

# APPROVAL SHEET

## WLBD0603 - 4532 HC ( High Current Series ) Chip Bead



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

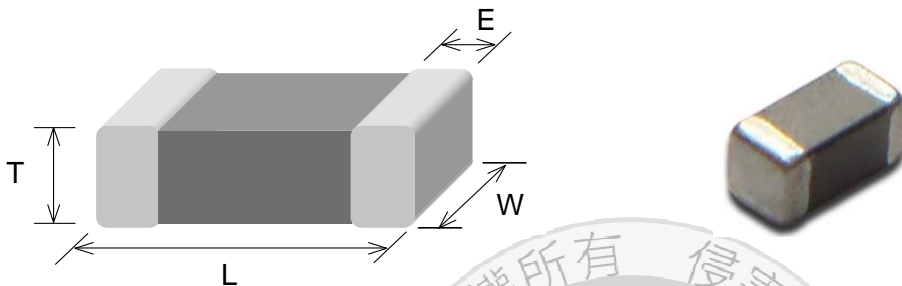
## FEATURES

1. Combination of high frequency noise suppression with capability of handing high current
2. The current rating up to 6 Amps with low DCR

## APPLICATIONS

1. High current DC power lines
2. Circuits where a stable ground is unavailable

## SHAPE and DIMENSION



| TYPE | 0603<br>(EIA 0201) | 1005<br>(EIA 0402) | *1608<br>(EIA 0603)         | *2012<br>(EIA 0805)        | 3216<br>(EIA 1206) | 3225<br>(EIA 1210) | 4516<br>(EIA 1806) | 4532<br>(EIA 1812) |
|------|--------------------|--------------------|-----------------------------|----------------------------|--------------------|--------------------|--------------------|--------------------|
| L    | 0.60±0.03          | 1.00±0.10          | 1.60±0.15                   | 2.00±0.20                  | 3.20±0.20          | 3.20±0.20          | 4.50±0.25          | 4.50±0.25          |
| W    | 0.30±0.03          | 0.50±0.10          | 0.80±0.15                   | 1.25±0.20                  | 1.60±0.20          | 2.50±0.20          | 1.60±0.20          | 3.20±0.25          |
| T    | 0.30±0.03          | 0.50±0.10          | 0.80±0.15<br>&<br>0.60±0.15 | 0.90±0.20<br>&<br>1.25±0.2 | 1.10±0.20          | 1.30±0.20          | 1.60±0.20          | 1.50±0.25          |
| E    | 0.15±0.05          | 0.25±0.10          | 0.30±0.20                   | 0.50±0.30                  | 0.50±0.30          | 0.50±0.30          | 0.60±0.40          | 0.60±0.40          |
| Unit | mm                 |                    |                             |                            |                    |                    |                    |                    |

## Ordering Information

| WL                  | BD                | 0603 - 4532  | HC                         | U                | 300   | T / P  | H / L                         |
|---------------------|-------------------|--|----------------------------|------------------|---|--|-------------------------------|
| <b>Product Code</b> | <b>Series</b>     | <b>Dimensions</b>  | <b>Series extension</b>    | <b>Tolerance</b> | <b>Value</b>                                | <b>Packing Code</b>                            |                               |
| WL:<br>Inductor     | BD: Chip<br>Bead. | JIS: (EIA)<br>0603 : (0201)<br>1005 : (0402)<br>1608: (0603)<br>2012: (0805)<br>3216: (1206)<br>3225: (1210)<br>4516: (1806)<br>4532: (1812) | Refer to<br>characteristic | U: ±25%          | 300 =30 OHM<br>601 =600 OHM<br>102 =1000OHM | T = 7"<br>Paper Tape<br>P = 7"<br>Plastic Tape | H: High current<br>L: Low DCR |

## PART NUMBER AND CHARACTERISTICS TABLE

### WLBD0603- 3216 HC\_H series

| Walsin Part Number | Impedance ( $\Omega$ )<br>+/-25% | Test Frequency<br>(MHz) | DC Resistance<br>( $\Omega$ ) max. | Rated Current<br>(mA) max. |
|--------------------|----------------------------------|-------------------------|------------------------------------|----------------------------|
| WLBD0603HCU100TH   | 10                               | 100                     | 0.05                               | 1000                       |
| WLBD0603HCU220TH   | 22                               | 100                     | 0.065                              | 1000                       |
| WLBD0603HCU330TH   | 33                               | 100                     | 0.09                               | 750                        |
| WLBD0603HCU470TH   | 47                               | 100                     | 0.12                               | 500                        |
| WLBD0603HCU800TH   | 80                               | 100                     | 0.18                               | 500                        |
| WLBD0603HCU121TH   | 120                              | 100                     | 0.23                               | 450                        |
| WLBD0603HCU241TH   | 240                              | 100                     | 0.4                                | 350                        |
| WLBD0603HCU331TH   | 330                              | 100                     | 0.5                                | 300                        |
| Walsin Part Number | Impedance ( $\Omega$ )<br>+/-25% | Test Frequency<br>(MHz) | DC Resistance<br>( $\Omega$ ) max. | Rated Current<br>(mA) max. |
| WLBD1005HCU100TH   | 10                               | 100                     | 0.09                               | 2000                       |
| WLBD1005HCU300TH   | 30                               | 100                     | 0.04                               | 3000                       |
| WLBD1005HCU330TH   | 33                               | 100                     | 0.04                               | 3000                       |
| WLBD1005HCU600TH   | 60                               | 100                     | 0.07                               | 2500                       |
| WLBD1005HCU121TH   | 120                              | 100                     | 0.15                               | 1500                       |
| Walsin Part Number | Impedance ( $\Omega$ )<br>+/-25% | Test Frequency<br>(MHz) | DC Resistance<br>( $\Omega$ ) max. | Rated Current<br>(mA) max. |
| WLBD1608HCU300TH   | 30                               | 100                     | 0.04                               | 3000                       |
| WLBD1608HCU600TH   | 60                               | 100                     | 0.04                               | 3000                       |
| WLBD1608HCU800TH   | 80                               | 100                     | 0.04                               | 3000                       |
| WLBD1608HCU121TH   | 120                              | 100                     | 0.07                               | 2500                       |
| WLBD1608HCU221TH   | 220                              | 100                     | 0.09                               | 2000                       |
| WLBD1608HCU301TH   | 300                              | 100                     | 0.09                               | 2000                       |
| WLBD1608HCU471TH   | 470                              | 100                     | 0.20                               | 1000                       |
| WLBD1608HCU601TH   | 600                              | 100                     | 0.20                               | 1000                       |
| WLBD1608HCU102TH   | 1000                             | 100                     | 0.25                               | 800                        |
| Walsin Part Number | Impedance ( $\Omega$ )<br>+/-25% | Test Frequency<br>(MHz) | DC Resistance<br>( $\Omega$ ) max. | Rated Current<br>(mA) max. |
| WLBD2012HCU310TH   | 31                               | 100                     | 0.015                              | 6000                       |
| WLBD2012HCU400TH   | 40                               | 100                     | 0.03                               | 4000                       |
| WLBD2012HCU600TH   | 60                               | 100                     | 0.04                               | 3000                       |
| WLBD2012HCU800TH   | 80                               | 100                     | 0.02                               | 5000                       |
| WLBD2012HCU121TH   | 120                              | 100                     | 0.02                               | 5000                       |
| WLBD2012HCU181TH   | 180                              | 100                     | 0.03                               | 4000                       |
| WLBD2012HCU221TH   | 220                              | 100                     | 0.04                               | 3000                       |
| WLBD2012HCU301TH   | 300                              | 100                     | 0.09                               | 2000                       |
| WLBD2012HCU331TH   | 330                              | 100                     | 0.09                               | 2000                       |
| WLBD2012HCU601TH   | 600                              | 100                     | 0.09                               | 2000                       |
| **WLBD2012HCU102TH | 1000                             | 100                     | 0.09                               | 2000                       |
| WLBD2012HCU152TH   | 1500                             | 100                     | 0.3                                | 1500                       |

