

## Reliability and Test Condition

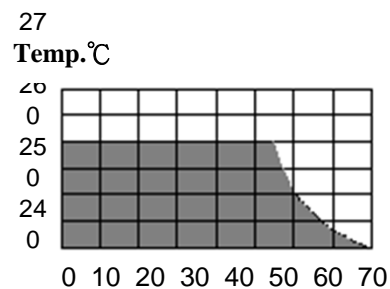
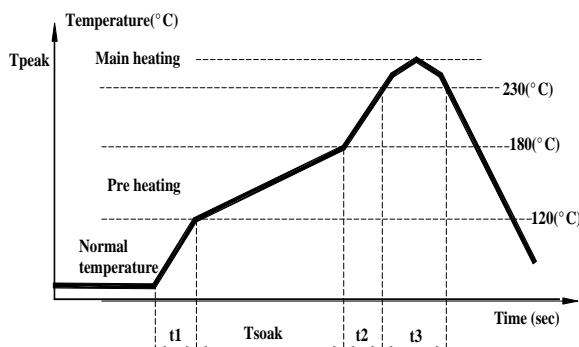
| ITEM                  | SPECIFICATION      | TEST CONDITIONS |
|-----------------------|--------------------|-----------------|
| Operating Temperature | - 55 °C ~ + 125 °C |                 |
| Storage Temperature   | - 40 °C ~ + 85 °C  |                 |

### Reflow soldering conditions

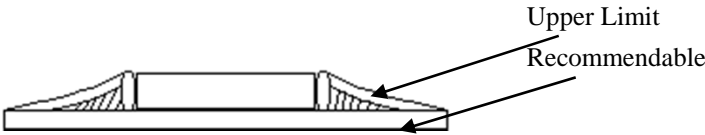
|                           |       |                         |
|---------------------------|-------|-------------------------|
| Temperature rise gradient | t1    | 1~5°C/sec               |
| Heating time              | Tsoak | 50s ~ 150s              |
| Heating temperature       |       | 120°C ~ 180°C           |
| Time over 230°C           | t3    | 90~120 sec              |
| Slope of temp. rise       | t2    | 1~5°C/sec               |
| Peak temperature          | Tpeak | 255~260°C               |
| Peak hold time            |       | 10sec (max)             |
|                           |       | No. of mounting 3 times |

- Pre-heating should be in such a way that the temperature difference between solder and ferrite surface is limited to 150°C max. Also cooling into solvent after soldering should be in such a way that the temperature difference is limited to 100°C max. Unenough pre-heating may cause cracks on the ferrite, resulting in the deterioration of product quality.
- Products should be soldered within the following allowable range indicated by the slanted line. The excessive soldering conditions may cause the corrosion of the electrode, When soldering is repeated, allowable time is the accumulated time.

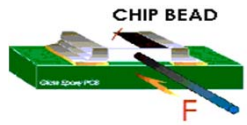
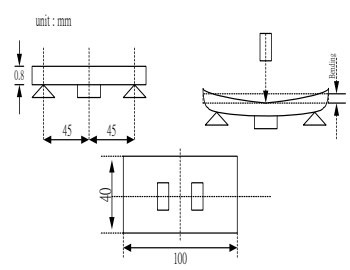
### Reflow soldering temperature profile



## Reliability and Test Condition

| ITEM | SPECIFICATION   | TEST CONDITIONS |
|------|---|-----------------|
|      | <p><b>Reworking with soldering iron</b></p> <ul style="list-style-type: none"> <li>Preheating : 150°C, 1 minute</li> <li>Tip temperature : 280°C max.</li> <li>Soldering time : 3 seconds max.</li> <li>Soldering iron output : 30w max.</li> <li>End of soldering iron : <math>\phi</math> 3mm max.</li> <li>Reworking should be limited to only one time.</li> </ul> <p>Note : Do not directly touch the products with the tip of the soldering iron in order to prevent the crack on the ferrite material due to the thermal shock.</p> <p><b>Solder Volume</b></p> <ul style="list-style-type: none"> <li>Solder shall be used not to be exceed the upper limits as shown below.</li> </ul>  <ul style="list-style-type: none"> <li>Accordingly increasing the solder volume, the mechanical stress to product is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance.</li> </ul> |                 |

## MECHANICAL CHARACTERISTICS

| ITEM                   | SPECIFICATION   | TEST CONDITIONS  |
|------------------------|---|--|
| Terminal Strength      | <ul style="list-style-type: none"> <li>Terminal strength does not distort the case shall meet SPEC DC resistance specifications.</li> </ul> | <ul style="list-style-type: none"> <li>Solder chip on PCB and applied 10N (1.02Kgf) for 10 sec.</li> </ul>    |
| Substrate bending test | <ul style="list-style-type: none"> <li>SPEC substrate bending test DC resistance shall meet specifications.</li> </ul>                      | <ul style="list-style-type: none"> <li>After soldering a chip to a test substrate, bend the substrate by 3mm hold for 10s and then return.</li> <li>Soldering shall be done in accordance with the recommended PC board pattern and reflow soldering.</li> </ul>  |

