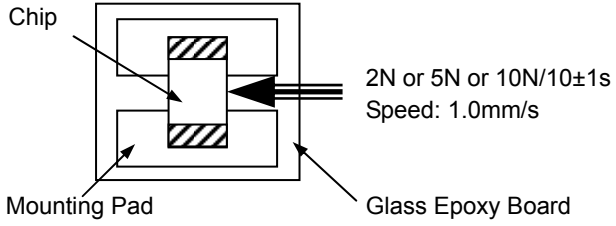
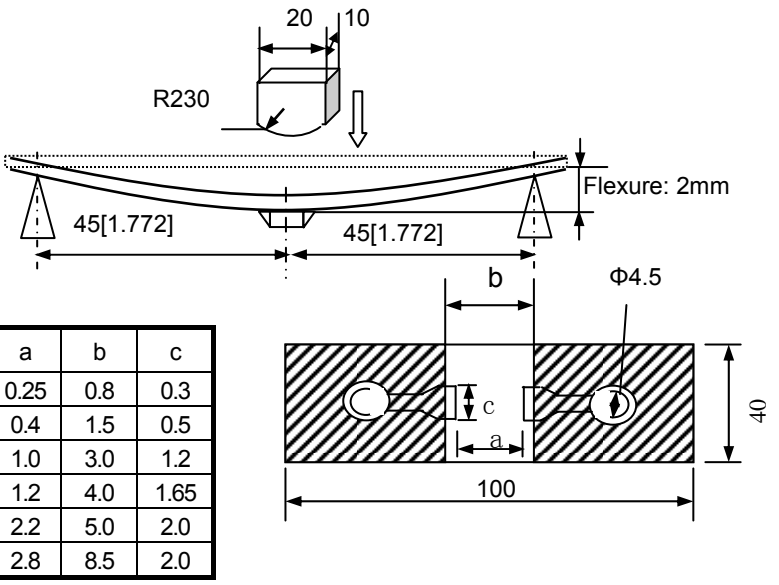
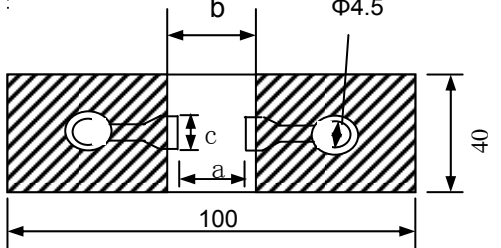
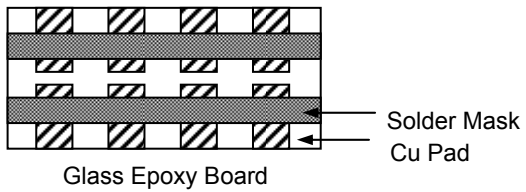


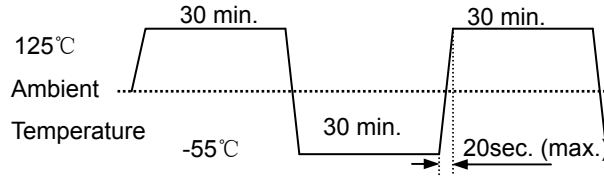
RELIABILITY AND TEST CONDITIONS

Multilayer Chip Ferrite Bead (GZ/GZ-C/SZ/SZ-C/PZ/UPZ/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"> 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. 2N force for 0603 series. 5N force for 1005 and 1608 series. 10N force for 2010, 2012, 3216 and 4516series. Keep time: 10±1s 																												
4. Resistance to Flexure	No visible mechanical damage.	<ol style="list-style-type: none"> 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. Flexure: 2mm Pressurizing Speed: 0.5mm/sec Keep time: ≥30 sec  <table border="1" data-bbox="470 1332 837 1590"> <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>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	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"> No visible mechanical damage. Impedance change: Within ±20%. 	<ol style="list-style-type: none"> Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder. 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. 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). 																												

