat: 150℃,60sec. Solder: Sn99.5%-Cu0.5% Solder temperature: 260±5℃ Flux for lead free: Rosin. 9.5% Temperature ramp/immersion and immersion rate: 25±6 mm/s Dip time: 10±1sec. Depth: completely cover the termination. 	Appearance：No damage. Impedance：within±15% of initial value RDC：within ±15% of initial value and shall not exceed the specification value
Solderability	Preheat: 150℃,60sec. Solder: Sn99.5%-Cu0.5% Solder temperature: 245±5℃ Flux for lead free: Rosin. 9.5% Depth: completely cover the termination. Dip time: 4±1sec.	More than 95% of the terminal electrode should be covered with solder. 
Terminal strength	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Component mounted on a PCB apply a force (>0805:1kg <=0805:0.5kg)to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also the force shall be applied gradually as not to shock the component being tested.	Appearance：No damage. Impedance：within±15% of initial value. RDC：within ±15% of initial value and shall not exceed the specification value 

<table>
<tr><th>Test item</th><th>Test Condition</th><th>Performance</th></tr>
<tr><td>Bending</td><td>Shall be mounted on a FR4 substrate of the following dimensions:>=0805:40x100x1.2mm
<0805:40x100x0.8mm
Bending depth:>=0805:1.2mm
<0805:0.8mm
Duration of 10 sec for a min</td><td>Appearance：No damage.
impedance：within±10% of initial value
RDC：within ±15% of initial value and shall not exceed the specification value</td></tr>
<tr><td>Vibration Test</td><td>Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles)
Oscillation Frequency: 10～2K～10Hz for 20 minutes
Equipment： Vibration checker
Total Amplitude:1.52mm±10%
Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations)。</td><td>Appearance：No damage.
Impedance：within±15% of initial value
RDC：within ±15% of initial value and shall not exceed the specification value</td></tr>
<tr><td>Shock</td><td><table><tr><th>Type</th><th>Peak Value (g's)</th><th>Normal duration (D) (ms)</th><th>Wave form</th><th>Velocity change (Vi)ft/sec</th></tr><tr><td>SMD</td><td>1,500</td><td>0.5</td><td>Half-sine</td><td>15.4</td></tr><tr><td>Lead</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr></table></td><td>Appearance：No damage.
Impedance：within±15% of initial value
RDC：within ±15% of initial value and shall not exceed the specification value</td></tr>
<tr><td>Life test</td><td>Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles)
Temperature: 125±2℃(bead),
85±2℃(inductor)
Applied current: rated current.
Duration: 1000±12hrs.
Measured at room temperature after placing for 24±2 hrs.</td><td rowspan="2">Appearance: no damage.
Impedance: within±15%of initial value.
RDC：within ±15% of initial value and shall not exceed the specification value</td></tr>
<tr><td>Load Humidity</td><td>Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles)
Humidity: 85±2%R.H.
Temperature: 85±2℃.
Duration: 1000hrs Min. with 100% rated current.
Measured at room temperature after placing for 24±2 hrs.</td></tr>
<tr><td>Thermal shock</td><td>Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles)
Condition for 1 cycle
Step1: -40±2℃ 30±5 min.
Step2: 25±2℃ ≦0.5min
Step3: +125±2℃ 30±5min.(Bead)
Number of cycles: 500
Measured at room temperature after placing for 24±2 hrs.</td><td>Appearance: no damage.
Impedance: within±15%of initial value..
RDC：within ±15% of initial value and shall not exceed the specification value</td></tr>
<tr><td>Insulation Resistance</td><td>Chip Inductor Only
Test Voltage:100±10%V for 30 Sec.</td><td>IR>1GΩ</td></tr>
</table>

Derating Curve

For the ferrite chip bead whichwithstanding current over 1.5A, as the operating temperature over 85℃, the derating current information is necessary to consider with. For the detail derating of current, please refer to the Derated Current vs. Operating Temperature curve.



