Abstracts

Integration of CPW quadrature couplers in multilayer thin-film MCM-D

G. Carchon, W. De Raedt and B. Nauwelaers. "Integration of CPW quadrature couplers in multilayer thin-film MCM-D." 2001 Transactions on Microwave Theory and Techniques 49.10 (Oct. 2001, Part I [T-MTT] (Mini-Special Issue on Electrical Performance of Electronic Packaging (EPEP))): 1770-1776.

In this paper, the design, integration, and measurement of quadrature couplers integrated in a multilayer thin-film multichip-module technology are discussed. We have investigated four- and six-finger coplanar-waveguide (CPW) Lange couplers and a coupler based on reentrant sections. Three methods for the design of CPW Lange couplers are compared for the first time. The method of Paolino consistently results in the best performance. The four-finger Lange coupler results in a -3.2+/-0.2-dB coupling bandwidth from 10.8 to 14.9 GHz, with a return loss better than -18 dB and an isolation better than -20 dB. The six-finger Lange coupler results in a -3.2+/-0.5-dB coupling bandwidth from 9.5 to 17 GHz, with a return loss and isolation better than -16 dB. The coupler using reentrant sections results in a -3.4+/-1.1-dB coupling bandwidth from 6.9 to 18.8 GHz with a return loss and isolation better than -21 dB. It is shown that CPW Lange couplers are not sensitive to planarization effects, while for the design of couplers using reentrant sections, the effect should be taken into account. The Lange couplers have the additional advantage that they are easier to design, have a lower insertion loss, and can be very well predicted using method-of-moments simulations.

❑ Return to main document.