Abstracts

Characterization of Asymmetric Coplanar Waveguide Discontinuities

N.I. Dib, M. Gupta, G.E. Ponchak and L.P.B. Katehi. "Characterization of Asymmetric Coplanar Waveguide Discontinuities." 1993 Transactions on Microwave Theory and Techniques 41.8 (Sep. 1993 [T-MTT] (Special Issue on Modeling and Design of Coplanar Monolithic Microwave and Millimeter-Wave Integrated Circuits)): 1549-1558.

A general technique to characterize asymmetric coplanar waveguide (CPW) discontinuities with air bridges where both the fundamental coplanar and slotline modes maybe excited together is presented. First, the CPW discontinuity without air bridges is analyzed using the space-domain integral equation (SDIE) approach. Second, the parameters (phase, amplitude, and wavelength) of the coplanar and slotline modes are extracted from an amplitude modulated-like standing wave existing in the CPW feeding lines. Then a 2n x 2n generalized scattering matrix of the n-port discontinuity without air bridges is derived which includes the occurring mode conversion. Finally, this generalized scattering matrix is reduced to an n x n matrix by enforcing suitable conditions at the ports which correspond to the excited slotline mode. For the purpose of illustration, the method is applied to a shielded asymmetric short-end CPW shunt stub, the scattering parameters of which are compared with those of a symmetric one. Experiments are performed on both discontinuities and the results are in good agreement with theoretical data. The advantages of using air bridges in CPW circuits as opposed to bond wires are also discussed.

❑ Return to main document.