Storage Conditions

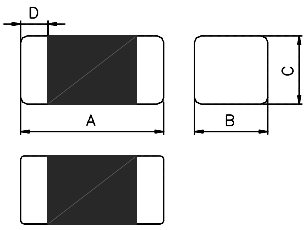
Storage Condition : Less than 40℃and 60% RH

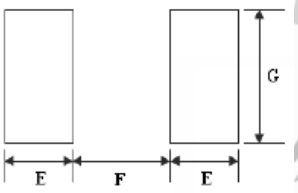
Storage Time : 6 months Max.

Soldering and Mounting

Recommended PC Board Pattern

Chip Size						Land Patterns For Reflow Soldering		
	Type	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	F(mm)	G(mm)
WLBD	0603	0.6±0.03	0.30±0.03	0.30±0.03	0.15±0.05	**0.35**	**0.30**	**0.40**





PC board shold be designed so that products can prevent damage from mechanical stress when warping the board.

Soldering

Mildly activated rosin fluxes are preferred. The terminations are suitable for re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

Note.

If wave soldering is used ,there will be some risk.

Re-flow soldering temperatures below 240 degrees, there will be non-wetting risk

Lead Free Solder re-flow:

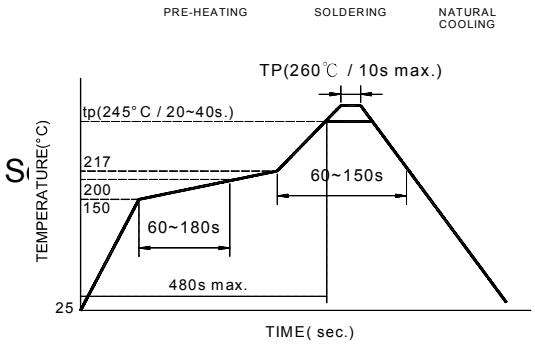
Recommended temperature profiles for lead free re-flow soldering in Figure 1. (Refered to J-STD-020C)

Soldering Iron:

Products attachment with a soldering iron is discouraged due to the inherent process control limitations. If a soldering iron must be employed the following precautions are recommended. for Iron Soldering in Figure 2.

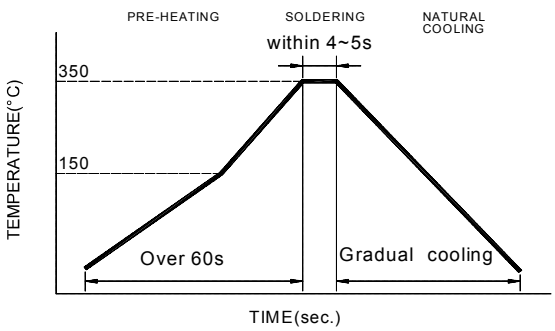
- Preheat circuit and products to 150℃
- 350℃ tip temperature (max)
- Never contact the ceramic with the iron tip
- 1.0mm tip diameter (max)
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- Limit soldering time to 4~5sec.

Reflow Soldering



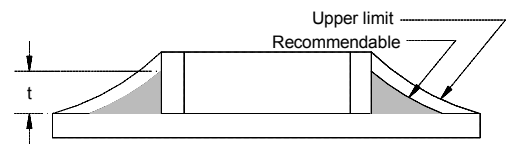
Reflow times: 3 times max
Fig.1

Iron Soldering



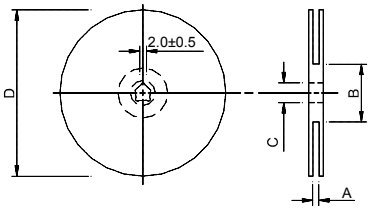
Iron Soldering times：1 times max

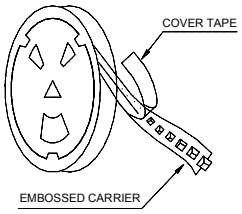
Accordingly increasing the solder volume, the mechanical stress to product is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance. Solder shall be used not to be exceed as shown in right side:
Minimum fillet height = soldering thickness + 25% product height



