Abstracts

Surface-Wave Losses of Coplanar Transmission Lines

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Coplanar transmission lines lose energy to surface waves when the propagation constant of the surface-wave mode exceeds that of the transmission line. This happens when the substrate thickness is an appreciable fraction of a wavelength. The losses should become important in integrated circuits at near-millimeter wavelengths because it is hard to make the substrate thickness small compared to a wavelength. In this paper we have developed a theory based on reciprocity for predicting these losses. We also utilized the quasi-static approximation method to derive expressions for propagation constants and line impedances. Experimental measurements were made for the surface-wave losses in the two strip line, the two slot line and the three wire line, and the results obtained were consistent with the theory.

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