



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



**Chip EMIFIL ® LC Combined Type for Large Current  
NFE61PT□□□□1H9□ Reference Specification**

**1. Scope**

This reference specification applies to Chip EMIFIL ® LC Combined Type for Large Current NFE61P Series.

**2. Part Numbering**

|                       |           |                    |          |             |                 |                  |           |                   |
|-----------------------|-----------|--------------------|----------|-------------|-----------------|------------------|-----------|-------------------|
| NF                    | E         | 61                 | PT       | 101         | Z               | 1H               | 9         | L                 |
| Product ID            | Structure | Dimension<br>(L×W) | Features | Capacitance | Characteristics | Rated<br>Voltage | Electrode | Packaging<br>Code |
| (L: Taping / B: Bulk) |           |                    |          |             |                 |                  |           |                   |

**3. Rating**

| Customer Part Number | Murata Part Number                 | Capacitance   | Rated Voltage | Withstanding Voltage | Rated Current | Insulation Resistance |
|----------------------|------------------------------------|---|---------------|----------------------|---------------|-----------------------|
|                      | NFE61PT330B1H9L<br>NFE61PT330B1H9B | 33pF ± 30%  | 50 V(DC)      | 125 V(DC)            | 2 A(DC)       | 1000 MΩ<br>min.       |
|                      | NFE61PT680B1H9L<br>NFE61PT680B1H9B | 68pF ± 30%  |               |                      |               |                       |
|                      | NFE61PT101Z1H9L<br>NFE61PT101Z1H9B | 100pF ± 30%   |               |                      |               |                       |
|                      | NFE61PT181B1H9L<br>NFE61PT181B1H9B | 180pF ± 30%   |               |                      |               |                       |
|                      | NFE61PT361B1H9L<br>NFE61PT361B1H9B | 360pF ± 20%   |               |                      |               |                       |
|                      | NFE61PT681B1H9L<br>NFE61PT681B1H9B | 680pF ± 30%   |               |                      |               |                       |
|                      | NFE61PT102E1H9L<br>NFE61PT102E1H9B | 1000pF ± $\begin{smallmatrix} 80 \\ 20 \end{smallmatrix}$ % |               |                      |               |                       |
|                      | NFE61PT472C1H9L<br>NFE61PT472C1H9B | 4700pF ± $\begin{smallmatrix} 80 \\ 20 \end{smallmatrix}$ % |               |                      |               |                       |

• Operating Temperature : - 40 °C to + 85 °C

• Storage Temperature : - 55 °C to + 125 °C

**4. Standard Testing Condition**

<Unless otherwise specified>

Temperature: Ordinary Temp. 15°C to 35°C

Humidity: Ordinary Humidity 25 %(RH) to 85 %(RH)

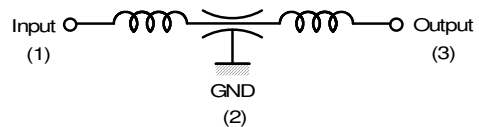
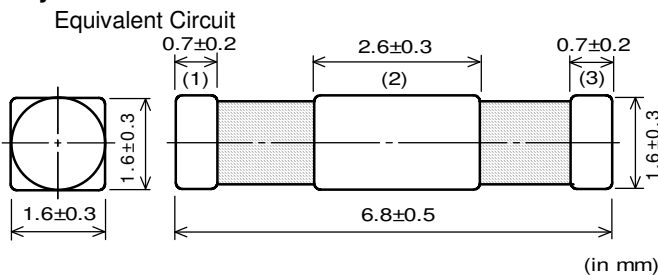
<In case of doubt>

Temperature: 20°C ± 2°C

Humidity: 60 %(RH) to 70 %(RH)

