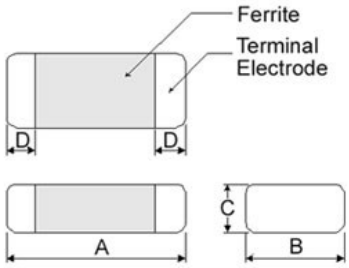
# SMD Multilayer Ferrite Chip Beads

## FEATURES

- Internal silver printed layers and magnetic shielded structures to minimize crosstalk
- Monolithic structure for excellent reliability
- Smaller DC resistance and larger allowable current than CVB series
- Can be used in a wide range of frequency to suppress EMI




## Shape and Dimensions

Unit: mm [inch]

| Type | A | B | C | D |
|---|---|---|---|---|
| 1005 [0402] | 1.0±0.15 [.039±.006] | 0.5±0.15 [.020±.006] | 0.5±0.15 [.020±.006] | 0.25±0.1 [.010±.004] |
| 1608 [0603] | 1.65±0.15 [.065±.006] | 0.8±0.15 [.031±.006] | 0.5±0.15 [.021±.006] | 0.3±0.2 [.012±.008] |
| 1608 [0603] | 1.65±0.15 [.065±.006] | 0.8±0.15 [.031±.006] | 0.8±0.15 [.031±.006] | 0.3±0.2 [.012±.008] |
| 2012 [0805] | 2.0 ±0.15 [.079 ±0.05] | 1.2±0.2 [.049±.008] | 0.9±0.2 [.033±.008] | 0.5±0.3 [.020±.012] |
| 3216 [1206] | 3.2±0.15 [0.13 ±0.05)] | 1.6±0.2 [.062±.008] | 0.9±0.2 [.033±.008] | 0.5±0.3 [.020±.012] |

## PRODUCT IDENTIFICATION

CVB ① 1608 ② E ③ 221 ④ T ⑤

①

| EMI BEADS | |
|---|---|
| CVB | Chip Ferrite Bead For |

②

| External Dimensions (L×W) (mm) | |
|---|---|
| 1005 [0402] | 1.0×0.5 |
| 1608 [0603] | 1.65×0.8 |
| 2012 [0805] | 2.0×1.25 |
| 3216 [1206] | 3.2×1.65 |

③

| Type | |
|---|---|
| E | Large Current |

④

| Nominal Impedance | |
|---|---|
| Example | Nominal Value |
| 300 | 30Ω |
| 221 | 220Ω |
| 102 | 1000Ω |

⑤

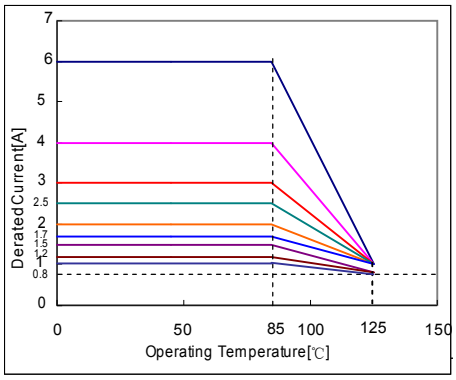
| Packing | |
|---|---|
| T | Tape & Reel |

**SMD Multilayer Ferrite Chip Beads**

## DETAIL ELECTRICAL CHARACTERISTICS

### Rated Current

When operating temperatures exceed +85℃, derating of current is necessary for chip ferrite beads for which rated current is 1000mA and over. Please apply the derating curve shown in chart according to the operating temperature.




## CVB1005 E TYPE

| Part Number | Impedance | Z Test Frequency | Max. DC Resistance | Max. Rated Current |
|---|---|---|---|---|
| Units | Ω | MHz | Ω | mA |
| Symbol | Z | Freq. | DCR | Ir |
| CVB1005E100T | 10±25% | 100 | 0.03 | 2000 |
| CVB1005E300T | 30±25% | 100 | 0.05 | 1700 |
| CVB1005E600T | 60±25% | 100 | 0.07 | 1500 |
| CVB1005E800T | 80±25% | 100 | 0.09 | 1200 |
| CVB1005E121T | 120±25% | 100 | 0.09 | 1400 |
| CVB1005E151T | 150±25% | 100 | 0.14 | 1400 |
| CVB1005E221T | 220±25% | 100 | 0.18 | 1100 |
| CVB1005E601T | 600±25% | 100 | 0.34 | 700 |
| CVB1005E102T | 1000±25% | 100 | 0.49 | 500 |

