Abstracts

On-chip spiral inductors suspended over deep copper-lined cavities

Hongrui Jiang, Ye Wang, J.-L.A. Yeh and N.C. Tien. "On-chip spiral inductors suspended over deep copper-lined cavities." 2000 Transactions on Microwave Theory and Techniques 48.12 (Dec. 2000 [T-MTT] (Special Issue on 2000 International Microwave Symposium)): 2415-2423.

A silicon micromachining method has been developed to fabricate on-chip high-performance suspended spiral inductors. The spiral structure of an inductor was formed with polysilicon and was suspended over a 30-/spl mu/m-deep cavity in the silicon substrate beneath. Copper (Cu) was electrolessly plated onto the polysilicon spiral to achieve low resistance. The Cu plating process also metallized the inner surfaces of the cavity, forming both a good radio-frequency (RF) ground and an electromagnetic shield. High quality factors (Qs) over 30 and self-resonant frequencies higher than 10 GHz have been achieved. A study of the mechanical properties of the suspended inductors indicates that they can withstand large shock and vibration. Simulation predicts a reduction of an order of magnitude in the mutual inductance of two adjacent inductors with the 30-/spl mu/m-deep Cu-lined cavity from that with silicon as the substrate. This indicates very small crosstalk between the inductors due to the shielding effect of the cavities.

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