# Reliability and Test Condition

| Item | Performance | Test Condition |
|---|---|---|
| **Electrical Performance Test** | | |
| Inductance | Refer to standard electrical characteristics list. | HP4284A,CH11025,CH3302,CH1320,CH1320S LCR Meter. |
| DCR | | CH16502,Agilent33420A Micro-Ohm Mete |
| Operating Temperature | -55℃~+125℃ (Including self - temperature rise) | |
| Storage temperature and Humidity range | 1. -10~+40℃,50~60%RH (Product with taping)<br>2. -55~+125℃(on board) | |
| Saturation Current (Isat) | Approximately △L30% | Saturation DC Current (Isat) will cause L0 to drop △L(%) |
| Heat Rated Current (Irms) | Approximately △T40℃ | Heat Rated Current (Irms) will cause the coil temperature rise △T(℃).<br>1.Applied the allowed DC current<br>2.Temperature measured by digital surface thermometer |
| **Reliability Test** | | |
| High Temperature Exposure(Storage) AEC-Q200 | Appearance：No damage.<br>Impedance：within±15% of initial value<br>Inductance：within±10% of initial value<br>Q：Shall not exceed the specification value.<br>RDC：within ±15% of initial value and shall not exceed the specification value. | Preconditioning: Run through IR reflow for 2 times.<br>( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>Temperature：125±2℃<br>Duration ：1000hrs Min.<br>Measured at room temperature after placing for 24±2 hrs |
| Temperature Cycling AEC-Q200 | | Preconditioning: Run through IR reflow for 2 times.<br>( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>Condition for 1 cycle<br>Step1：-55±2℃ 30min Min.<br>Step2：125±2℃ transition time 1min MAX.<br>Step3：125±2℃ 30min Min.<br>Step4：Low temp. transition time 1min MAX.<br>Number of cycles： 1000<br>Measured at room temperature after placing for 24±2 hrs |
| Moisture Resistance | | Preconditioning: Run through IR reflow for 2 times.<br>( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>1.Baked at 50℃ for 25hrs, measured at room temperature after placing for 4 hrs.<br>2.Raise temperature to 65±2℃ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25℃ in 2.5hrs.<br>3.Raise temperature to 65±2℃ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25℃ in 2.5hrs,keep at 25℃ for 2hrs then keep at -10℃ for 3hrs<br>4.Keep at 25℃ 80-100%RH for 15min and vibrate at the frequency of 10 to 55 Hz to 10 Hz, measure at room temperature after placing for 1~2 hrs. |
| Biased Humidity (AEC-Q200) | | Preconditioning: Run through IR reflow for 2 times.<br>( IPC/JEDEC J-STD-020DClassification Reflow Profiles)<br>Humidity ：85±3% R.H,<br>Temperature：85℃±2℃<br>Duration : 1000hrs Min with 100% rated current.<br>Measured at room temperature after placing for24±2hrs |

