Abstracts

Planar Microwave and Millimeter-Wave Lumped Elements and Coupled-Line Filters Using Micro-Machining Techniques

C.-Y. Chi and G.M. Rebeiz. "Planar Microwave and Millimeter-Wave Lumped Elements and Coupled-Line Filters Using Micro-Machining Techniques." 1995 Transactions on Microwave Theory and Techniques 43.4 (Apr. 1995, Part I [T-MTT]): 730-738.

Planar microwave and millimeter-wave inductors and capacitors have been fabricated on high-resistivity silicon substrates using micro-machining techniques. The inductors and capacitors are suspended on a thin dielectric membrane to reduce the parasitic capacitance to ground. The resonant frequencies of a 1.2 nH and a 1.7-nH inductor have been increased from 22 GHz and 17 GHz to around 70 GHz and 50 GHz, respectively. We also report on the design and measurement of a new class of stripline filters suspended on a thin dielectric membrane. Interdigitated filters with 43% and 5% bandwidth have been fabricated and exhibit a port-to-port 0.7 dB and 2.0 dB loss, respectively, at 14-15 GHz. The micro-machining fabrication technique can be used with Silicon and GaAs substrates in microstrip or coplanar-waveguide configurations to result in planar low-loss lumped elements and filters suitable for monolithic integration or surface mount devices up to 100 GHz.

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