MICROELECTRONIC CIRCUITS

SEDRA

FIFTH EDITION

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Adel S. Sedra
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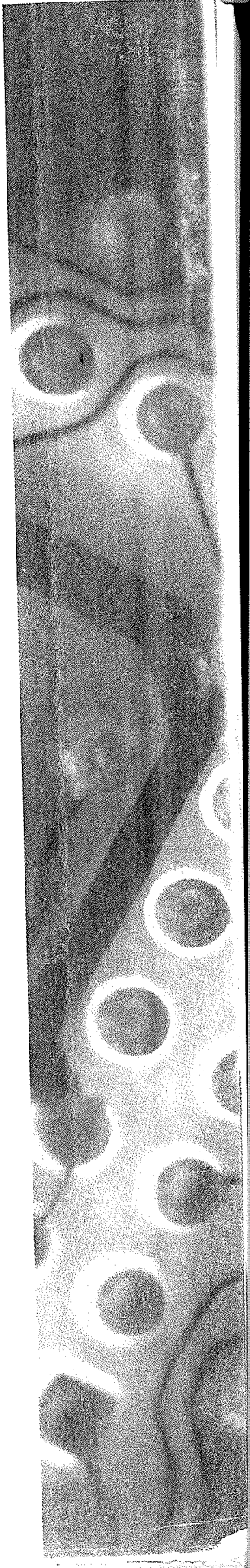

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Cover Illustration: The chip shown is an inside view of a mass-produced surface-micromachined gyroscope system, integrated on a 3mm by 3mm die, and using a standard 3-m 2-V BiCMOS process suited for the harsh automotive environment. This first single-chip gyroscopic sensor, in which micro-mechanical and electronic components are intimately entwined on the same chip, provides unprecedented performance through the use of a collection of precision-directed techniques, including emphasis on differential operation (both mechanically and electronically) bolstered by trimmable thin-film resistive components. This tiny, robust, low-power, angular-rate-to-voltage transducer, having a sensitivity of 12.5mV/°/s and resolution of 0.015°/s (or 50°/hour) has a myriad of applications—including automotive skid control and rollover detection, dead reckoning for GPS backup and robot motion control, and camera-field stabilization. The complete gyroscope package, weighing 1/3 gram with a volume of 1/6 cubic centimeter, uses 30mW from a 5-V supply. *Source:* John A. Geen, Steven J. Sherman, John F. Chang, Stephen R. Lewis; Single-chip surface micromachined integrated Gyroscope with 50°/h Allan deviation, IEEE Journal of Solid-State Circuits, vol. 37, pp. 1860–1866, December 2002. (Originally presented at ISSCC 2002.) Photographed by John Chang, provided by John Geen, both of Analog Devices, Micromachine Products Division, Cambridge, MA, USA.

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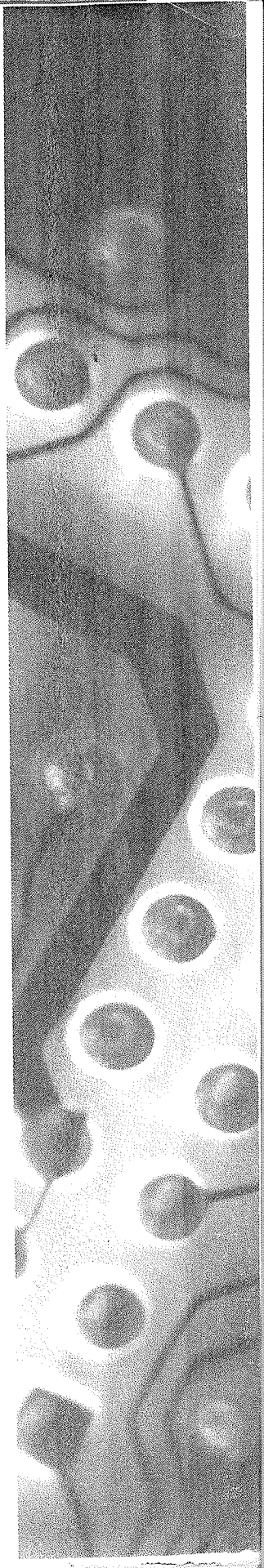

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