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<table>
<tr><th>Item</th><th>Performance</th><th>Test Condition</th></tr>
<tr><td colspan="3">Reliability Test</td></tr>
<tr><td>High Temperature Operational Life (AEC-Q200)</td><td>Appearance：No damage.<br>Impedance：within±15% of initial value<br>Inductance：within±10% of initial value<br>Q：Shall not exceed the specification value.<br>RDC：within ±15% of initial value and shall not exceed the specification value.</td><td>Preconditioning: Run through IR reflow for 2 times.<br>( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>Temperature：125±2℃<br>Duration ：1000hrs Min. with 100% rated current.<br>Measured at room temperature after placing for 24±2hrs</td></tr>
<tr><td>External Visual</td><td>Appearance：No damage</td><td>Inspect device construction, marking and workmanship.<br>Electrical Test not required.</td></tr>
<tr><td>Physical Dimension</td><td>According to the product specification size measurement</td><td>According to the product specification size measurement</td></tr>
<tr><td>Resistance to Solvents</td><td>Appearance：No damage.</td><td>Add aqueous wash chemical - OKEM clean or equivalent.</td></tr>
<tr><td>Mechanical Shock</td><td>Appearance：No damage.<br>Impedance：within±15% of initial value<br>Inductance：within±10% of initial value<br>Q：Shall not exceed the specification value.<br>RDC：within ±15% of initial value and shall not exceed the specification value</td><td>
<table>
<tr><th>Type</th><th>Peak value (g's)</th><th>Normal duration (D) (ms)</th><th>Wave form</th><th>Velocity change (Vi)ft/sec</th></tr>
<tr><td>SMD</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr>
<tr><td>Lead</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr>
</table>
shocks in each direction along 3 perpendicular axes.</td></tr>
<tr><td>Vibration</td><td rowspan="3">Appearance：No damage.<br>Impedance：within±15% of initial value<br>Inductance：within±10% of initial value<br>Q：Shall not exceed the specification value.<br>RDC：within ±15% of initial value and shall not exceed the specification value</td><td>IPC/JEDEC J-STD-020D Classification Reflow Profiles<br>Oscillation Frequency: 10～2K～10Hz for 20 minute<br>Equipment： Vibration checker<br>Total Amplitude:1.52mm±10%<br>Testing Time : 12 hours (20 minutes, 12 cycles each of 3 orientations)。</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>Test condition ：
<table>
<tr><th>Temperature(℃)</th><th>Time(s)</th><th>Temperature ramp/immersion and emersion rate</th><th>Number of heat cycles</th></tr>
<tr><td>260±5 (solder temp)</td><td>10±1</td><td>25mm/s ±6 mm/s</td><td>1</td></tr>
</table></td></tr>
<tr><td>Thermal shock (AEC-Q200)</td><td>Preconditioning: Run through IR reflow for 2 times.<br>( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>Condition for 1 cycle<br>Step1：-55±2℃ 15±1min<br>Step2：125±2℃ within 20Sec.<br>Step3：125±2℃ 15±1min<br>Number of cycles： 300<br>Measured at room fempraturc after placing fo24±2hrs</td></tr>
</table>

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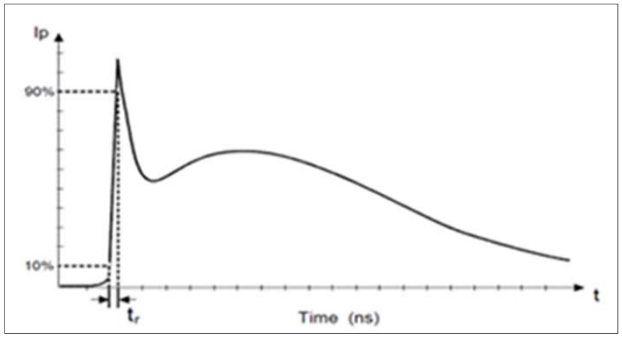
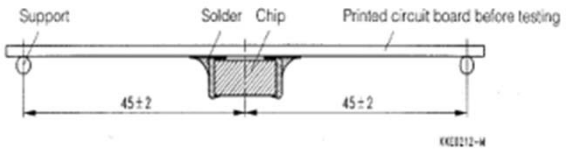
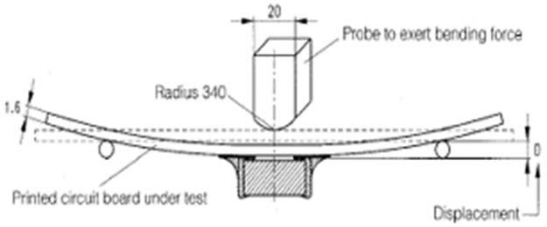
| **Reliability Test** | | |
| ESD | Appearance：No damage. |  |
| Solderability | More than 95% of the terminal electrode should be covered with solder。 | Steam Aging: 16 hours ± 15 min<br>Preheat: 150℃,60sec.<br>Solder: Sn96.5% Ag3% Cu0. 5%<br>Temperature: 245±5℃。<br>Flux for lead free: Rosin. 9.5%。<br>Dip time: 4±1sec.<br>Depth: completely cover the termination |
| Electrical Characterization | Refer Specification for Approval | Summary to show Min, Max, Mean and Standard deviation |
| Flammability | Electrical Test not required | V-0 or V-1 are acceptable. |
| Board Flex | Appearance：No damage | Preconditioning: Run through IR reflow for 2 times.<br>( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>Place the 100mm X 40mm board into a fixture similar to the one shown in below Figure with the component facing down.<br>The apparatus shall consist of mechanical means to apply a force which will bend the board (D) x = 2 mm minimum.<br>The duration of the applied forces shall be 60 (+ 5) sec.<br>The force is to be applied only once to the board.<br>  <br>  |

