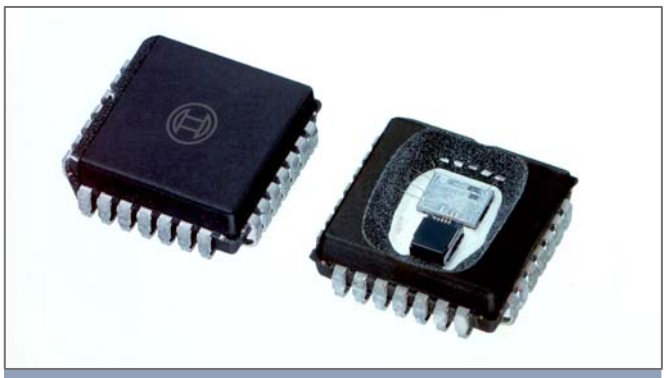
Automotive Electronics

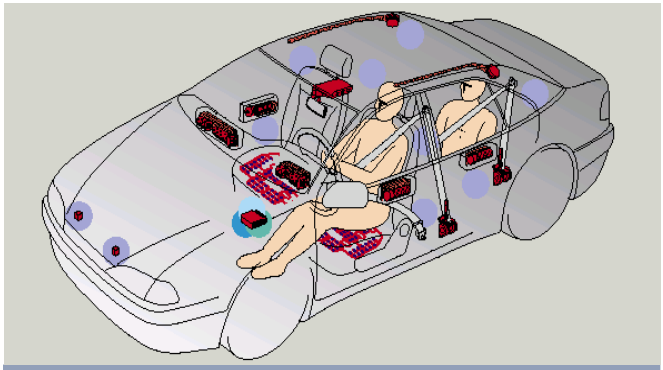
Product Information
Accelerometers for satellite sensor with PAS3-protocol (for Side & Front Crash Sensing)

BOSCH
Invented for life

preliminary



PLCC sensor with sensing element and ASIC



Front-/ Side- and Central Acceleration Sensors

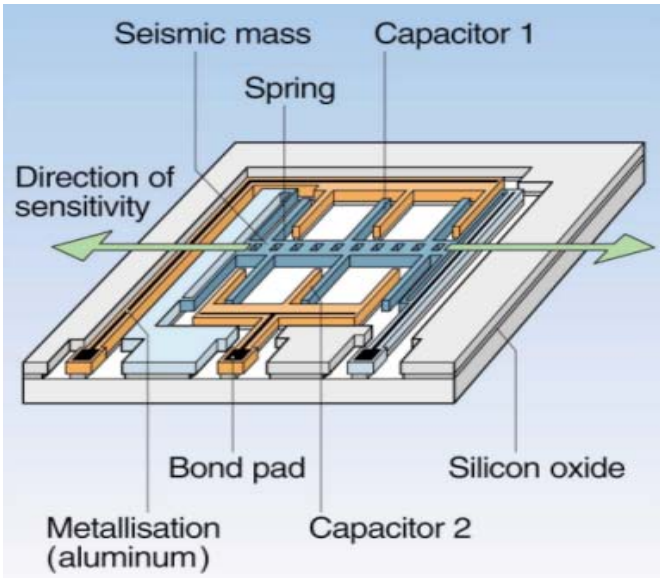
Main features of the sensor:

- 2-wire current interface
- Digital transmission of acceleration data
- Available measurement range:
  SMB120D: ±50g
  SMB124D: ±100g
  SMB172D: ±200g
- 400 Hz 3-pole Bessel filter
- Full power-on self test of sensor and ASIC
- Micromachined sensor element & ASIC in a surface mount standard PLCC28 housing
- Only 5 external components required

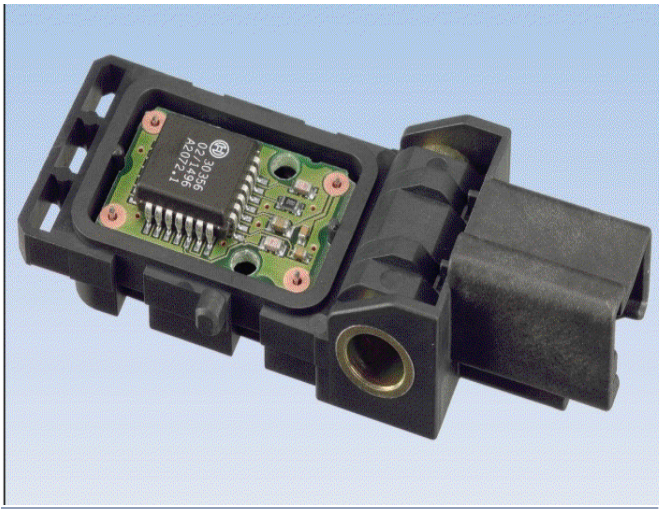
New technical concepts and sensor elements are used to meet the rapidly growing standards of passenger safety in modern passenger cars.
The recent development of smart airbag deployment, combined with early crash sensing and crash severity sensing, signifies the subsequent step after the application of the side airbag.

For the deployment of side airbags, a firing decision has to be made within just a few milliseconds. The satellite sensor, located on the outer body of the car, is able to transmit high speed acceleration signals directly from the location of the impact.
In a different application, the signals from upfront sensors help to determine the severity of frontal crashes, an important input for the deployment of "smart airbags".

The sensor consists a sensing element and an ASIC for signal evaluation and data communication based on PAS3 (Peripheral Acceleration Sensor)- protocol.
The sensing element is produced in Bosch`s micromachining technology, proven in millions of passenger cars. The ASIC is especially designed to meet the stringent requirements in the automotive environment.
Both micro-machined sensor element and ASIC are mounted in a low-cost surface mount standard PLCC28 housing. A complete sensor requires just some additional discrete components.



Schematic drawing of x-sensor element



Example for a complete satelite sensor module

The satellite sensors use a two-wire current interface for digital transmission of acceleration data to the central ECU. The use of a current interface offers high immunity against emission of electromagnetic radiation.
A logic "low" signal is represented by the 7 mA quiescent current of the satellite, a logic "high" by additionally sinked 20mA.
The Manchester coded serial data transmission and the parity Bit provide additional safety for the communication.
A new 8-Bit data word is transmitted any 230 microseconds. The data contains measured acceleration values or status of the satellite sensor.

The ASIC in the sensor module includes the analog signal evaluation for the additional capacitor type micromachined accelerometer, a 400Hz 3-pole low pass filter, and an 8 Bit A/D converter.
A state machine in the digital part of the electronics is controlling the communication to the central ECU, the internal offset regulation, power on self test and the error handling.

Different types of the receiver ASIC' s are available to the interface two or more satellite sensors to the microcontroller in the central airbag ECU.

Parameter	Min.	Nom.	Max	Unit
Operating temp. 50g / 100g 200g	 -40 -40		 +85 +125	 °C °C
Supply current Sink current	4 17	7 20	10 26	mA mA
Tolerance of sensitivity (overall) 50g / 100g 200g		 5 10	 9 15	 % %
Nonlinearity of sensitivity		0.5	2	%
Cross axis sensitivity			5	%

Contact

Robert Bosch GmbH
Sales Semiconductors
Postbox 13 42
72703 Reutlingen
Germany
Tel.: +49 7121 35-2979
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:

Internet: www.bosch-semiconductors.de