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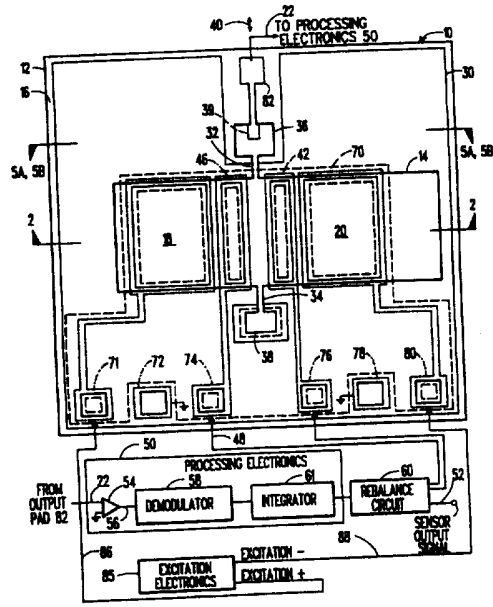
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<p>(21) International Application Number: PCT/US96/14131 (22) International Filing Date: 3 September 1996 (03.09.96) (30) Priority Data: 08/523,401 5 September 1995 (05.09.95) US (71) Applicant: THE CHARLES STARK DRAPER LABORATORY, INC. [US/US]; 555 Technology Square, Cambridge, MA 02139 (US). (72) Inventors: GREIFF, Paul; 2 Cameron Road, Wayland, MA 01778 (US). SOHN, Jerome, B.; 27 Hadley Road, Sudbury, MA 01776 (US). (74) Agents: GAGNEBIN, Charles, L., III et al.; Weingarten, Schurgin, Gagnebin & Hayes L.L.P., Ten Post Office Square, Boston, MA 02109 (US).</p>		<p>(81) Designated States: CA, JP, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 17 April 1997 (17.04.97)</p>

(54) Title: MICROMECHANICAL SENSOR WITH A GUARD BAND ELECTRODE AND FABRICATION TECHNIQUE THEREFOR



(57) Abstract

An electrostatically actuated micromechanical sensor (10) having a guard band electrode (30) for reducing the effect of transients associated with a dielectric substrate (12) of the sensor. A proof mass (14), responsive to an input, is suspended over the substrate and one or more electrodes (18, 20) are disposed on the substrate in electrostatic communication with the proof mass to sense the input acceleration and/or torque the proof mass back to the null position. The guard band electrode is disposed over the dielectric substrate in overlapping relationship with the electrodes and maintains the surface of the substrate at a reference potential, thereby shielding the proof mass from transients and enhancing the accuracy of the sensor. A dissolved wafer process for fabricating the sensor is described, in which the proof mass is defined by boron doping. An alternative fabrication technique is also described in which the proof mass is defined by an epitaxial layer.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/14131

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G01P 15/00

US CL :073/514.36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,008,774 A (BULLIS ET AL) 16 April 1991, see entire document.	1-11
Y	US 4,495,820 A (SHIMADA ET AL) 29 January 1985, col. 4, lines 55-60, FIG. 2.	1-4, 7
A	US 4,426,768 A (BLACK ET AL) 24 January 1984.	1-11
A	US 4,943,032 A (ZDEBLICK) 24 July 1990.	1-11

Further documents are listed in the continuation of Box C.

See patent family annex.

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International application No.

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B. FIELDS SEARCHED

Minimum documentation searched

Classification System: U.S.

073/514.16, 514.17, 514.18, 514.23, 514.32, 514.36, 777; 257/415; 310/309; 324/687, 688; 361/280, 283.1, 283.2, 283.3, 283.4, 290, 291; 437/148, 228SEN, 901, 921, 927, DIG159

B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

USPTO APS

search terms: silicon, substrate, mass, weight, proof, pendulum, electrode, terminal, pad, epitaxial, glass, layer, plate, wafer, sensor, accelerometer