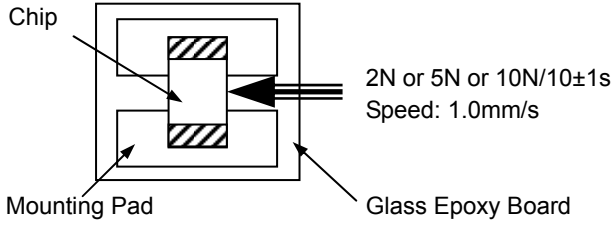
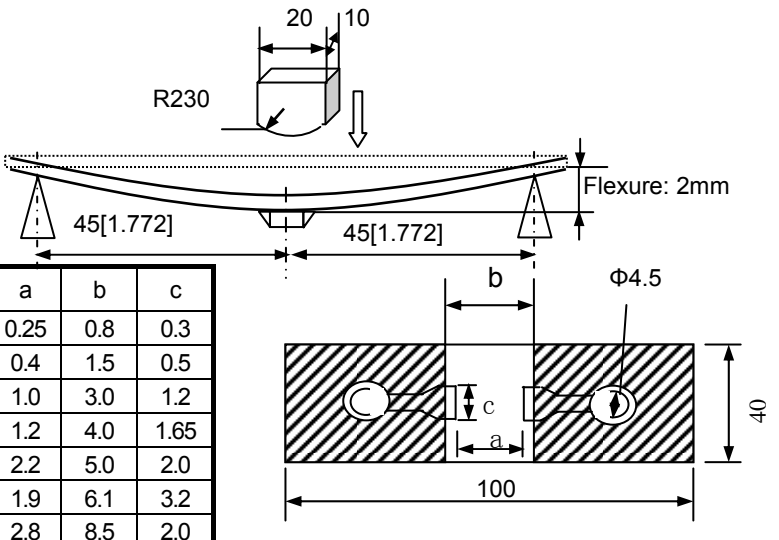
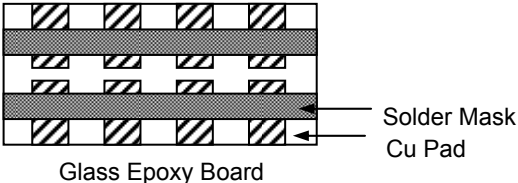


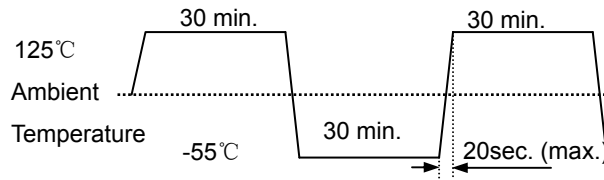
# RELIABILITY AND TEST CONDITIONS

## Multilayer Chip Ferrite Bead (GZ/GZ-C/SZ/SZ-C/PZ/UPZ/EPZ/HZ/HPZ Series)

Items	Requirements	Test Methods and Remarks																																
1. Operating Temperature Range		-55°C to +125°C																																
2. Storage Temperature Range		-55°C to +125°C																																
3. Terminal Strength	No removal or split of the termination or other defects shall occur.	<ol style="list-style-type: none"> <li>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.</li> <li>2N force for 0603 series.</li> <li>5N force for 1005 and 1608 series.</li> <li>10N force for 2010, 2012, 3216, 4516 and 4030 series.</li> <li>Keep time: 10±1s</li> </ol> 																																
4. Resistance to Flexure	No visible mechanical damage.	<ol style="list-style-type: none"> <li>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.</li> <li>Flexure: 2mm</li> <li>Pressurizing Speed: 0.5mm/sec</li> <li>Keep time: ≥30 sec</li> </ol>  <table border="1" data-bbox="466 1281 842 1563"> <thead> <tr> <th>Type</th> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <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> </tbody> </table>	Type	a	b	c	0603[0201]	0.25	0.8	0.3	1005[0402]	0.4	1.5	0.5	1608[0603]	1.0	3.0	1.2	2012[0805]	1.2	4.0	1.65	3216[1206]	2.2	5.0	2.0	4030[1612]	1.9	6.1	3.2	4516[1806]	2.8	8.5	2.0
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4516[1806]	2.8	8.5	2.0																															
5. Vibration	<ol style="list-style-type: none"> <li>No visible mechanical damage.</li> <li>Impedance change: Within ±20%.</li> </ol>	<ol style="list-style-type: none"> <li>Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder.</li> <li>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.</li> <li>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).</li> </ol> 																																

