

Stand-off Design on Semiconductor Tapeless Leadframe Package for BLT Improvement

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Abstract—This paper presents a stand-off design on semiconductor tapeless leadframe package for bond line thickness (BLT) improvement and robustness.

Keywords— Stand-off design; BLT; bond line thickness; leadframe.

I. BACKGROUND OF THE PROJECT

- At thermomechanical point of view, bond line thickness (BLT) acts as a stress reliever to the coefficient of thermal expansion (CTE) difference between silicon die and the die paddle (or simply diepad) of the semiconductor tapeless leadframe package



Fig. 1. Cross-sectional view of the leadframe package.

- BLT refers to the actual height of the epoxy glue when a silicon die is bonded to the leadframe diepad, the thicker the glue the better in terms of stress relieving
- During assembly manufacturing, maintaining the same height or thickness of BLT is difficult to achieve due to mechanical and material responses
- BLT differs according to the size of the silver fillers inside a conductive glue

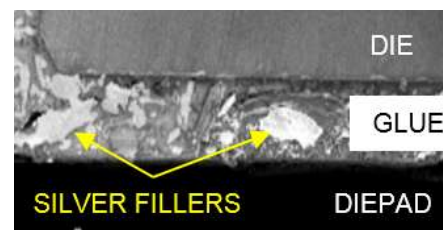


Fig. 2. Cross-sectional view of the epoxy glue.

II. STAND-OFF DESIGN

- A stand-off or stopper is integrated to the design structure of the semiconductor tapeless leadframe package, at multiple locations on top of the leadframe diepad

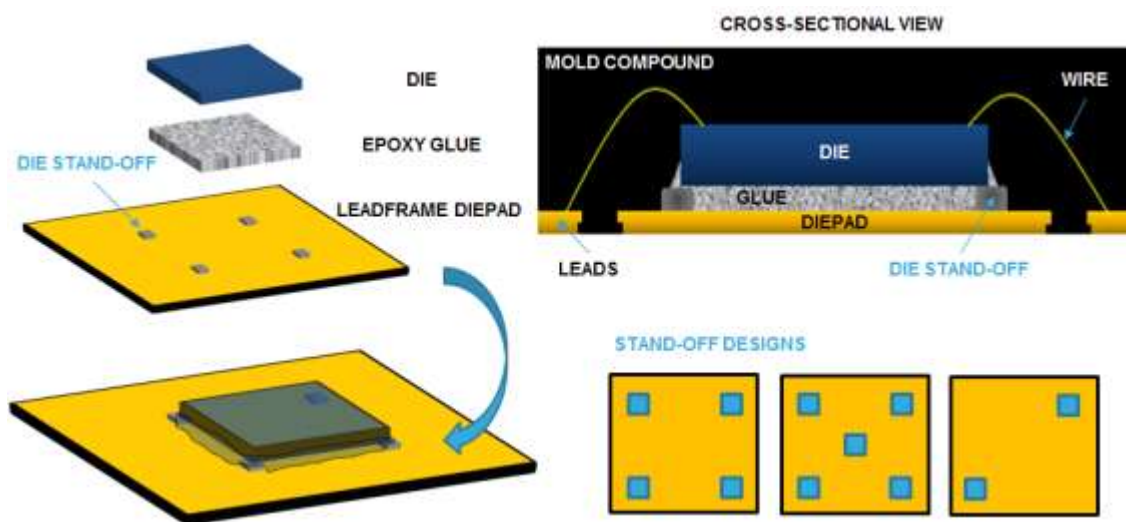


Fig. 3. Stand-off design on the leadframe package.

- During die attach process, the stand-off or stopper secures planarity of the die and at the same time maintains equal height or thickness for BLT
- On assembly manufacturing point of view, the stand-off design enables better control for BLT requirement
- Since BLT is controlled to a certain height, quality issues with regards to epoxy glue BLT would be mitigated, i.e. stress relieving factor during thermal cycle