## CVB1608 E TYPE

| Part Number | Impedance | Z Test Frequency | Max. DC Resistance | Max. Rated Current |
|---|---|---|---|---|
| Units | Ω | MHz | Ω | mA |
| Symbol | Z | Freq. | DCR | Ir |
| CVB1608E100T | 10±25% | 100 | 0.02 | 4000 |
| CVB1608E300T | 30±25% | 100 | 0.03 | 3000 |
| CVB1608E400T | 40±25% | 100 | 0.03 | 3000 |
| CVB1608E600T | 60±25% | 100 | 0.04 | 3000 |
| CVB1608E101T | 100±25% | 100 | 0.07 | 2700 |
| CVB1608E121T | 120±25% | 100 | 0.08 | 2500 |
| CVB1608E151T | 150±25% | 100 | 0.08 | 2000 |
| CVB1608E181T | 180±25% | 100 | 0.09 | 2000 |
| CVB1608E221T | 220±25% | 100 | 0.10 | 2000 |
| CVB1608E301T | 300±25% | 100 | 0.12 | 1500 |
| CVB1608E471T | 470±25% | 100 | 0.15 | 1200 |
| CVB1608E601T | 600±25% | 100 | 0.20 | 1000 |
| CVB1608E102T | 1000±25% | 100 | 0.25 | 800 |
| CVB1608E152T | 1500±25% | 100 | 0.40 | 500 |

## CVB2012 E TYPE

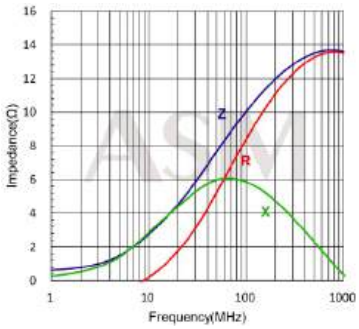
| Part Number | Impedance | Z Test Frequency | Max. DC Resistance | Max. Rated Current |
|---|---|---|---|---|
| Units | Ω | MHz | Ω | mA |
| Symbol | Z | Freq. | DCR | Ir |
| CVB2012E100T | 10±25% | 100 | 0.01 | 6000 |
| CVB2012E600T | 60±25% | 100 | 0.03 | 3000 |
| CVB2012E121T | 120±25% | 100 | 0.04 | 3000 |
| CVB2012E221T | 220±25% | 100 | 0.08 | 2000 |
| CVB2012E301T | 300±25% | 100 | 0.08 | 2000 |
| CVB2012E471T | 470±25% | 100 | 0.10 | 2000 |
| CVB2012E601T | 600±25% | 100 | 0.10 | 2000 |
| CVB2012E102T | 1000±25% | 100 | 0.12 | 1500 |
| CVB2012E222T | 2200±25% | 100 | 0.60 | 200 |

## CVB3216 E TYPE

| Part Number | Impedance | Z Test Frequency | Max. DC | Max. Rated Current |
|---|---|---|---|---|
| Units | Ω | MHz | Ω | mA |
| Symbol | Z | Freq. | DCR | Ir |
| CVB3216E190T | 19±25% | 100 | 0.01 | 5000 |
| CVB3216E300T | 30±25% | 100 | 0.01 | 4000 |
| CVB3216E600T | 60±25% | 100 | 0.02 | 4000 |
| CVB3216E101T | 100±25% | 100 | 0.03 | 3000 |
| CVB3216E121T | 120±25% | 100 | 0.03 | 3000 |
| CVB3216E221T | 220±25% | 100 | 0.05 | 2000 |
| CVB3216E301T | 300±25% | 100 | 0.06 | 2000 |
| CVB3216E501T | 500±25% | 100 | 0.10 | 2000 |
| CVB3216E601T | 600±25% | 100 | 0.10 | 2000 |
| CVB3216E102T | 1000±25% | 100 | 0.15 | 1200 |

## CVB1005 E TYPE

CVB1005E100T

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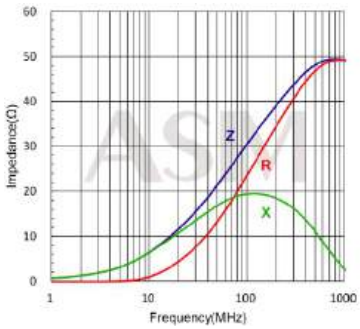