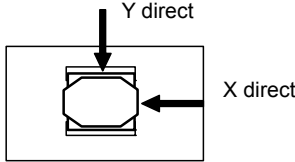
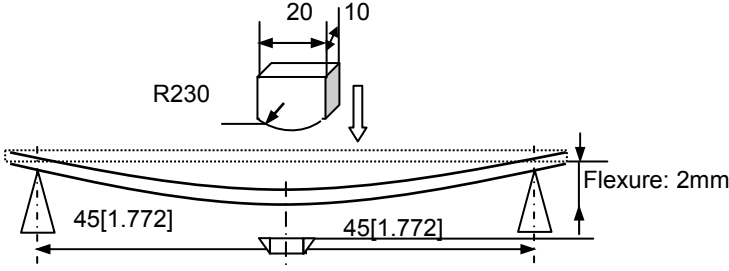
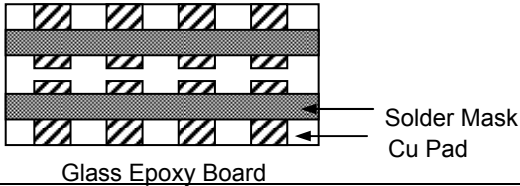
## RELIABILITY AND TEST CONDITIONS

### Multilayer Chip Ferrite Bead (GZ/GZ-C/SZ/SZ-C/PZ/UPZ/EPZ/HZ/HPZ Series)

Items	Requirements	Test Methods and Remarks
6. Dropping	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: Within <math>\pm 20\%</math>.</li> </ol>	<ol style="list-style-type: none"> <li>① Drop chip bead 10 times on a concrete floor from a height of 100 cm.</li> </ol>
7. Temperature	<ol style="list-style-type: none"> <li>① Impedance change should be within <math>\pm 20\%</math> of initial value measuring at <math>20^{\circ}\text{C}</math>.</li> </ol>	<ol style="list-style-type: none"> <li>① Temperature range: <math>-55^{\circ}\text{C}</math> to <math>+125^{\circ}\text{C}</math> Reference temperature: <math>+20^{\circ}\text{C}</math></li> </ol>
8. Solderability	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Wetting shall be exceeded 75% coverage for 0603 series, and 95% coverage for the other.</li> </ol>	<ol style="list-style-type: none"> <li>① Solder temperature: <math>240\pm 2^{\circ}\text{C}</math></li> <li>② Duration: 3 sec</li> <li>③ Solder: Sn/3.0Ag/0.5Cu</li> <li>④ Flux: 25% Resin and 75% ethanol in weight</li> </ol>
9. Resistance to Soldering Heat	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Wetting shall be exceeded 75% coverage for 0603 series, and 95% coverage for the other</li> <li>③ Impedance change: Within <math>\pm 20\%</math>.</li> </ol>	<ol style="list-style-type: none"> <li>① Solder temperature: <math>260\pm 3^{\circ}\text{C}</math></li> <li>② Duration: 5 sec</li> <li>③ Solder: Sn/3.0Ag/0.5Cu</li> <li>④ Flux: 25% Resin and 75% ethanol in weight</li> <li>⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ol>
10. Thermal Shock	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: Within <math>\pm 20\%</math>.</li> </ol>	<ol style="list-style-type: none"> <li>① Temperature and time: <math>-55^{\circ}\text{C}</math> for <math>30\pm 3</math> min <math>\rightarrow</math> <math>125^{\circ}\text{C}</math> for <math>30\pm 3</math> min</li> <li>② Transforming interval: Max. 20 sec</li> <li>③ Tested cycle: 100 cycles</li> <li>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ol>  <p>The diagram illustrates a thermal shock test cycle. The vertical axis is labeled 'Temperature' and has markers for '125°C', 'Ambient', and '-55°C'. The horizontal axis represents time. The cycle consists of three main segments: a 30-minute dwell at <math>125^{\circ}\text{C}</math>, a 30-minute dwell at <math>-55^{\circ}\text{C}</math>, and a 30-minute dwell at <math>125^{\circ}\text{C}</math>. The transitions between these temperature levels are indicated by arrows, with a maximum duration of 20 seconds for each transition.</p>
11. Resistance to Low Temperature	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: Within <math>\pm 20\%</math>.</li> </ol>	<ol style="list-style-type: none"> <li>① Temperature: <math>-55\pm 2^{\circ}\text{C}</math></li> <li>② Duration: <math>1000^{+24}</math> hours</li> <li>③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ol>
12. Damp Heat (Steady States)	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: Within <math>\pm 20\%</math>.</li> </ol>	<ol style="list-style-type: none"> <li>① Temperature: <math>60\pm 2^{\circ}\text{C}</math></li> <li>② Humidity: 90% to 95% RH</li> <li>③ Duration: <math>1000^{+24}</math> hours</li> <li>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ol>
13. Loading Under Damp Heat	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: Within <math>\pm 20\%</math>.</li> </ol>	<ol style="list-style-type: none"> <li>① Temperature: <math>60\pm 2^{\circ}\text{C}</math></li> <li>② Humidity: 90% to 95% RH</li> <li>③ Duration: <math>1000^{+24}</math> hours</li> <li>④ Applied current: Rated current</li> <li>⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ol>
14. Loading at High Temperature (Life Test)	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: Within <math>\pm 20\%</math>.</li> </ol>	<ol style="list-style-type: none"> <li>① Temperature: GZ&amp;GZ-C&amp;SZ&amp;SZ-C&amp;HZ series: <math>125\pm 2^{\circ}\text{C}</math> PZ&amp;UPZ&amp;EPZ&amp;HPZ series: <math>85\pm 2^{\circ}\text{C}</math></li> <li>② Duration: <math>1000^{+24}</math> hours</li> <li>③ Applied current: Rated current.</li> <li>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ol>

