Abstracts

Characterizing the Cylindrical Via Discontinuity (Short Papers)

Design of efficient electronic packaging for today's high-speed digital circuits and monolithic microwave integrated circuits requires accurate characterization of the electrical discontinuities that occur because they can significantly degrade the circuit performance by introducing various effects such as capacitive and inductive loading. However, discontinuities such as the cylindrical via are difficult to characterize because its relatively complicated geometry must be accurately modeled for good results. In this work, it is demonstrated that the nonorthogonal finite-difference time-domain (FDTD) technique can handle cylindrical via discontinuities without the use of an excessive number of unknowns as would be required with an equivalent orthogonal FDTD approach. Since the FDTD analysis is band limited in the frequency domain, the inaccurate, high-frequency components need to be removed before performing reliable transient analyses with the numerical results. The use of window filters to solve this problem is discussed, and a Hanning window is employed in a study of the transient response of an equivalent circuit for the via.

❑ Return to main document.