Abstracts

Novel Techniques for Millimeter-Wave Packages

M.I. Herman, K.A. Lee, E.A. Kolawa, L.E. Lowry and A.N. Tulintseff. "Novel Techniques for Millimeter-Wave Packages." 1995 Transactions on Microwave Theory and Techniques 43.7 (Jul. 1995, Part I [T-MTT]): 1516-1523.

A new millimeter-wave package architecture with supporting electrical, mechanical and material science experiment and analysis is presented. This package is well suited for discrete devices, monolithic microwave integrated circuits (MMIC's) and multichip module (MCM) applications. It has low-loss wide-band RF transitions which are necessary to overcome manufacturing tolerances leading to lower per unit cost. Potential applications of this new packaging architecture which go beyond the standard requirements of device protection include integration of antennas, compatibility to photonic networks and direct transitions to waveguide systems. Techniques for electromagnetic analysis, thermal control and hermetic sealing were explored. Three dimensional electromagnetic analysis was performed using a finite-difference time-domain (FDTD) algorithm and experimentally verified for millimeter-wave package input and output transitions. New multi-material system concepts (AIN, Cu, and diamond thin films) which allow excellent surface finishes to be achieved with enhanced thermal management have been investigated. A new approach utilizing block copolymer coatings was employed to hermetically seal packages which met MIL STD-883.

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