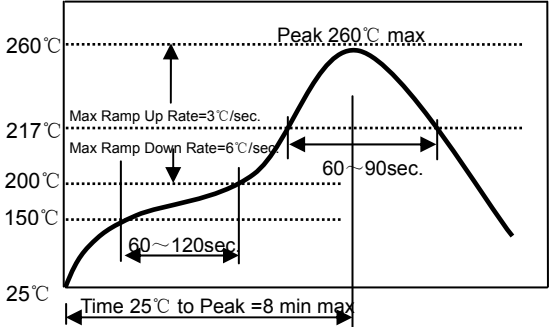
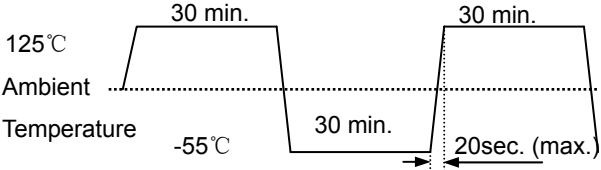
## RELIABILITY AND TEST CONDITIONS

### Wire Wound Chip Ferrite Bead (SPH3015HZSeries)

Items	Requirements	Test Methods and Remarks
1. Operating Temperature Range		-40°C ~ +125°C
2. Storage Temperature Range		-40°C ~ +125°C
3. Terminal Strength	No removal or split of the termination or other defects shall occur.	<ol style="list-style-type: none"> <li>Solder the inductor to the testing jig (glass epoxy board shown in using eutectic solder. Then apply a force in the direction of the arrow.</li> <li>10N force.</li> <li>Keep time: 5s</li> </ol> 
4. Resistance to Flexure	No visible mechanical damage.	<ol style="list-style-type: none"> <li>Solder the chip to the test jig (glass epoxy board) using eutectic solder. Then apply a force in the direction shown the following figure.</li> <li>Flexure: 2mm</li> <li>Pressurizing Speed: 0.5mm/sec</li> <li>Keep time: 30±1s</li> <li>Test board size: 100X40X1.0</li> <li>Land dimension: 3015</li> </ol> 
5. Vibration	<ol style="list-style-type: none"> <li>No visible mechanical damage.</li> <li>Impedance change: Within ±10%</li> </ol>	<ol style="list-style-type: none"> <li>Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder.</li> <li>The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz.</li> <li>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).</li> </ol> 
6. Dropping	<ol style="list-style-type: none"> <li>No visible mechanical damage.</li> <li>Impedance change: Within ±20%.</li> </ol>	Drop chip bead 10 times on a concrete floor from a height of 100 cm.