Atmospheric pressure: 86kPa to 106kPa

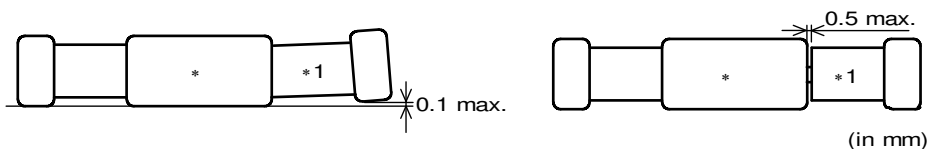
**5. Style and Dimensions**



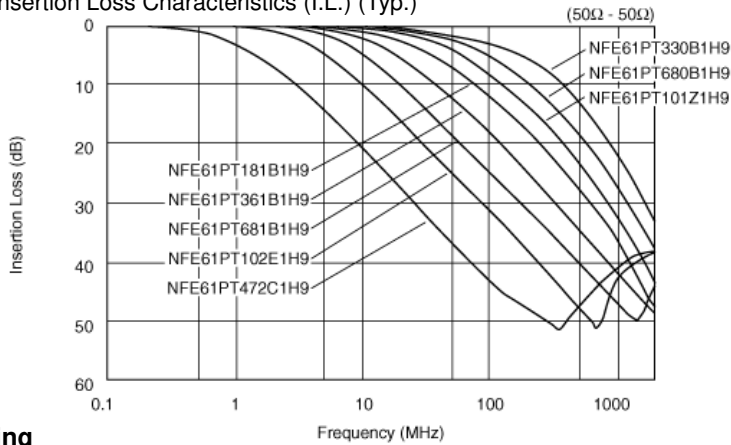
\* (1),(3):No Polarity

■ Unit Mass (Typical value)  
0.062g

Note : Gap and bend between ceramic capacitor(\*) and ferrite bead(\*1) may come out as illustrated below, however, these are not affect the performance, mounting and reliability of the products.



■ Insertion Loss Characteristics (I.L.) (Typ.)



**6. Marking**

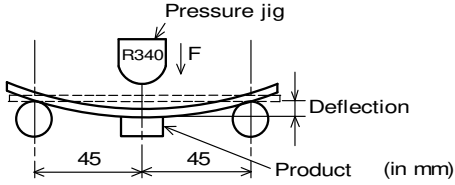
No marking.

**7. Electrical Performance**

| No.                      | Item                        | Specification                  | Test Method   |             |         |           |                |               |          |                          |              |          |
|--------------------------|-----------------------------|--------------------------------|---|-------------|---------|-----------|----------------|---------------|----------|--------------------------|--------------|----------|
| 7.1                      | Capacitance                 | Meet item 3.                   | Table 1   |             |         |           |                |               |          |                          |              |          |
|                          |                             |                                | <table border="1"> <thead> <tr> <th>Capacitance</th> <th>Voltage</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>33,68,100 (pF)</td> <td>1 to 5 V(rms)</td> <td>1MHz±10%</td> </tr> <tr> <td>180,360,680<br/>1000 (pF)</td> <td>1±0.2 V(rms)</td> <td>1kHz±10%</td> </tr> <tr> <td>4700 (pF)</td> <td>0.1 max.V(rms)</td> <td>1kHz±10%</td> </tr> </tbody> </table> | Capacitance | Voltage | Frequency | 33,68,100 (pF) | 1 to 5 V(rms) | 1MHz±10% | 180,360,680<br>1000 (pF) | 1±0.2 V(rms) | 1kHz±10% |
| Capacitance              | Voltage                     | Frequency                      |   |             |         |           |                |               |          |                          |              |          |
| 33,68,100 (pF)           | 1 to 5 V(rms)               | 1MHz±10%                       |   |             |         |           |                |               |          |                          |              |          |
| 180,360,680<br>1000 (pF) | 1±0.2 V(rms)                | 1kHz±10%                       |   |             |         |           |                |               |          |                          |              |          |
| 4700 (pF)                | 0.1 max.V(rms)              | 1kHz±10%                       |   |             |         |           |                |               |          |                          |              |          |
| 7.2                      | Insulation Resistance(I.R.) | Meet item 3.                   | Voltage : 50 V(DC)<br>Time : 60 ± 5 seconds   |             |         |           |                |               |          |                          |              |          |
| 7.3                      | Withstanding Voltage        | Products shall not be damaged. | Test Voltage : 125 V(DC)<br>Testing Time : 1 to 5 seconds<br>Limit the charging current: 10mA max.  |             |         |           |                |               |          |                          |              |          |

