

## BGA Solder Reflow and Rework Recommendations

## **BGA Reflow Soldering Recommendations**

Reflow:

- Use caution when profiling to insure minimal temperature difference (<15°C and preferably <10°C) between components
- Forced convection reflow with nitrogen preferred (50 – 75 PPM)
- Preheat stage temperature ramp rate: <2°C per second
- Time required in Flux Activation stage: 150 to 180 seconds
- Flux Activation stage temperature range: 150 to  $183^{\circ}\mathrm{C}$
- Time required in Solder stage: 60 seconds
- Maximum temperature 210 220°C (Do not exceed 10 seconds at maximum temperature)
- Cool-Down stage temperature reduction rate: <2°C per second

Inspection:

- · Inspection of pre-processed solder bumps
- Visual solder deposit inspection
- Use machine vision for solder bump identification during placement
- Use recommended assembly process and process parameters coupled with electrical testing (100% post-process inspection is not recommended)

## Figure 1. BGA Recommended Solder Reflow Profile

## **BGA Rework Recommendations**

Removal and replacement of BGA packages on printed circuit boards is fairly straightforward. However, reattachment or touch-up of BGA packages that have already been soldered to the board is not practical in most cases.

Three important criteria should be considered when choosing a rework system:

- Minimize the change in temperature across the solder joint array to promote good solder joint formation, minimize intermetallic growth, improve solderability and minimize component warpage
- Minimize die temperature to prevent die delamination and wire bond failure
- Minimize board temperature adjacent to the rework site to reduce intermetallic growth, prevent secondary reflow, and prevent possible component delamination

Refer to Applications Notes on Surface Mount Assembly of Amkor/Anam PBGA and SuperBGA<sup>®</sup> Packages in the Applications Notes section of the Lattice web site for more complete information. The Lattice web site is located at <u>www.latticesemi.com</u>.