## Reliability and Test Condition

| ITEM                      | SPECIFICATION  | TEST CONDITIONS   |
|---------------------------|--|---|
| Resistance to solder heat | <ul style="list-style-type: none"> <li>No visible damage</li> <li>Electrical characteristics and mechanical characteristics shall be satisfied.</li> </ul> <p><b>Consult standard MIL-STD-202 METHOD 210</b></p> | <ul style="list-style-type: none"> <li>Solder Temp. : <math>265 \pm 3^{\circ}\text{C}</math></li> <li>Immersion time : <math>6 \pm 1</math> sec</li> <li>Preheating : <math>100^{\circ}\text{C}</math> to <math>150^{\circ}\text{C}</math>, 1 minute.</li> <li>Measurement to be made after keeping keeping at room temp for <math>24 \pm 2</math> hrs.</li> <li>Solder : Sn-3Ag-0.5Cu</li> </ul> |
| Solderability             | <ul style="list-style-type: none"> <li>95% min. coverage of all metallized area</li> </ul> <p><b>Consult standard J-STD-002</b></p>  | <ul style="list-style-type: none"> <li>Solder Temp. : <math>240 \pm 5^{\circ}\text{C}</math></li> <li>Immersion time : <math>3 \pm 1</math> sec</li> <li>Solder : Sn-3Ag-0.5Cu</li> </ul>   |

## Environmental Characteristics

| ITEM                        | SPECIFICATION   | TEST CONDITIONS   |
|-----------------------------|---|---|
| High Temperature Resistance | <ul style="list-style-type: none"> <li>Appearance : no mechanical damage</li> <li>Impedance shall be with <math>\pm 30\%</math> of the initial value</li> </ul> | <ul style="list-style-type: none"> <li>Operate Temperature : <math>125^{\circ}\text{C} \pm 2^{\circ}\text{C}</math></li> <li>Time : <math>1000 \pm 12</math>Hrs</li> <li>Measurement : After placing at room ambient temperature for 24 hours minimum</li> </ul>  |
| Biased Humidity Resistance  | <ul style="list-style-type: none"> <li>Appearance : no mechanical damage</li> <li>Impedance shall be with <math>\pm 30\%</math> of the initial value</li> </ul> | <ul style="list-style-type: none"> <li>Humidity : <math>85 \pm 5\%</math> RH</li> <li>Temperature : <math>85^{\circ}\text{C} \pm 2^{\circ}\text{C}</math></li> <li>Time : <math>1000 \pm 12</math>Hrs</li> <li>Measurement : After placing at room ambient temperature for 24 hours minimum</li> </ul>  |
| Temperature Cycle           | <ul style="list-style-type: none"> <li>Appearance : no mechanical damage</li> <li>Impedance shall be with <math>\pm 30\%</math> of the initial value</li> </ul> | <ul style="list-style-type: none"> <li>Low Temperature : <math>-55 \pm 5^{\circ}\text{C}</math> kept stabilized for 30 minutes each</li> <li>High Temperature : <math>125 \pm 5^{\circ}\text{C}</math> kept stabilized for 30 minutes each</li> <li>Cycle : 1000 cycles</li> <li>Measurement : After placing for 24 hours minimum at room ambient temperature</li> <li>step1. <math>-55^{\circ}\text{C}</math> temp <math>\pm 5^{\circ}\text{C}</math> <math>30 \pm 3</math> minutes</li> <li>step2. Room temperature 2 to 5 minutes</li> <li>step3. <math>+125^{\circ}\text{C}</math> temp <math>\pm 5^{\circ}\text{C}</math> <math>30 \pm 3</math> minutes</li> <li>step4. Room temperature 2 to 5 minutes</li> </ul> |
| Vibration test              | <ul style="list-style-type: none"> <li>Appearance : no mechanical damage</li> <li>Impedance shall be with <math>\pm 30\%</math> of the initial value</li> </ul> | <ul style="list-style-type: none"> <li>Frequency and Amplitude : 10-2000-10Hz</li> <li>Direction : X, Y, Z.</li> <li>Test duration : 4 hours for each direction, 12 hours in total.</li> </ul>  |
| Mechanical Shock Test       | <ul style="list-style-type: none"> <li>Appearance : no mechanical damage</li> <li>Impedance shall be with <math>\pm 30\%</math> of the initial value</li> </ul> | <ul style="list-style-type: none"> <li>peak acceleration : 100g's</li> <li>Duration of pulse : 6 ms</li> <li>Waveform : Half-sine</li> <li>Velocity change : 12.3 ft/sec</li> <li>Direction : X, Y, Z (3 axes/3 times)</li> </ul>   |

**Reliability and Test Condition**

| ITEM                         | SPECIFICATION  | TEST CONDITIONS   |
|------------------------------|--|---|
| Operational Life             | <ul style="list-style-type: none"><li>· Appearance : no mechanical damage</li><li>· Impedance shall be with <math>\pm 30\%</math> of the initial value</li></ul> | <ul style="list-style-type: none"><li>· Temperature : <math>125^{\circ}\text{C} \pm 2^{\circ}\text{C}</math></li><li>· Time : <math>1000 \pm 12\text{Hrs}</math></li><li>· Measurement : After placing at room ambient temperature for 24 hours minimum</li></ul> |
| Electrostatic discharge test | <ul style="list-style-type: none"><li>· Appearance : no mechanical damage</li><li>· Impedance shall be with <math>\pm 30\%</math> of the initial value</li></ul> | <ul style="list-style-type: none"><li>· ESD voltage ; 15K Volts</li><li>· Mode 1 : 150 pF / 330 Ohm</li><li>· Mode 2 : 150 pF / 2000 Ohm</li></ul>  |
|                              |  |   |