## RELIABILITY AND TEST CONDITIONS

### Wire Wound Chip Ferrite Bead (SPH3015HZSeries)

Items	Requirements	Test Methods and Remarks
7. Temperature	Impedance change: Within $\pm 20\%$	<ol style="list-style-type: none"> <li>① Temperature: <math>-40^{\circ}\text{C}\sim+125^{\circ}\text{C}</math></li> <li>② With a reference value of <math>+20^{\circ}\text{C}</math>, change rate shall be calculated</li> </ol>
8. Solderability	90% or more of electrode area shall be coated by new solder.	<ol style="list-style-type: none"> <li>① The test samples shall be dipped in flux, and then immersed in molten solder.</li> <li>② Solder temperature: <math>245\pm 5^{\circ}\text{C}</math></li> <li>③ Duration: <math>5\pm 1</math> sec.</li> <li>④ Solder: Sn/3.0Ag/0.5Cu</li> <li>⑤ Flux: 25% resin and 75% ethanol in weight</li> <li>⑥ Immersion depth: all sides of mounting terminal shall be immersed</li> </ol>
9. Resistance to Soldering Heat	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: Within <math>\pm 10\%</math></li> </ol>	<ol style="list-style-type: none"> <li>① Re-flowing Profile: Please refer to the following figure</li> <li>② Test board thickness: 1.0mm</li> <li>③ Test board material: glass epoxy resin</li> <li>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring</li> </ol> 
10. Thermal Shock	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: Within <math>\pm 10\%</math></li> </ol>	<ol style="list-style-type: none"> <li>① Temperature and time: <math>-40\pm 3^{\circ}\text{C}</math> for <math>30\pm 3</math> min <math>\rightarrow</math> <math>125^{\circ}\text{C}</math> for <math>30\pm 3</math> min</li> <li>② Transforming interval: Max. 20 sec</li> <li>③ Tested cycle: 100 cycles</li> <li>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ol> 
11. Resistance to Low Temperature	<ol style="list-style-type: none"> <li>① No visible mechanical damage</li> <li>② Impedance change: Within <math>\pm 10\%</math></li> </ol>	<ol style="list-style-type: none"> <li>① Temperature: <math>-40\pm 3^{\circ}\text{C}</math></li> <li>② Duration: <math>1000^{\pm 24}</math> hours</li> <li>③ The chip shall be stabilized at normal condition for 1~2 hours before measuring</li> </ol>
12. Damp Heat (Steady States)	<ol style="list-style-type: none"> <li>① No mechanical damage.</li> <li>② Impedance change: Within <math>\pm 10\%</math></li> </ol>	<ol style="list-style-type: none"> <li>① Temperature: <math>60\pm 2^{\circ}\text{C}</math></li> <li>② Humidity: 90% to 95%RH</li> <li>③ Duration: <math>1000^{\pm 24}</math> hours</li> <li>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring</li> </ol>
13.istance to High Temperature	<ol style="list-style-type: none"> <li>③ No visible mechanical damage</li> <li>Impedance change: Within <math>\pm 10\%</math></li> </ol>	<ol style="list-style-type: none"> <li>① Temperature: <math>125\pm 2^{\circ}\text{C}</math></li> <li>② Duration: <math>1000^{\pm 24}</math> hours</li> <li>③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ol>

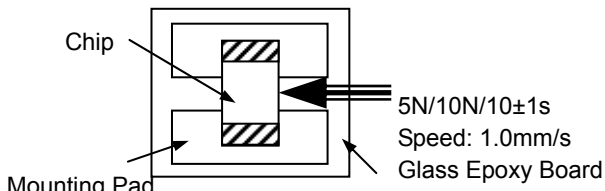
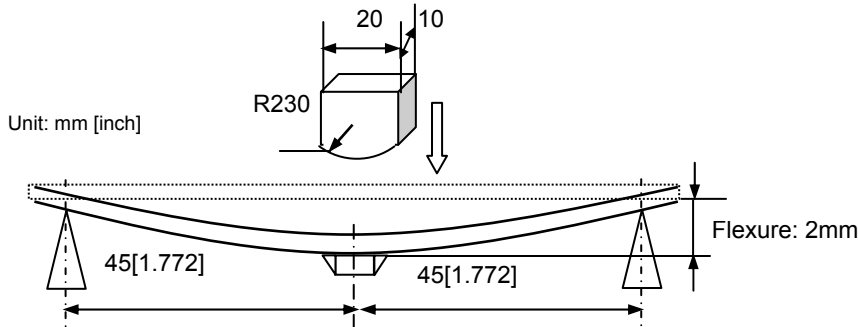
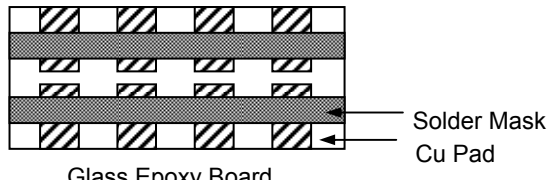
## RELIABILITY AND TEST CONDITIONS

