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Modeling and Fabrication of Micromachined Inductors

by

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Modeling and Fabrication of Micromachined Inductors

**Approved by
Supervising Committee:
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Dedication

This thesis is dedicated to my wife, Hee-sun Han and
My parents, Tae-Rho Yoo and Kyu-Ja Han.

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Abstract

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In this work, micromachining technology is adopted to enhance the performance of planar inductors. Good inductors frequently require two main factors: high self resonant frequencies and high quality factors. By removing the entire silicon substrate underneath an integrated inductor, the effect of parasitic capacitance and resistive loss due to substrate conductivity can be removed, dramatically improving performance at high frequency (RF and Microwave regime).

A model of an inductor on silicon is presented to explain the effect of frequency and substrate conductivity on inductor performance. Removing the substrate for enhancing inductor performance is justified by the proposed model and experimental investigation.

Various fabrication issues and techniques for the micromachined inductor are studied as well.

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