**8. Mechanical Performance**

| No.                  | Item                             | Specification  | Test Method  |            |  |             |                                  |                |                  |                |      |              |  |                      |            |  |  |
|----------------------|----------------------------------|--|--|------------|--|-------------|----------------------------------|----------------|------------------|----------------|------|--------------|--|----------------------|------------|--|--|
| 8.1                  | Appearance and Dimensions        | Meet item 5.   | Visual Inspection and measured with Slide Calipers   |            |  |             |                                  |                |                  |                |      |              |  |                      |            |  |  |
| 8.2                  | Solderability                    | The electrodes shall be at least 75% covered with new solder coating.  | Flux : Ethanol solution of rosin, 25(wt)%<br>Pre-heat : 150 ± 10 °C, 60 ~ 90 s<br>Solder : Sn-3.0Ag-0.5Cu<br>Solder Temperature : 240 ± 3 °C<br>Immersion Time : 3 ± 1 s<br>Immersion and emersion rates : 25mm / s  |            |  |             |                                  |                |                  |                |      |              |  |                      |            |  |  |
| 8.3                  | Resistance to soldering heat     | Meet Table 2.  | Flux : Ethanol solution of rosin, 25(wt)%<br>Pre-heat : 150 ± 10 °C, 60 ~ 90 s<br>Solder : Sn-3.0Ag-0.5Cu<br>Solder Temperature : 270 ± 5 °C<br>Immersion Time : 10 ± 1 s<br>Immersion and emersion rates : 25mm / s<br>Then measured after exposure the room condition for 4 to 48 hours. |            |  |             |                                  |                |                  |                |      |              |  |                      |            |  |  |
|                      |                                  | Table 2  |  |            |  |             |                                  |                |                  |                |      |              |  |                      |            |  |  |
|                      |                                  | <table border="1"> <thead> <tr> <th>Appearance</th> <th colspan="2">No damaged</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cap. Change</td> <td>33,68,100<br/>180,360<br/>680 (pF)</td> <td>Within<br/>±15%</td> </tr> <tr> <td>1000<br/>4700(pF)</td> <td>Within<br/>±30%</td> </tr> <tr> <td>I.R.</td> <td colspan="2">1000 MΩ min.</td> </tr> <tr> <td>Withstanding Voltage</td> <td colspan="2">No damaged</td> </tr> </tbody> </table> | Appearance   | No damaged |  | Cap. Change | 33,68,100<br>180,360<br>680 (pF) | Within<br>±15% | 1000<br>4700(pF) | Within<br>±30% | I.R. | 1000 MΩ min. |  | Withstanding Voltage | No damaged |  |  |
| Appearance           | No damaged                       |  |  |            |  |             |                                  |                |                  |                |      |              |  |                      |            |  |  |
| Cap. Change          | 33,68,100<br>180,360<br>680 (pF) | Within<br>±15%   |  |            |  |             |                                  |                |                  |                |      |              |  |                      |            |  |  |
|                      | 1000<br>4700(pF)                 | Within<br>±30%   |  |            |  |             |                                  |                |                  |                |      |              |  |                      |            |  |  |
| I.R.                 | 1000 MΩ min.                     |  |  |            |  |             |                                  |                |                  |                |      |              |  |                      |            |  |  |
| Withstanding Voltage | No damaged                       |  |  |            |  |             |                                  |                |                  |                |      |              |  |                      |            |  |  |

