Abstracts

Transmission-Line Properties of Parallel Strips Separated by a Dielectric Sheet

H.A. Wheeler. "Transmission-Line Properties of Parallel Strips Separated by a Dielectric Sheet." 1965 Transactions on Microwave Theory and Techniques 13.2 (Mar. 1965 [T-MTT]): 172-185.

A transmission line is made of a symmetrical pair of strip conductors, or a single strip and a ground plane, on opposite faces of a sheet of dielectric material. There is computed, to a close approximation, the relations among the dielectric constant of the sheet, the effective dielectric constant of the sheet and the empty space, the shape ratio, and the wave resistance, for the entire range of possible values. These relations are summarized in a graphical chart covering the range of practical interest. The computation is based on conformal mapping of the dielectric boundary on coordinates such that its effect can be most closely evaluated by simple principles. All relations are approximated in terms of ordinary functions (exponential and hyperbolic). Of particular interest is the effective filling fraction of the dielectric material, which depends mainly on the shape ratio and only slightly on the dielectric constant. Explicit formulas are given for analysis or synthesis.

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