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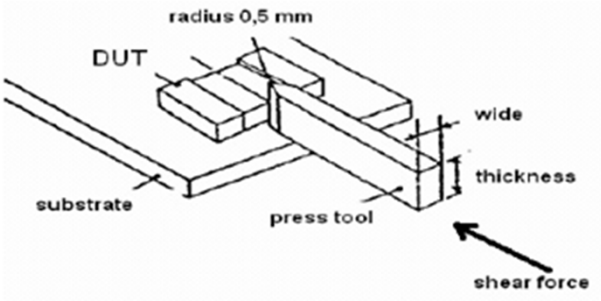
| **Reliability Test** | | |
| Terminal Strength(SMD) | Appearance：No damage | Preconditioning: Run through IR reflow for 2 times.<br>( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>With the component mounted on a PCB with the device to be tested, apply a 17.7 N (1.8 Kg) force to the side of a device<br>being tested. This force shall be applied for 60 +1 seconds. Also the force shall be applied gradually as not to apply a shock to the component being tested.<br>  |

Note : When there are questions concerning measurement result : measurement shall be made after

48 ± 2 hours of recovery under the standard condition.

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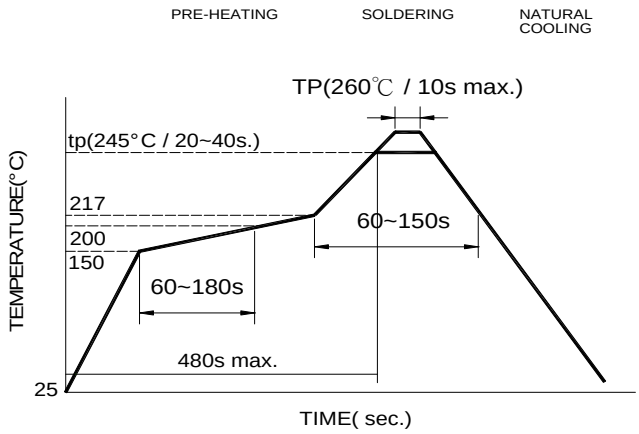
| **Reliability Test** | | |
| Soldering | Mildly activated rosin fluxes are preferred. JANTEK terminations are suitable for all wave and re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools. | |
| Lead Free Solder re-flow: | Recommended temperature profiles for re-flow soldering in Figure 1. | |
| Soldering Iron(Figure 2): | Products attachment with a soldering iron is discouraged due to the inherent process control limitations.<br>In the event that a soldering iron must be employed the following precautions are recommended.<br>Note：<br>・Preheat circuit and products to 150℃<br>・Never contact the ceramic with the iron tip<br>・Use a 20 watt soldering iron with tip diameter of 1.0mm<br>・355℃ tip temperature (max)<br>・1.0mm tip diameter (max)<br>・Limit soldering time to 4~5 sec | |

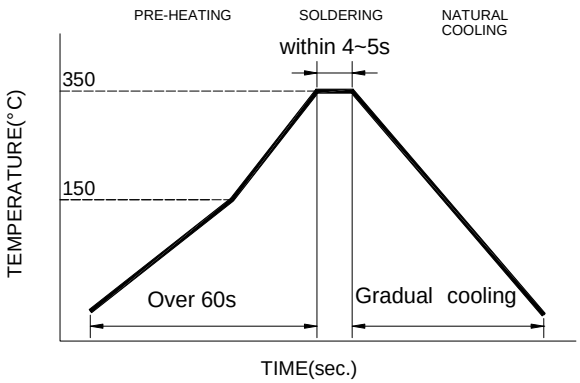
Reflow Soldering




Reflow times: 3 times max.

Fig.1

Iron Soldering




Iron Soldering times: 1 times max.

Fig.2