## PART NUMBER AND CHARACTERISTICS TABLE

### WLBD3225- 4532 HC\_H series

| Walsin Part Number | Impedance ( $\Omega$ )<br>+/-25%   | Test Frequency<br>(MHz) | DC Resistance<br>( $\Omega$ ) max. | Rated Current<br>(mA) max. |
|--------------------|--|-------------------------|------------------------------------|----------------------------|
| WLBD3216HCU300PH   | 30   | 100                     | 0.015                              | 6000                       |
| WLBD3216HCU500PH   | 50   | 100                     | 0.015                              | 6000                       |
| WLBD3216HCU800PH   | 80   | 100                     | 0.03                               | 4000                       |
| WLBD3216HCU121PH   | 120  | 100                     | 0.015                              | 6000                       |
| WLBD3216HCU601PH   | 600  | 100                     | 0.07                               | 2500                       |
| WLBD3216HCU122PH   | 1200   | 100                     | 0.2                                | 1000                       |
| Walsin Part Number | Impedance ( $\Omega$ )<br>+/-25%   | Test Frequency<br>(MHz) | DC Resistance<br>( $\Omega$ ) max. | Rated Current<br>(mA) max. |
| WLBD3225HCU600PH   | 60   | 100                     | 0.15                               | 1500                       |
| WLBD3225HCU102PH   | 1000   | 50                      | 0.09                               | 2000                       |
| Walsin Part Number | Impedance ( $\Omega$ )<br>+/-25%   | Test Frequency<br>(MHz) | DC Resistance<br>( $\Omega$ ) max. | Rated Current<br>(mA) max. |
| WLBD4516HCU600PH   | 60   | 100                     | 0.015                              | 6000                       |
| WLBD4516HCU720PH   | 72   | 100                     | 0.015                              | 6000                       |
| WLBD4516HCU181PH   | 180  | 100                     | 0.02                               | 3500                       |
| WLBD4516HCU851PH   | 850  | 100                     | 0.15                               | 1500                       |
| Walsin Part Number | Impedance ( $\Omega$ )<br>+/-25%   | Test Frequency<br>(MHz) | DC Resistance<br>( $\Omega$ ) max. | Rated Current<br>(mA) max. |
| WLBD4532HCU800PH   | 80   | 100                     | 0.01                               | 9000                       |
| WLBD4532HCU121PH   | 120  | 100                     | 0.015                              | 6000                       |
| WLBD4532HCU601PH   | 600  | 50                      | 0.04                               | 3000                       |
| WLBD4532HCU132PH   | 1300   | 60                      | 0.04                               | 3000                       |
| Test Level         | 250 mV   |                         |                                    |                            |
| Test Instruments   | <ul style="list-style-type: none"> <li>• HP4291B RF IMPEDANCE / MATERIAL ANALYZER</li> <li>• HP4338A/B MILLIOHMMETER</li> <li>• Agilent 8720ES S-PARAMETER NETWORK ANALYZER</li> <li>• HP6632B SYSTEM DC POWER SUPPLY</li> </ul> |                         |                                    |                            |

### GENERAL TECHNICAL DATA

1. Operating temperature range : - 55°C ~ +125°C
2. Storage Condition : Less than 40°C and 70% RH
3. Storage Time: 12 months(Size:1005 above)
4. Soldering method: Reflow or Wave Soldering
5. \*\* The thickness  $1.25 \pm 0.2\text{mm}$  / MOQ= 3K reel

## PART NUMBER AND CHARACTERISTICS TABLE

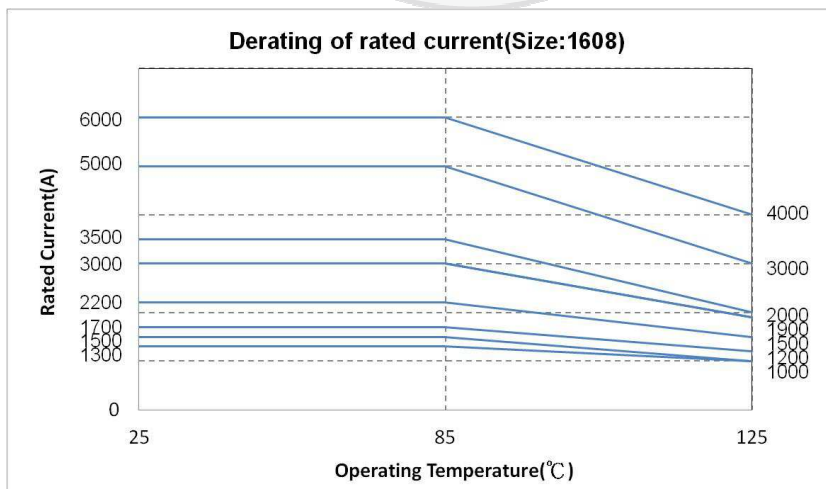
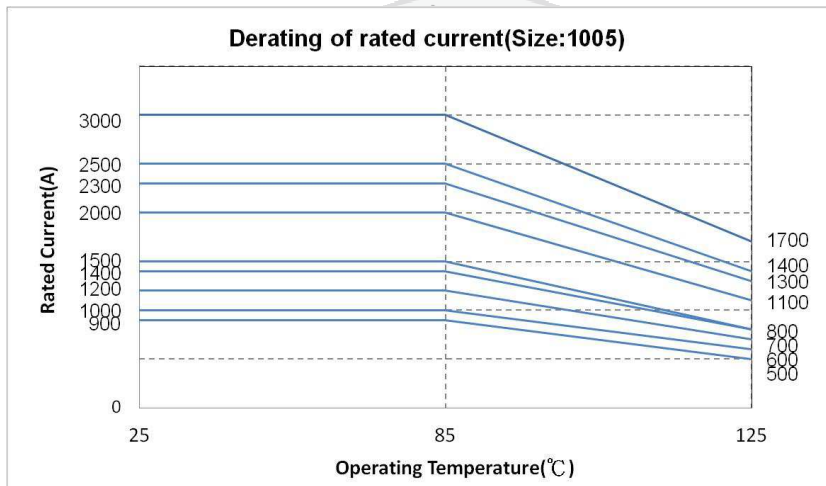
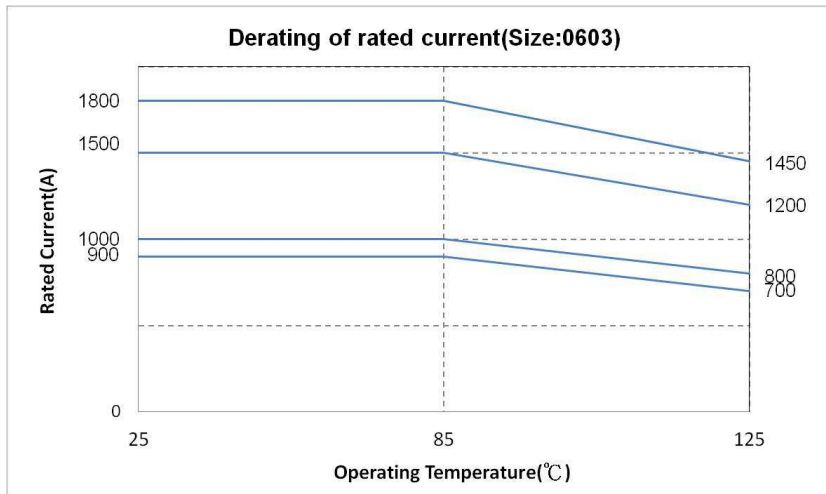
WLBD0603- 1608 HC\_L series ( Low DCR Type)

| Walsin Part Number | Impedance (Ω)<br>+/-25%  | Test Frequency (MHz) | DC Resistance (Ω) Max. | Rated Current (mA) Max. |       |
|--------------------|--|----------------------|------------------------|-------------------------|-------|
|                    |  |                      |                        | 85°C                    | 125°C |
| WLBD0603HCU220TL   | 22   | 100                  | 0.04                   | 1800                    | 1450  |
| WLBD0603HCU330TL   | 33   | 100                  | 0.055                  | 1500                    | 1200  |
| WLBD0603HCU800TL   | 80   | 100                  | 0.13                   | 1000                    | 800   |
| WLBD0603HCU121TL   | 120  | 100                  | 0.16                   | 900                     | 700   |
| Walsin Part Number | Impedance (Ω)<br>+/-25%  | Test Frequency (MHz) | DC Resistance (Ω) Max. | Rated Current (mA) Max. |       |
|                    |  |                      |                        | 85°C                    | 125°C |
| WLBD1005HCU330TL   | 33   | 100                  | 0.022                  | 3000                    | 1700  |
| WLBD1005HCU600TL   | 60   | 100                  | 0.032                  | 2500                    | 1400  |
| WLBD1005HCU800TL   | 80   | 100                  | 0.038                  | 2300                    | 1300  |
| WLBD1005HCU121TL   | 120  | 100                  | 0.055                  | 2000                    | 1100  |
| WLBD1005HCU181TL   | 180  | 100                  | 0.090                  | 1500                    | 800   |
| WLBD1005HCU221TL   | 220  | 100                  | 0.100                  | 1400                    | 800   |
| WLBD1005HCU331TL   | 330  | 100                  | 0.150                  | 1200                    | 700   |
| WLBD1005HCU471TL   | 470  | 100                  | 0.200                  | 1000                    | 600   |
| WLBD1005HCU601TL   | 600  | 100                  | 0.230                  | 900                     | 500   |
| Walsin Part Number | Impedance (Ω)<br>+/-25%  | Test Frequency (MHz) | DC Resistance (Ω) Max. | Rated Current (mA) Max. |       |
|                    |  |                      |                        | 85°C                    | 125°C |
| **WLBD1608HCU260TL | 26   | 100                  | 0.007                  | 6000                    | 4000  |
| **WLBD1608HCU300TL | 30   | 100                  | 0.010                  | 5000                    | 3000  |
| **WLBD1608HCU700TL | 70   | 100                  | 0.022                  | 3500                    | 2000  |
| **WLBD1608HCU101TL | 100  | 100                  | 0.030                  | 3000                    | 1900  |
| **WLBD1608HCU121TL | 120  | 100                  | 0.030                  | 3000                    | 1900  |
| WLBD1608HCU221TL   | 220  | 100                  | 0.050                  | 2200                    | 1500  |
| WLBD1608HCU331TL   | 330  | 100                  | 0.080                  | 1700                    | 1200  |
| WLBD1608HCU471TL   | 470  | 100                  | 0.130                  | 1500                    | 1000  |
| WLBD1608HCU601TL   | 600  | 100                  | 0.150                  | 1300                    | 1000  |
| Test Level         | 250 mV   |                      |                        |                         |       |
| Test Instruments   | <ul style="list-style-type: none"> <li>•HP4991A<br/>RF Impedance / Material Analyzer</li> <li>•HP4338A/B Milliohm meter</li> <li>•Agilent 5071C S-Parameter Network Analyzer</li> <li>•HP6632B System DC Power Supply</li> </ul> |                      |                        |                         |       |