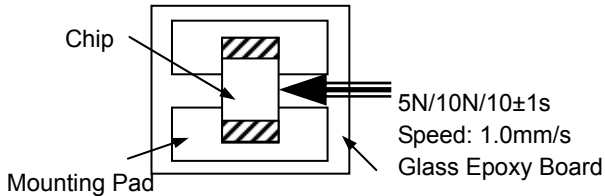
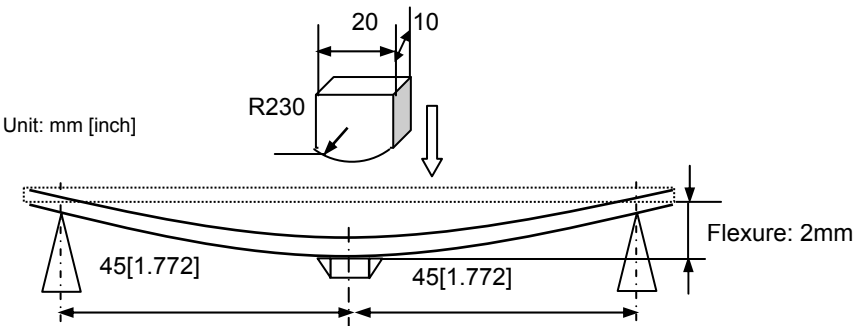
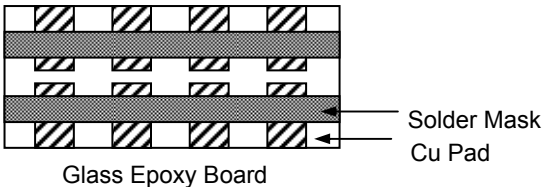
RELIABILITY AND TEST CONDITIONS

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

Items	Requirements	Test Methods and Remarks
6. Dropping	<ul style="list-style-type: none"> ① No visible mechanical damage. ② Impedance change: Within $\pm 20\%$. 	<ul style="list-style-type: none"> ① Drop chip bead 10 times on a concrete floor from a height of 100 cm.
7. Temperature	<ul style="list-style-type: none"> ① Impedance change should be within $\pm 20\%$ of initial value measuring at 20°C. 	<ul style="list-style-type: none"> ① Temperature range: -55°C to $+125^{\circ}\text{C}$ Reference temperature: $+20^{\circ}\text{C}$
8. Solderability	<ul style="list-style-type: none"> ① No visible mechanical damage. ② Wetting shall be exceeded 75% coverage for 0603 series, and 95% coverage for the other. 	<ul style="list-style-type: none"> ① Solder temperature: $240\pm 2^{\circ}\text{C}$ ② Duration: 3 sec ③ Solder: Sn/3.0Ag/0.5Cu ④ Flux: 25% Resin and 75% ethanol in weight
9. Resistance to Soldering Heat	<ul style="list-style-type: none"> ① No visible mechanical damage. ② Wetting shall be exceeded 75% coverage for 0603 series, and 95% coverage for the other ③ Impedance change: Within $\pm 20\%$. 	<ul style="list-style-type: none"> 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.
10. Thermal Shock	<ul style="list-style-type: none"> ① No visible mechanical damage. ② Impedance change: Within $\pm 20\%$. 	<ul style="list-style-type: none"> ① Temperature and time: -55°C for 30 ± 3 min \rightarrow 125°C for 30 ± 3min 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. It starts at an ambient temperature, rises to 125°C and holds for 30 minutes. It then drops to -55°C and holds for 30 minutes. The temperature returns to ambient, then rises to 125°C again for 30 minutes. The dwell time at 125°C is specified as 20 seconds (maximum).</p>
11. Resistance to Low Temperature	<ul style="list-style-type: none"> ① No visible mechanical damage. ② Impedance change: Within $\pm 20\%$. 	<ul style="list-style-type: none"> ① Temperature: $-55\pm 2^{\circ}\text{C}$ ② Duration: 1000^{+24} hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
12. Damp Heat (Steady States)	<ul style="list-style-type: none"> ① No visible mechanical damage. ② Impedance change: Within $\pm 20\%$. 	<ul style="list-style-type: none"> 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.
13. Loading Under Damp Heat	<ul style="list-style-type: none"> ① No visible mechanical damage. ② Impedance change: Within $\pm 20\%$. 	<ul style="list-style-type: none"> ① Temperature: $60\pm 2^{\circ}\text{C}$ 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.
14. Loading at High Temperature (Life Test)	<ul style="list-style-type: none"> ① No visible mechanical damage. ② Impedance change: Within $\pm 20\%$. 	<ul style="list-style-type: none"> ① Temperature: GZ&GZ-C&SZ&SZ-C&HZ&ARZ series: $125\pm 2^{\circ}\text{C}$ PZ&UPZ&HPZ series: $85\pm 2^{\circ}\text{C}$ 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

