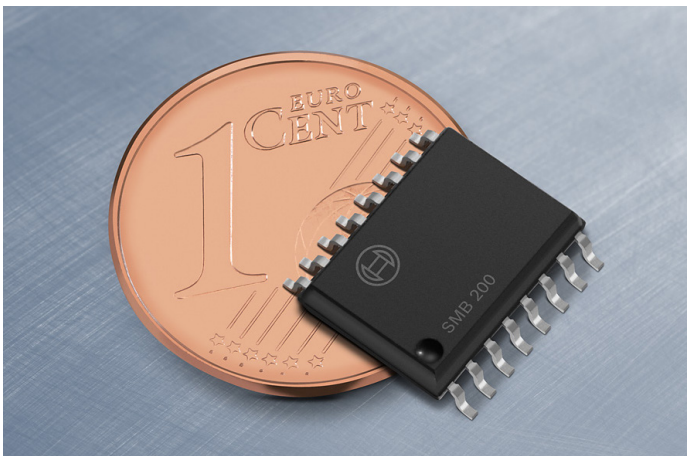


Automotive Electronics

Low-g accelerometer for rollover applications SMB200



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Acceleration sensor SMB200 for roll-over sensing

Customer benefit / features:

- ▶ Dual-axis (a_x/a_z) accelerometer with a measurement range ± 4.8 g for both channels
- ▶ Bidirectional digital 16 bit SPI-Interface
- ▶ 10 bit resolution of acceleration data
- ▶ 52 Hz on-chip digital low-pass filter (approximating 3 pole-Bessel filter characteristic)
- ▶ Slow on-chip offset regulation
- ▶ Full self-test capability; triggerable positive/negative test response
- ▶ Non-ratiometric output
- ▶ Uses 2 MHz external oscillator clock
- ▶ RoHS compliant

Overview

The SMB200 accelerometer is especially designed for passive safety applications like rollover detection to measure the vertical and lateral accelerations of the vehicle during a rollover event for improved system performance. Especially in combination with the SMG10x (Bosch angular rate sensor for rollover applications) an ideal sensor combination for a complete rollover system is formed.

The sensors consist of a micromechanical (MEMS) sensor element and a signal processing ASIC packaged together in a molded SMD plastic housing for surface mounting.

Product description

The SMB200 is a dual-axis (a_x/a_z) accelerometer for measuring in-plane (x-axis) and out-of-plane (z-axis) acceleration with a full scale measurement range of ± 4.8 g for each channel.

Full self-test capability and digital data transmission via a bidirectional Serial Peripheral Interface (SPI) ensure high signal reliability and quality as demanded from most safety critical applications.

A fast on-chip offset adjustment during power-on and a slow on-chip offset cancellation for continuous regulation is possible via SPI commands.

The sensor is applicable in a broad temperature range from -40 °C up to $+105$ °C and operates with 3.3 V (digital supply voltage) and 5 V (analog supply voltage). The sensor output signal itself is independent of the supply voltage (non-ratiometric output).

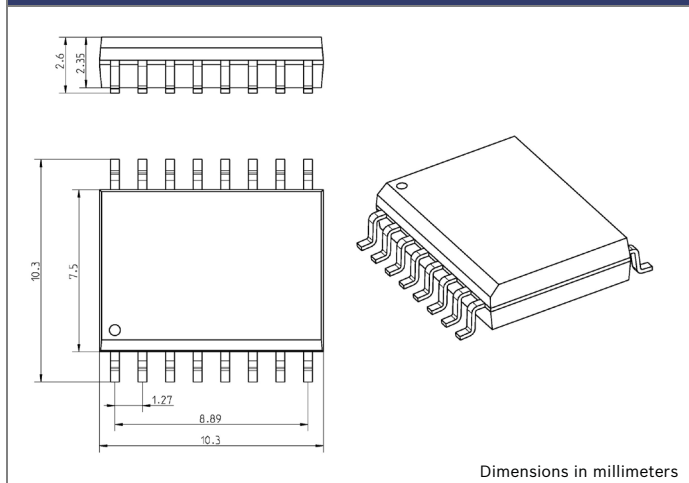
Parameters SMB200**Measurement and functional characteristics**

Full scale dynamic range	±480 LSB
Resolution	10 bit
Sensitivity	100 LSB/g
Sensitivity tolerance (maximum ratings)	< ±9 % (a _x) < ±10 % (a _z)
Non-linearity of sensitivity	±1 % of FS
Noise	< 1.5 LSB rms
-3dB cutoff frequency ¹	52 Hz
Cross axis sensitivity (max.)	< 5 %

Operating conditions

Analog supply voltage ¹	5 V
Digital supply voltage ¹	3.3 V
Supply current max.	10 mA
Operating temperature	-40 °C...+105 °C
External clock frequency ¹	2 MHz

1) Nominal values

Outline SOIC16w package**Working principle**

The acceleration sensor SMB200 is manufactured by using surface micromachining technology. The acceleration sensor features suspended free moving comb-like seismic mass elements and fixed counter-electrodes. As a result of external forces acting on the vehicle, deflections of the seismic masses along the sensitive axis generate changes in system capacitance. These changes are detected using a differential measurement principle.

Interface

The sensor communicates via a bidirectional digital 16 bit Serial Peripheral Interface (SPI) with 10 bit resolution of acceleration data.

Package

The SMB200 is packaged in an easy mountable and RoHS compliant SOIC16-wide housing.

Portfolio

The SMB200 sensor is part of a larger sensor portfolio. The portfolio consists of acceleration sensors, angular rate sensors, pressure sensors, and combined inertial sensors for occupant safety systems, vehicle dynamics control VDC, active suspension systems, motor management, transmission control systems, and navigation.

Bosch has been active in the field of micro-electro-mechanical systems (MEMS) for more than 20 years, and is established as one of the pioneers of this technology. With more than 1000 MEMS patents, hundreds of engineers in this field, and more than 3 billion MEMS sensors shipped to date, Bosch is the global market leader for MEMS sensors.

For more information about automotive MEMS sensors, visit www.bosch-sensors.com.

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