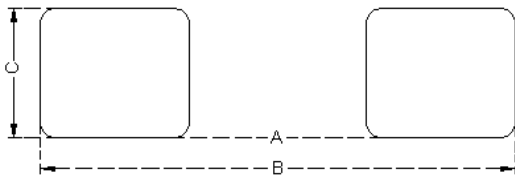
### GENERAL TECHNICAL DATA

1. Operating temperature range : - 55°C ~ +125°C
2. Storage Condition : Less than 40°C and 70% RH
3. Storage Time : 6 months(Size:0603&1005)  
12 months(Size:1608 above)
4. Soldering method : Reflow
5. \*\* The thickness 0.6mm

6. In operating temperature exceeding +85°C, derating of current is set according to the operating temperature graph as follows



### Land Patterns for Reflow Soldering

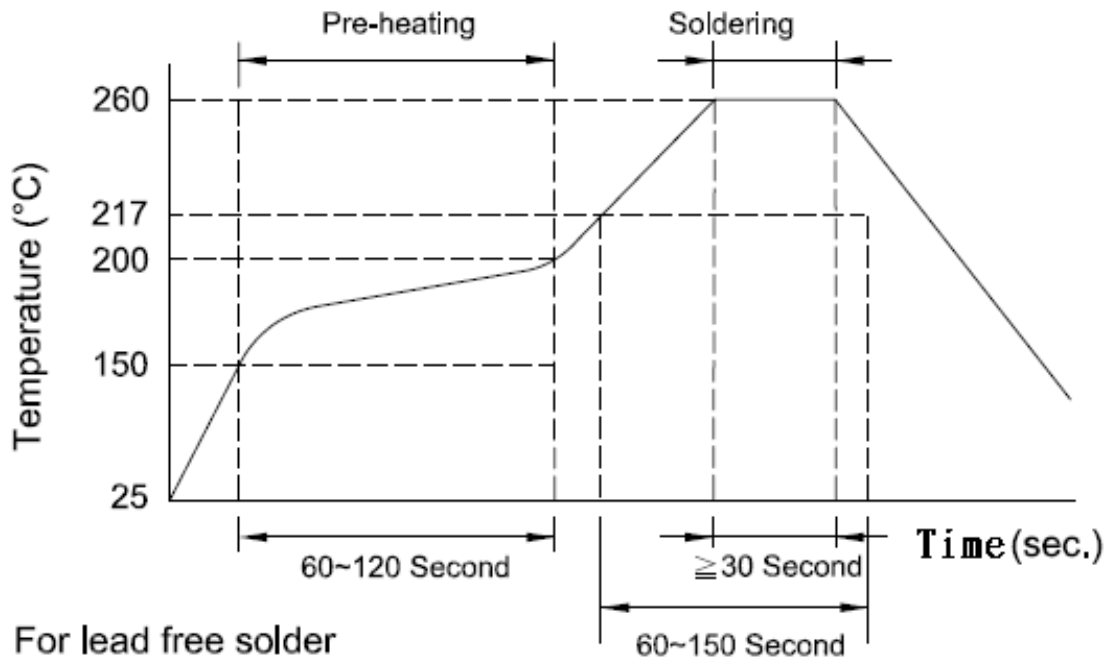


### Solder Land Information

Unit: mm (inches)

| Size | A           | B                       | C            |
|------|-------------|-------------------------|--------------|
| 0603 | 0.2~0.3     | 0.75~1.05               | 0.3          |
| 1005 | 0.4 (0.016) | 1.2 ~1.4 (0.047 ~0.055) | 0.5 (0.020)  |
| 1608 | 0.7 (0.028) | 1.8~ 2.0 (0.071~ 0.079) | 0.7 (0.028)  |
| 2012 | 1.2 (0.047) | 3.0 ~4.0 (0.118 ~0.157) | 1.0 (0.039)  |
| 3216 | 2.0 (0.079) | 4.2 ~5.2 (0.165 ~0.205) | 1.2 (0.047)  |
| 3225 | 2.0 (0.079) | 4.2 ~5.2 (0.165 ~0.205) | 3.4 (0.134)  |
| 4516 | 3.0 (0.118) | 5.5~6.5 (0.217 ~0.256)  | 1.2 (0.047)  |
| 4532 | 3.0 (0.118) | 5.5 ~6.5 (0.217 ~0.256) | 4.22 (0.166) |

