

Automotive Electronics

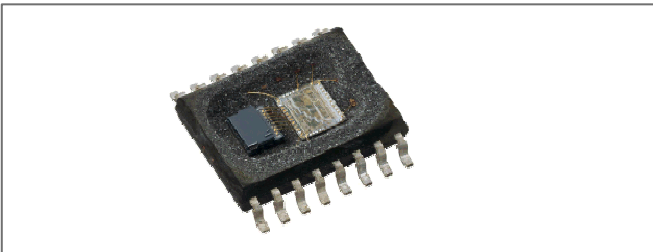
Product Information

2nd Generation Micro-Machined Accelerometers (for Restraint and Safety Systems)



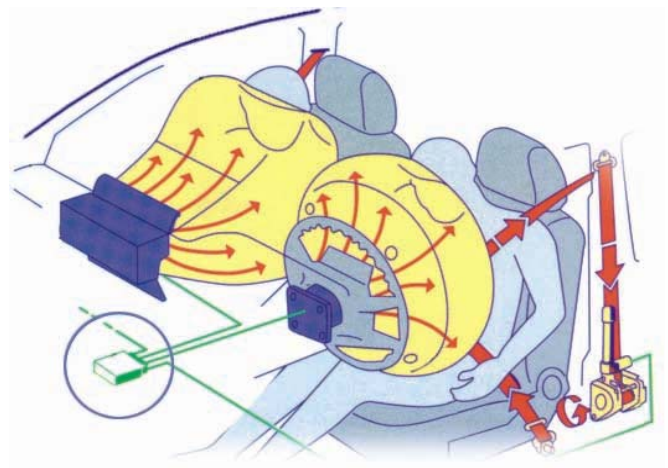
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preliminary



2nd generation Micro-Machined Accelerometers (for restraint and safety systems)

Crash test with deployment of airbag



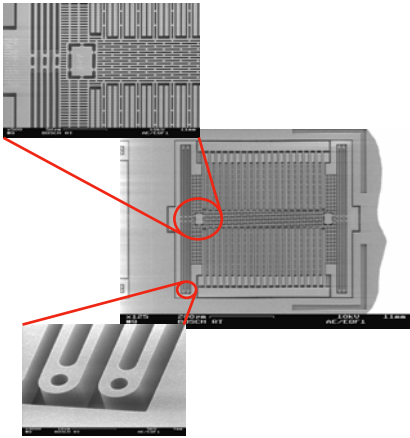
The SMB25x/26x accelerometers cover various acceleration ranges and sensitivity axes:

Type	Range	Sensitivity Axes
SMB252	±35g	X (single axis)
SMB262		X, Y (dual axis)
SMB253	±50g	X (single axis)
SMB263		X, Y (dual axis)
SMB254	±70g	X (single axis)
SMB264	x: ±70g y: ±20g	X, Y (dual axis)
SMB256	±100g	X (single axis)
SMB266		X, Y (dual axis)
SMB257	±140g	X (single axis)
SMB258	±200g	X (single axis)

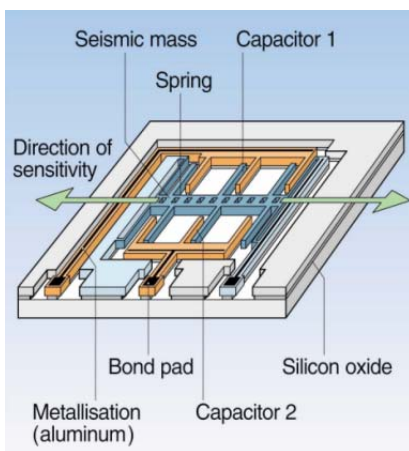
The SMB25x/26x series features

- ▶ Standard SMD SOIC16 packaging
- ▶ Self test
- ▶ Automotive temperature range
- ▶ Ratiometric analog output
- ▶ On-chip 2 pole filter
- ▶ On-chip offset adjustment

Details of micromachined sensing element



Schematic drawing of x- and z-sensor element



Parameter	Min	Nom	Max	Unit
Supply voltage	4.75	5	5.25	V
Supply current				
Single channel		5	6	mA
Dual channel		8	10	mA
Tolerance of sensitivity		4	5	%
Nonlinearity of sensitivity		1	2	%
Cross axis sensitivity			5	%
3db corner frequency	352	400	448	Hz

Product portfolio

The SMB25x/26x series is part of a larger sensor portfolio based on a single manufacturing technology. The portfolio consists of the following sensors:

- ▶ Peripheral Airbag Sensors/Upfront Sensors SMB180/SMB190 with acceleration ranges from $\pm 50g$ to $\pm 200g$
- ▶ Gyroscopes SMG06x for rollover and navigation applications with measurement range of $\pm 250^\circ/s$ and $\pm 80^\circ/s$

Working principle

The common sensing principle of the accelerometers is capacitive. An acceleration in the lateral direction deflects the proof mass that is suspended by folded springs in the x-sensing element. One set of electrodes is attached to the proof mass and moves with acceleration. These movable electrodes form capacitors with two sets of fixed electrodes opposing them with a small air gap in between. The use of such a differential capacitive arrangement with two capacitors reduces the nonlinearity of the transfer function of the device. Over-range stops are implemented for shock protection that avoids the direct contact of the fingers at large accelerations. The mechanical sensitivity (in fF/g) can be adjusted by the thickness and/or the length of the springs.

The differential capacitance signal is evaluated by an ASIC which is electrically connected to the sensor by chip-to-chip wire bonds. A change of C1 and C2 is detected and transformed into a corresponding analog voltage by a capacitance/ voltage converter.

Contact

Robert Bosch GmbH
Sales Semiconductors
Postbox 13 42
72703 Reutlingen
Germany
Tel.: +49 7121 35-2179
Fax: +49 7121 35-2170

Robert Bosch Corporation
Component Sales
38000 Hills Tech Drive
Farmington Hills, MI 48331
USA
Tel.: +1 248 876-7441
Fax: +1 248 848-2818

Robert Bosch K.K.
Component Sales
9-1, Ushikubo 3-chome
Tsuzuki-ku, Yokohama 224
Japan
Tel.: +81 45 9 12-83 01
Fax: +81 45 9 12-95 73

E-Mail: bosch.semiconductors@de.bosch.com

Internet: www.bosch-semiconductors.de

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