

Multilayer Asymmetric Aperture-Coupled Broadside Microstrip Lines and Their Quasi-Static and Dynamic Analyses

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This paper describes new multilayer aperture-coupled broadside microstrip lines suitable for miniaturized microwave and millimeter-wave integrated circuits. Spectral-domain method is used for detailed investigations of these structures, and both quasi-static and dynamic results are presented to illustrate the need of a full-wave analysis for accurate circuit designs at high frequencies. The new transmission lines possess many desirable features, such as flexibility in circuit design and ability to optimize various transmission lines' characteristics, as well as miniaturization by using thin dielectric layers. Besides having the inherent properties of large ratios for the mode characteristic impedances and effective dielectric constants found in broadside-coupled structures, we also found that the studied coupled transmission lines can have equal mode effective dielectric constants for certain values of the structural parameters.

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