### Wire Wound Chip Ferrite Bead (SPH3015HZSeries)

Item	Requirements	Test Methods and Remarks
14. Loading Under Damp Heat	<ul style="list-style-type: none"><li>① No mechanical damage.</li><li>② Impedance change: Within <math>\pm 10\%</math></li></ul>	<ul style="list-style-type: none"><li>① Temperature: <math>60\pm 2^{\circ}\text{C}</math></li><li>② Humidity: 90% to 95% RH</li><li>③ Applied current: Rated current</li><li>④ Duration: <math>1000^{\pm 24}</math> hours</li><li>⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring</li></ul>
15. Loading at High Temperature (Life Test)	<ul style="list-style-type: none"><li>① No mechanical damage.</li><li>② Impedance change: Within <math>\pm 10\%</math></li></ul>	<ul style="list-style-type: none"><li>① Temperature: <math>85\pm 2^{\circ}\text{C}</math></li><li>② Applied current: Rated current</li><li>③ Duration: <math>1000^{\pm 24}</math> hours</li><li>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring</li></ul>

# RELIABILITY AND TEST CONDITIONS

## Chip 3-Terminal EMI Filters (MFL Series)

Items	Requirements	Test Methods and Remarks
1. Operating Temperature Range		-40°C to +85°C
2. Storage Temperature Range		-40°C to +85°C
3. Terminal Strength	No removal or split of the termination or other defects shall occur.	<ol style="list-style-type: none"> <li>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.</li> <li>5N force for 1608 series</li> <li>10N force for 2012 series</li> <li>Keep time: 10±1s</li> </ol> 
4. Resistance to Flexure	No visible mechanical damage.	<ol style="list-style-type: none"> <li>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. Solder the chip to the test jig (glass epoxy board) using eutectic solder. Then apply a force in the direction.</li> <li>Flexure: 2mm</li> <li>Pressurizing Speed: 0.5mm/sec</li> <li>Keep time: ≥30 sec</li> </ol> 
5. Vibration	No visible mechanical damage.	<ol style="list-style-type: none"> <li>Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder.</li> <li>The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz.</li> <li>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).</li> </ol> 
6. Dropping	No visible mechanical damage.	Drop the chip 10 times on a concrete floor from a height of 100 cm.
7. Solderability	<ol style="list-style-type: none"> <li>No visible mechanical damage.</li> <li>Wetting shall be exceeded 75% coverage.</li> </ol>	<ol style="list-style-type: none"> <li>Solder temperature: 240±2°C</li> <li>Duration: 3 sec</li> <li>Solder: Sn/3.0Ag/0.5Cu</li> <li>Flux: 25% Resin and 75% ethanol in weight</li> </ol>

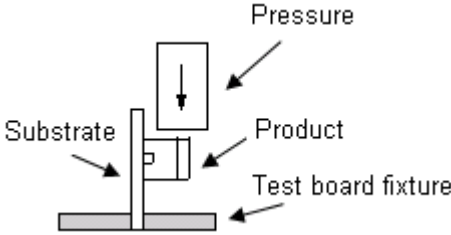
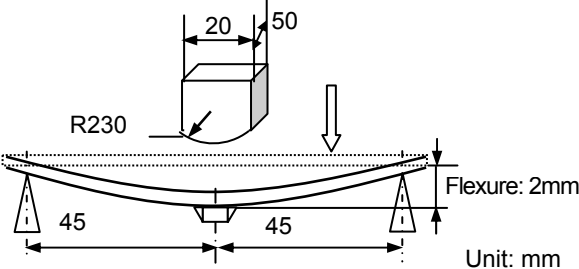
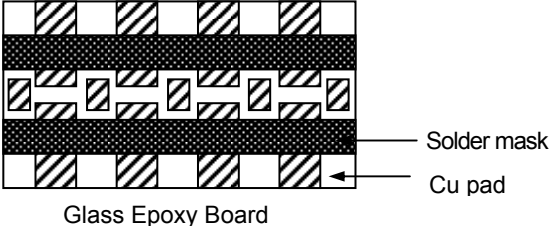
## RELIABILITY AND TEST CONDITIONS