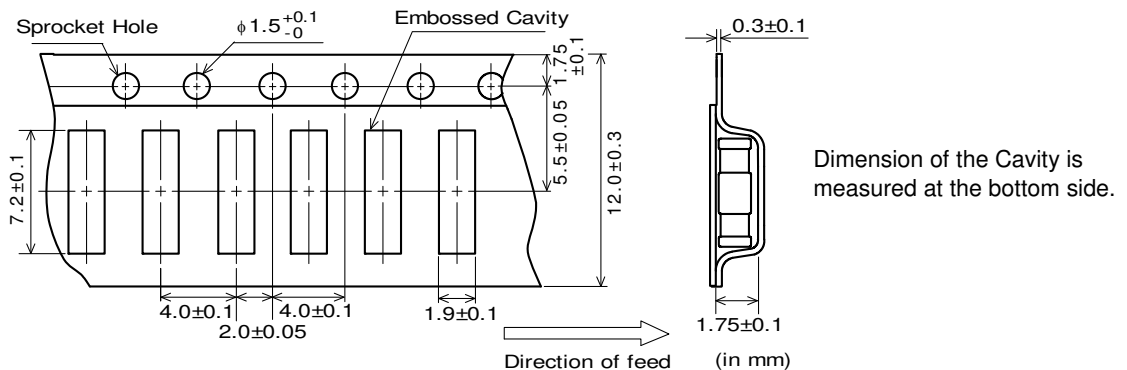
| No.         | Item             | Specification  | Test Method |            |  |             |           |             |         |          |             |      |          |  |   |
|-------------|------------------|--|-------------|------------|--|-------------|-----------|-------------|---------|----------|-------------|------|----------|--|---|
| 8.4         | Bending Strength | Meet Table 2.<br><u>Table 2</u> <table border="1"> <thead> <tr> <th>Appearance</th> <th colspan="2">No damaged</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Cap. Change</td> <td>33,68,100</td> <td rowspan="2">Within ±15%</td> </tr> <tr> <td>180,360</td> </tr> <tr> <td>680 (pF)</td> <td rowspan="2">Within ±30%</td> </tr> <tr> <td>1000</td> </tr> <tr> <td>4700(pF)</td> <td></td> </tr> </tbody> </table> | Appearance  | No damaged |  | Cap. Change | 33,68,100 | Within ±15% | 180,360 | 680 (pF) | Within ±30% | 1000 | 4700(pF) |  | It shall be soldered on the paper-phenol substrate. (t=1.6mm)<br><br>Deflection : 3 mm<br>Keeping Time : 30 seconds |
| Appearance  | No damaged       |  |             |            |  |             |           |             |         |          |             |      |          |  |   |
| Cap. Change | 33,68,100        | Within ±15%  |             |            |  |             |           |             |         |          |             |      |          |  |   |
|             | 180,360          |  |             |            |  |             |           |             |         |          |             |      |          |  |   |
|             | 680 (pF)         | Within ±30%  |             |            |  |             |           |             |         |          |             |      |          |  |   |
|             | 1000             |  |             |            |  |             |           |             |         |          |             |      |          |  |   |
| 4700(pF)    |                  |  |             |            |  |             |           |             |         |          |             |      |          |  |   |

