Abstracts

Frequency and Time Domain Characterization of Microstrip-Ridge Structures

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Microstrip-ridge structures, i.e., conducting strips which are mounted on ridges and are in the close proximity of other conductors on other ridges, are found in sub-millimeter/ terahertz monolithic circuits in conjunction with layered, ridged dielectric waveguides; in millimeter-wave monolithic circuits as microslab lines; in microwave monolithic circuits as integrated traveling-wave optical modulators; and in VLSI circuits as interconnects. A hybrid full-wave frequency domain technique which uniquely synthesizes well-known integral equation and mode-matching methods is shown to be applicable to the study of microstrip-ridge structures. Unlike most other integral equation techniques, the integral equation-mode matching (IEMM) technique is capable of characterizing a wide variety of nonplanar structures. Time domain results are obtained by utilizing a Fourier transform and an equivalent circuit model to evaluate the response at each frequency point. To introduce this method, several two-dimensional structures-specifically, coupled microstrips on ridges, coupled microstrip with an etched groove, and an electrooptic modulator are examined.

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