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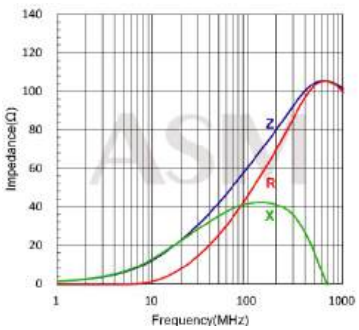


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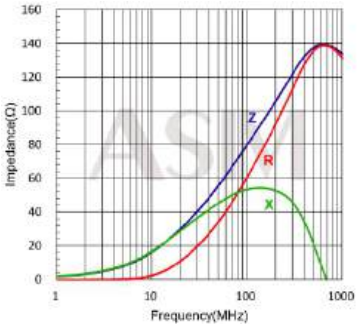


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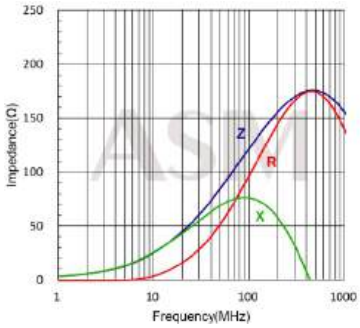


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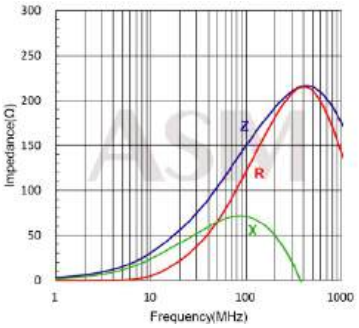


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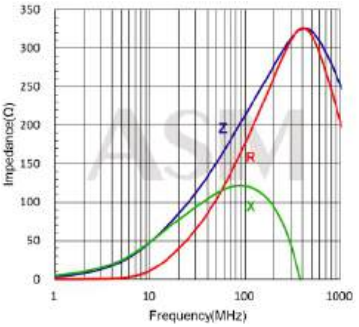


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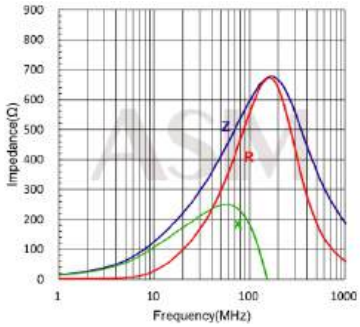


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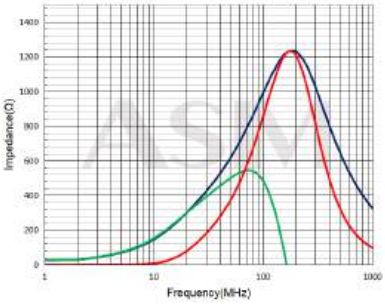
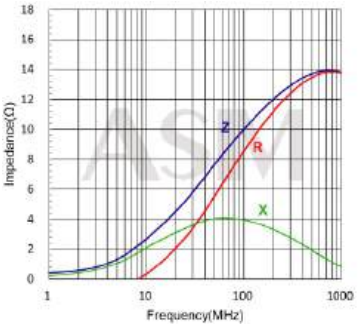



## CVB1608 E TYPE

CVB1608E100T

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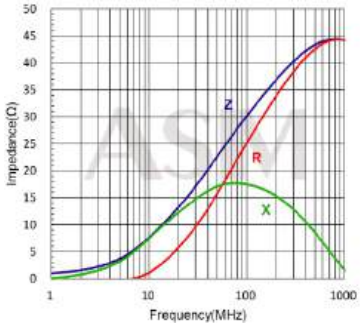


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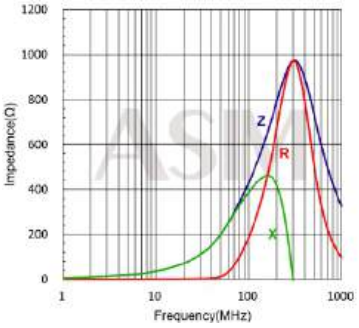

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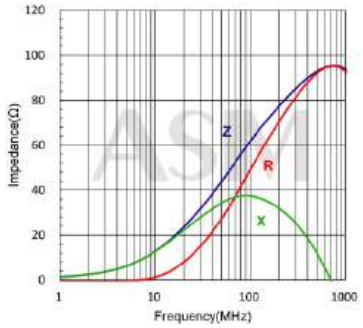


