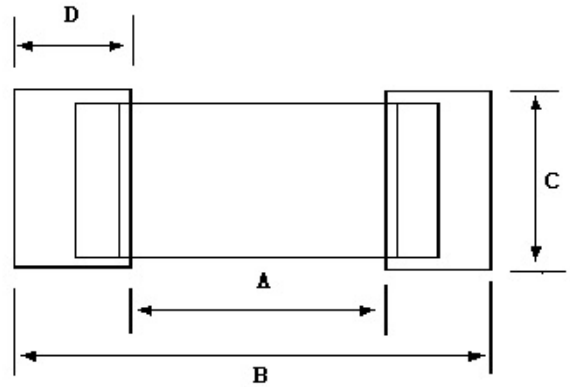


● **Soldering Recommendations**

1. Recommended solder pad layout

Unit : mm

A	B	C	D
6.5±0.2	9.5±0.2	6.8±0.2	1.5±0.2



- 2. The solder paste shall be printed in a thickness of 150 to 200um.**
- 3. Steel plate and foot distance printing.**

Foot distance printing (mm)	Steel Plate thickness (mm)
> 0.65mm	0.18mm
0.65mm~0.5mm	0.15mm
0.50mm~0.40mm	0.12mm
<=0.40 mm	0.10mm

4. IR Soldering

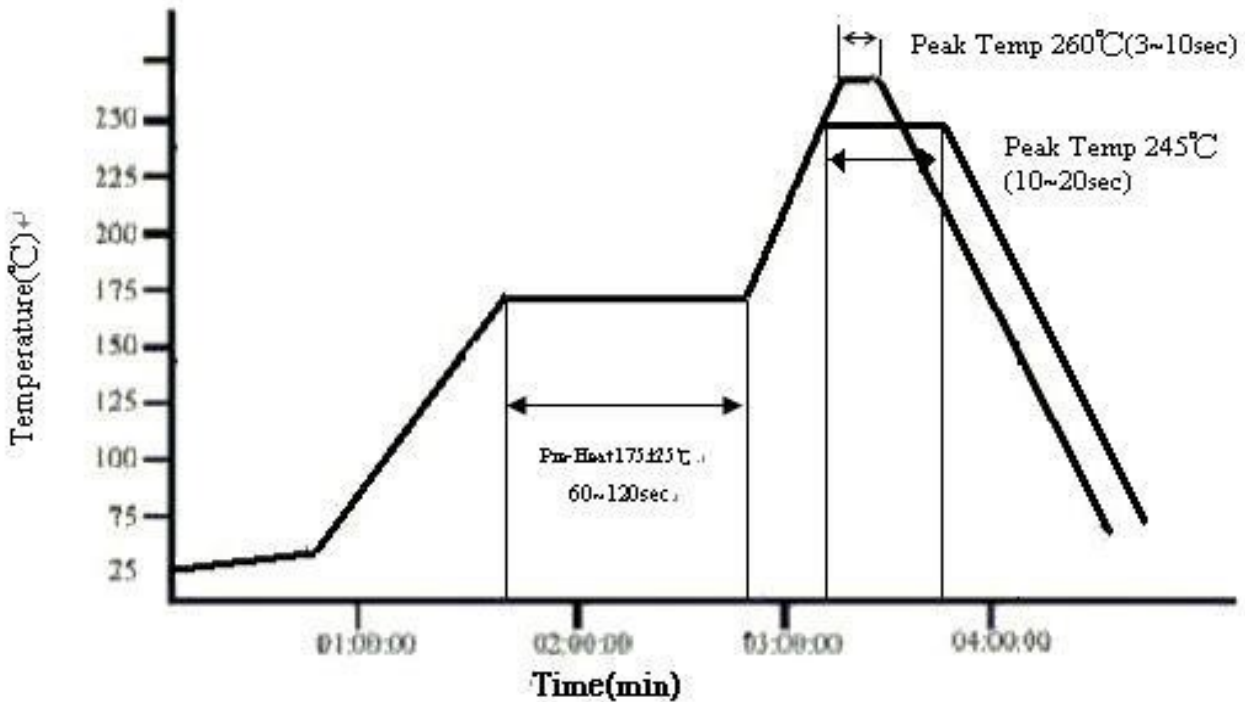
Rapid heating, partial heating or rapid cooling will easily cause defect of the component. So pre heating and gradual cooling process is suggested. IR soldering has the highest yields due to controlled heating rates and solder liquidus times. Make sure that the element is not subjected to a thermal gradient steeper than 4 degrees per second. 2 degrees per second is the ideal gradient. During the soldering process, pre-heating to within 100 degrees of the solders peak temperature is essential to minimize thermal shock.

5. IR reflow Pb Free Process suggestion profile

- (1) The solder recommend is Sn96.5/Ag 3.5 of 120 to 150 μ m
- (2) Ramp-up rate (217°C to Peak) + 3°C/sec. max
- (3) Temp. maintain at 175 +/-25°C 180 sec. max
- (4) Temp. maintain above 217 °C 60-150 sec.
- (5) Peak temperature range 245°C+20°C/-10°C time within 5°C of actually peak temperature (tp) 10~20 sec.
- (6) Ramp down rate +6°C/sec. max.

※Perform adequate test in advance as the reflow temperature profile will vary according to the conditions of the manufacturing process, and the specification of the reflow furnace.

Resistance to soldering heat-High Temperature Resistance: 260°C , 10sec. - 3times.



6. Manual soldering

In hand soldering of the Varistors. Large temperature gradient between preheated the Varistors and the tip of soldering iron may cause electrical failures and mechanical damages such as cracking or breakings of the devices. The soldering shall be carefully controlled and carried out so that the temperature gradient is kept minimum with following recommended conditions for hand soldering.

6.1 Recommended Soldering Condition 1

- (1) Solder : 0.12~0.18mm Thread solder (Sn96.5:Ag3.5) with soldering flux in the core.
Rosin-based and non-activated flux is recommended.
- (2) Preheating: The Varistors shall be preheated so that Temperature Gradient between the devices and the tip of soldering iron is 150°C or below.
- (3) Soldering Iron: Rated Power of 20w max with 3mm soldering tip in diameter.
Temperature of soldering iron tip 380°C max,3-5sec (The required amount of solder shall be melted in advance on the soldering tip.)
- (4) Cooling: After soldering. The Varistors shall be cooled gradually at room ambient temperature.

6.2 Recommended Soldering Condition 2 (Without Pre heating)

- (1) Solder iron tip shall not directly touch to ceramic dielectrics.
- (2) Solder iron tip shall be fully preheated before soldering while soldering iron tip to the external electrode of Varistors.

7. Cleaning

7.1 Residues of corrosive soldering fluxes on the PC board after cleaning may greatly have influences on the electrical characteristic and the reliability (such as humidity resistance)of the Varistors which have been mounted on the board. It shall be confirmed that the characteristic and the reliability of the devices are not affected by the applied cleaning conditions.

7.2 conditions are recommended for preventing failures or damages of the devices due to the large vibration energy and the resonance caused by the ultrasonic waves.

- (1) Frequency 29MHz max
- (2) Radiated Power 20w/lithr max
- (3) Period 5minuets max