Abstracts

Analysis of Dispersion and Series Gap Discontinuity in Shielded Suspended Striplines with Substrate Mounting Grooves

L.-K. Wu and H.-M. Chang. "Analysis of Dispersion and Series Gap Discontinuity in Shielded Suspended Striplines with Substrate Mounting Grooves." 1992 Transactions on Microwave Theory and Techniques 40.2 (Feb. 1992 [T-MTT]): 279-284.

Dispersion and series gap discontinuity of shielded suspended striplines (SSL's) on Duroid substrate (epsilon/sub r/ = 2.22) are analyzed using the finite-difference time-domain method (FD-TD). Numerical accuracy of better than 0.15% is achieved when the FD-TD is used to calculate the effective dielectric constant (Epsilon /sub reff/) of an air-filled rectangular coaxial transmission line. Data obtained for the frequency-dependent Epsilon/sub reff/ of uniform SSL's, and both scattering and equivalent circuit parameters of various series gap discontinuities, are then presented. In general, presence of sidewall mounting grooves causes a nearly frequency-independent small reduction in Epsilon /sub reff/. On the other hand, proximity effects of the housing are found to be more important. It is demonstrated that: 1) for a given housing, Epsilon /sub reff/ decreases first with an increase in strip width before increasing again when strip is wider enough to interact strongly with the sidewalls and 2) reducing sidewall spacing causes an increase in Epsilon /sub reff/. For the gap discontinuity, coupling across the gap is stronger for wider strips and/or narrower gap width. Irregular transmission behavior is also found when strip is wide enough to interact strongly with the sidewalls.

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