Abstracts

A Coaxial 0.5-18 GHz Near Electric Field Measurement System for Planar Microwave Circuits Using Integrated Probes

T.P. Budka, S.D. Waclawik and G.M. Rebeiz. "A Coaxial 0.5-18 GHz Near Electric Field Measurement System for Planar Microwave Circuits Using Integrated Probes." 1996 Transactions on Microwave Theory and Techniques 44.12 (Dec. 1996, Part I [T-MTT]): 2174-2184.

This paper reports on the basic theory of operation and experimental results obtained from an electric field imaging system for planar microwave circuits that employs the method of modulated scattering with monolithically integrated probes. The low-cost system is capable of mapping the normal and tangential electric field intensities and electrical phase delays above reciprocal microwave circuits in the frequency range of 0.5-18 GHz with a spatial electric field resolution of better than 100 µm. Monolithic probes incorporating silicon Schottky diodes integrated with electrically small dipole and monopole antenna scatterers on a 40-µm-thick high-resistivity silicon substrate are used. Electric field intensity and electrical phase delay images are presented for a 55-Omega coplanar waveguide line (CPW), a three-turn microstrip meander line at 8.8, 11.7, and 13.4 GHz, a microstrip coupled-line directional coupler at 10 GHz, and a microstrip patch antenna at 12.85 GHz. The results demonstrate that the modulated scattering technique is a valuable low-cost tool for microwave circuit diagnostics.

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