

Numerical Modelling of Time Response of CMOS Micromachined Thermistor Sensor

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The time response of CMOS micromachined thermistor sensors is simulated by means of three two-dimensional numerical models employing a finite "box" or "control volume" scheme. The numerical schemes are then applied to two specific devices, and a comparison of the simulation results with experimental measurements indicates the validity of our procedures.

1. Introduction

The simulation and modelling of microelectronic devices and, in particular, of microsensors, is now widely accepted as a useful design tool. This procedure offers insight into device operation and a quick and inexpensive means to investigate the performance of possible new sensors. Microsensor behavior is governed by a set of nonlinear partial differential equations which cannot be solved by classical analytic means, except in special circumstances. In realistic situations, some form of computer simulation is thus necessary.

In this paper, we develop a model suitable for the simulation of the time-varying operation of a complimentary metal-oxide-semiconductor (CMOS) micromachined thermistor sensor. We solve the equations numerically and compare the results with experimental measurements.

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