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"> 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. 5N force for 1608 series 10N force for 2012 series Keep time: 10±1s 
4. Resistance to Flexure	No visible mechanical damage.	<ol style="list-style-type: none"> 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. Flexure: 2mm Pressurizing Speed: 0.5mm/sec Keep time: ≥30 sec 
5. Vibration	No visible mechanical damage.	<ol style="list-style-type: none"> Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder. 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. 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). 
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"> No visible mechanical damage. Wetting shall be exceeded 75% coverage. 	<ol style="list-style-type: none"> Solder temperature: 240±2°C Duration: 3 sec Solder: Sn/3.0Ag/0.5Cu Flux: 25% Resin and 75% ethanol in weight

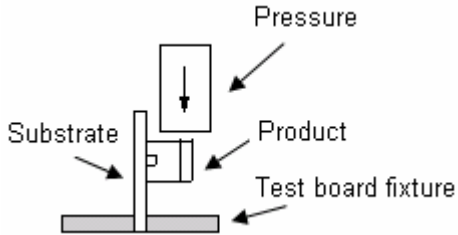
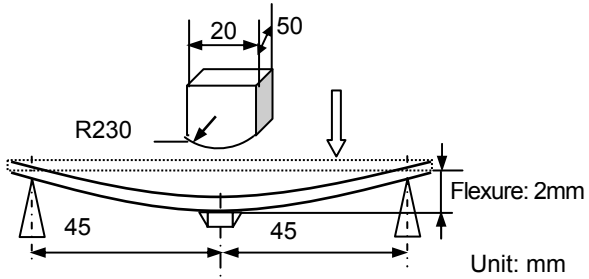
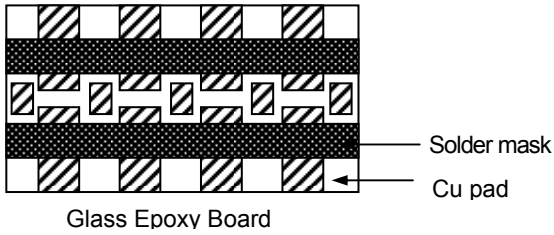
RELIABILITY AND TEST CONDITIONS

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°C for 30 ± 3 min \rightarrow 85°C for 30 ± 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 vertical axis is labeled 'Temperature' and has markers for 85°C, 'Ambient', and -40°C. The horizontal axis represents time. The cycle consists of three segments: a 30-minute ramp up from ambient to 85°C, a 30-minute hold at 85°C, a 30-minute ramp down to -40°C, a 30-minute hold at -40°C, and a 30-minute ramp up back to ambient. The transition times between the high and low temperature holds are indicated as a maximum of 20 seconds.</p>
10. Damp Heat (Steady States)	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 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.

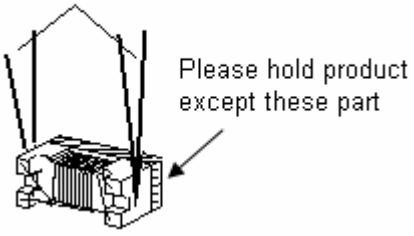
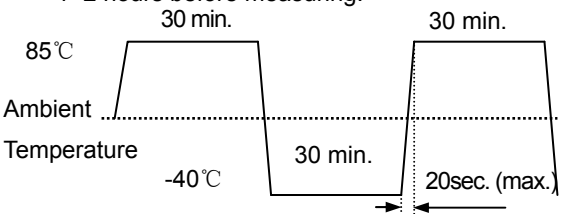
RELIABILITY AND TEST CONDITIONS

Wire Wound Chip Common Mode Choke Coil (SDCW/SDCW-H/SDCW-U 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"> 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. 5N force for 2012 series 8N force for 3216 series. Keep time: 30±1s 
4. Resistance to Flexure	No visible mechanical damage.	<ol style="list-style-type: none"> 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. Flexure: 2mm Pressurizing Speed: 0.5mm/sec Keep time: 5s 
5. Vibration	No visible mechanical damage.	<ol style="list-style-type: none"> Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder. 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. 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). 

