TEST-BASED RELIABILITY EVALUATION OF HYBRID IC PACKAGES WITH DIFFERENT INTERCONNECTION TECHNOLOGIES

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Hybrid integrated circuits (IC) enable the integration of diverse technologies within a single package, but their reliability is strongly influenced by packaging and interconnection processes. Variations in assembly technologies can introduce latent defects that are difficult to detect using conventional inspection methods, motivating the need for effective electrical testing approaches for early reliability evaluation. This study aims to evaluate the reliability of hybrid IC packages manufactured using different interconnection and assembly technologies, focusing on the capability of electrical testing to identify process-related reliability risks at an early stage.

Hybrid IC packages produced with distinct interconnection technologies were subjected to controlled electrical stress conditions. A set of electrical and functional parameters was monitored before and during stress application to assess degradation behavior. The collected measurement data were analyzed to compare reliability-related trends across different packaging implementations. The results reveal measurable differences in electrical response and degradation characteristics between the investigated interconnection technologies. Certain electrical parameters exhibited increased sensitivity to process-induced weaknesses, indicating their suitability as early indicators of reliability issues in hybrid IC packages.

The study demonstrates that test-based electrical evaluation provides valuable insight into the reliability of hybrid IC packaging technologies. The proposed approach supports early identification of reliability risks and can contribute to more efficient qualification and optimization of hybrid integrated circuit assembly processes.