Packaging Specification

Reel Dimension

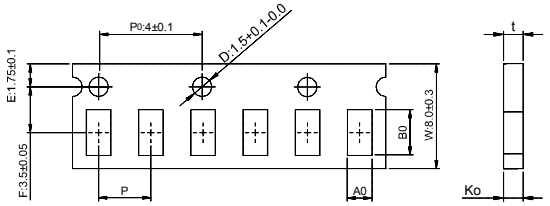




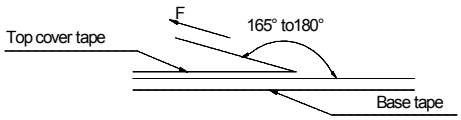
Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x8mm	10±1.5	50 or more	13±0.2	178±2

TAPE AND REEL SPECIFICATIONS

Paper carrier



Size	B0(mm)	A0(mm)	K0(mm)	P(mm)	t(mm)
0603	0.70±0.06	0.40±0.06	0.45max	2.0± 0.05	0.45max



The force for tearing off cover tape is 15 to 60 grams in the arrow direction under the following conditions.

Room Temp. (c)	Room Humidity (%)	Room atm (hPa)	Tearing Speed Mm/min
5 ~ 35	45 ~ 85	860 ~ 1060	300

Application Notice

Storage Conditions(component level)

To maintain the solder ability of terminal electrodes:

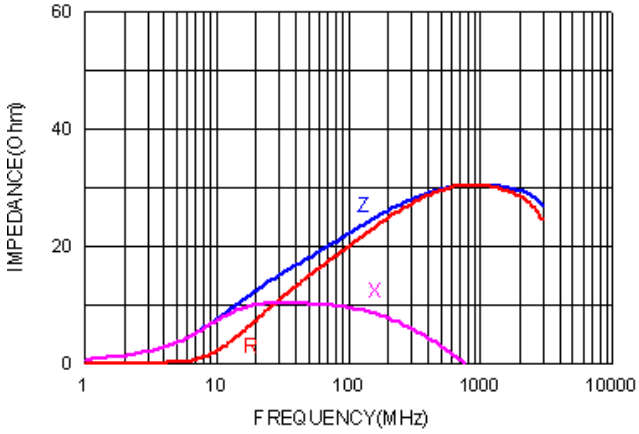
1. Temperature and humidity conditions: Less than 40℃ and 60% RH.
2. Recommended products should be used within 12 months from the time of delivery.
3. The packaging material should be kept where no chlorine or sulfur exists in the air.

Transportation

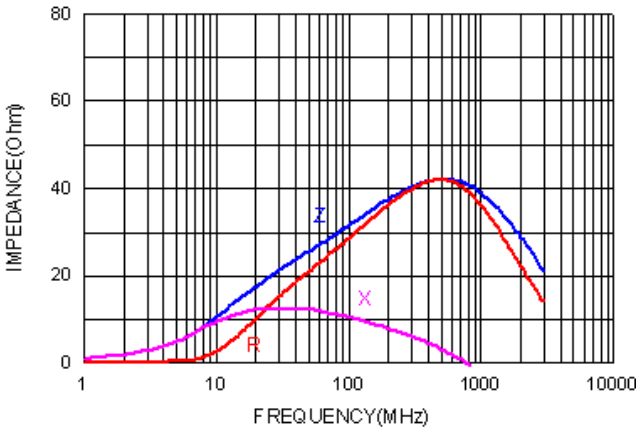
1. Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
3. Bulk handling should ensure that abrasion and mechanical shock are minimized.

