Abstracts

Uniplanar one-dimensional photonic-bandgap structures and resonators

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This paper presents uniplanar one-dimensional (1-D) periodical structures, so-called photonic-bandgap (PBG) structures, and defect high-Q resonators for coplanar waveguide, coplanar strip line, and slot line. Proposed uniplanar PBG structures consist of 1-D periodically etched slots along a transmission line or alternating characteristic impedance series with wide band-stop filter characteristics. A stop bandwidth obtained is 2.8 GHz with a stopband rejection of 36.5 dB. This PBG performance can be easily improved if the number of cells or the filling factor is modified in a parametric analysis. Using uniplanar 1-D PBG structures, we demonstrate new high-Q defect resonators with full-wave simulation and measured results. These structures based on defect cavity or Fabry-Perot resonators consist of a center resonant line with two sides of PBG reflectors. They achieve a loaded Q of 247.3 and unloaded Q of 299.1. The proposed circuits should have many applications in monolithic and hybrid microwave integrated circuits.

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