RELIABILITY AND TEST CONDITIONS

Wire Wound Chip Common Mode Choke Coil (SDCW/SDCW-H/SDCW-U 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 95% 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°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°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.

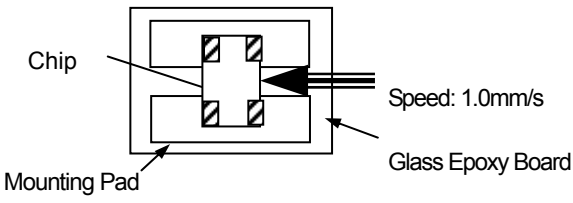
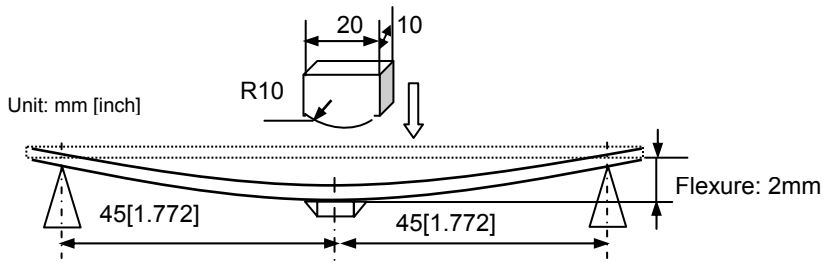
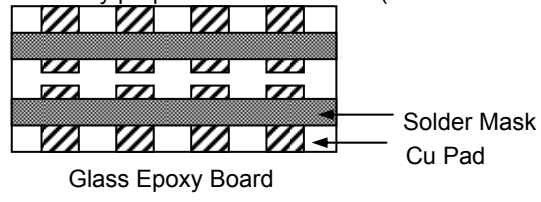
RELIABILITY AND TEST CONDITIONS

Wire Wound Chip Common Mode Choke Coil (SDCW/SDCW-H/SDCW-U Series)

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

Multilayer Chip Common Mode Choke Coil (SDCM/SDCMA 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 visible mechanical damage.	<ol style="list-style-type: none"> 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. 10N force for 2012 and 3216 series. Keep time: 10±1sec 
4. Resistance to Flexure	No visible mechanical damage.	<ol style="list-style-type: none"> 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. Flexure: 2mm Pressurizing Speed: 0.5mm/sec Keep time: ≥30 sec 
5. Vibration	No visible mechanical damage.	<ol style="list-style-type: none"> Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder. 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. 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). 
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"> No visible mechanical damage. Wetting shall be exceeded 75% coverage. 	<ol style="list-style-type: none"> Solder temperature: 240±2°C Duration: 3sec Solder: Sn/3.0Ag/0.5Cu Flux: 25% Resin and 75% ethanol in weight

RELIABILITY AND TEST CONDITIONS

Multilayer Chip Common Mode Filter (SDCM/SDCMA 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 Satisfy electrical Characteristic.	① Temperature and time: -40°C for 30 ± 3 min \rightarrow 85°C for 30 ± 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 shows a temperature profile starting from 'Ambient'. It rises to 85°C and holds for 30 min. It then falls to -40°C and holds for 30 min. The transition time between 85°C and -40°C is indicated as 20 sec. (max.). The cycle then repeats.</p>
10. Damp Heat (Steady States)	① No visible mechanical damage. ② Satisfy electrical Characteristic.	① Temperature: $40\pm 2^{\circ}\text{C}$ ② Humidity: 90% to 95% RH ③ Duration: 500^{+24} hours ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
11. Resistance to High temperature	① No visible mechanical damage. ② Satisfy electrical Characteristic.	① Temperature: $85\pm 2^{\circ}\text{C}$ ② Duration: 500^{+24} hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.