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Specialized Mold Chase Design for Semiconductor QFN Leadframe Package

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I. BACKGROUND OF THE STUDY

- Package chip-out in Fig. 1 is a common defect frequently encountered in end-of-line process at the semiconductor assembly manufacturing, and is defined as a region of material missing from a body

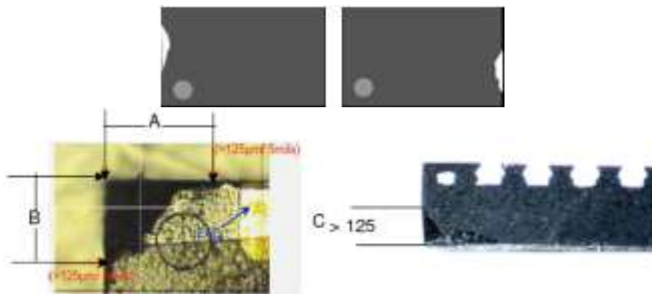

Fig. 1. Examples of package chip-out.

- Traditional package singulation techniques in Fig. 2 come with some process related defects or anomalies like uncut unit, metal burrs, shallow cut, delamination and package chip-out as earlier shown

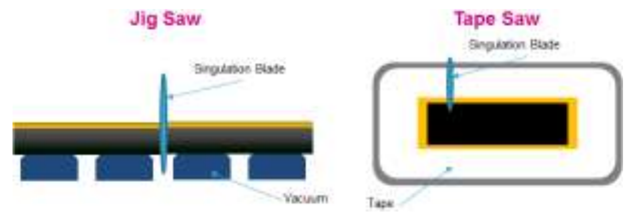

Fig. 2. Conventional package singulation techniques.

- Note that machine and process parameter optimization, blade selection and evaluation, and ensuring planarity and calibration can help significantly reduce the package chip-out, yet it cannot be totally eliminated due to the degradation of the mechanical blade

II. PROCESS DESIGN IMPROVEMENT

- A specialized mold chase design and the corresponding assembly process flow highlighted in Fig. 3 paved way for a specialized cutting technique for quad flat no-leads (QFN) leadframe package assembly

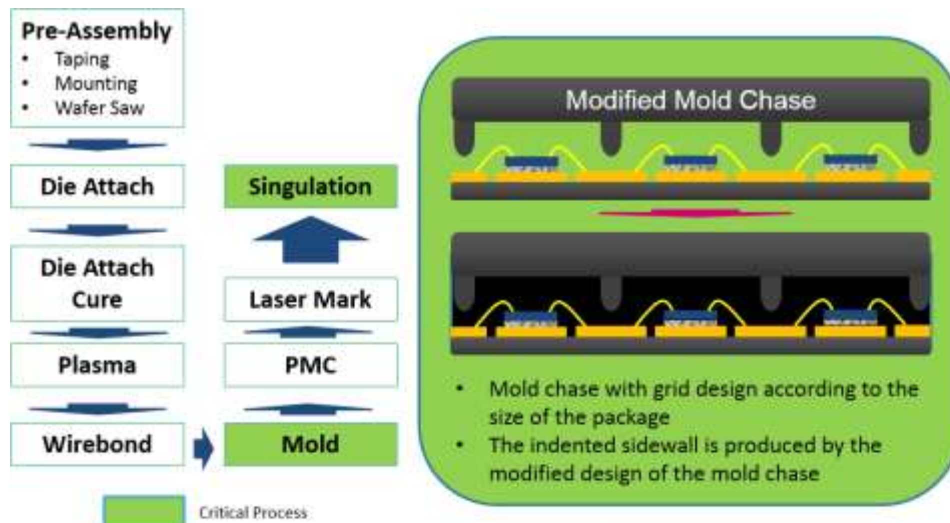

Fig. 3. Specialized mold chase design and process flow.

- Eventually, the semiconductor QFN leadframe package would have indented sidewalls realized during mold encapsulation with the specialized design of the mold chase
- The lower part of the package without the indented design would be the remaining part to be cut or sawn using mechanical blades during singulation process, hence prolonging the blade life