

**DESIGN OF A PROXIMITY SENSOR USING INDUCTORS,
COMPATIBLE WITH INTEGRATED CIRCUIT FABRICATION**

by

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Thesis

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by

Vikas Inderpal Gupta

1995

Dedicated to my parents,

Inderpal Gupta and Shardarani Gupta

and my brother

Vishal Gupta

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Abstract

DESIGN OF A PROXIMITY SENSOR USING PLANAR INDUCTORS,
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This work consists of designing an eddy-current proximity sensor, using a planar inductor as its transducer. The sensor is capable of measuring distances between a metal target and its transducer. Single coil designs for the transducer are studied. Methods to calculate the self inductance and resistance of these coils and the mutual inductance between the coils and the target are discussed. The effect of scaling these coils down to microelectronic dimensions is studied.

Two coil transformer designs are studied as an alternative to the single coil designs. The scaling of single coil designs causes the resistance of these coils to increase affecting their performance. This can be circumvented by using a two coil design.

Various fabrication issues which arise due to the specific application of the eddy-current proximity sensor are also studied.

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