### Chip 3-Terminal EMI Filters (MFL Series)

Items	Requirements	Test Methods and Remarks
8. Resistance to Soldering Heat	No visible mechanical damage.	① Solder temperature: $260\pm 3^{\circ}\text{C}$ ② Duration: 5 sec. ③ Solder: Sn/3.0Ag/0.5Cu ④ Flux: 25% Resin and 75% ethanol in weight. ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
9. Thermal Shock	① No visible mechanical damage. ② Insulation resistance: Satisfy electrical characteristics	① Temperature and time: $-40^{\circ}\text{C}$ for $30\pm 3$ min $\rightarrow$ $85^{\circ}\text{C}$ for $30\pm 3$ min ② Transforming interval: Max. 20 sec ③ Tested cycle: 100 cycles ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring. <p>The diagram illustrates a thermal shock test cycle. The temperature starts at Ambient, rises to <math>85^{\circ}\text{C}</math> and holds for 30 minutes. It then drops to <math>-40^{\circ}\text{C}</math> and holds for 30 minutes. The transition between <math>85^{\circ}\text{C}</math> and <math>-40^{\circ}\text{C}</math> is limited to a maximum of 20 seconds. The cycle then repeats.</p>
10. Damp Heat (Steady States)	① No visible mechanical damage ② Insulation resistance: Satisfy electrical characteristics	① Temperature: $60\pm 2^{\circ}\text{C}$ ② Humidity: 90% to 95% RH ③ Duration: $1000^{+24}$ hours ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
11. Loading Under Damp Heat	① No visible mechanical damage ② Insulation resistance: Satisfy electrical characteristics	① Temperature: $40\pm 2^{\circ}\text{C}$ ② Humidity: 90% to 95% RH ③ Duration: $1000^{+24}$ hours ④ Applied current: Rated current ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
12. Loading at High Temperature (Life Test)	① No visible mechanical damage ② Insulation resistance: Satisfy electrical characteristics	① Temperature: $85\pm 2^{\circ}\text{C}$ ② Duration: $1000^{+24}$ hours ③ Applied current: Rated current ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.

## RELIABILITY AND TEST CONDITIONS

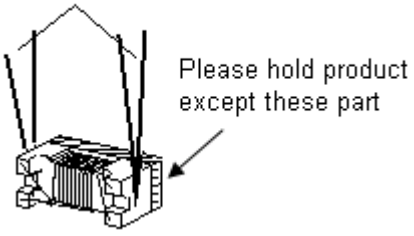
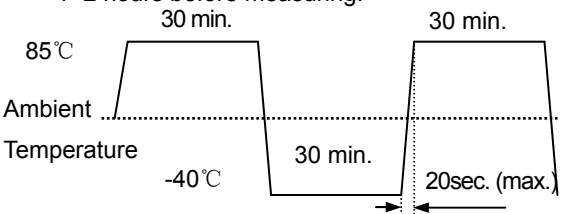
### Wire Wound Chip Common Mode Choke Coil (SDCW/SDCW-H/-CH/-U/-S/-C Series)

Item	Requirements	Test Methods and Remarks
1. Operating Temperature Range		-40°C to +85°C
2. Storage Temperature Range		-40°C to +85°C
3. Terminal strength	No removal or split of the termination or other defects shall occur.	<ol style="list-style-type: none"> <li>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.</li> <li>3N force for 1210 and 1608 series</li> <li>5N force for 2012 series</li> <li>8N force for 3216 series.</li> <li>Keep time: 30±1s</li> </ol> 
4. Resistance to Flexure	No visible mechanical damage.	<ol style="list-style-type: none"> <li>Solder the chip to the test jig (glass epoxy board) using eutectic solder. Then apply a force in the direction shown as the following figure.</li> <li>Flexure: 2mm</li> <li>Pressurizing Speed: 0.5mm/sec</li> <li>Keep time: 5s</li> </ol> 
5. Vibration	No visible mechanical damage.	<ol style="list-style-type: none"> <li>Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder.</li> <li>The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz.</li> <li>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).</li> </ol> 



