Abstracts

Transition Properties of a Vertical Conductor Connecting Two Microstrip Lines at Different Planes

A.S. Theodorou and N.K. Uzunoglu. "Transition Properties of a Vertical Conductor Connecting Two Microstrip Lines at Different Planes." 1994 Transactions on Microwave Theory and Techniques 42.12 (Dec. 1994, Part I [T-MTT]): 2277-2284.

Transition properties of a vertical conductor connecting two semi-infinite microstrip lines at different planes are analyzed by using dynamic solution techniques. This fundamental geometry is encountered in many microwave interconnect and packaging applications, and in particular when three-dimensional multilayer metallization techniques are employed. In order to compute the reflection and transmission properties of this three-dimensional discontinuity, a method of moments technique is employed. To this end, the Green's function of the multilayer shielded microstrip geometry is used. The surface current density distributions on the two semi-infinite microstrip lines are described in terms of the incident, reflected, and transmitted guided fundamental mode wave distributions plus a summation of current pulses in the region of discontinuity. The current on the vertical cylindrical connection line is also described in terms of a superposition of triangular shaped pulses. Application of the boundary conditions on the three conductors leads to a simultaneous linear system of equations by using a method of moments technique. Reflection and transmission coefficients are computed for several connection lines, and numerical results are presented. It is shown that a rather small connection conductor height can induce large reflection phenomena for an incident wave.

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