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Author

Nagel M.   Kurz H.

Author Unabbreviated

Nagel Michael; Kurz Heinrich

Author/Editor Affiliation

Nagel M. Kurz H. : AMO GmbH, Aachen, Germany

Title

Terahertz imaging: Terahertz reflectometry images faults in silicon chips

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Abstract

Terahertz imaging microprobes boost the accuracy of reflectometry-based fault location in silicon chips into the sub-micron range. The steadily growing complexity of integrated-circuit (IC) technology-for example, emerging 3D through-silicon-via (3D-TSV) technology-is pushing the available inspection and fault-analysis tools to their limits. Among the nondestructive methods, time-domain reflectometry (TDR) is considered to be an exceptionally fast method for fault detection in electronic packages. Today's TDR systems-also called "closed-loop radar"-are generally all-electronic and use a step or pulse generator and a high-bandwidth oscilloscope as the main components. The electromagnetic signal is transmitted through a high-frequency cable and a probe tip to the device under test (DUT). Every discontinuity at the transmission path within the DUT causes a part of the injected signal to be reflected. By monitoring these reflections in the time domain, it is possible to detect structural defects and distinguish functional from defective structures. (7 References).