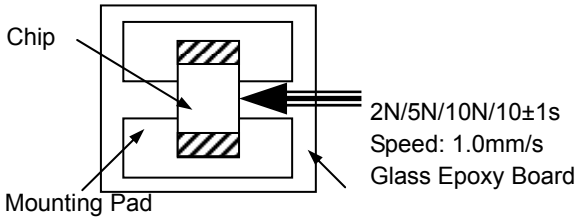
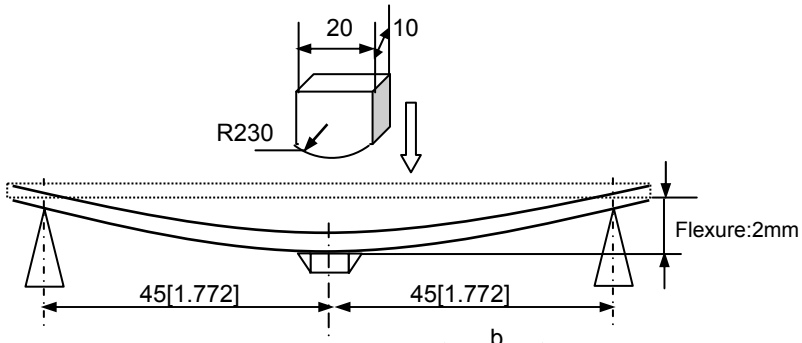
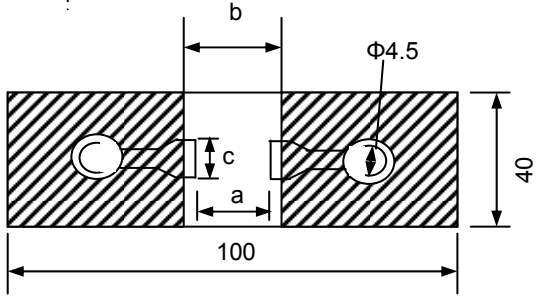
RELIABILITY AND TEST CONDITIONS

Multilayer Chip Inductor (SDFL Series)

<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">-40℃ to +85℃</td></tr>
<tr><td>2. Storage Temperature Range</td><td colspan="2">-40℃ to +85℃</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 inductor 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.
② 2N force for 0603
③ 5N force for 1005 and 1608 series.
④ 10N force for 2012 and 3216 series.
⑤ Keep time: 10±1s
 
</td></tr>
<tr><td rowspan="2">4. Resistance to Flexure</td><td>No visible mechanical damage.</td><td>① Solder the inductor to the test jig (glass epoxy board) using a eutectic solder. Then apply a force in the direction of the arrow shown as the following figure.
② Flexure: 2mm
③ Pressurizing Speed: 0.5mm/sec
④ Keep time: ≥30 sec</td></tr>
<tr><td colspan="2"> 

Unit: mm [inch]
 

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
</td></tr>
</table>

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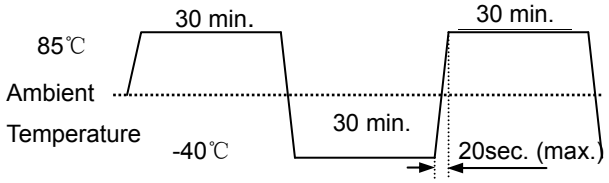
RELIABILITY AND TEST CONDITIONS

Multilayer Chip Inductor (SDFL Series)

Items	Requirements	Test Methods and Remarks
5. Vibration	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±30%.	① Solder the inductor to the testing jig using eutectic solder. ② The inductor 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. 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 3mutually perpendicular directions (total of 6 hours).
6. Dropping	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±30%.	Drop chip inductor 10 times on a concrete floor from a height of 100 cm.
7. Temperature	Inductance change should be within ±10% of initial value measuring at 20℃.	Temperature range: -40℃ to +85℃ Reference temperature:+20℃
8. Solderability	① No visible mechanical damage. ② Wetting shall exceed 95% coverage.	① Solder temperature: 240±2℃ 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	① No visible mechanical damage. ② Wetting shall exceed 95% coverage. ③ Inductance change: Within ±10%. ④ Q factor change: Within ±30%.	① Solder temperature: 260±3℃ 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	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±30%.	① Temperature and time: -40℃ for 30±3 min →85℃ 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. 