Impedance Frequency Characteristics(Typical)

WLBD0603K2U220TP



WLBD0603K2U330TP



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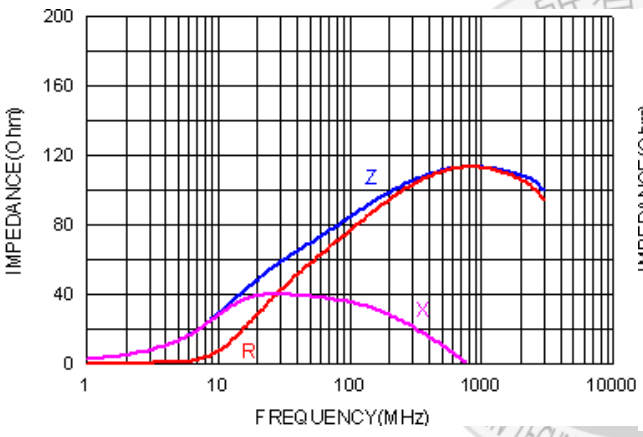

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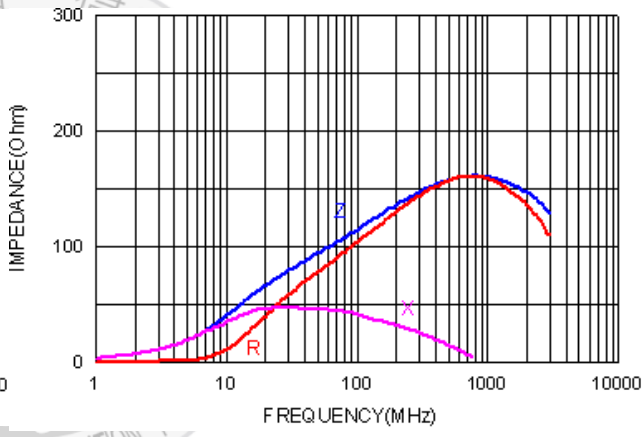
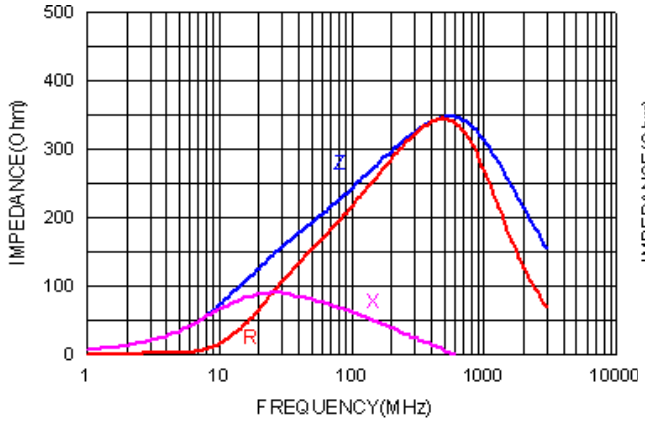
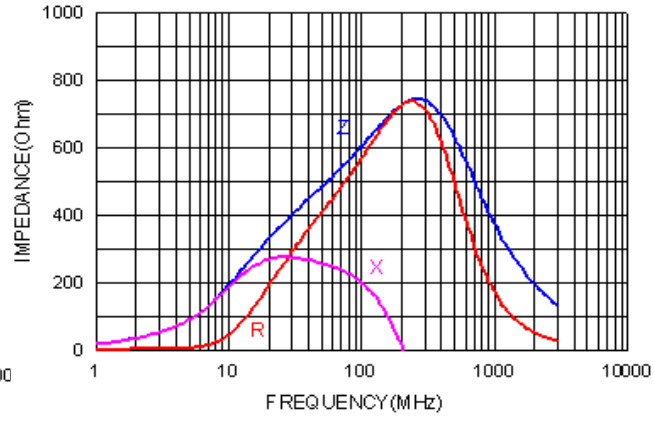