### RECOMMENDED SOLDERING CONDITIONS

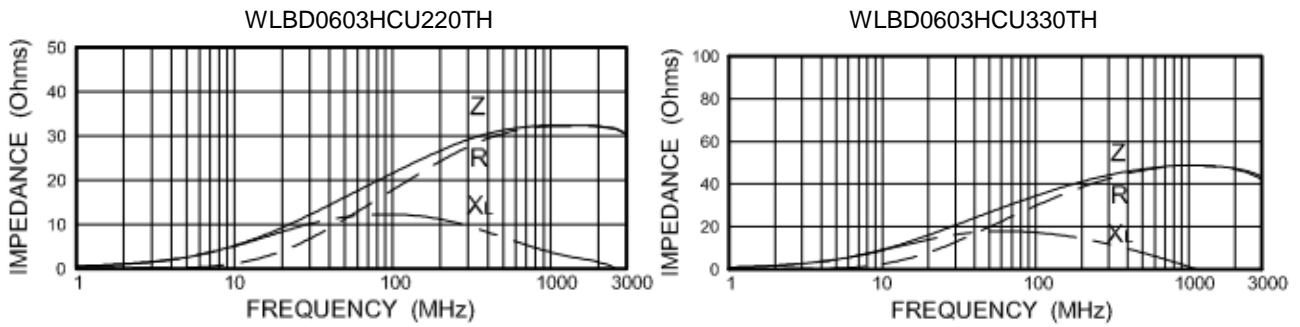


## RELIABILITY AND TEST CONDITION

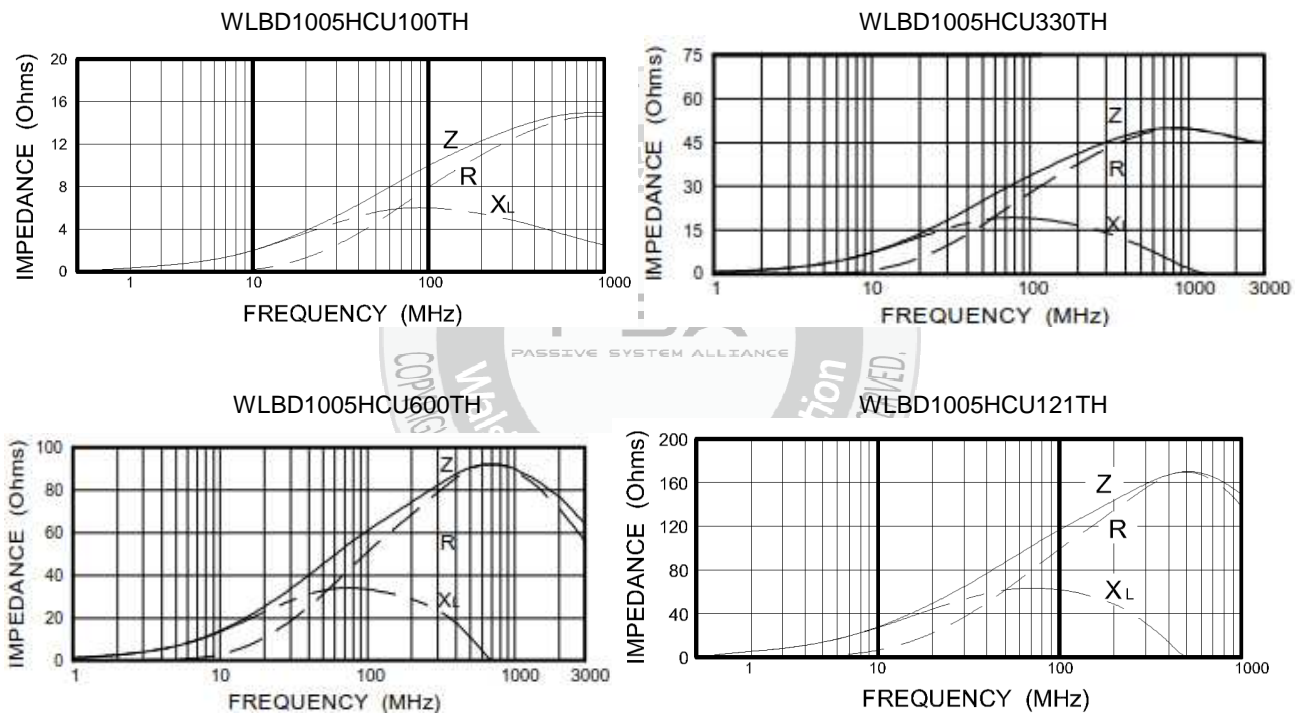
| Test item                 | Test Condition   | Criteria   |
|---------------------------|--|--|
| Temperature Cycle         | Temperature : -55 ~ +125°C<br>Cycle : 100 cycles<br>Dwell time : 30minutes<br>Measurement : at ambient temperature 24 hours after test completion  | No mechanical damage<br>Impedance value should be within $\pm 20\%$ of the initial value   |
| Operational Life          | Temperature : 125°C $\pm 5^\circ\text{C}$<br>Test time : 1000 hours<br>Apply current : full rated current<br>Measurement : at ambient temperature 24 hours after test completion                           | No mechanical damage<br>Impedance value should be within $\pm 20\%$ of the initial value   |
| Rated Current Test        | Apply current : full rated current / 5min  | Temperature rise should be less than 40°C  |
| Biased Humidity           | Temperature : 40°C $\pm 2^\circ\text{C}$<br>Humidity : 90 ~ 95 % RH<br>Test time : 1000 hours<br>Apply current : full rated current<br>Measurement : at ambient temperature 24 hours after test completion | No mechanical damage<br>Impedance value should be within $\pm 20\%$ of the initial value   |
| Resistance to Solder Heat | Solder temperature : 260 $\pm 5^\circ\text{C}$<br>Flux : Rosin<br>DIP time : 10 $\pm 1$ sec  | More than 95 % of terminal electrode should be covered with new solder<br>No mechanical damage<br>Impedance value should be within $\pm 20\%$ of the initial value |
| Adhesive Test             | Reflow temperature : 245°C It shall be Soldered on the substrate applying direction parallel to the substrate<br>Apply force(F) : 5 N<br>Test time : 10 sec  | No mechanical damage<br>Soldering the products on PCB after the pulling test force > 5 N   |
| Steam Aging Test          | Temperature : 93°C<br>Test time : 4 hours(WLCM1005)<br>Others : 8 hours<br>Solder temperature : 235 $\pm 5^\circ\text{C}$<br>Flux : Rosin<br>DIP time : 5 $\pm 1$ sec                                      | More than 95 % of terminal electrode should be covered with new solder   |



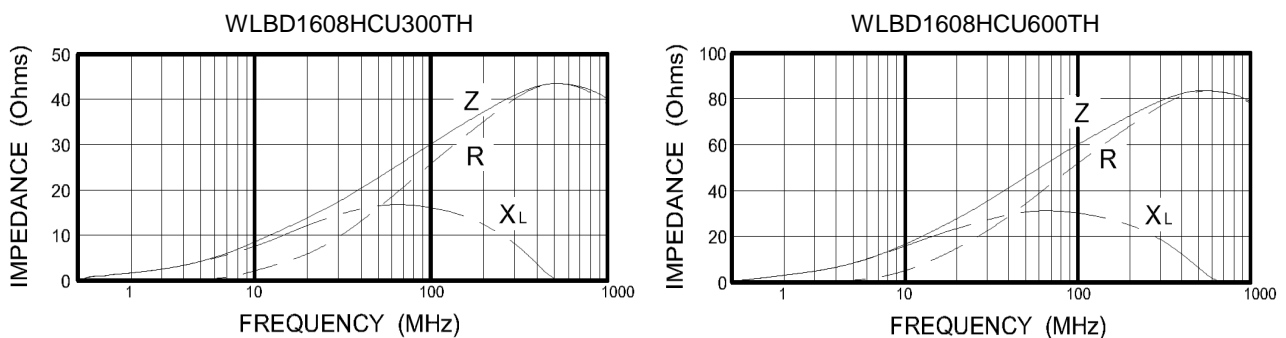
## Bead 0603- Impedance Frequency Characteristics (Typical)

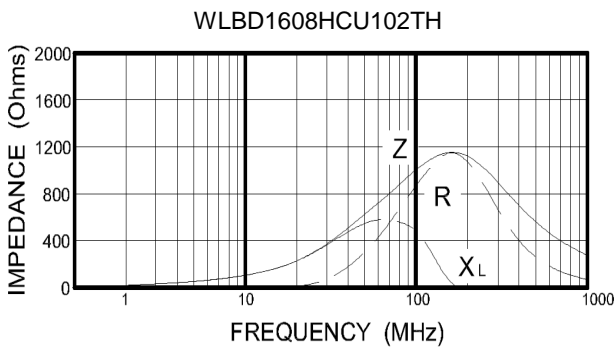
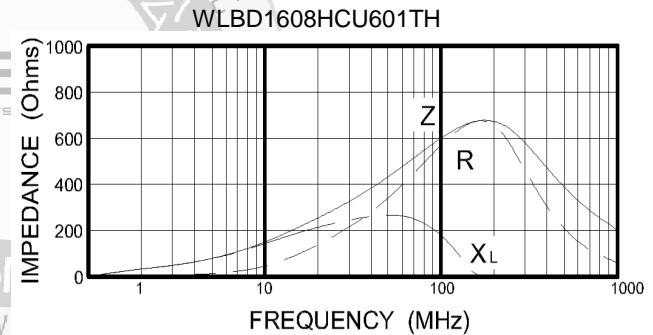
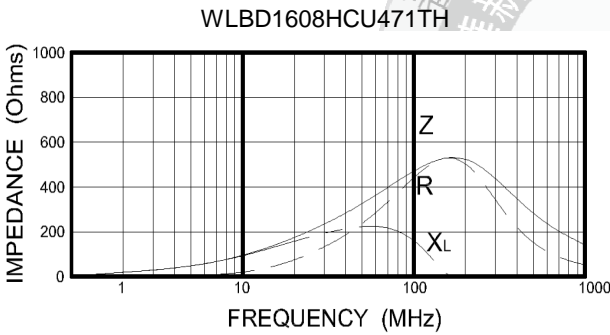
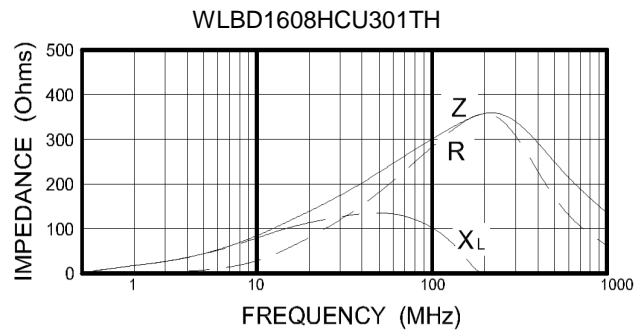
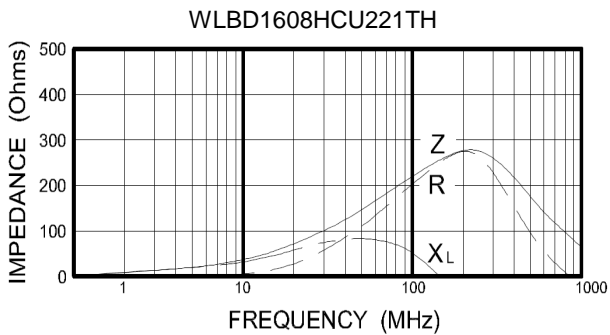
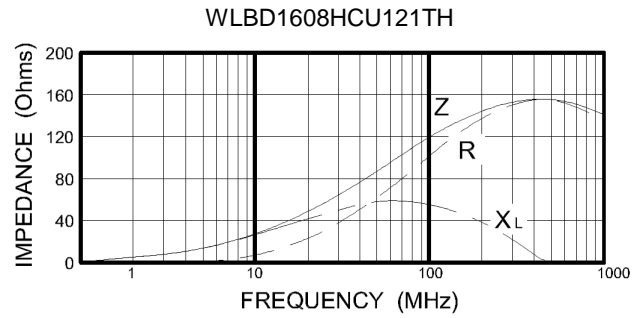
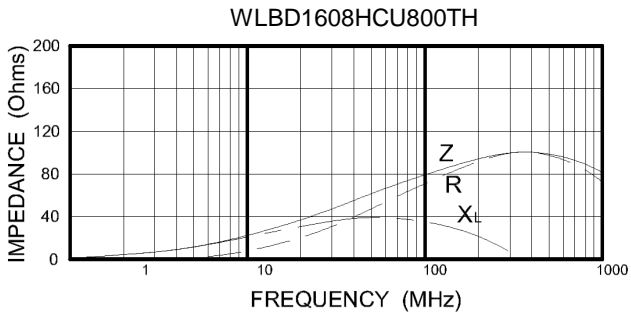