## RELIABILITY AND TEST CONDITIONS

### Wire Wound Chip Common Mode Choke Coil (SDCW/SDCW-H/-CH/-U/-S/-C Series)

Item	Requirements	Test Methods and Remarks
6. Dropping	No visible mechanical damage.	Drop the chip 3 times on a concrete floor from a height of 100 cm.
7. Solderability	Wetting shall be exceeded 90% coverage, except welding points.	① Solder temperature: $240\pm 2^{\circ}\text{C}$ ② Duration: $4\pm 1\text{sec}$ ③ Solder: Sn/3.0Ag/0.5Cu ④ Flux: 25% Resin and 75% ethanol in weight Stainless tweezers 
8. Resistance to soldering heat	① No visible mechanical damage. ② Impedance change: within $\pm 20\%$ . ③ Insulation Resistance: $10\text{M}\Omega$ Min.	① Reflow soldering. ② The chip shall be stabilized at normal condition for 1~2 hours before measuring. ③ Please reference the Re-flowing Profile in Soldering and Notice for EMC Components
9. Temperature Characteristics	① No visible mechanical damage. ② Impedance change: Within $\pm 20\%$ . ③ Insulation Resistance: $10\text{M}\Omega$ Min.	① Temperature range: $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ ② Reference temperature: $+20^{\circ}\text{C}$
10. Thermal shock	① No mechanical damage. ② Impedance change: Within $\pm 20\%$ . ③ Insulation Resistance: $10\text{M}\Omega$ Min.	① Temperature and time: $-40^{\circ}\text{C}$ for $30\pm 3\text{min}$ $\rightarrow$ $+85^{\circ}\text{C}$ for $30\pm 3\text{min}$ ② Transforming interval: Max. 20 sec ③ Tested cycle: 250 cycles ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring. 
11. Resistance to low temperature	① No mechanical damage. ② Impedance change: Within $\pm 20\%$ . ③ Insulation Resistance: $10\text{M}\Omega$ Min.	① Temperature: $-40\pm 2^{\circ}\text{C}$ ② Duration: $500^{+12}$ hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.

## RELIABILITY AND TEST CONDITIONS

### Wire Wound Chip Common Mode Choke Coil (SDCW/SDCW-H/-CH /-U/-S/-C Series)

Item	Requirements	Test Methods and Remarks
12. Damp heat (Steady states)	<ul style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: Within <math>\pm 20\%</math>.</li> <li>③ Insulation Resistance: 10M<math>\Omega</math> Min.</li> </ul>	<ul style="list-style-type: none"> <li>② Temperature: 60<math>\pm 2^{\circ}\text{C}</math></li> <li>③ Humidity: 90% to 95% RH</li> <li>④ Duration: 500<sup>+12</sup> hours</li> <li>⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ul>
13. Loading under damp heat	<ul style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: Within <math>\pm 20\%</math>.</li> <li>③ Insulation Resistance: 10M<math>\Omega</math> Min.</li> </ul>	<ul style="list-style-type: none"> <li>① Temperature: 60<math>\pm 2^{\circ}\text{C}</math></li> <li>② Humidity: 90% to 95% RH</li> <li>③ Duration: 500<sup>+12</sup> hours</li> <li>④ Applied current: Rated current.</li> <li>⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ul>
14. Loading at high temperature (Life test)	<ul style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: Within <math>\pm 20\%</math>.</li> <li>③ Insulation Resistance: 10M<math>\Omega</math> Min.</li> </ul>	<ul style="list-style-type: none"> <li>① Temperature: 85<math>\pm 2^{\circ}\text{C}</math></li> <li>② Duration: 500<sup>+12</sup> hours</li> <li>③ Applied current: Rated current</li> <li>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ul>

