

Experimental and Numerical Investigations on Solder Reliability for Flip-
Chip BGA Packaging
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Abstract

Solder reliability assessments are performed in this research using a 3-D equivalent global model and local submodeling technique. The equivalent global model is capable of addressing critical solder failure locations. The local solder ball and bump submodels are then used to predict number of cycles to failure. Because the solder bumps are encapsulated with underfill material, the fatigue model was derived from the ratio expressed between cases with and without underfill to determine the correlative fatigue ductility coefficient. Two flip-chip BGA package cases are studied with the provided experimental data. According to the prediction fatigue life results, the determined solder ball life is close to the first failure and the determined solder bump life for the second studied case also shows conservative agreement with the field data.

Keyword : solder reliability; flip-chip BGA package; fatigue life