**9. Environment Performance** (It shall be soldered on the substrate.)

| No.                  | Item                | Specification   | Test Method  |            |             |             |           |             |         |                      |             |      |  |  |  |
|----------------------|---------------------|---|--|------------|-------------|-------------|-----------|-------------|---------|----------------------|-------------|------|--|--|--|
| 9.1                  | Humidity            | Meet Table 4.<br><u>Table 4</u> <table border="1"> <thead> <tr> <th>Appearance</th> <th colspan="2">No damaged</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Cap. Change</td> <td>33,68,100</td> <td rowspan="2">Within ±15%</td> </tr> <tr> <td>180,360</td> </tr> <tr> <td>680 (pF)</td> <td rowspan="2">Within ±30%</td> </tr> <tr> <td>1000</td> </tr> <tr> <td>4700 (pF)</td> <td></td> </tr> </tbody> </table> | Appearance   | No damaged |             | Cap. Change | 33,68,100 | Within ±15% | 180,360 | 680 (pF)             | Within ±30% | 1000 | 4700 (pF)  |  | Temperature : 40 ± 2 °C<br>Humidity : 90 to 95 %(RH)<br>Time : 500 h (+ 24 h , - 0 h)<br>Then measured after exposure in the room condition for 4 to 48 hours. |
| Appearance           | No damaged          |   |  |            |             |             |           |             |         |                      |             |      |  |  |  |
| Cap. Change          | 33,68,100           | Within ±15%   |  |            |             |             |           |             |         |                      |             |      |  |  |  |
|                      | 180,360             |   |  |            |             |             |           |             |         |                      |             |      |  |  |  |
|                      | 680 (pF)            | Within ±30%   |  |            |             |             |           |             |         |                      |             |      |  |  |  |
|                      | 1000                |   |  |            |             |             |           |             |         |                      |             |      |  |  |  |
| 4700 (pF)            |                     |   |  |            |             |             |           |             |         |                      |             |      |  |  |  |
| 9.2                  | Heat Life           | <table border="1"> <tbody> <tr> <td rowspan="2">Cap. Change</td> <td>1000</td> <td rowspan="2">Within ±30%</td> </tr> <tr> <td>4700 (pF)</td> </tr> <tr> <td>I.R.</td> <td colspan="2">100 MΩ min.</td> </tr> <tr> <td>Withstanding Voltage</td> <td colspan="2">No damaged</td> </tr> </tbody> </table>  | Cap. Change  | 1000       | Within ±30% | 4700 (pF)   | I.R.      | 100 MΩ min. |         | Withstanding Voltage | No damaged  |      | Temperature : 85 ± 2 °C<br>Test Voltage :<br>33,68,100,180,360,680 (pF) : Rated Voltage × 200%<br>1000,4700 (pF) : Rated Voltage × 150%<br>Time : 1000 h (+ 48h , - 0h)<br>Then measured after exposure in the room condition for 4 to 48 hours. |  |  |
| Cap. Change          | 1000                | Within ±30%   |  |            |             |             |           |             |         |                      |             |      |  |  |  |
|                      | 4700 (pF)           |   |  |            |             |             |           |             |         |                      |             |      |  |  |  |
| I.R.                 | 100 MΩ min.         |   |  |            |             |             |           |             |         |                      |             |      |  |  |  |
| Withstanding Voltage | No damaged          |   |  |            |             |             |           |             |         |                      |             |      |  |  |  |
| 9.3                  | Temperature Cycling | Meet Table 2.   | 1 Cycle<br>1step : - 55°C (+ 0°C, - 3°C) / 30±3 min<br>2step : Room Temperature / within 5 min<br>3step : +125°C (+ 3°C, - 0°C) / 30±3 min<br>4step : Room Temperature / within 5 min<br>Total of 10 cycles<br>Then measured after exposure in the room condition for 4 to 48 hours. |            |             |             |           |             |         |                      |             |      |  |  |  |

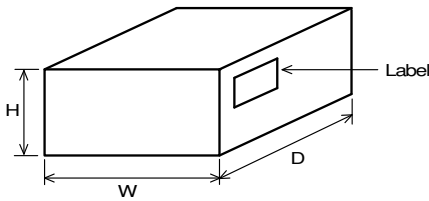
**10. Specification of Packaging**

10.1. Appearance and Dimensions (12mm-wide plastic tape)





10.8. Specification of Outer Case



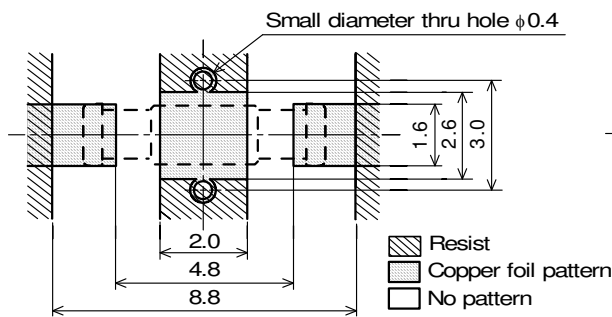
| Outer Case Dimensions (mm) |     |    | Standard Reel Quantity in Outer Case (Reel) |
|----------------------------|-----|----|---|
| W                          | D   | H  |   |
| 186                        | 186 | 93 | 4   |

\* Above Outer Case size is typical. It depends on a quantity of an order.

