Triaxial Acceleration Sensor SMB365

Bosch Sensortec

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General Description

The SMB365 is a triaxial low-g acceleration sensor for consumer market applications. It allows measurements of static as well as dynamic accelerations. Due to its 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 SMB365 is based on automotive proven Robert Bosch technology for silicon surface micro-machining processes. This has been proven in more than 200 million Bosch accelerometers so far.

The SMB365 senses tilt, motion and vibration in cell phones, handhelds, computer peripherals, man-machine interfaces, virtual reality features and game controllers.

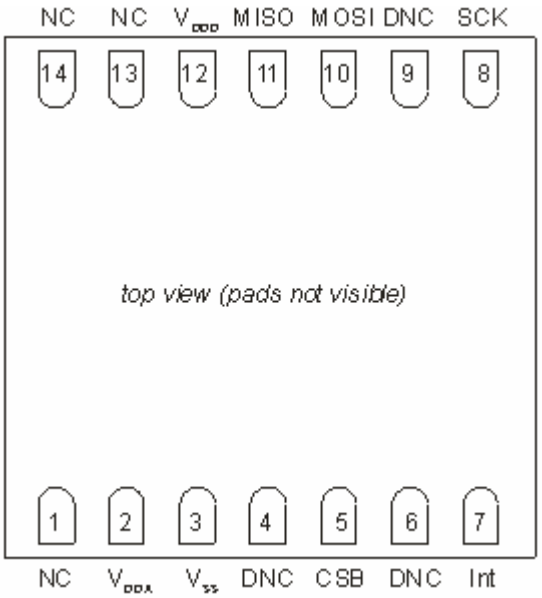
Applications based on low-g Sensing
Free fall detection
Data entry
Menu and cursor control
Tilt-based scrolling
Automatic display orientation
Navigation
Context awareness
Gaming

Key Features SMB365
Switchable g-range (2 g/10 g)
Ultra-low power ASIC: 600 µA at V_{dd} 2.5 V
4mg resolution at 50 Hz bandwidth
SPI interface
Interrupt feature for mobile wake-up or free-fall detection
Full selftest capability
QFN package (footprint 4x4 mm^2, height 1.2 mm)
RoHS compliance

Technical Data

Triaxial Acceleration Sensor – SMB365	
Sensitivity axes	x/y/z
Measurement range	±2g, ±10g (switchable via SPI)
Sensitivity (calibrated)	2g: 256 LSB/g; 10g: 51 LSB/g
Resolution	4 mg
Nonlinearity	±0.5%FS
Axis Mixing	0.2%
0g-Offset (calibrated)	±40 mg
Offset temperature drift	2 mg/°C
Noise	<4 mg rms
Bandwidth	50 Hz (first order filter)
Digital Input/ Output	SPI
Supply Voltage	2.3-3.6 V
Current consumption	600 µA (10bit resolution) 500 µA (7bit resolution)
Idle Current	5 µA
Temperature range	-40-85°C (operational)

Triaxial Acceleration Sensor SMB365 – Pin Configuration



Pin No.	Name	Function
1	NC	not connected
2	VDDA	ASIC analog core supply
3	VSS	ASIC ground
4	DNC	do not connect
5	CSB	SPI select (chip select bar)
6	DNC	do not connect
7	INT	Interrupt output signal
8	SCK	SPI clock
9	DNC	do not connect
10	MOSI	SPI output (master out slave in)
11	MISO	SPI input (master in slave out)
12	VDDD	ASIC digital core supply
13	NC	not connected
14	NC	not connected

Note: Pin configuration is subject to change.

Sensor Operation

The SMB365 provides a digital 10bit output signal in SPI format. Via SPI command the full measurement range can be chosen to 2g or 10g. A first-order filter with a pole-frequency of 50Hz is included to provide preconditioning of the measured acceleration signal. Typical noise level and quantization lead to a sensitivity resolution of 4mg or an accuracy of 0.3° in an inclination sensing application, respectively. The current consumption is typically 600µA at a supply voltage of 2.5V. Furthermore, the sensor can be switched into a low-power mode where it informs the host system about an acceleration change via an interrupt pin. This feature can be used to wake-up the host system from a sleep mode or to indicate “free fall”.

The sensor also features full self-test capability. It is activated via SPI command which results in a physical deflection of the seismic mass in the sensing element due to an electrostatic force. Thus, it provides full testing of the complete signal evaluation path including the micromachined sensor structure and the evaluation ASIC.

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

Bosch is the world market leader for acceleration sensors in automotive applications. The SMB365 offers this high experience and reliability 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.

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Version_1.1_062006