Abstracts

Transient Analysis of Microstrip Line on Anisotropic Substrate in Three-Dimensional Space

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The recent development of MIC demands considerable attention to the anisotropy of substrates such as sapphire in order to both utilize its characteristics and eliminate its undesirable features. Anisotropic materials usually have a three-dimensional structure, and yield complex characteristics in wave propagation. Hence the analysis requires an exact three-dimensional treatment using all electromagnetic field components. Also, progress in high-speed pulse techniques demands analysis in the time domain. This paper describes how the anisotropy, with the permittivity tensor involving off-diagonal elements, may be generally formulated by Bergeron's method. The formulation is discussed in the case of the propagation characteristics for single and parallel strip lines on a sapphire substrate with tilted optical axis. Furthermore, to show the distinctive influence of anisotropy on the coupling property between lines, a parallel-line-type directional coupler on such a substrate is analyzed.

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