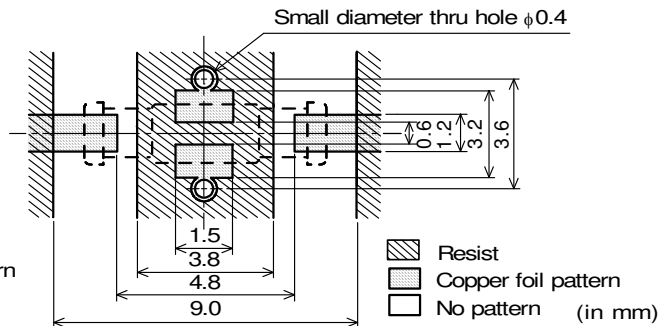
11. Standard Land Dimensions

The chip EMI filter suppresses noise by conducting the high-frequency noise element to ground. Therefore, to get enough noise reduction, feed through holes which is connected to ground-plane should be arranged according to the figure to reinforce the ground-pattern.

(a) Standard land dimensions for reflow  
·Side on which chips are mounted



(b) Standard land dimensions for flow  
·Side on which chips are mounted



12. **Caution**

Limitation of Applications

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property.

- (1) Aircraft equipment (2) Aerospace equipment (3) Undersea equipment (4) Power plant control equipment
- (5) Medical equipment (6) Transportation equipment (automobiles, trains, ships, etc.) (7) Traffic signal equipment
- (8) Disaster prevention / crime prevention equipment (9) Data-processing equipment
- (10) Applications of similar complexity or with reliability requirements comparable to the applications listed in the above

13. Notice

This product is designed for solder mounting.

Please consult us in advance for applying other mounting method such as conductive adhesive.

13.1. Flux and Solder

|        |   |
|--------|---|
| Flux   | Use rosin-based flux, Do not use highly acidic flux (with chlorine content exceeding 0.2(wt)%).<br>Do not use water-soluble flux. |
| Solder | Use Sn-3.0Ag-0.5Cu solder   |

13.2. Note for Assembling

< Thermal Shock >

Pre-heating should be in such a way that the temperature difference between solder and products surface is limited to 100°C max. Also cooling into solvent after soldering should be in such a way that the temperature difference is limited to 100°C max.

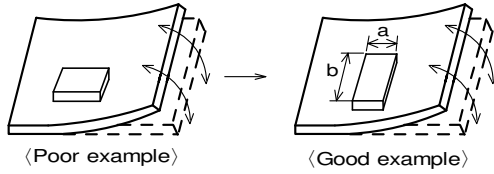
< Consideration for mounting of 2.5mm pitch >

The mounting of 2.5mm pitch should be prevented on flow soldering to avoid an excess of solder volume.

13.3. Attention Regarding P.C.B. Bending

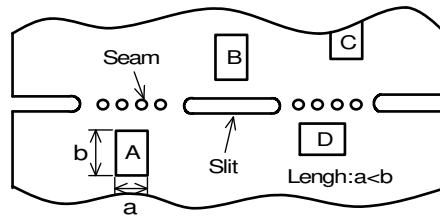
The following shall be considered when designing P.C.B.'s and laying out products.

- (1) P.C.B. shall be designed so that products are not subject to the mechanical stress for board warpage.  
[Products direction]



Products shall be located in the sideways direction (Length: $a < b$ ) to the mechanical stress.

- (2) Products location on P.C.B. near seam for separation.  
Products (A,B,C,D) shall be located carefully so that products are not subject to the mechanical stress due to warping the board.  
Because they may be subjected the mechanical stress in order of  $A > C > B \cong D$ .