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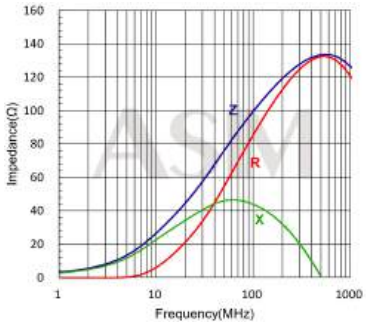


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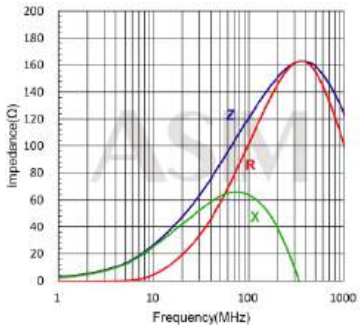


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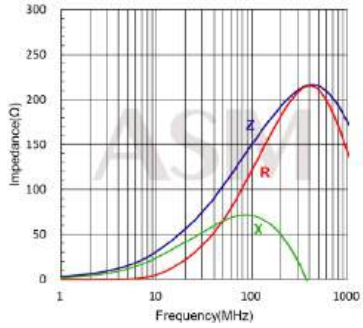


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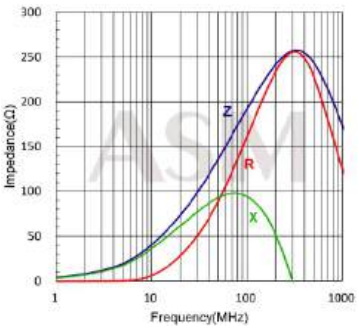


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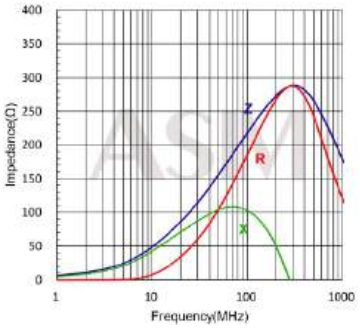


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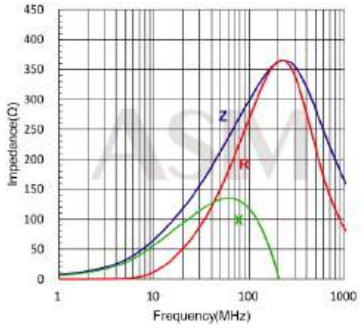


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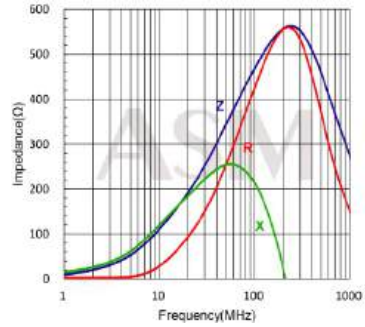


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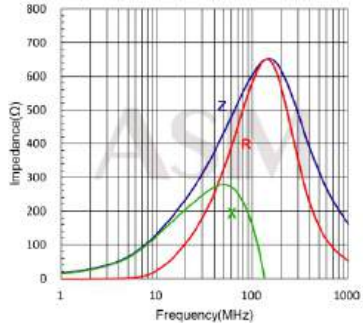


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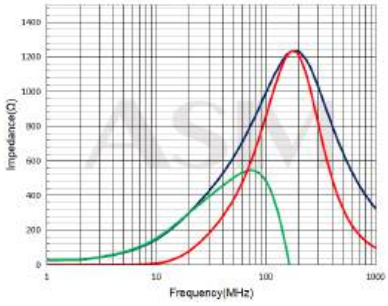


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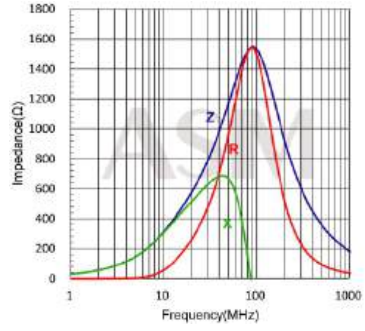
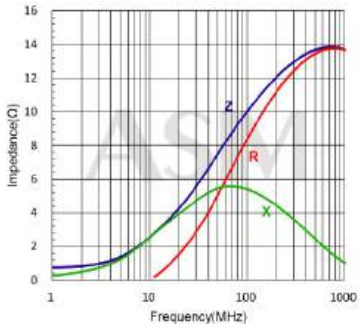