## Bead 1005- Impedance Frequency Characteristics (Typical)

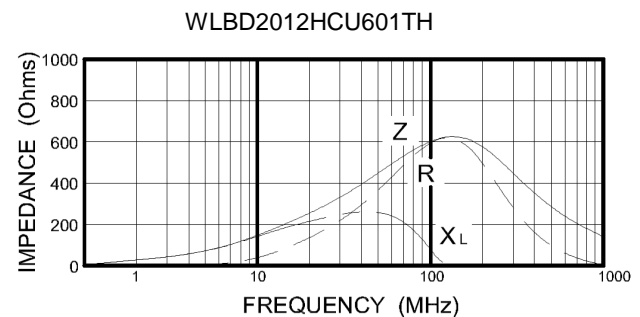
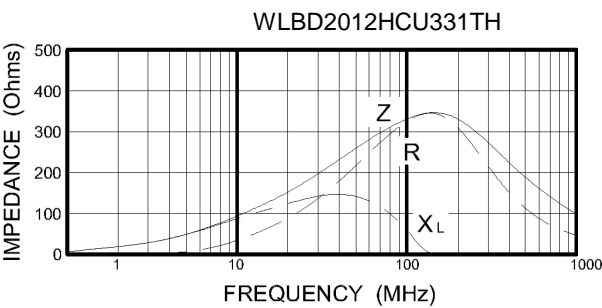
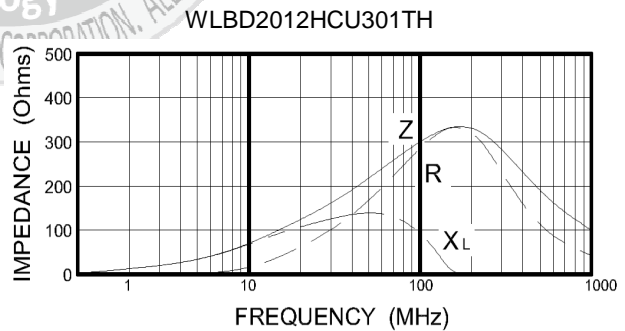
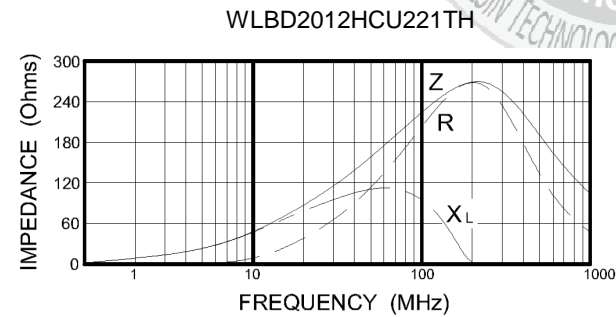
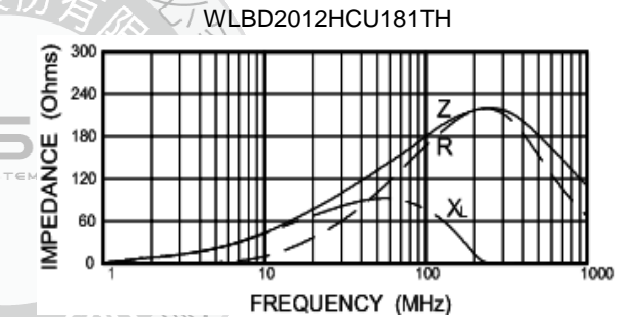
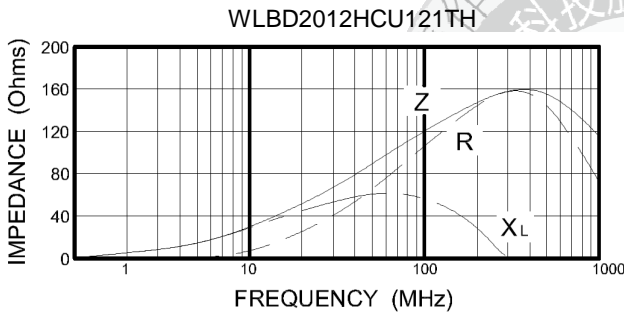
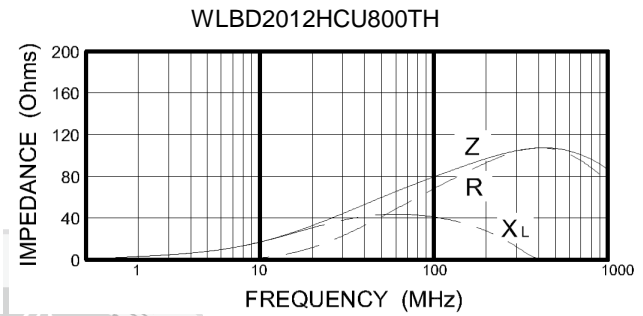
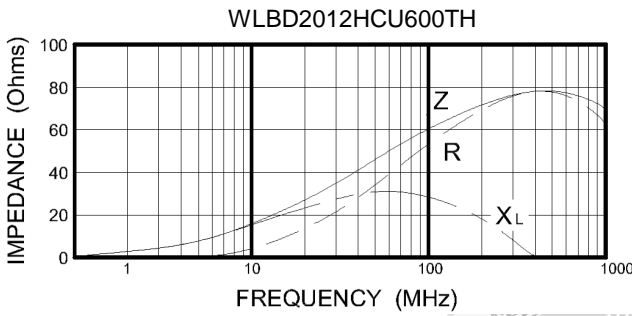
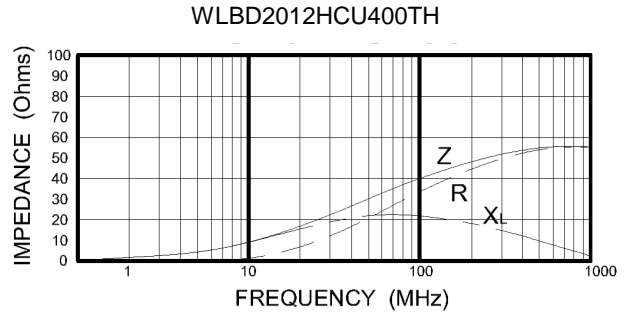
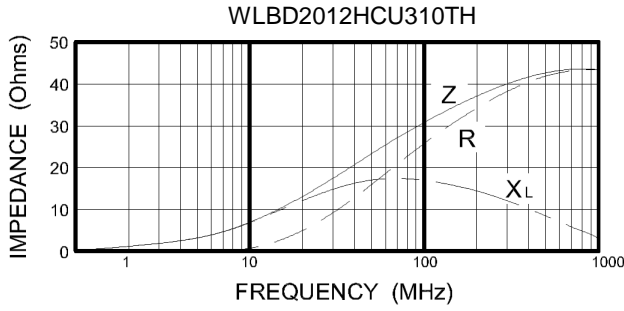