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RELIABILITY AND TEST CONDITIONS

Multilayer Chip Inductor (SDFL Series)

Items	Requirements	Test Methods and Remarks
11. Resistance to Low Temperature	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±30%.	① Temperature: -40±2℃ ② Duration: 1000^{+24} hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
12. Resistance to High Temperature	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±30%.	① Temperature: 85±2℃ ② Duration: 1000^{+24} hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
13. Damp Heat (Steady States)	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±30%.	① Temperature: 60±2℃ 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.
14. Loading Under Damp Heat	① No visible mechanical damage. ② Inductance change: Within±10% for inductance≤12μH, Within ±15% for inductance≥15μH. ③ Q factor change: Within ±30%.	① Temperature: 60±2℃ 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.
15. Loading at High Temperature (Life Test)	① No visible mechanical damage. ② Inductance change: Within±10% for inductance≤12μH, Within±15% for inductance≥15μH. ③ Q factor change: Within ±30%.	① Temperature: 85±2℃ 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.

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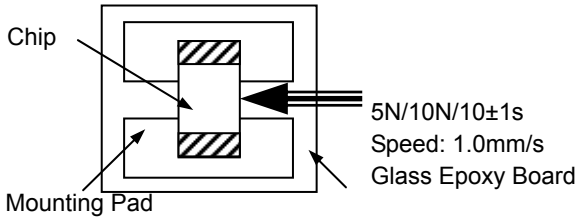
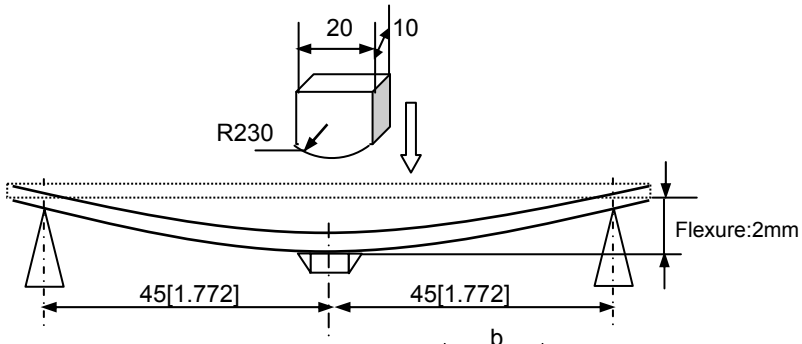
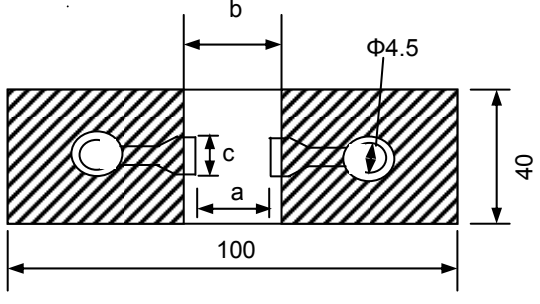
RELIABILITY AND TEST CONDITIONS

Multilayer Chip Inductor for Choke (MCL Series)

<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">-40℃ to +85℃</td></tr>
<tr><td>2. Storage Temperature Range</td><td colspan="2">-40℃ to +85℃</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 inductor 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.
② 5N force for 1608 series, 10N force for 2012 series.
③ Keep time: 10±1s
④ Speed: 1.0mm/s.
 
</td></tr>
<tr><td rowspan="2">4. Resistance to Flexure</td><td>No visible mechanical damage.</td><td>① Solder the inductor to the test jig (glass epoxy board) using a eutectic solder. Then apply a force in the direction of the arrow shown as the following figure.
② Flexure: 2mm
③ Pressurizing Speed: 0.5mm/sec
④ Keep time: ≥30 sec</td></tr>
<tr><td colspan="2"> 

Unit: mm [inch]
 

Type	a	b	c
1608[0603]	1.0	3.0	1.2
2012[0805]	1.2	4.0	1.65
</td></tr>
</table>

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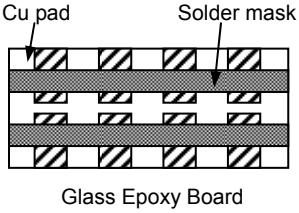
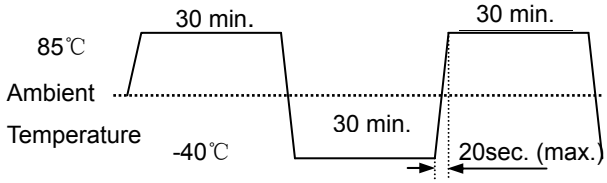
RELIABILITY AND TEST CONDITIONS

Multilayer Chip Inductor for Choke (MCL Series)