## CVB2012 E TYPE

CVB2012E100T

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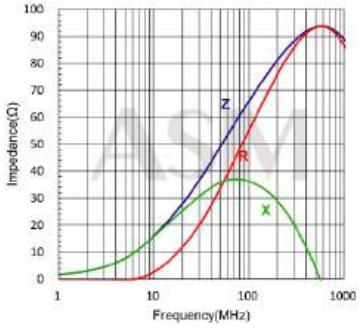
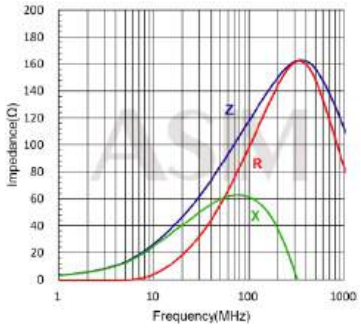



CVB2012E121T

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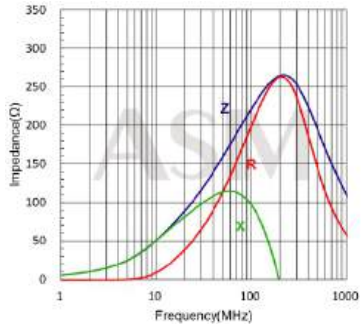


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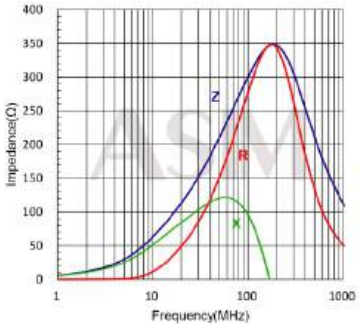


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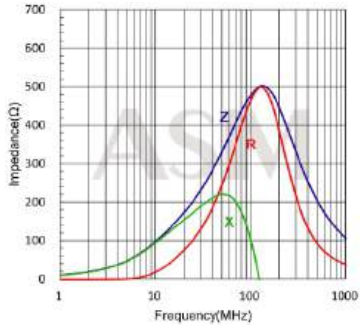


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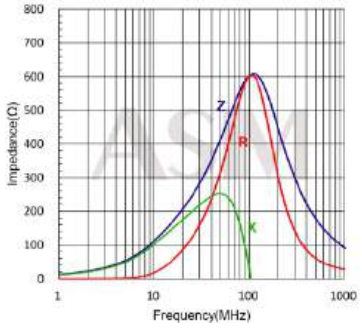


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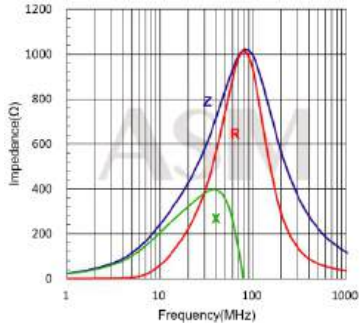


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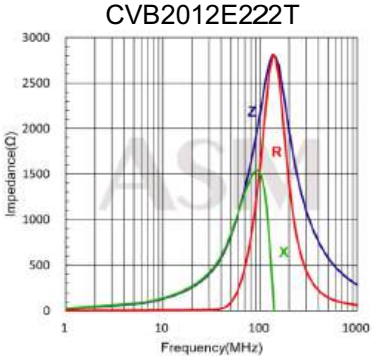
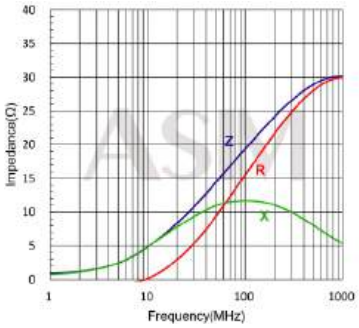
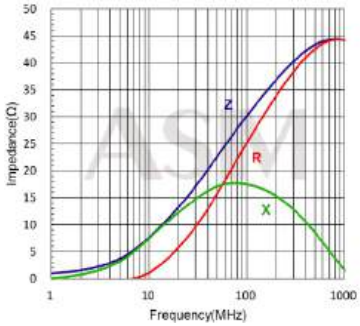