## RELIABILITY AND TEST CONDITIONS

### Multilayer Chip Common Mode Choke Coil (SDMM0806 Series)

Items	Requirements	Test Methods and Remarks
1. Operating Temperature Range		-40°C to +85°C
2. Storage Temperature Range		-40°C to +85°C
3. Resistance to Flexure	No visible mechanical damage.	<ol style="list-style-type: none"> <li>① Solder the chip to the 1.0mm test jig (glass epoxy board) using a eutectic solder. Then apply a force in the direction shown as the following figure.</li> <li>② Flexure: 2mm</li> <li>③ Pressurizing Speed: 0.5mm/sec</li> <li>④ Keep time: 5 sec</li> </ol>
		<p>Unit: mm [inch]</p> <p>Flexure: 2mm</p>
4. Vibration	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: within <math>\pm 20\%</math>.</li> <li>③ Insulation Resistance: 10M<math>\Omega</math> Min.</li> </ol>	<ol style="list-style-type: none"> <li>① Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder.</li> <li>② The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz.</li> <li>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).</li> </ol> <p>Solder Mask Cu Pad Glass Epoxy Board</p>
5. Dropping	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: within <math>\pm 20\%</math>.</li> <li>③ Insulation Resistance: 10M<math>\Omega</math> Min.</li> </ol>	Drop the chip 3 times on a concrete floor from a height of 100 cm.
6. Solderability	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Wetting shall be exceeded 90% coverage.</li> </ol>	<ol style="list-style-type: none"> <li>① Solder temperature: 240<math>\pm</math>2°C</li> <li>② Duration: 3sec</li> <li>③ Solder: Sn/3.0Ag/0.5Cu</li> <li>④ Flux: 25% Resin and 75% ethanol in weight</li> </ol>
7. Resistance to Soldering Heat	<ol style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: within <math>\pm 20\%</math>.</li> <li>③ Insulation Resistance: 10M<math>\Omega</math> Min.</li> </ol>	<ol style="list-style-type: none"> <li>① Solder temperature: 260<math>\pm</math>3°C</li> <li>② Duration: 5 sec.</li> <li>③ Solder: Sn/3.0Ag/0.5Cu</li> <li>④ Flux: 25% Resin and 75% ethanol in weight.</li> <li>⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.</li> </ol>

## RELIABILITY AND TEST CONDITIONS

### Multilayer Chip Common Mode Filter (SDMM0806 Series)

Items	Requirements	Test Methods and Remarks
8. Temperature Characteristics	① No visible mechanical damage. ② Impedance change: within $\pm 20\%$ . ③ Insulation Resistance: 10M $\Omega$ Min.	① Temperature range: $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$ . ② Reference temperature: $+20^{\circ}\text{C}$ .
9. Thermal Shock	① No visible mechanical damage. ② Impedance change: within $\pm 20\%$ . ③ Insulation Resistance: 10M $\Omega$ Min.	① Temperature and time: $-40^{\circ}\text{C}$ for $30\pm 3$ min $\rightarrow$ $85^{\circ}\text{C}$ for $30\pm 3$ min ② Transforming interval: Max. 20 sec ③ Tested cycle: 100 cycles ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
10. Resistance to low temperature	① No mechanical damage. ② Impedance change: within $\pm 20\%$ . ③ Insulation Resistance: 10M $\Omega$ Min.	① Temperature: $-40\pm 2^{\circ}\text{C}$ ② Duration: 1000 <sup>+12</sup> hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
11. Damp Heat (Steady States)	① No mechanical damage. ② Impedance change: within $\pm 20\%$ . Insulation Resistance: 10M $\Omega$ Min.	① Temperature: $60\pm 2^{\circ}\text{C}$ ② Humidity: 90% to 95% RH ③ Duration: 1000 <sup>+24</sup> hours ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
12. Loading under damp heat	① No visible mechanical damage. ② Impedance change: within $\pm 20\%$ . ③ Insulation Resistance: 10M $\Omega$ Min.	① Temperature: $60\pm 2^{\circ}\text{C}$ . ② Humidity: 90% to 95% RH. ③ Duration: 1000 <sup>+12</sup> hours. ④ Applied current: Rated current. ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
13. Loading at high temperature (Life test)	① No visible mechanical damage. ② Impedance change: within $\pm 20\%$ . ③ Insulation Resistance: 10M $\Omega$ Min.	① Temperature: $85\pm 2^{\circ}\text{C}$ . ② Duration: 1000 <sup>+12</sup> hours. ③ Applied current: Rated current. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.