

Research on the Underfill Filler Particles for Reliability of Flip-Chip Solder Interconnects by Micromechanical

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ABSTRACT

In the flip chip on board package method, capillary flow then drivers the underfill filling the gap between the integrated circuit (IC) chip and substrate. These shear stresses are imposed on the solder interconnects due to a coefficient of thermal expansion (CTE) mismatch between the IC chip and substrate. Also, this underfill is required to closely match the CTE value of the solder to minimize the stresses brought about by the thermal mismatch between the IC chip and substrate. This paper is developed by micromechanical. Using Eshelby equivalence inclusions principle and Mori-Tankaka 's average stress field concept to investigate the equivalence thermal elastic of underfill filler particles. And then, the software of finite element method (FEM) ANSYS is used to simulate the inhomogeneous of underfill fillers affect the reliability of flip chip solder interconnects. The predicted properties are then investigated the volume fraction of underfill fillers in them are whether affect the reliability of flip chip solder interconnection. And used the Taguchi optimum finds the important parameters. At last, this paper investigated different cases. The Case was when the underfill filled not perfect. It cause the delaminate phenomenon between the substrate and the underfill.

Keywords : flip chip ; underfill ; reliability ; micromechanical

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