Abstracts

Investigations of Complex Modes in a Generalized Bilateral Finline with Mounting Grooves and Finite Conductor Thickness (Dec. 1989 [T-MTT])

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A generalized bilateral finline with mounting grooves and finite conductor thickness is analyzed by a full-wave mode-matching method. The final nonstandard eigenvalue equation is derived from the unknown coefficients in the slot regions to reduce the size of the matrix equation. The convergence studies of the mode-matching method are first performed for the fundamental mode of a symmetric bilateral finline. Both the propagation constant and the characteristic impedance based on the power-voltage definition are analyzed and compared to the existing data. Excellent agreement between various data is obtained and the effects of metallization thickness and mounting grooves are discussed. The accurate results for the fundamental mode obtained by the mode-matching method with considerations of both relative and absolute convergence apply equally well to the analyses of the complex modes of the finline. The field matching plots at the slot-dielectric (air) interface of the finline also confirm that the converged solutions for the complex modes have superior field matchings over the nonconverged ones. The dispersion characteristics of the fundamental, higher order, evanescent, and complex modes are presented for an asymmetric bilateral finline. The effects of mounting grooves and metallization thickness on the complex mode propagation constants are investigated and discussed.

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