Items	Requirements	Test Methods and Remarks
5. Vibration	① No visible mechanical damage. 	① Solder the inductor to the testing jig using eutectic solder. ② The inductor 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. 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 3mutually perpendicular directions (total of 6 hours).
6. Temperature	① Inductance change should be within ±20% of initial value measuring at 20℃.	① Temperature range: -40℃ to +85℃ Reference temperature:+20℃
7. Solderability	① No visible mechanical damage. ② Wetting shall exceed 95% coverage.	① Solder temperature: 240±2℃ ② Duration: 3 sec. ③ Solder: Sn/3.0Ag/0.5Cu ④ Flux: 25% Resin and 75% ethanol in weight
8. Resistance to Soldering Heat	① No visible mechanical damage. ② Wetting shall exceed 95% coverage. ③ Inductance change: Within ±20%.	① Solder temperature: 260±3℃ 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 Inductance change: Within ±20%.	① Temperature and time: -40℃ for 30±3 min →85℃ 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. 
10. Resistance to Low Temperature	① No mechanical damage. ② Inductance change: Within ±20%.	① Temperature: -40±2℃ ② Duration: 1000^{+24} hours. ③ 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 Inductance change: Within ±20%.	① Temperature: 60±2℃ 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 Inductance change: Within ±20%.	① Temperature: 85±2℃ 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.

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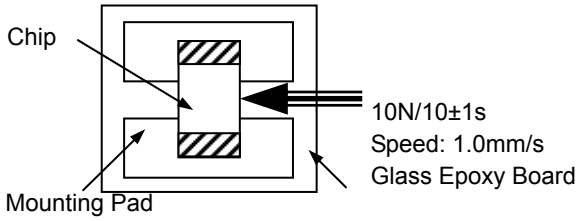
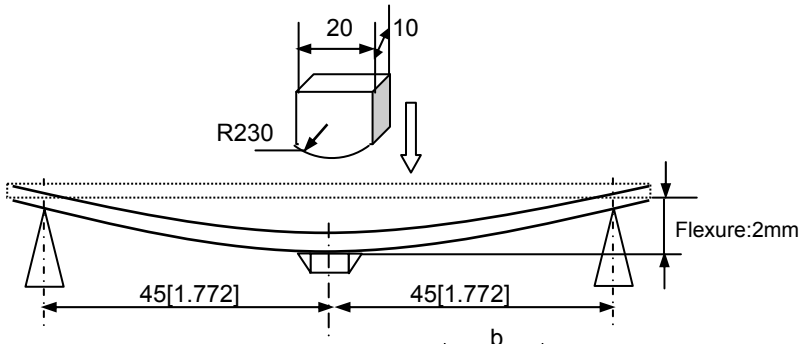
RELIABILITY AND TEST CONDITIONS

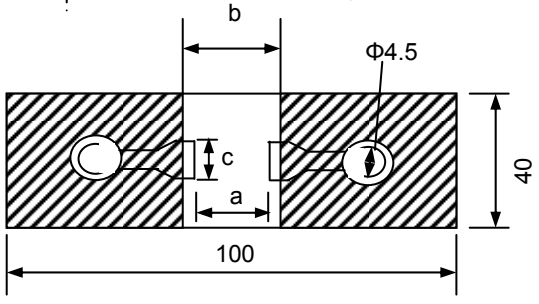
Multilayer Chip Power Inductor (MPH/MPM Series)

Items	Requirements	Test Methods and Remarks
1. Operating Temperature Range	MPH Series:-40℃ to +85℃ MPM Series:-40℃ to +1255℃	
2. Storage Temperature Range	MPH Series:-40℃ to +85℃ MPM Series:-40℃ to +1255℃	
3. Terminal Strength	No removal or split of the termination or other defects shall occur.	① Solder the inductor 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. ② 10N force for MPH/MPM series. ③ Keep time: 10±1s ④ Speed: 1.0mm/s. 
4. Resistance to Flexure	No visible mechanical damage.	① Solder the inductor to the test jig (glass epoxy board) using a eutectic solder. Then apply a force in the direction of the arrow shown as the following figure. ② Flexure: 2mm ③ Pressurizing Speed: 0.5mm/sec ④ Keep time: ≥30 sec



Unit: mm [inch]

Type	a	b	c
1608[0603]	1.0	3.0	1.2
2012[0805]	1.2	4.0	1.65
2016[0806]	0.8	2.4	1.4
2520[1008]	1.3	3.0	1.8
201206	0.8	2.4	1.4



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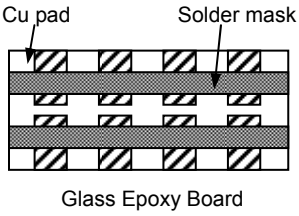
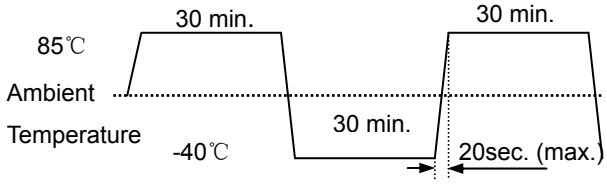
RELIABILITY AND TEST CONDITIONS

