Abstracts

Variational Method for the Analysis of Microstrip-Like Transmission Lines

E. Yamashita. "Variational Method for the Analysis of Microstrip-Like Transmission Lines." 1968 Transactions on Microwave Theory and Techniques 16.8 (Aug. 1968 [T-MTT]): 529-535.

A theoretical method is presented by which microstrip-like transmission lines can be analyzed. These transmission lines are characterized by conducting strips, large ground planes, multi-dielectric-layer insulation, and planar geometry. The method is essentially based on a variational calculation of the line capacitance in the Fourier-transformed domain and on the charge density distribution as a trial function. A shielded double-layer microstrip line is analyzed by this method. Derived formulas for this structure are also applicable to simpler structures: a double-layer microstrip line, a shielded microstrip line, and a microstrip line. The calculated values of the line capacitance and the guide wavelength are compared with the measured values where possible. Oxide-layer effects on a silicon microstrip line and shielding effects on a sapphire microstrip line are also discussed based on this theory. The limitations and possible applications of this method are described.

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