WLBD0603K2U241TP

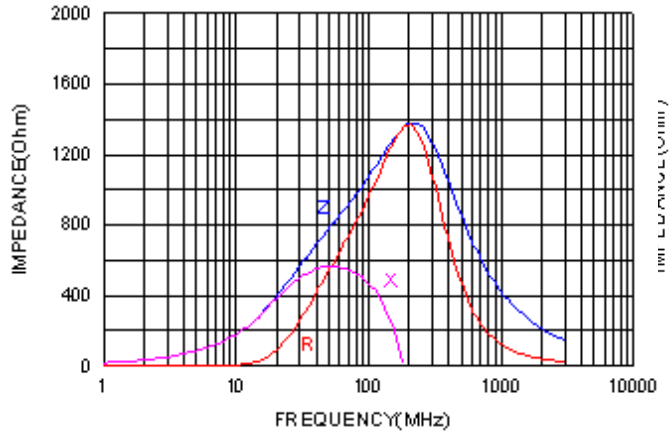


WLBD0603K2U601TP



Impedance Frequency Characteristics(Typical)

WLBD0603K2U102TP



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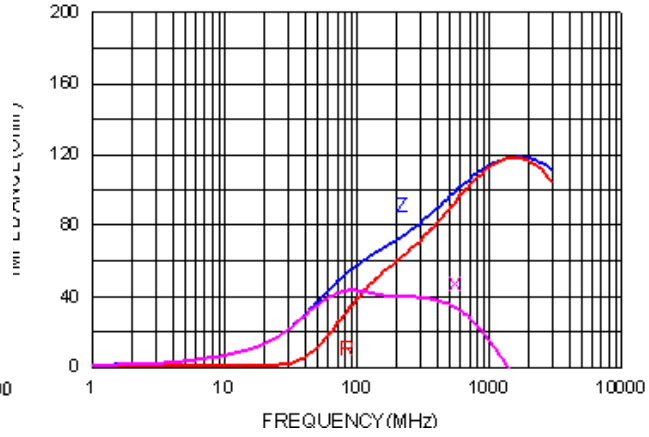

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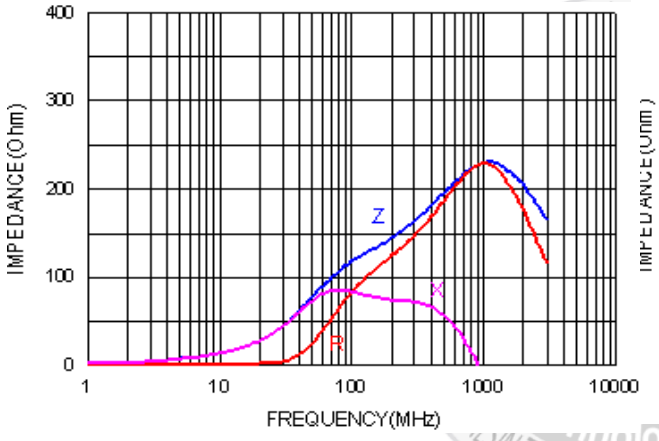

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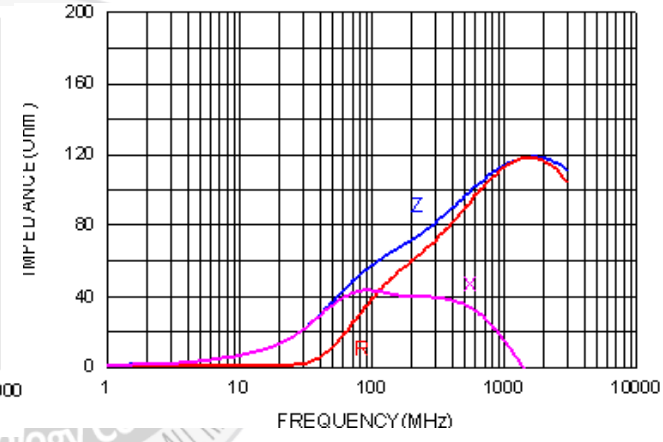