Multilayer Chip Power Inductor (MPH/MPM Series)

Items	Requirements	Test Methods and Remarks
5. Vibration	① No visible mechanical damage. 	① Solder the inductor to the testing jig using eutectic solder. ② The inductor 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. 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 3mutually perpendicular directions (total of 6 hours).
6. Dropping	① No visible mechanical damage. ② Inductance change: Within ±20%.	Drop chip inductor 10 times on a concrete floor from a height of 100 cm.
7. Temperature	① Inductance change should be within ±20% of initial value measuring at 20℃.	① MPH series Temperature range: -40℃ to +85℃ MPM series Temperature range: -40℃~ +125℃ Reference temperature:+20℃
8. Solderability	① No visible mechanical damage. ② Wetting shall exceed 95% coverage.	① Solder temperature: 240±2℃ 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	① No visible mechanical damage. ② Wetting shall exceed 95% coverage. ③ Inductance change: Within ±20%.	① Solder temperature: 260±3℃ 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	① No visible mechanical damage. ② Inductance change: Within ±20%.	① Temperature and time: -40℃ for 30±3 min →85℃ 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. 
11. Resistance to Low Temperature	① No mechanical damage. ② Inductance change: Within ±20%.	① Temperature: -40±2℃ ② Duration: 1000^{+24} hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
12. Resistance to High Temperature	① No mechanical damage. ② Inductance change: Within ±20%.	① Temperature: 85±2℃ ② Duration: 1000^{+24} hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
13. Damp Heat (Steady States)	① No visible mechanical damage. ② Inductance change: Within ±20%.	① Temperature: 60±2℃ 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.

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RELIABILITY AND TEST CONDITIONS

Multilayer Chip Power Inductor (MPM Series)

Items	Requirements	Test Methods and Remarks
14. Loading Under Damp Heat	① No visible mechanical damage. ② Inductance change: Within ±20%.	① Temperature: 60±2℃ 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.
15. Loading at High Temperature (Life Test)	① No visible mechanical damage. ② Inductance change: Within ±20%.	① Temperature: 125±2℃ 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.

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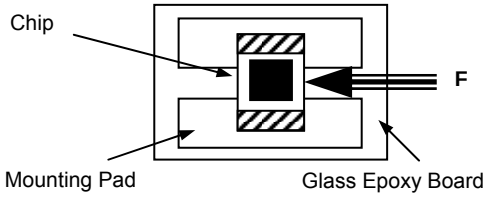
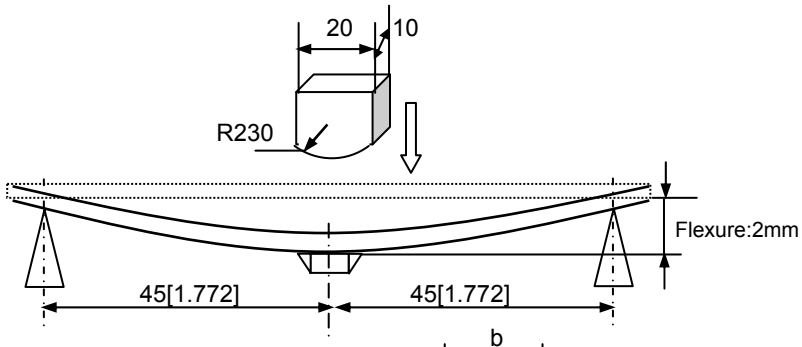
RELIABILITY AND TEST CONDITIONS

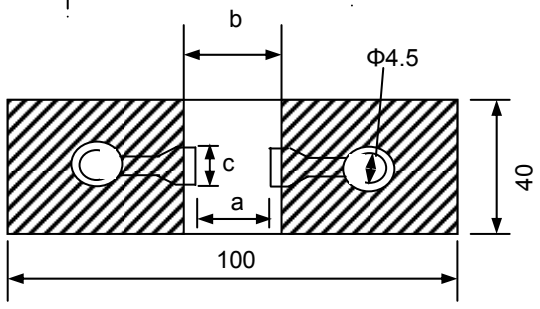
Multilayer Chip Inductor (SDCL/SDHL/HQ/MSDCL/SDCL0603Q_02 Series)