# CVB3216 E TYPE

CVB3216E190T




CVB3216E300T

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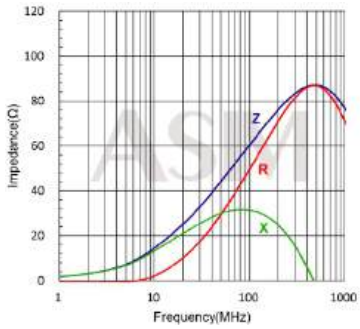


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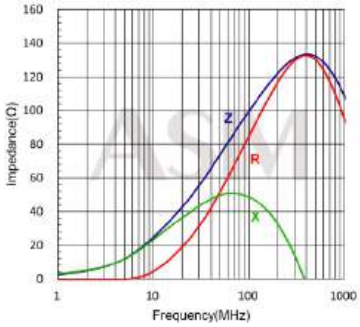


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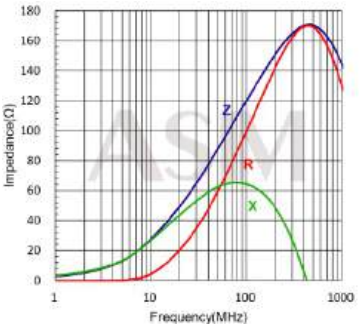


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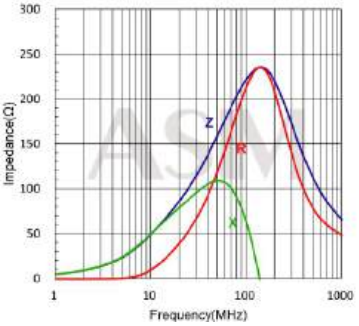


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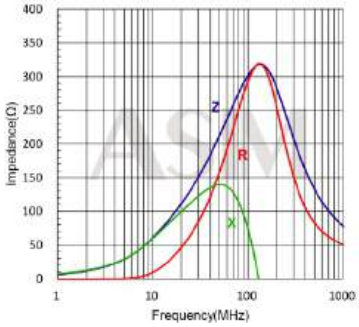


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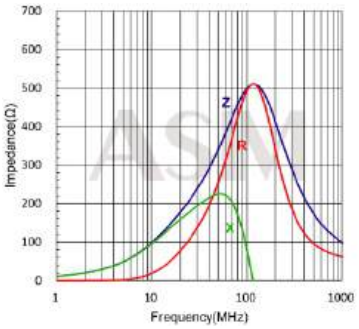
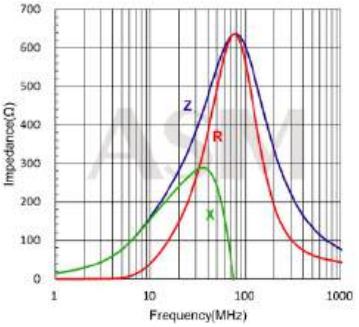



CVB3216E601T

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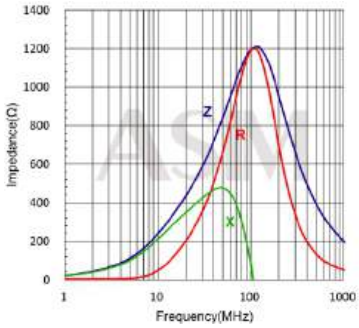
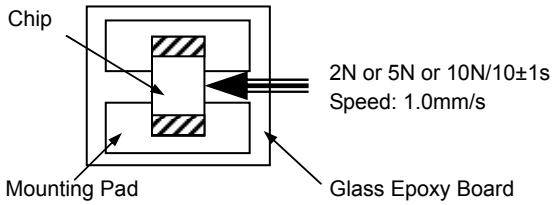
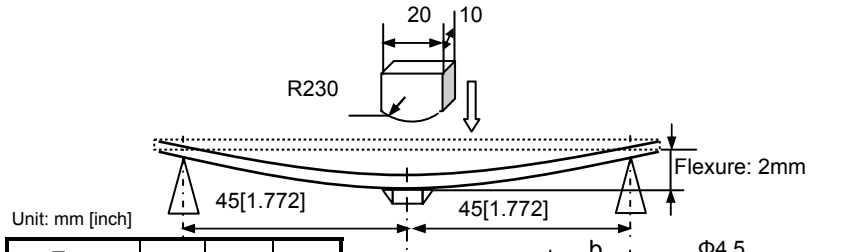
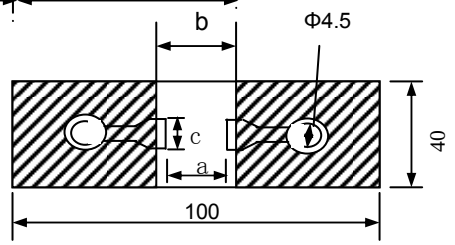
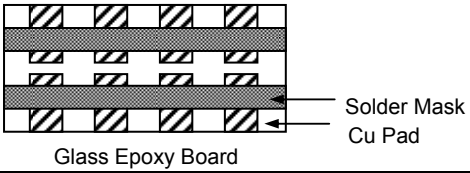


