



Application Note: Solder Flow recommendations SN/63 tin lead solder

There are four stages to the solder reflow profile

Preheat stage

Pre-flow stage

Reflow stage

Package and board cool down

Preheat stage

The preheat stage is to bring the package up to about +125°C ($\pm 25^\circ\text{C}$) the rate of increase from ambient to 125 °C should be approximately 2 to 3°C per second. Too high of a rate of increase may cause the solder paste to bubble and splatter distributing solder balls on the circuit. Component damage may also occur from the stresses caused by too rapid a change in temperature.

Pre-flow stage

The Pre-flow section of the solder profile is a gradual transition from the 125°C Preheat section to the point of eutectic transformation (+183°C) this stage allows the entire board to achieve an equilibrium near the melting point of the solder. The rate of temperature change should be between 0.5 to 1 degree per second. That would be between 60 to 120 seconds depending upon the rate of change. Rates slower than recommended will cause the solder to oxidize and solder balls to form. The temperature should arrive at 180°C but not exceed that temperature.

Reflow stage

This is the portion of the profile where the solder changes from a solid to a liquid and the actual flux and flow action occur. Solder will flow to all areas not protected by solder mask. MwT recommends that a rapid rise to a maximum temperature of 235°C with the dwell time above 215°C to be below 30 seconds. The total time above 180°C should be less than 180 seconds. Post dwell above 215°C should transition directly into the package and board cool down ramp.

Package and board cool down

As the package and board drops below the solder liquidus point of +183°C the cool down temperature ramp controls the solder grain size and fatigue resistance. The cool down rate should be approximately 2 to 4°C per second. Do not exceed 5°C per second

Sn63Pb37 Solder Profile