Items	Requirements	Test Methods and Remarks
1. Operating Temperature Range	0402/0603/1005 series: -55℃ to +125℃ 1608/2012 series: -40℃ to +85℃	
2. Storage Temperature Range	0402/0603/1005 series: -55℃ to +125℃ 1608/2012 series: -40℃ to +85℃	
3. Terminal Strength	No removal or split of the termination or other defects shall occur.	① Solder the inductor 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. ② 1N force for SDCL0402H-01 series. ③ 2N force for 0603 series. ④ 5N force for 1005 and 1608 series. ⑤ 10N force for 2012 series. ⑥ Keep time: 10±1s ⑦ Speed: 1.0mm/s. 
4. Resistance to Flexure	No visible mechanical damage.	① Solder the inductor to the test jig (glass epoxy board) using a eutectic solder. Then apply a force in the direction of the arrow shown as the following figure. ② Flexure: 2mm ③ Pressurizing Speed: 0.5mm/sec ④ Keep time: ≥30 sec



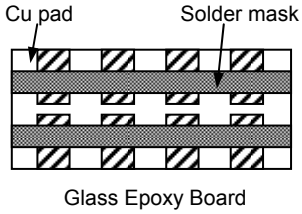
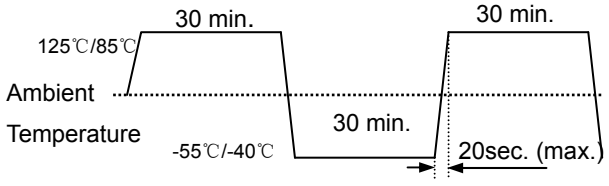
Unit: mm [inch]

Type	a	b	c
0402[01005]	0.18	0.8	0.2
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



RELIABILITY AND TEST CONDITIONS

Multilayer Chip Inductor (SDCL/SDHL/HQ/MSDCL/SDCL0603Q_02 Series)

Items	Requirements	Test Methods and Remarks
5. Vibration	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%. 	① Solder the inductor to the testing jig using eutectic solder. ② The inductor 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. 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 3mutually perpendicular directions (total of 6 hours).
6. Dropping	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	Drop chip inductor 10 times on a concrete floor from a height of 100 cm.
7. Temperature	Inductance change should be within ±10% of initial value measuring at 20℃.	Temperature range: 0402/0603/1005 series: -55℃ to +125℃ 1608/2012 series: -40℃ to +85℃ Reference temperature:+20℃
8. Solderability	① No visible mechanical damage. ② Wetting shall exceed 75% coverage for 0603 series; exceed 95% for others.	① Solder temperature: 240±2℃ 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	① No visible mechanical damage. ② Wetting shall exceed 75% coverage for 0402/0603 series; exceed 95% for others. ③ Inductance change: Within ±10%. ④ Q factor change: Within ±20%.	① Solder temperature: 260±3℃ 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	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	① Temperature and time: 1608/2012 series: -40℃ for 30±3 min →85℃ for 30±3min 0402/0603/1005 series: -55℃ for 30±3 min →125℃ 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. 

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RELIABILITY AND TEST CONDITIONS

Multilayer Chip Inductor (SDCL/SDHL/HQ/MSDCL/SDCL0603Q_02 Series)

Items	Requirements	Test Methods and Remarks
11. Resistance to Low Temperature	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	① Temperature: 0402/0603/1005 series: -55±2℃ 1608/2012 series: -40±2℃ Duration: 1000^{+24} hours ② The chip shall be stabilized at normal condition for 1~2 hours before measuring.
12. Resistance to High Temperature	① No mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	① Temperature: 0402/0603/1005 Series: 125±2℃ 1608/2012 Series: 85±2℃ ② Duration: 1000^{+24} hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
13. Damp Heat (Steady States)	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	① Temperature: 60±2℃ 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.
14. Loading Under Damp Heat	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	① Temperature: 60±2℃ 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.
15. Loading at High Temperature (Life Test)	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	① Temperature: 1608/2012 series: 85±2℃ 0402/0603/1005 series:125±2℃ 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.

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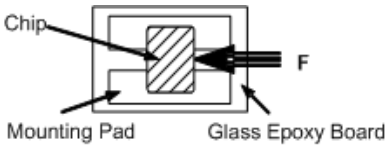
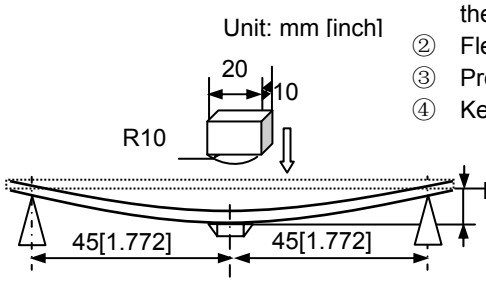
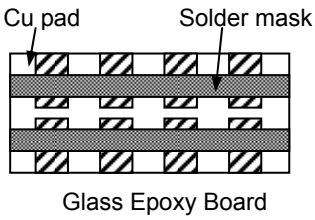
RELIABILITY AND TEST CONDITIONS

