Abstracts

Characterization of Coplanar Waveguide Open End Capacitance--Theory and Experiment

M.-H. Mao, R.-B. Wu, C.-H. Chen and C.-H. Lin. "Characterization of Coplanar Waveguide Open End Capacitance--Theory and Experiment." 1994 Transactions on Microwave Theory and Techniques 42.6 (Jun. 1994 [T-MTT]): 1016-1024.

The theory, numerical analysis, analytical approximate formula, measurement technique, and characteristic curves were presented in this paper for the characterization of coplanar waveguide open end capacitance. A novel variational equation was proposed in terms of the scalar potential on the slot aperture and was solved by applying the finite element method. With the available analytical Green's function and exact integration formulas in the space domain, this approach was found to be quite efficient and suitable for analyzing the coplanar waveguide discontinuity problems--even with more complicated geometrical configurations. Numerical results were compared to those obtained numerically and experimentally in previous literature, but did not correlate very well. An analytical formula under narrow-slot assumption was thus derived to render a verification of numerical results. Measurement by utilizing the resonance method were also made and the experimental data confirmed the validity of our theory. The relationship between the capacitance and the physical dimensions was also investigated. The characteristic curves of the open end capacitance were obtained. Also, an empirical formula was established for the open end structures with a thick substrate and narrow gap.

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