Abstracts

Generalized analysis of coupled lines in multilayer microwave MCM-D technology-application: integrated coplanar Lange couplers

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In this paper, the design and realization of coplanar Lange couplers integrated in a multilayer thin-film multichip module deposition (MCM-D) technology is discussed. The MCM-D technology has been well established for the interconnection of high-speed digital circuits, and is now being recognized to be very useful for the integration and interconnection of microwave components. In this way, passive structures, such as spiral inductors, filters, and couplers, may be realized efficiently and more cost effective in MCM-D compared to monolithic microwave integrated circuits. The presented coplanar Lange couplers have been designed using an equivalent coupled-line model. A general and computationally efficient method for the determination of the required modal characteristic impedances and the related geometrical parameters in a microwave multilayer coupled-line topology is presented. Also, a way to calculate the optimum coupled line length is given. Using the described method, coplanar Lange couplers have been realized and then measured. Comparison between the measurement results and HP Momentum simulations show good agreement and indicate the feasibility of designing and integrating such components in MCM-D.

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