Wire Wound Chip Ceramic Inductors (SDWL-C/SDWL-C-M/SDWL-CP/CH Series)

Items	Requirements	Test Methods and Remarks
1. Operating Temperature Range	-40℃ to +125℃	
2. Storage Temperature Range	-40℃ to +125℃	
3. Terminal Strength	No removal or split of the termination or other defects shall occur. 	① Solder the inductor to the testing jig (glass epoxy board shown as the left figure.) ② Using eutectic solder. Then apply a force in the direction of the arrow. ③ 4N force for SDWL1005 series. ④ 7N force for SDWL1608 series. ⑤ 20N force for 2012, 2520, 3216, 3225 and 4532 series. ⑥ Keep time: 10±1s ⑦ Speed: 1.0 mm/s.
4. Resistance to Flexure	No visible mechanical damage. 	① Solder the inductor to the test jig. Using a eutectic solder. Then apply a force in the direction shown as the left figure. ② Flexure: 2mm ③ Pressurizing Speed: 0.5mm/sec. ④ Keep time ≧ 5 sec.
5. Vibration	① No visible mechanical damage. ② Inductance change: within ±5% ③ Q factor change: within ±20% 	① Solder the inductor to the testing jig (glass epoxy board shown in as the left figure.) ② Using eutectic solder. ③ The inductor 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. ④ 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	① No visible mechanical damage. ② Inductance change: within ±5% ③ Q factor change: within ±20%	Drop chip inductor 10 times on a concrete floor from a height of 100 cm.
7. Temperature coefficient	+50±100ppm/℃	① Between -40℃ and +125℃ ② with a reference value of +20℃
8. Solderability	① 90% or more of electrode area shall be coated by new solder for SDWL1005C/SDWL1608C series. ② 80% or more of electrode area shall be coated by new solder for other series.	① Electrode of the coil shall be immersed in flux for 5 to 10 Seconds. ② The coil shall be immersed in solder bath at a temperature of 240±5℃, Duration for 3±0.5 seconds. ③ Solder: Sn/3.0Ag/0.5Cu ④ Flux: 25% Resin and 75% ethanol in weight.

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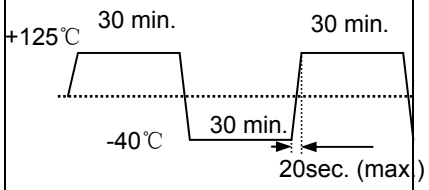
RELIABILITY AND TEST CONDITIONS

Wire Wound Chip Ceramic Inductors (SDWL-C/SDWL-C-M/SDWL-CP/CH Series)

Items	Requirements	Test Methods and Remarks
9. Resistance to Soldering Heat	① No visible mechanical damage. ② Inductance change: Within ±5% ③ Q factor change: Within ±20%	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 inductors（coils）
10. Thermal Shock	① No visible mechanical damage. ② Inductance change: Within ±5% ③ Q factor change: Within ±20% 	① Temperature, Time: (see the left figure.). -40℃ for 30±3 min →+125℃ for 30±3min ② Transforming interval: 20 sec. (max.) ③ Tested cycle: 100 cycles ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
11. Resistance to Low Temperature	① No visible mechanical damage. ② Inductance change: Within ±5% ③ Q factor change: Within ±20%	① Temperature: -40±2℃ ② Duration: 1000^{+24} hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
12. Resistance to High Temperature	① No mechanical damage. ② Inductance change: Within±5% ③ Q factor change: Within ±20%	① Temperature: 125±2℃ ② Duration: 1000+24 hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
13. Damp Heat (Steady States)	① No mechanical damage. ② Inductance change: Within ±5% ③ Q factor change: Within ±20%	① Temperature: 60±2℃, Humidity: 90% to 95% RH ② Duration:1000^{+24} hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
14. Loading Under Damp Heat	① No mechanical damage. ② Inductance change: Within ±5% ③ Q factor change: Within ±20%	① Temperature: 60±2℃, Humidity: 90% to 95% RH 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.
15. Loading at High Temperature (Life Test)	① No mechanical damage. ② Inductance change: Within ±5% ③ Q factor change: Within ±20%	① Temperature: 125±2℃ 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.