## Bead 1608- Impedance Frequency Characteristics (Typical)

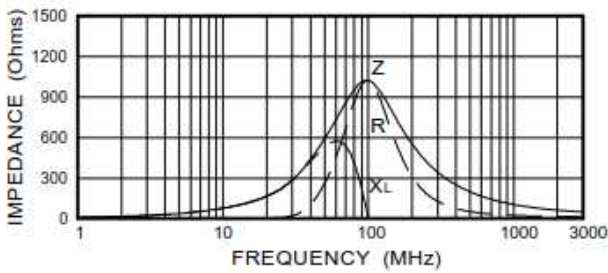




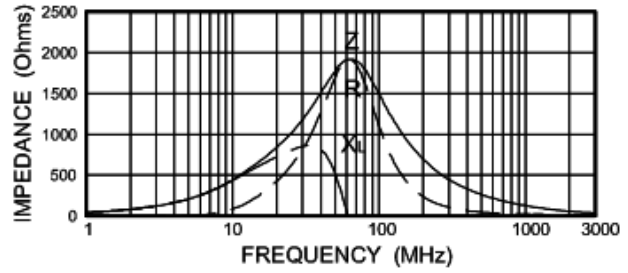
## Bead 2012- Impedance Frequency Characteristics(Typical)



\*\*WLBD2012HCU102TH

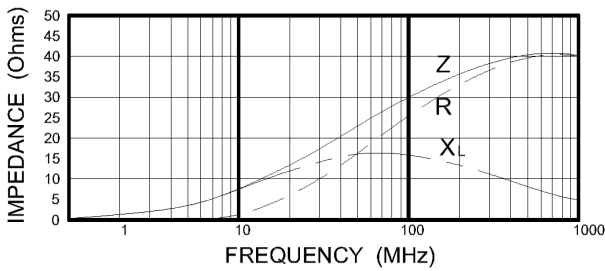


WLBD2012HCU152TH

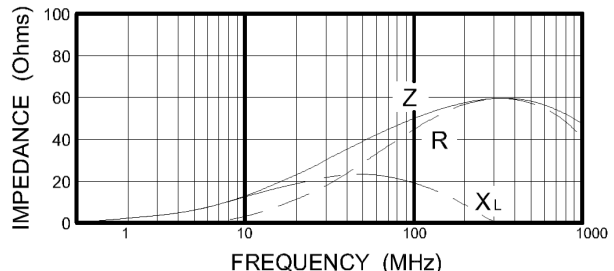


### Bead 3216- Impedance Frequency Characteristics(Typical)

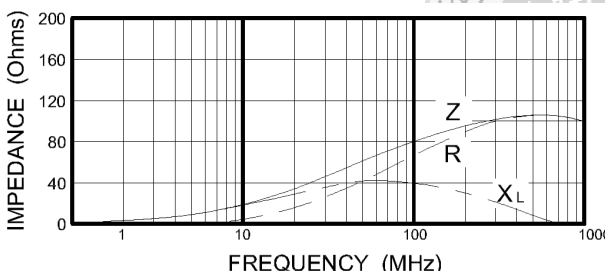
WLBD3216HCU300PH



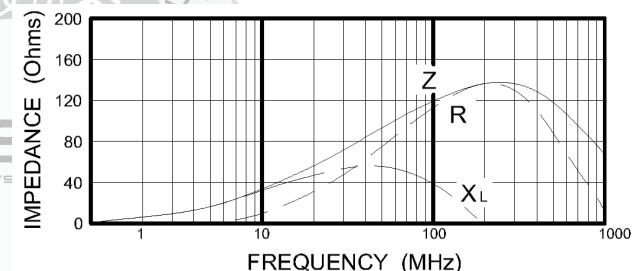
WLBD3216HCU500PH



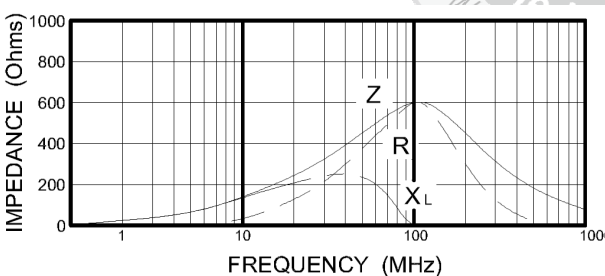
WLBD3216HCU800PH



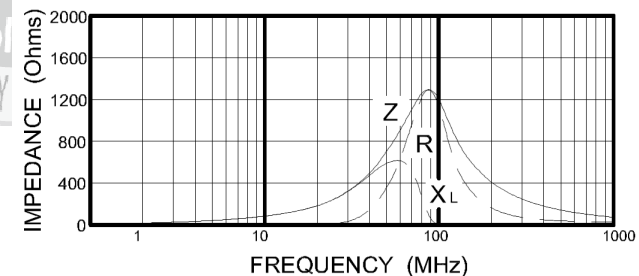
WLBD3216HCU121PH



WLBD3216HCU601PH

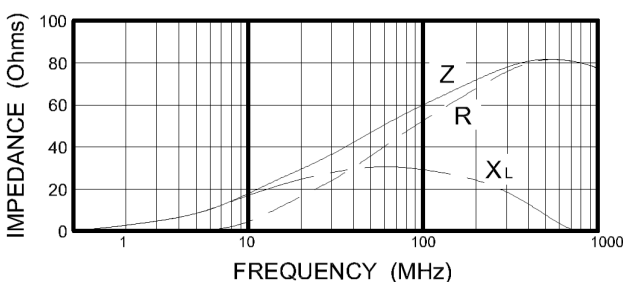


WLBD3216HCU122PH

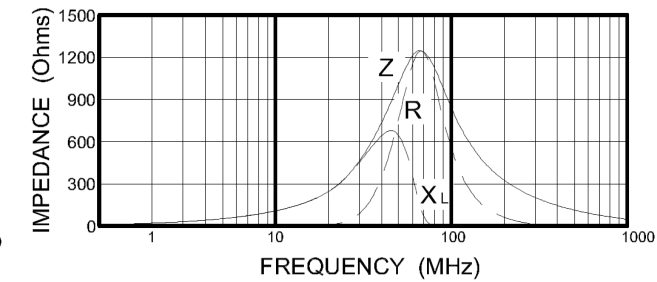


### Bead 3225- Impedance Frequency Characteristics(Typical)

WLBD3225HCU600PH

