

Triaxial analog acceleration sensor

SMB363

Bosch Sensortec



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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 with 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 the well-established Robert Bosch automotive technology for silicon surface micro-machining processes. This has been proven in more than 100 million Bosch accelerometers so far.

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

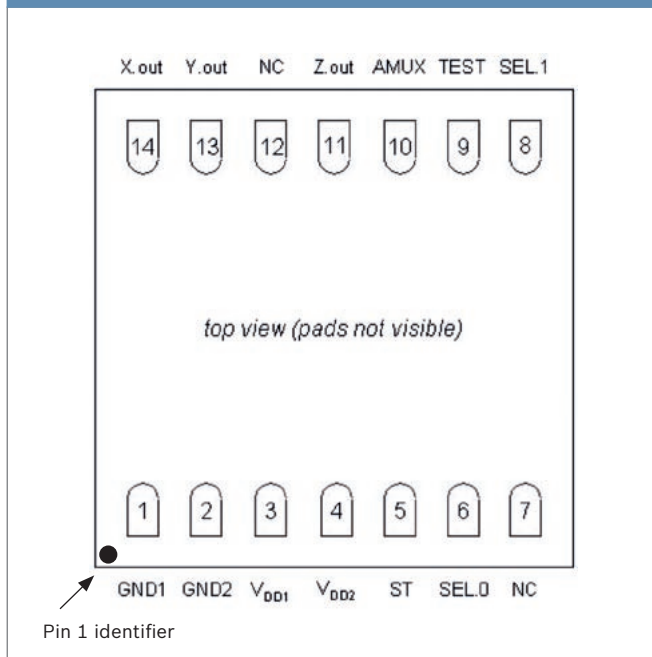
- ▶ Low-g acceleration range
- ▶ Fully calibrated
- ▶ Ultra low-power sensor module
- ▶ Standby mode
- ▶ 3 parallel analog outputs
- ▶ 1 additional multiplexed serial analog output
- ▶ 1ms wake-up time from standby to operation
- ▶ Full self-test capability
- ▶ Small QFN package (footprint 4 mm x 4 mm, height 1.2 mm)
- ▶ RoHS compliant

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

Triaxial acceleration sensor – SMB363

Measurement range	$\pm 2\text{ g}$
Sensitivity axes x/y/z	$V_{DD}/5$ per 1g
Cross-axis sensitivity	$\pm 0.2\%$ FS
Non-linearity	$\pm 0.5\%$ FS
Zero-g voltage	$V_{DD}/2$
Zero-g voltage temp. drift	$\pm 2\text{ mg/K}$
Noise	$160\mu\text{g}/\sqrt{\text{Hz}}$
Bandwidth	1.0kHz (first order low-pass filter)
Supply voltage range	2.3 ... 3.5V
Typical supply voltage	2.5V
Current consumption	200 μA (operation mode) 1 μA (standby mode)
Temperature range	-40 ... +85°C (operational)

Triaxial acceleration sensor – SMB363: Pin-out configuration



Pin	Name	Digital Analog	Description
01	GND1	A	Ground connection pin 1
02	GND2	A	Ground connection pin 2
03	V _{DD1}	A in	Supply voltage connection pin 1
04	V _{DD2}	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

Note: Pin configuration is subject to change

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 directions. 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} (2.3V to 3.5V), the sensor provides a fully ratiometric output signal of $V_{DD}/5$ per g and a zero-g voltage of $V_{DD}/2$. The current consumption in operation is typically only 200 μ A.

A first order low pass filter with a pole frequency limited to 1kHz 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 4mm x 4mm and a height of merely 1.2mm.

Bosch is the world market leader for acceleration sensors in automotive applications. The SMB363 offers this high level of experience and robustness for consumer applications. Bosch Sensortec is a newly-founded subsidiary of Bosch. It focuses on the application and marketing of micromechanical components for all markets except the automotive industry.

Please contact us for further details. We are happy to provide you with further information upon request.

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