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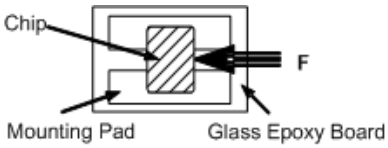
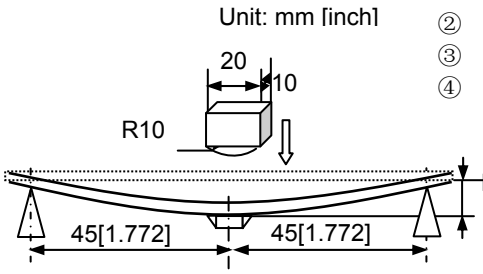
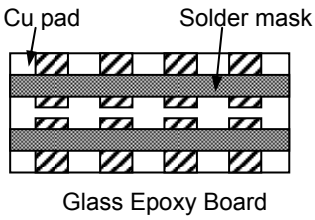
RELIABILITY AND TEST CONDITIONS

Wire Wound Chip Ceramic Inductors (WL-FS/SDWL-FW Series)

Items	Requirements	Test Methods and Remarks
1. Operating Temperature Range	-40℃ to +85℃	
2. Storage Temperature Range	-40℃ to +85℃	
3. Terminal Strength	No removal or split of the termination or other defects shall occur. 	① Solder the inductor to the testing jig (glass epoxy board shown in as the left figure.) ② Using eutectic solder. Then apply a force in the direction of the arrow. ③ 20N force for SDWL2012/2520/3216/3225 series ④ Keep time: 10±1s ⑤ Speed: 1.0 mm/s.
4. Resistance to Flexure	No visible mechanical damage. 	① Solder the inductor to the test jig. Using a eutectic solder. Then apply a force in the direction shown as the left figure. ② Flexure: 2mm ③ Pressurizing Speed: 0.5mm/sec. ④ Keep time ≧ 5 sec.
5. Vibration	① No visible mechanical damage. ② Inductance change: within ±10% ③ Q factor change: within ±20% 	① Solder the inductor to the testing jig (glass epoxy board shown in as the left figure.) ② Using eutectic solder. ③ The inductor 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. ④ 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	① No visible mechanical damage. ② Inductance change: within ±10% ③ Q factor change: within ±20%	Drop chip inductor 10 times on a concrete floor from a height of 100 cm.
7. Temperature coefficient	+200±700ppm/℃	① Between -40℃ and +85℃ ② with a reference value of +20℃
8. Solderability	80% or more of electrode area shall be coated by new solder	① Electrode of the coil shall be immersed in flux for 5 to 10 Seconds. ② The coil shall be immersed in solder bath at a temperature of 240±5℃, Duration for 3±0.5 seconds. ③ Solder: Sn/3.0Ag/0.5Cu ④ Flux: 25% Resin and 75% ethanol in weight.

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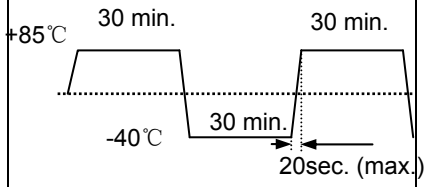
RELIABILITY AND TEST CONDITIONS

Wire Wound Chip Ceramic Inductors (SDWL-FW Series)

9. Resistance to Soldering Heat	① No visible mechanical damage. ② Inductance change: Within ±10% ③ Q factor change: Within ±20%	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 inductors（coils）
10. Thermal Shock	① No visible mechanical damage. ② Inductance change: Within ±10% ③ Q factor change: Within ±20% 	① Temperature, Time: (see the left figure.). -40℃ for 30±3 min →+85℃ for 30±3min ② Transforming interval: 20 sec. (max.) ③ Tested cycle: 100 cycles ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
11. Resistance to Low Temperature	① No visible mechanical damage. ② Inductance change: Within ±10% ③ Q factor change: Within ±20%	① Temperature: -40±2℃ ② Duration: 48±2 hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
12. Resistance to High Temperature	① No visible mechanical damage. ② Inductance change: Within ±10% ③ Q factor change: Within ±20%	① Temperature: 85±2℃ ② Duration: 48±2 hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
13. Damp Heat (Steady States)	① No mechanical damage. ② Inductance change: Within ±10% ③ Q factor change: Within ±20%	① Temperature: 60±2℃, Humidity: 90% to 95% RH ② Duration:240±4 hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
14. Loading Under Damp Heat	① No mechanical damage. ② Inductance change: Within ±10% ③ Q factor change: Within ±20%	① Temperature: 60±2℃, Humidity: 90% to 95% RH ② Duration: 96±4 hours ③ Applied current: Rated current. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
15. Loading at High Temperature (Life Test)	① No mechanical damage. ② Inductance change: Within ±10% ③ Q factor change: Within ±20%	① Temperature: 85±2℃ 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.

