Abstracts

Monolithic waveguide filters using printed photonic-bandgap materials

C.A. Kyriazidou, H.F. Contopanagos and N.G. Alexopoulos. "Monolithic waveguide filters using printed photonic-bandgap materials." 2001 Transactions on Microwave Theory and Techniques 49.2 (Feb. 2001 [T-MTT]): 297-307.

A system of N dielectric layers imprinted with a transverse lattice of planar metallic scatterers and stacked monolithically along the longitudinal direction of a rectangular waveguide is examined in this paper. This monolithically constructed photonic crystal exhibits valuable filtering properties. The resulting optimized filters are inexpensive to fabricate because the building block (printed layer) is ideal for mass production. The complete filter contains no air gaps (monolithic) and can be modularly built up, or reconfigured, by simple stacking requiring no adhesives (modular). The filter response is designed using our analytical expressions and fast software, as well as using commercial software such as HFSS. A comparison of the two design methods shows that our approach is five orders of magnitude faster than HFSS and significantly reduces the memory requirements. Prototype measurements in the Ka-band show excellent agreement with predictions of our design method. Optimized designs displaying reduced size, extremely flat passbands (0.25 dB), and great isolation (-100 dB) are also presented.

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