Abstracts

Wide-band compact modeling of spiral inductors in RFICs

D. Melendy, P. Francis, C. Pichler, Kyuwoon Hwang, G. Srinivasan and A. Weisshaar. "Wide-band compact modeling of spiral inductors in RFICs." 2002 MTT-S International Microwave Symposium Digest 02.2 (2002 Vol. II [MWSYM]): 717-720 vol.2.

A new wide-band compact modeling methodology for planar spiral inductors on lossy silicon substrate is presented. The new ideal lumped-element equivalent circuit model employs transformer loops in the series branch to include the effects of the frequency-dependent losses, in particular eddy-current loss in the bulk silicon substrate. A robust automated extraction procedure is employed to extract the element values of the new compact model. The new automated modeling methodology has been applied to a typical 1.5 nH spiral fabricated on a low-resistivity CMOS substrate. The frequency-dependent series resistance and inductance as well as the quality factor obtained with the new wideband model are in excellent agreement with the measured results over a 10 GHz bandwidth.

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