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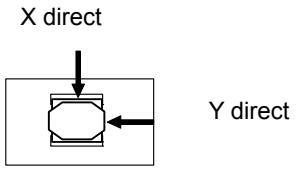
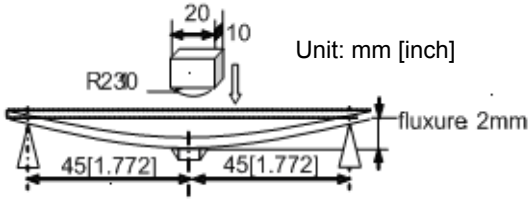
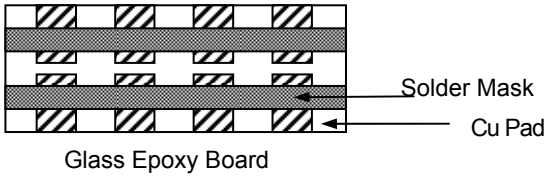
RELIABILITY AND TEST CONDITIONS

Power Inductors (SPH/SWPA Series)

Items	Requirements	Test Methods and Remarks
1. Operating Temperature Range	-40℃ to +125℃（ including self-heating）	
2. Storage Temperature Range	-40℃ to +125℃	
3. Terminal Strength	No removal or split of the termination or other defects shall occur. 	① Solder the inductor to the testing jig (glass epoxy board shown as the left figure) using eutectic solder. Then apply a force in the direction of the arrow. ② 10N force for all series. ③ Keep time: 5s
4. Resistance to Flexure	No visible mechanical damage. 	① Solder the chip to the test jig (glass epoxy board as the left figure.) ② using eutectic solder. Then apply a force in the direction shown as the left figure. ③ Flexure: 2mm ④ Pressurizing Speed: 0.5mm/sec ⑤ Keep time: 30±1s ⑥ Test board size: 100X40X1.0 ⑦ Land dimension: See the Recommended Land Patterns.
5. Vibration	① No visible mechanical damage. ② Inductance change: Within ±10% 	① Solder the chip to the testing jig (glass epoxy board shown as the left figure) using eutectic solder. 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. 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 3mutually perpendicular directions (total of 6 hours).
6. Temperature coefficient	Inductance change: within ±20%	① Temperature: -40℃ ~ +125℃ ② with a reference value of +20℃, change rate shall be calculated
7. Solderability	90% or more of electrode area shall be coated by new solder.	① The test samples shall be dipped in flux, and then immersed in molten solder. ② Solder temperature: 245±5℃ ③ Duration: 5±1 sec. ④ Solder: Sn/3.0Ag/0.5Cu ⑤ Flux: 25% resin and 75% ethanol in weight ⑥ Immersion depth: all sides of mounting terminal shall be immersed

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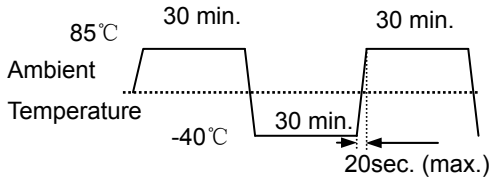
RELIABILITY AND TEST CONDITIONS

Power Inductors (SPH/SWPA Series)

Items	Requirements	Test Methods and Remarks
8. Resistance to Soldering Heat	① No visible mechanical damage. ② Inductance change: Within ±10%	① Re-flowing Profile: Please refer to Re-flowing Profile item. ② Test board thickness: 1.0mm ③ Test board material: glass epoxy resin ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring ⑤ Please reference the Re-flowing Profile in Soldering and Notice for inductors（coils）
9. Thermal Shock	① No visible mechanical damage. ② Inductance change: Within ±10% 	① Temperature and time: -40±3℃ for 30±3 min→ 125℃ 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
10. Resistance to Low Temperature	① No mechanical damage. ② Inductance change: Within±10%	① Temperature: -40±3℃ ② Duration: $1000^{\pm 24}$ hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring
11. Resistance to High Temperature	① No mechanical damage. ② Inductance change: Within±10%	① Temperature: 125±2℃ ② Duration: $1000^{\pm 24}$ hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
12. Damp Heat	① No mechanical damage. ② Inductance change: Within±10%	① Temperature: 60±2℃ ② Humidity: 90% to 95%RH ③ Duration: $1000^{\pm 24}$ hours ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring
13. Loading Under Damp Heat	① No mechanical damage. ② Inductance change: Within±10%	① Temperature: 60±2℃ ② Humidity: 90% to 95% RH ③ Applied current: Rated current ④ Duration: 1000±24 hours ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring
14. Loading at High Temperature	① No mechanical damage. ② Inductance change: Within±10%	① Temperature: 85±2℃ ② Applied current: Rated current ③ Duration: $1000^{\pm 24}$ hours ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring

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