Abstracts

Determination of complex permittivity of low-loss dielectrics

R.H. Voelker, Guang-Tsai Lei, Guang-Wen Pan and B.K. Gilbert. "Determination of complex permittivity of low-loss dielectrics." 1997 Transactions on Microwave Theory and Techniques 45.10 (Oct. 1997, Part II [T-MTT] (Special Issue on Interconnects and Packaging)): 1955-1960.

A new high-order-mode analytical method is described for calculating the frequency-dependent complex permittivity of a low-loss dielectric in a parallel-plate structure using a planar microwave circuit model. An analytical expression for the complex permittivity is derived in terms of the terminal impedance at a modal resonant frequency of the structure. The derivation provides physical and mathematical insight into the relation between complex permittivity and port impedance. The technique is validated by good agreement between manufacturer's specifications and complex permittivity calculated from measurements near resonant frequencies for a printed circuit board (PCB).

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