13.4. Standard Soldering Conditions

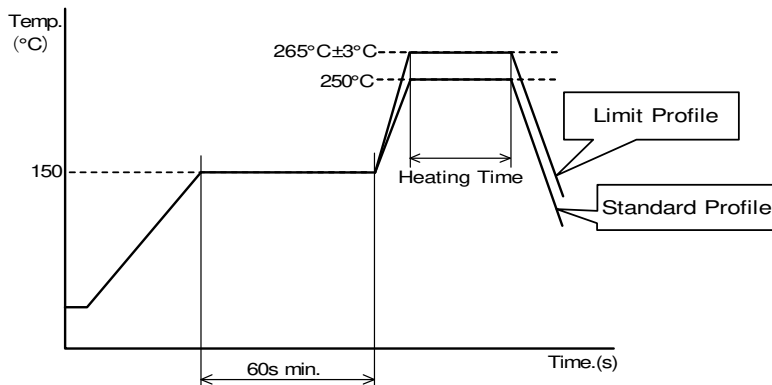
On flow soldering (e.g. double wave soldering), use the product in consideration of the conditions of solder, solder temperature and immersion time (melting time) because longer soldering time may cause the corrosion of the electrode.

On dipping soldering, use the product in consideration of the conditions of solder, solder temperature, flux, preheat and so on because de-wetting may be caused.

Standard soldering profile and the limit soldering profile is as follows.

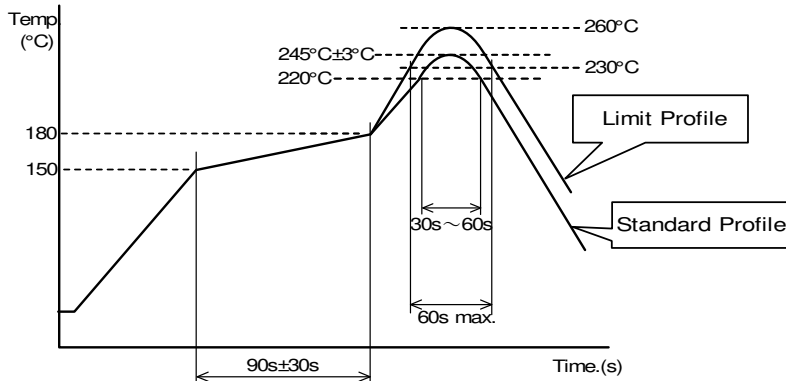
The excessive soldering conditions may cause leaching of the electrode and/or resulting in the deterioration of product quality.

< Flow Soldering Profile >



|               | Standard Profile | Limit Profile         |
|---------------|------------------|-----------------------|
| Pre-heating   | 150°C , 60s min. |                       |
| Heating       | 250°C , 4s ~ 6s  | 265°C ± 3°C , 5s max. |
| Cycle of flow | 2 times          | 2 times               |

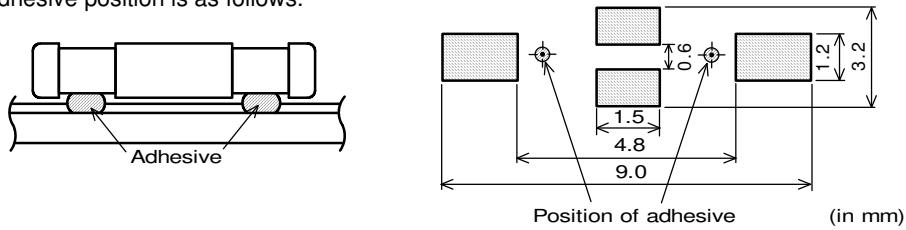
< Reflow Soldering Profile >



|                  | Standard Profile          | Limit Profile          |
|------------------|---------------------------|------------------------|
| Pre-heating      | 150°C ~ 180°C , 90s ± 30s |                        |
| Heating          | above 220°C , 30s ~ 60s   | above 230°C , 60s max. |
| Peak temperature | 245°C ± 3°C               | 260°C , 10s            |
| Cycle of reflow  | 2 times                   | 2 times                |

