

Abstract

Low temperature soldering (reflow peak temperature at 200°C and below) has been considered as one of the effective ways to reduce the processing defects caused by warpage of large BGA assembly. Most of the large BGAs are still surfaced with SnAgCu (SAC) and/or modified SAC balls, whose melting temperature ranges from 210°C to 220°C. Although BGA warpage can be reduced under low reflow temperature, the limited solder paste volume, because SnAgCu ball will not melt but dissolve during reflow, may still be insufficient to compensate for the mitigated warpage, possibly resulting in forming the defective joints, including non-contact, head-in-pillow and non-wet-open etc. Adding more paste would reduce the possibility of forming aforementioned defective joints but bring in the risk of joint bridging. Increasing the reflow peak temperature may enlarge the component warpage but allow more molten solder volume during soldering, which may compensate for the warpage displacement and help the joint formation as well. Hot-tearing from using low temperature solder is another concern related to the overlap of component warpage inversion temperature and solder solidification temperature. Thus, optimization of both paste volume and reflow temperature, as well as selection of the appropriate solder alloy are critical to succeed.