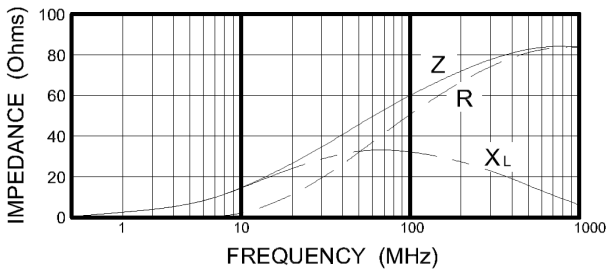


WLBD3225HCU102PH

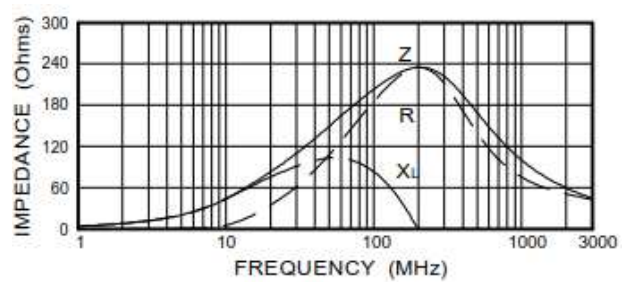


## Bead 4516- Impedance Frequency Characteristics (Typical)

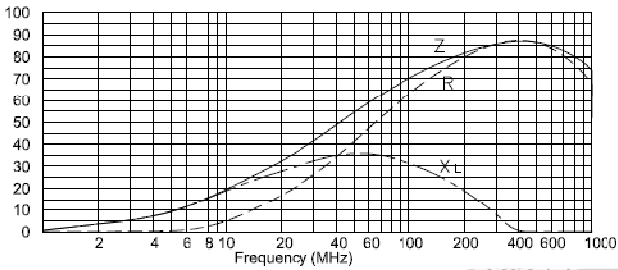
WLBD4516HCU600PH



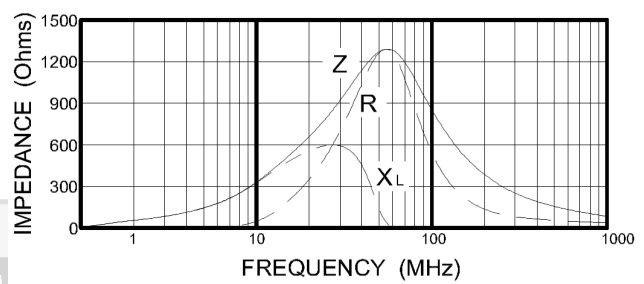
WLBD4516HCU181PH



WLBD4516HCU720PH

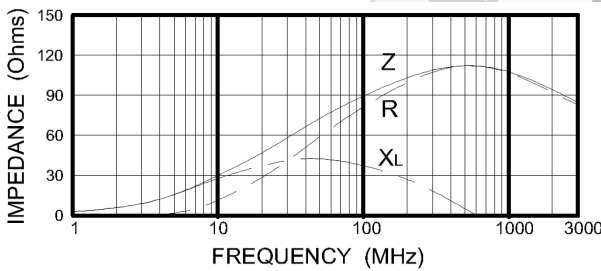


WLBD4516HCU851PH

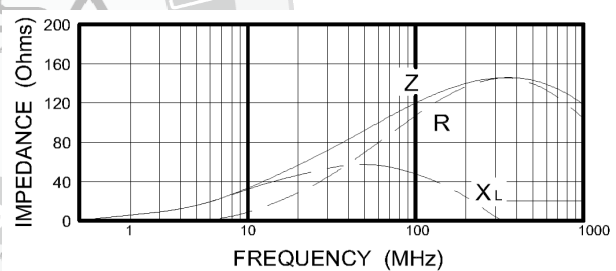


## Bead 4532- Impedance Frequency Characteristics (Typical)

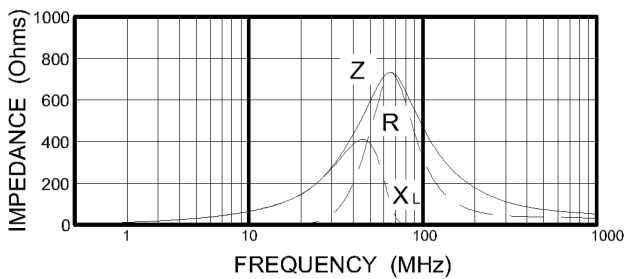
WLBD4532HCU800PH



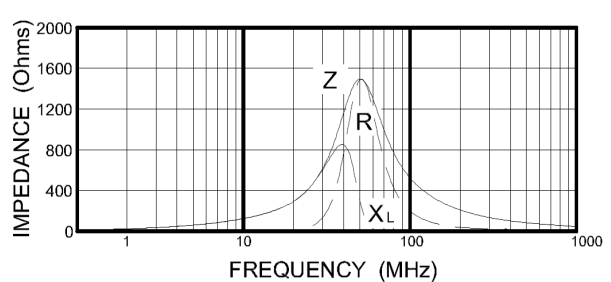
WLBD4532HCU12PH



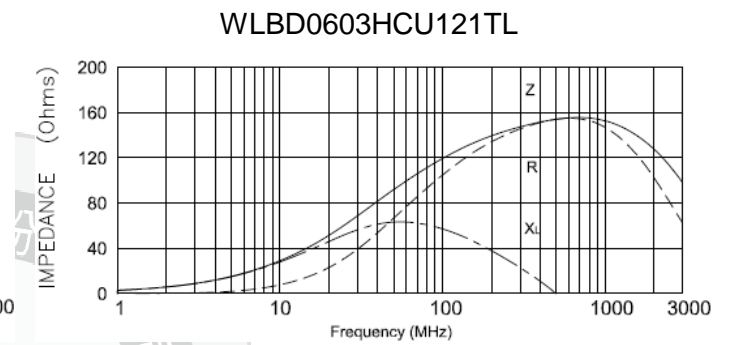
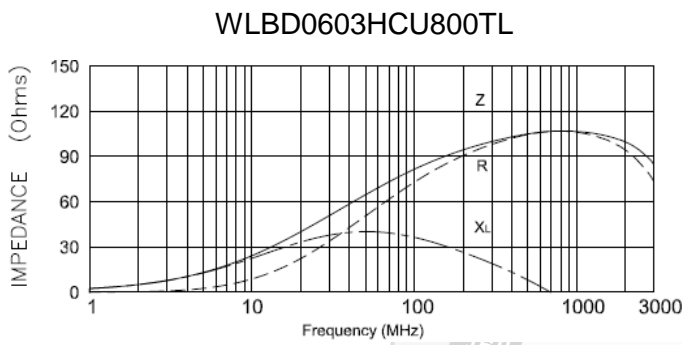
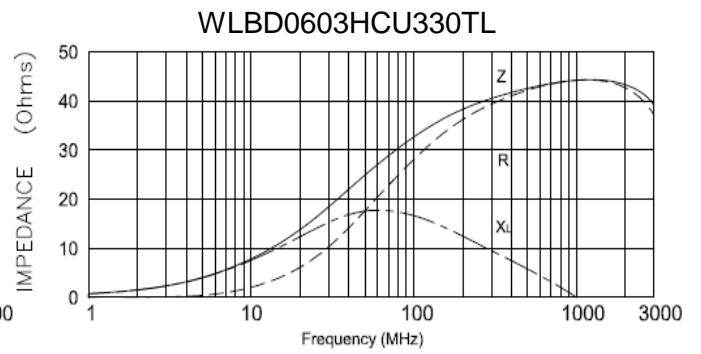
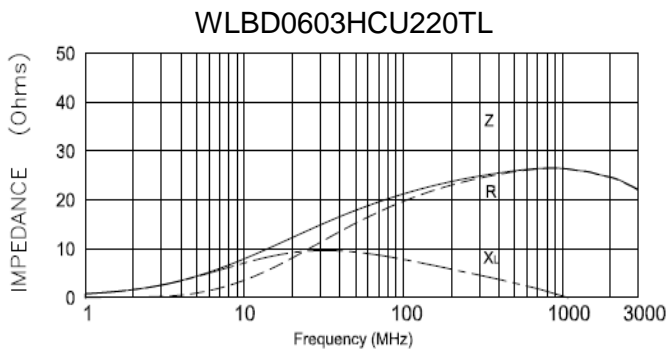
WLBD4532HCU601PH