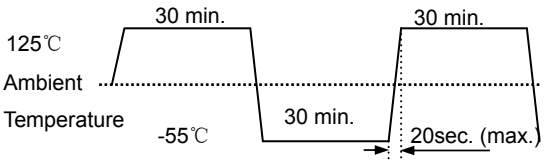

## Measuring Equipment

| Test Items | Device Model | Manufacturers |
|---|---|---|
| Impedance | 4991A | Keysight Technoiogies |
| DC Resistance | 4338A | Keysight Technoiogies |

## RELIABILITY AND TEST CONDITIONS

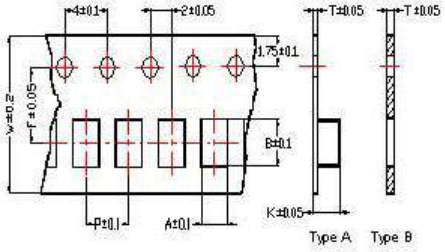
<table>
<tr><th>Items</th><th>Requirements</th><th>Test Methods and Remarks</th></tr>
<tr><td>1. Operating Temperature Range</td><td colspan="2">-55℃ to +125℃</td></tr>
<tr><td>2. Storage Temperature Range</td><td colspan="2">-55℃ to +125℃</td></tr>
<tr><td>3. Terminal Strength</td><td>No removal or split of the termination or other defects shall occur.</td><td>① Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder. Then apply a force in the direction of the arrow.<br>② 2N force for 0603 series.<br>③ 5N force for 1005 and 1608 series.<br>④ 10N force for 2010, 2012, 3216,4516 and 4030 series.<br>⑤ Keep time: 10±1s<br> 
</td></tr>
<tr><td rowspan="2">4. Resistance to Flexure</td><td>No visible mechanical damage.</td><td>① Solder the chip to the test jig (glass epoxy board) using a eutectic solder. Then apply a force in the direction shown as the following figure.<br>② Flexure: 2mm<br>③ Pressurizing Speed: 0.5mm/sec<br>④ Keep time: ≥30 sec</td></tr>
<tr><td colspan="2"> 

Unit: mm [inch]
<table>
<tr><th>Type</th><th>a</th><th>b</th><th>c</th></tr>
<tr><td>0603[0201]</td><td>0.25</td><td>0.8</td><td>0.3</td></tr>
<tr><td>1005[0402]</td><td>0.4</td><td>1.5</td><td>0.5</td></tr>
<tr><td>1608[0603]</td><td>1.0</td><td>3.0</td><td>1.2</td></tr>
<tr><td>2012[0805]</td><td>1.2</td><td>4.0</td><td>1.65</td></tr>
<tr><td>3216[1206]</td><td>2.2</td><td>5.0</td><td>2.0</td></tr>
<tr><td>4030[1612]</td><td>1.9</td><td>6.1</td><td>3.2</td></tr>
<tr><td>4516[1806]</td><td>2.8</td><td>8.5</td><td>2.0</td></tr>
</table>

</td></tr>
<tr><td>5. Vibration</td><td>① No visible mechanical damage.<br>② Impedance change: Within ±20%.</td><td>① Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder.<br>② The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5 mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz.<br>③ The frequency range from 10 to 55 Hz and return to 10 Hz shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total of 6 hours).<br> 
</td></tr>
</table>

