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Effects of Diameter on Copper Pillar with Solder Cap Interconnections During Reflow Soldering Process

Abstract

Recently, the copper pillar with solder cap interconnection has been introduced as an alternative for the solder bump interconnection to tackle the limitations, such as the collapsing nature of the solder bump and larger pitch size. This paper presents an effective simulation tool to evaluate the effects of different diameters of the copper pillar with solder cap during the reflow soldering process. A three-dimensional numerical approach is used to investigate the thermal behavior of the copper pillar with solder caps with different diameters. The interconnection bump diameters are 150, 200, 250, 300, and 350 µm. The model is developed and meshed using the Computational Fluid Dynamics (CFD) software. The temperature distributions of the copper pillar with solder caps with different diameters during the reflow soldering process are predicted. The paper aims to provide an understanding of the effect of diameters on the temperature distribution of copper pillars with solder caps during reflow soldering.

Keywords

Computational fluid dynamics; Copper pillar with solder cap; Infrared-convection reflow oven; Surface mount technology