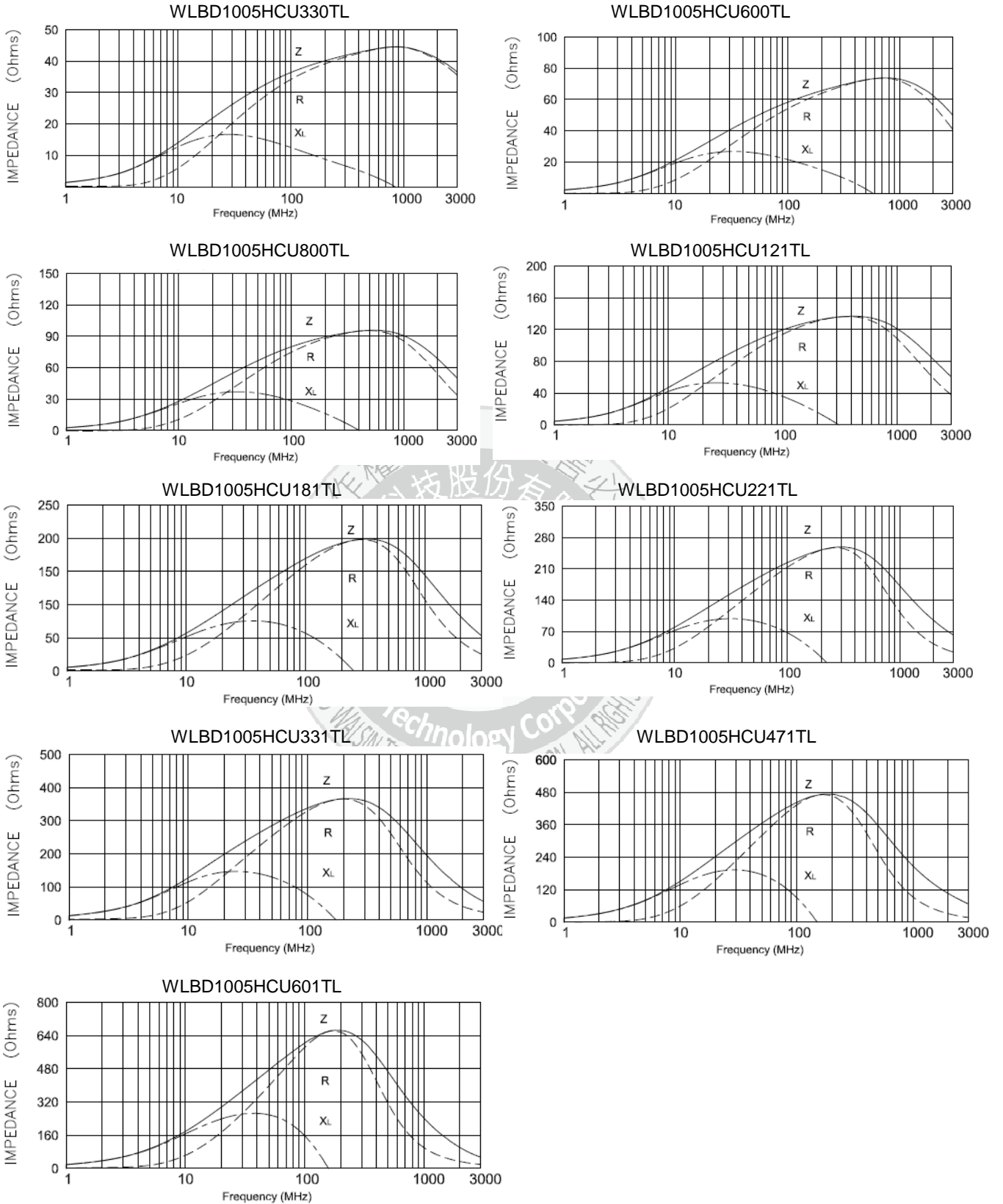
WLBD4532HCU132PH



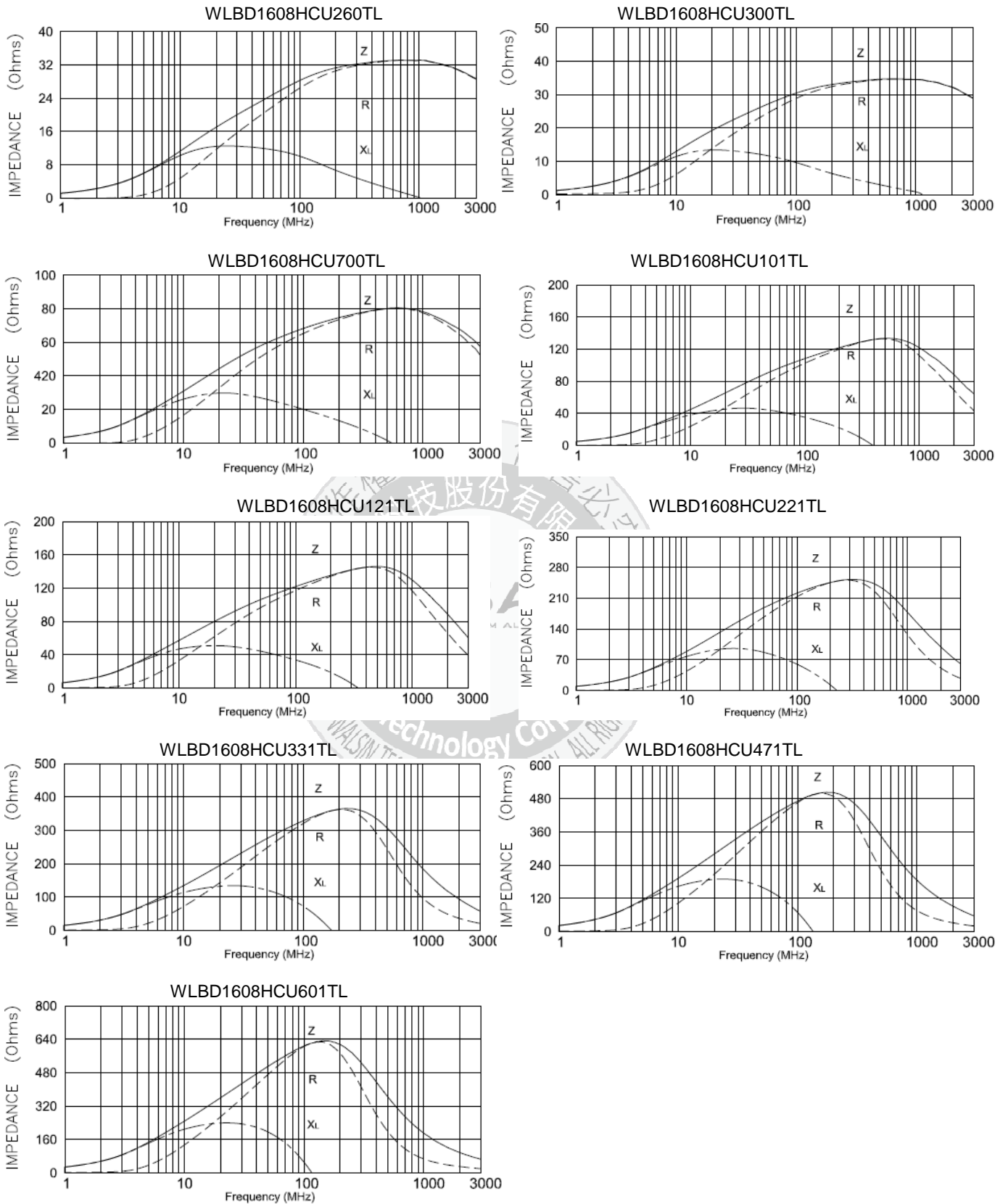
## Bead 0603L- Impedance Frequency Characteristics (Typical)



## Bead 1005L- Impedance Frequency Characteristics (Typical)



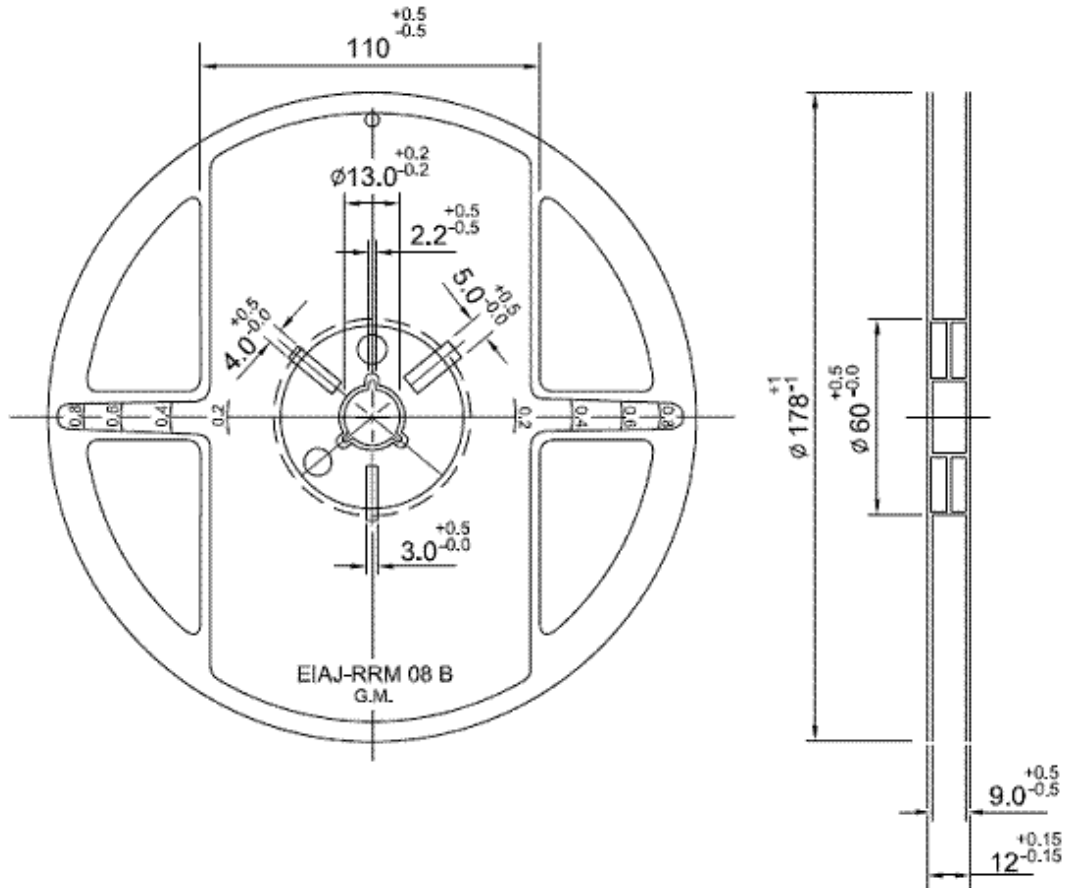
## Bead 1608L- Impedance Frequency Characteristics (Typical)





Packaging Specification  
Reel Dimension

Unit: mm



|                         | Reel Packaging Quantity |                        |                        |                        |                               |                        |                        |                        |                        |
|-------------------------|-------------------------|------------------------|------------------------|------------------------|-------------------------------|------------------------|------------------------|------------------------|------------------------|
| PART SIZE<br>(EIA SIZE) | <b>0603<br/>(0201)</b>  | <b>1005<br/>(0402)</b> | <b>1608<br/>(0603)</b> | <b>2012<br/>(0805)</b> | <b>**2012(T12)<br/>(0805)</b> | <b>3216<br/>(1206)</b> | <b>3225<br/>(1210)</b> | <b>4516<br/>(1806)</b> | <b>4532<br/>(1812)</b> |
| 7" REEL<br>Qty (Pcs)    | 15,000                  | 10,000                 | 4,000                  | 4,000                  | 3,000                         | 3,000                  | 2,000                  | 2,000                  | 1,000                  |
| inner box               | 5 reels                 | 5 reels                | 5 reels                | 5 reels                | 5 reels                       | 5 reels                | 5 reels                | 4 reels                | 4 reels                |