Thermal Characteristic Evaluation Of Lead Free Solders

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ABSTRACT

The regulation of hazardous materials has been expanding on a global scale in recent years, from the E.U. RoHS directive to the Chinese version of RoHS. Of these regulations, lead-free surface mounting is now commercially viable. The switch from conventional Sn-Pb solder to lead free solder is progressing and various Sn-based eutectic alloys are being studied. One problem with lead-free solder is that its melting temperature is higher than the heat resistance of mounted parts. Furthermore, high temperature work accelerates the oxidation of solder and reduces joint strength and connectivity. While factors such as usability, mechanical characteristics, and cost are taken into account when determining solder composition, it is crucial to evaluate the effects of soldering temperature and oxidation reactions when considering work conditions.

DSC and TG/DTA are useful to evaluate a thermal characteristic of the solder. The results of DSC showed a difference of the liquid phase temperature by the slight nickel composition. The results of TG/DTA showed the controlling of the oxidation of solder by addition of phosphorus.