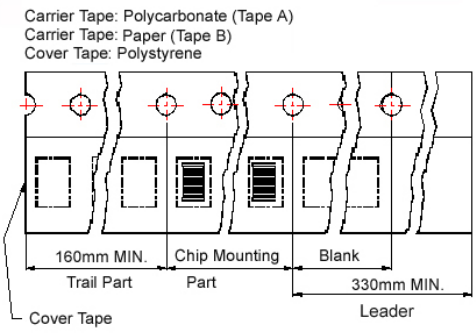
| Items | Requirements | Test Methods and Remarks |
|---|---|---|
| 6. Dropping | ① No visible mechanical damage.<br>② Impedance change: Within ±20%. | ① Drop chip bead 10 times on a concrete floor from a height of 100 cm. |
| 7. Temperature | ① Impedance change should be within ±20% of initial value measuring at 20℃. | ① Temperature range:-55℃ to +125℃<br>Reference temperature: +20℃ |
| 8. Solderability | ① No visible mechanical damage.<br>② Wetting shall be exceeded 75% coverage for 0603 series, and 95% coverage for the other. | ① Solder temperature: 240±2℃<br>② Duration: 3 sec<br>③ Solder: Sn/3.0Ag/0.5Cu<br>④ Flux: 25% Resin and 75% ethanol in weight |
| 9. Resistance to Soldering Heat | ① No visible mechanical damage.<br>② Wetting shall be exceeded 75% coverage for 0603 series, and 95% coverage for the other<br>③ Impedance change: Within ±20%. | ① Solder temperature: 260±3℃<br>② Duration: 5 sec<br>③ Solder: Sn/3.0Ag/0.5Cu<br>④ Flux: 25% Resin and 75% ethanol in weight<br>⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring. |
| 10. Thermal Shock | ① No visible mechanical damage.<br>② Impedance change: Within ±20%. | ① Temperature and time:<br>-55℃ for 30±3 min →125℃ for 30±3min<br>② Transforming interval: Max. 20 sec<br>③ Tested cycle: 100 cycles<br>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.<br>  |
| 11. Resistance to Low Temperature | ① No visible mechanical damage.<br>② Impedance change: Within ±20%. | ① Temperature: -55±2℃<br>② Duration: $1000^{+24}$ hours<br>③ The chip shall be stabilized at normal condition for 1~2 hours before measuring. |
| 12. Damp Heat (Steady States) | ① No visible mechanical damage.<br>② Impedance change: Within ±20%. | ① Temperature: 60±2℃<br>② Humidity: 90% to 95% RH<br>③ Duration: $1000^{+24}$ hours<br>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring. |
| 13. Loading Under Damp Heat | ① No visible mechanical damage.<br>② Impedance change: Within ±20%. | ① Temperature: 60±2℃<br>② Humidity: 90% to 95% RH<br>③ Duration: $1000^{+24}$ hours<br>④ Applied current: Rated current<br>⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring. |
| 14. Loading at High Temperature (Life Test) | ① No visible mechanical damage.<br>② Impedance change: Within ±20%. | ① Temperature: 125±2℃<br>② Duration: $1000^{+24}$ hours<br>③ Applied current: Rated current.<br>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring. |

## Packaging Specifications

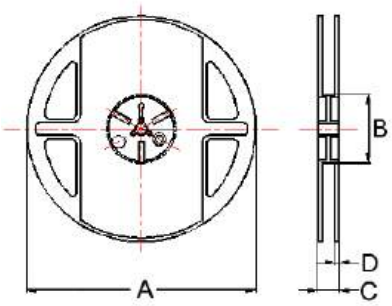
**Tape Dimensions**




**Tape Material**




**Reel Dimensions**




## Dimensions in mm

| TYPE | Tape Dimensions | | | | | | | | Reel Dimensions | | | | Quantity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | T | W | P | F | K | Tape | A | B | C | D | PCS / REEL |
| 1005 | 0.65 | 1.15 | 0.60 | 8.0 | 2.0 | 3.5 | - | B | 178 | 60 | 12 | 2 | 10000 |
| 1608 | 1.05 | 1.85 | 0.95 | 8.0 | 4.0 | 3.5 | - | B | 178 | 60 | 12 | 2 | 4000 |
| 2012 | 1.50 | 2.30 | 0.97 | 8.0 | 4.0 | 3.5 | - | B | 178 | 60 | 12 | 2 | 4000 |
| 3216 | 1.88 | 3.50 | 0.22 | 8.0 | 4.0 | 3.5 | 1.27 | A | 178 | 60 | 12 | 2 | 3000 |