

Automotive Electronics

Product Information

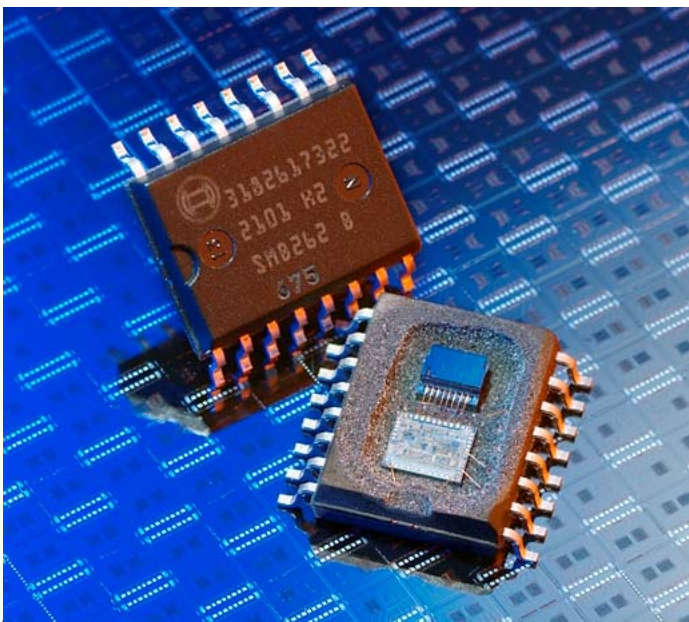
Accelerometers for satellite sensor with PAS4-protocol (for Side & Front Crash Sensing)



BOSCH

Invented for life

Preliminary



SOIC sensor with sensing element and ASIC

Features

- ▶ 2-wire current interface
- ▶ Digital transmission of acceleration data
- ▶ Available measurement range:
SMB18x: $\pm 50g$ and $\pm 100g$
SMB190: $\pm 200g$
- ▶ 400 Hz 3-pole Bessel filter
- ▶ Full power-on self test of sensor and ASIC
- ▶ Micromachined sensor element & ASIC in a surface mount standard SOIC16 housing
- ▶ Small number of external components
- ▶ Unique serial part number transmittable

General

New technical concepts and sensor elements are used to meet the rapidly growing standards of passenger safety in modern passenger cars.

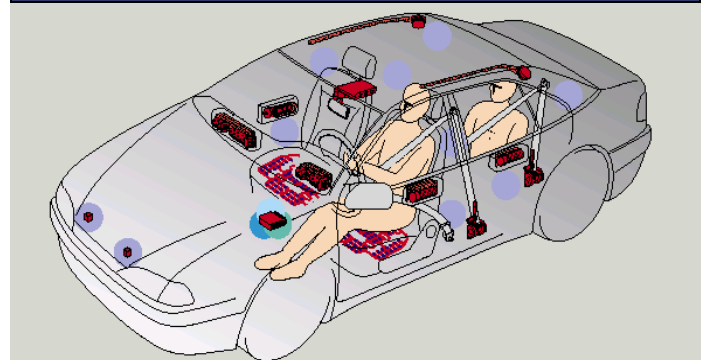
The recent development of smart airbag deployment, combined with early crash sensing and crash severity sensing, signifies the subsequent step after the application of the side airbag.

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 of a sensing element and an ASIC for signal evaluation and data communication based on PAS4 (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 SOIC16 housing. A complete sensor requires just some additional discrete components.

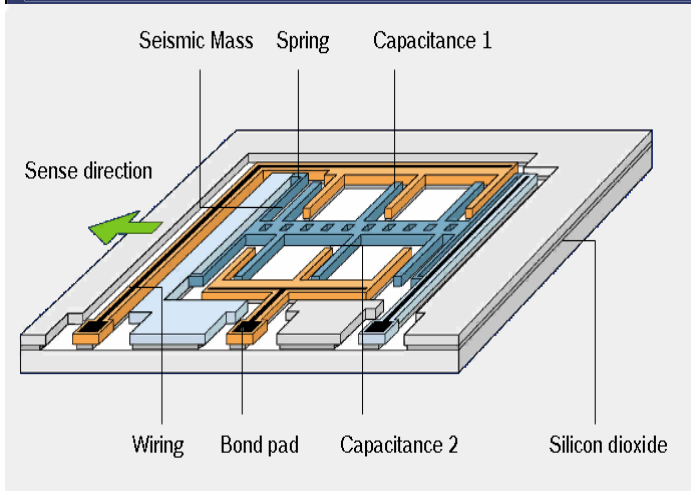
Front-/ Side- and Central Acceleration Sensors



Product	Range	Sensitivity Axes
SMB180	±100g	
SMB181	±50g	
SMB190	±200g	

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

Working Principle



Portfolio

The SMB18x/SMB19x acceleration sensors are part of a larger sensor portfolio. The portfolio consisting of pressure sensors, acceleration sensors, yaw rate sensors and CO₂ sensors for occupant safety systems, navigation applications, active suspension systems, tire pressure monitoring, A/C systems, or motor management.

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The 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 provides additional safety for the communication. A new 10-Bit data word is transmitted any 228 microseconds. The data contains measured 8-Bit acceleration values and digital information 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 interface two or more satellite sensors to the microcontroller in the central airbag ECU.

Example for a complete satellite sensor module

