Abstracts

Inductance and quality-factor evaluation of planar lumped inductors in a multilayer configuration

S.F. Mahmoud and E. Beyne. "Inductance and quality-factor evaluation of planar lumped inductors in a multilayer configuration." 1997 Transactions on Microwave Theory and Techniques 45.6 (Jun. 1997 [T-MTT]): 918-923.

Integral representations for the self and mutual inductance of planar loops on a multilayered structure are derived. The integrals are of the Sommerfeld type and can be easily evaluated under the quasi-static approximation which is validated by the small dimensions relative to a wavelength. Enhancement of loop inductance by inclusion of a magnetic layer is investigated. It is shown that such a layer can increase the inductance by a percentage which has the upper limit of [(/spl mu//sub r/-1)/(/spl mu//sub r/+1)]/spl times/100%, where /spl mu//sub r/ is the relative permeability of the layer. A study is also made on the inductor quality factor (Q) as affected by losses caused by finite electrical conductivity of the magnetic layer and the underlying substrate.

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