Abstracts

Characterization of finite-ground CPW reactive series-connected elements for innovative design of uniplanar M(H)MICs

Lei Zhu and Ke Wu. "Characterization of finite-ground CPW reactive series-connected elements for innovative design of uniplanar M(H)MICs." 2002 Transactions on Microwave Theory and Techniques 50.2 (Feb. 2002 [T-MTT]): 549-557.

A variety of finite-ground coplanar waveguide (FGCPW) reactive series-connected capacitive and inductive elements are extensively studied and characterized as equivalent-circuit models that include complex parasitic effects caused by finite-ground widths. These models are developed by implementing a numerical calibration procedure called short-open calibration, which is used to extract characteristic parameters of the circuit model from full-wave method-of-moments calculations. The proposed model is generally described as an equivalent series admittance (Y/sub g/) or impedance (Z/sub g/) together with a pair of shunt admittances (Y/sub p/) for FGCPW series-connected structures. With the new scheme, the FGCPW elements of interest behave like lossless lumped elements at low-frequency range, consisting of a series capacitance or inductance, as well as two shunt capacitances. As frequency increases, however, Y/sub g/ and Z/sub g/ exhibit a frequency-related dispersion and also a lossy resonance behavior, which stand for some added inductive or capacitive coupling effect caused by the extent of finite-ground width. On the other hand, unbounded radiation effect, considered in this model, appears too strong to be ignored around resonance. Theoretical and experimental results that compare very well with each other are shown for interesting electrical behaviors of finite-ground structures. An innovative uniplanar three-stage bandstop filter is designed and measured on the basis of its simplified equivalent-circuit model.

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