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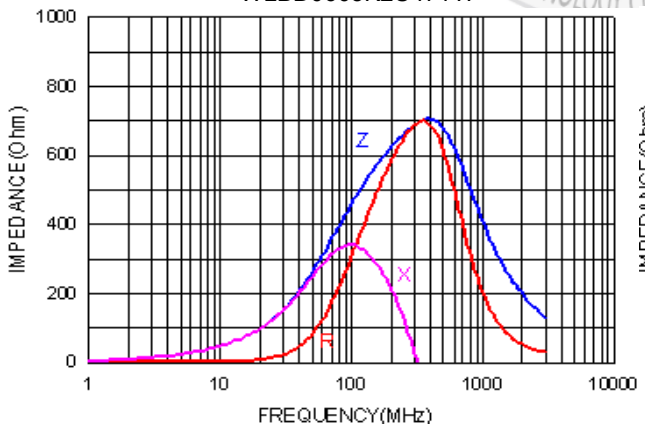

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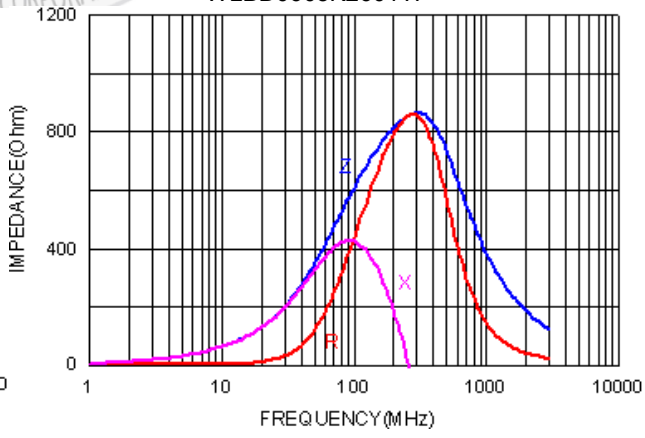

Impedance Frequency Characteristics(Typical)

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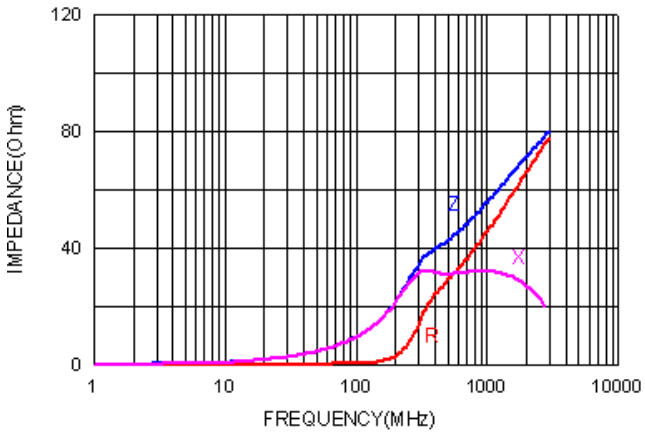
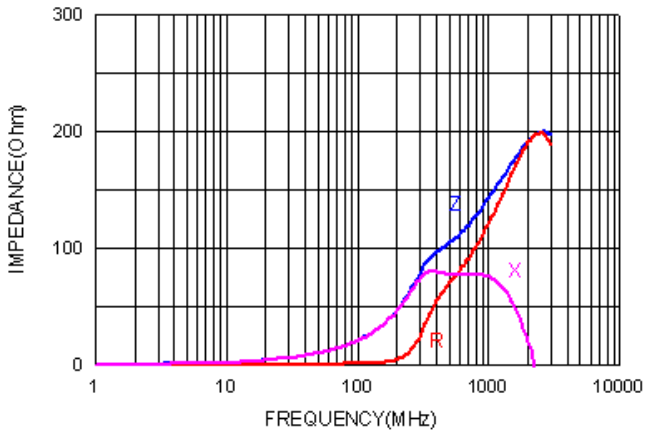
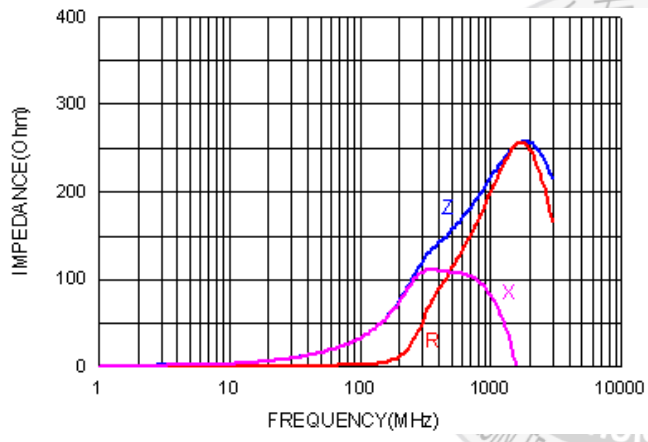