13.5. Printing of Adhesive (Flow Soldering)

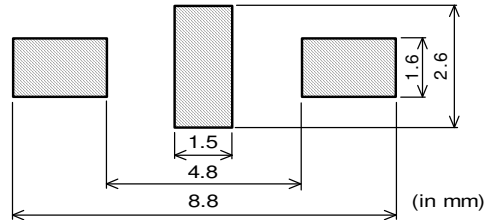
Adhesive amount shall be about 0.5mg for one position to obtain enough adhesive strength.  
The adhesive position is as follows.



13.6. Solder paste printing for reflow

- Standard thickness of the solder paste should be 150µm to 200µm.
- Use the solder paste printing pattern of the right pattern.
- For the resist and copper foil pattern, use standard land dimensions.

• Standard printing pattern of solder paste.



13.7. Reworking with Soldering iron

The following conditions shall be strictly followed when using a soldering iron.

- Pre-heating : 150°C, 1 min
- Tip temperature : 350°C max.
- Soldering time : 3(+1,-0) s
- Soldering iron output : 30W max.
- Tip diameter : φ 3mm max.
- Times : 2times max.

Note: Do not directly touch the products with the tip of the soldering iron in order to prevent the crack on the ceramic material due to the thermal shock.

13.8. Cleaning Conditions

Products shall be cleaned on the following conditions.

- (1) Cleaning temperature shall be limited to 60°C max. (40°C max. for IPA.)
- (2) Ultrasonic cleaning shall comply with the following conditions, with avoiding the resonance phenomenon at the mounted products and P.C.B.

Power: 20W / l max.      Frequency: 28kHz to 40kHz      Time: 5 minutes max.

(3) Cleaner

1. Cleaner
  - Isopropyl alcohol (IPA)
2. Aqueous agent
  - PINE ALPHA ST-100S



- (4) There shall be no residual flux and residual cleaner after cleaning.

In the case of using aqueous agent, products shall be dried completely after rinse with de-ionized water in order to remove the cleaner.

- (5) Other cleaning

Please contact us.

### 13.9. Operating Environment

Do not use this product under the following environmental conditions, on deterioration of the performance, such as insulation resistance may result from the use.

- (1) in the corrodible atmosphere (acidic gases, alkaline gases, chlorine, sulfur gases, organic gases and etc.)
- (2) in the atmosphere where liquid such as organic solvent, may splash on the products.

### 13.10. Resin coating

It may affect on the product's performance when using resin for coating / molding products. So please pay your careful attention when you select resin. In prior to use, please make the reliability evaluation with the product mounted in your application set.

### 13.11. Handling of a substrate

After mounting products on a substrate, do not apply any stress to the product caused by bending or twisting to the substrate when cropping the substrate, inserting and removing a connector from the substrate or tightening screw to the substrate.

Excessive mechanical stress may cause cracking in the product.



### 13.12. Storage condition

- (1) Storage period

Use the products within 12 months after delivered.

Solderability should be checked if this period is exceeded.

- (2) Storage environment condition

- Products should be stored in the warehouse on the following conditions.

Temperature : - 10 °C to + 40 °C

Humidity : 15 % to 85% relative humidity No rapid change on temperature and humidity

- Don't keep products in corrosive gases such as sulfur, chlorine gas or acid, or it may cause oxidization of electrode, resulting in poor solderability.
- Products should be stored on the palette for the prevention of the influence from humidity, dust and so on.
- Products should be stored in the warehouse without heat shock, vibration, direct sunlight and so on.
- Products should be stored under the airtight packaged condition.

- (3) Delivery

Care should be taken when transporting or handling product to avoid excessive vibration or mechanical shock.

## 14. Notes

- (1) Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
- (2) You are requested not to use our product deviating from the reference specifications.
- (3) The contents of this reference specification are subject to change without advance notice. Please approve our product specifications or transact the approval sheet for product specifications before ordering.