

Stencil Printing Process for Glue Crack Resolution on Thin Die Applications

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I. OVERVIEW

- Newer thin packages require very thin layer of glue underneath in order to meet the defined package height requirements
- However, very thin adhesive layers result to thin bond line thickness (BLT), which may eventually cause the adhesive glue to crack

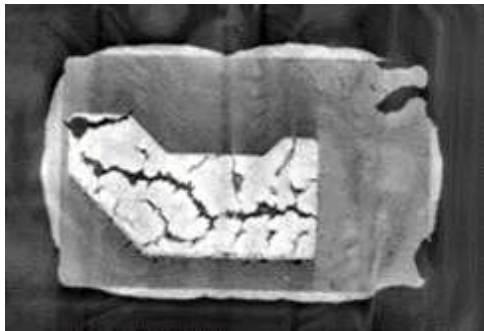


Fig. 1. Top view of glue crack propagating underneath the die.

II. PROBLEM IDENTIFICATION

- A semiconductor substrate-based package is designed with downset to have an outside connection on the bottom of the package
- Nevertheless, the downset is smaller than the silicon die, resulting to very thin BLT on the die periphery and eventually leading to glue crack

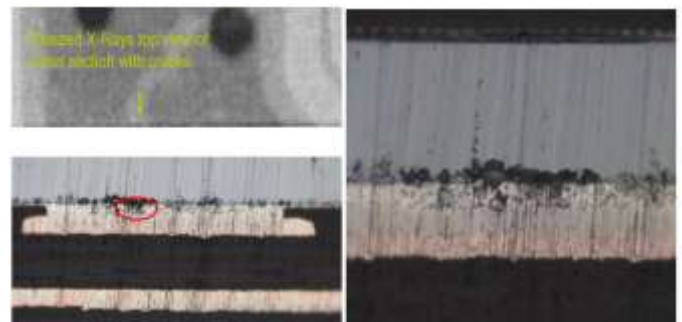


Fig. 2. Package cross-sectional view highlighting the glue crack.

III. PROCESS AND PACKAGE DESIGN SOLUTION

- A new process, that is stencil glue printing, is developed to ensure consistent volume of adhesive glue on the substrate-to-glue interface, eliminating the adhesive glue crack due to coefficient of thermal expansion (CTE) mismatch between the materials

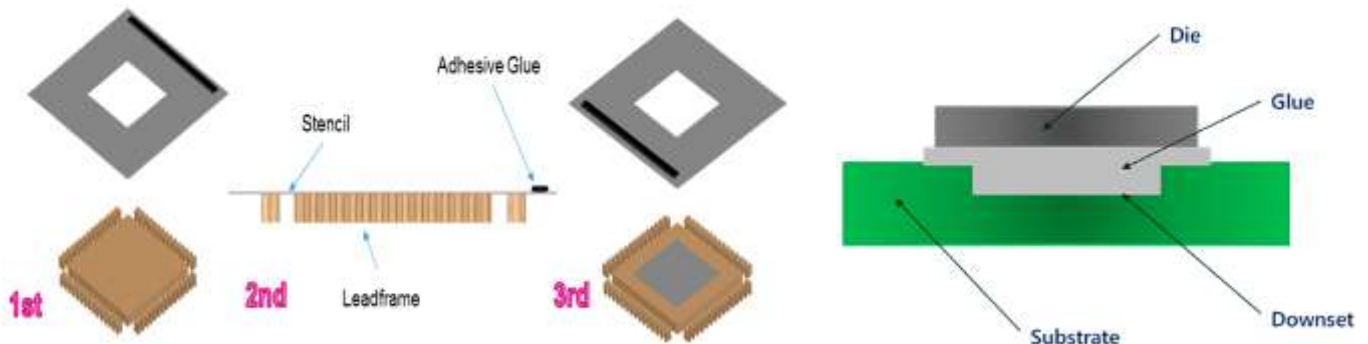


Fig. 3. Stencil printing process flow and improved package design.

- Thicker BLT will have a more stable die attach or diebond process, mitigating die tilting issues that can eventually cause wirebond process anomalies
- By refining the semiconductor substrate design, defects or anomalies caused by assembly processes could be eliminated, creating an error-proof process
- Ultimately, the process and package design improvement is designed for emerging thin die applications