

Triaxial Analog Acceleration Sensor **SMB363**

Bosch Sensortec



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Triaxial Acceleration Sensor SMB363

General Description

The SMB363 is a triaxial low-g acceleration sensor for consumer market applications. It allows measurements of static as well as dynamic accelerations. Due to its 3 perpendicular axes it provides the absolute orientation in a gravity field. As all other Bosch inertial sensors, it is a two-chip arrangement. An application-specific IC evaluates the output of a three-channel micromechanical acceleration-sensing element that works according to the differential capacitance principle.

The SMB363 is based on automotive proven Robert Bosch technology for silicon surface micro-machining processes. This has been proven in more than 100 million Bosch accelerometers so far.

The SMB363 senses tilt, motion and vibration in cell phones, game controllers, handhelds, computer peripherals, man-machine interfaces and virtual reality features.

Applications based on low-g Sensing

- ▶ Gaming
- ▶ Free fall detection
- ▶ Data entry
- ▶ Menu and cursor control
- ▶ Tilt-based scrolling
- ▶ Automatic display orientation
- ▶ Navigation
- ▶ Context awareness

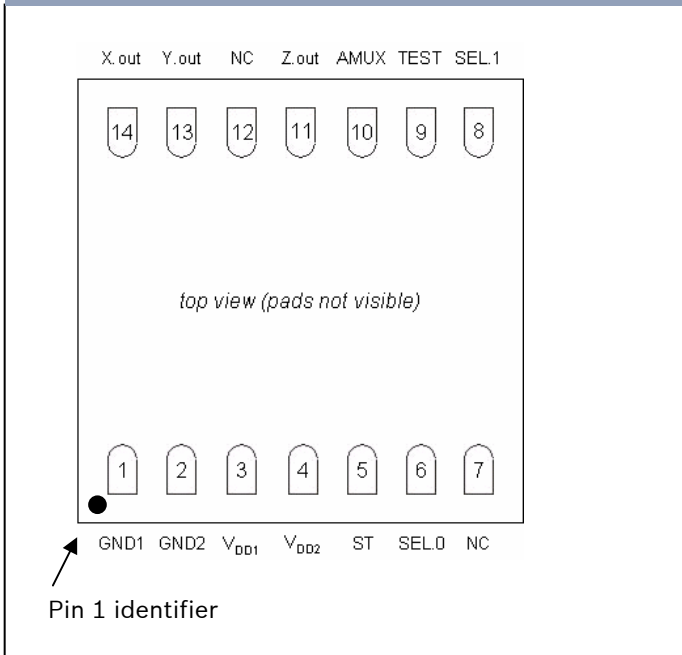
Key Features SMB363

- ▶ Acceleration range: ± 2 g
- ▶ Fully calibrated
- ▶ Ultra-low power ASIC: 200 μ A current consumption in operation at V_{DD} 2.5 V
- ▶ 200 μ g noise / $\sqrt{\text{Hz}}$
- ▶ 3 parallel analog outputs
- ▶ 1 serial multiplexed analog output
- ▶ 1 ms wake-up time from standby to operation
- ▶ Full selftest capability
- ▶ QFN package (footprint 4x4 mm² height 1,2 mm)
- ▶ RoHS compliance

Triaxial Acceleration Sensor – SMB363

Supply voltage range	2,3 – 3,5 V
Supply voltage typical	2,5 V
Temperature range	-40-85°C (operational)
Measurement range	± 2 g
Current consumption	200 μ A (operation mode) 1 μ A (standby mode)
Sensitivity axes x/y/z	$V_{DD} / 5$ per 1 g
0g-Voltage	$V_{DD} / 2$
Offset temperature drift	± 2 mg/K
Nonlinearity	$\pm 0,5$ %FS
Cross Axis Sensitivity	$\pm 0,5$ %
Noise	200 μ g $\sqrt{\text{Hz}}$
Bandwidth	1.0 kHz (first order filter)

Triaxial Acceleration Sensor – SMB363: Pin Configuration



Sensor Operation

The SMB363 measures in a total range of $\pm 2g$. Thus, the sensor provides 3 parallel analog output signals, corresponding to the x-, y-, and z direction. By setting the SEL.0 and SEL.1 pins to logic low or high it is possible to multiplex these parallel output signals to one additional serial output pin (AMUX pin). If both SEL pins are set to logic high, the sensor can be set from operation mode into standby mode.

In dependence of the chosen supply voltage V_{DD} (2.3 to 3.5 V) the sensor provides a fully radiometric output signal of $V_{DD} / 5$ per g and a zero-g voltage of $V_{DD} / 2$. The current consumption in operation is typically 200 μA and a supply voltage of $V_{DD} = 2,5V$.

A first order low pass filter with a pole-frequency limited to 1 kHz is included to provide preconditioning of the measured analog signals. Furthermore, a customized cut-off frequency for each axis can easily be realized by connecting the corresponding output pin to an external capacitor.

The sensor is available in a standard SMD QFN package with a footprint of 4 x 4 mm² and a height of 1.2 mm.

Bosch is the world market leader for acceleration sensors in automotive applications. The SMB363 offers this high experience and robustness for consumer applications.

Bosch Sensortec is a newly founded subsidiary of Bosch. It focuses on application and marketing of micromechanical components for all markets except the automotive.

Please contact us for further details. We are happy to provide you more information.

Pin	Name	Digital Analog	Description
01	GND1	A	Ground Connection Pin 1
02	GND2	A	Ground Connection Pin 2
03	VDD1	A in	Supply Voltage Connection Pin 1
04	VDD2	A in	Supply Voltage Connection Pin 2
05	ST	D in	Self Test Activation Pin
06	SEL.0	D in/out	Channel Multiplexer Selection Pin 1
07	NC	--	Not connected.
08	SEL.1	D in	Channel Multiplexer Selection Pin 2
09	TEST	D in/out	Do not connect!
10	AMUX	A out	Channel Multiplexer Serial Output Pin
11	Z.out	A out	Z Acceleration Parallel Output Pin
12	NC	--	Not connected.
13	Y.out	A out	Y Acceleration Parallel Output Pin
14	X.out	A out	X Acceleration Parallel Output Pin

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