WLBD0603K2U220TP



WLBD0603K2U330TP



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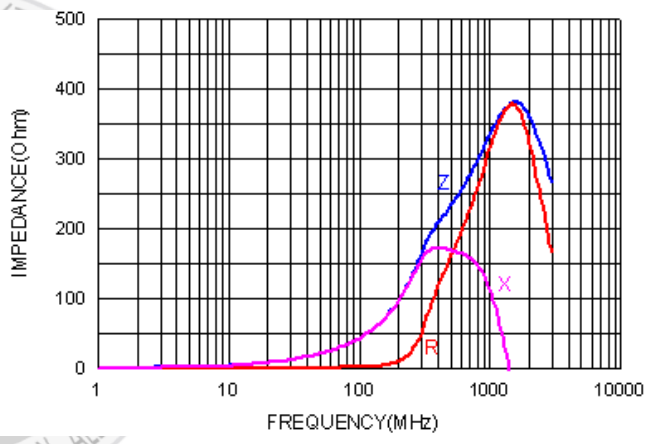
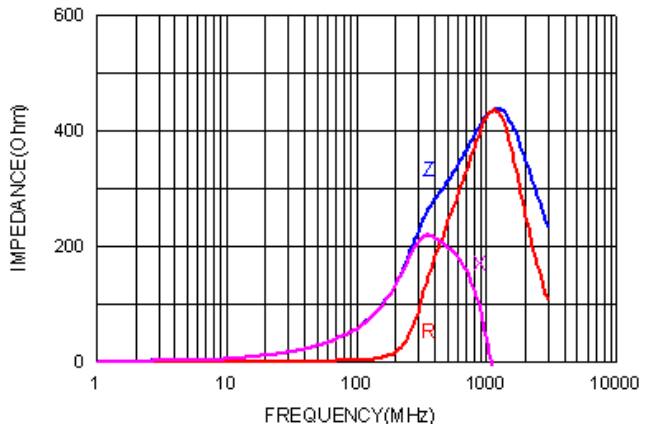


WLBD0603K2U560TP



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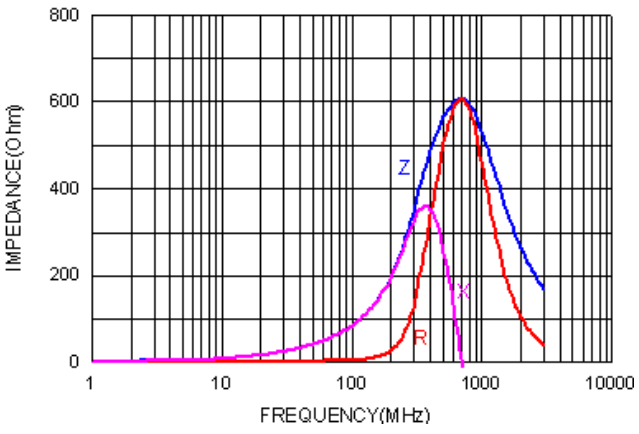

Impedance Frequency Characteristics(Typical)

WLBD0603K2U121TP