

BMC050

eCompass (6-axes electronic compass)

GENERAL DESCRIPTION

With leading-edge digital accelerometers and pressure sensors Bosch Sensortec is a well-established supplier of MEMS sensors for the mobile world.

Backed by Bosch's huge technology and IP portfolio, Bosch Sensortec is now introducing the BMC050, a latest generation fully compensated electronic compass that delivers excellent performance in very small size.

The BMC050 allows for determining precise tilt-compensated geomagnetic heading information and for providing accurate acceleration sensor data.

The BMC050 6-axis, digital eCompass comes in a small 3 mm x 3 mm x 0.95 mm LGA package. It comprises Bosch Sensortec proprietary FlipCore geo-magnetic sensing technology with Bosch Sensortec's well-proven, leading edge MEMS sensor technology for the accelerometer.

TECHNICAL SPECIFICATIONS

BMC050 Technical data

Digital interfaces	I ² C, SPI (3/4 wire) 4 interrupt pins
Current consumption	
– regular mode	540 µA @ 10 Hz
– low-power mode	190 µA @ 10 Hz
Supply voltage	1.62 ... 3.6 V
Supply voltage I/O	1.2 ... 3.6 V
Operating temperature	-40 ... +85 °C
LGA package	2 x 2 x 0.95 mm ³

Geomagnetic sensor

Measurement range	±1000 µT
Resolution	0.3 µT

Acceleration sensor

Stand-alone operation	supported
Resolution	10 bit
Programmable g-range	±2 g; ±4 g; ±8 g; ±16 g
Zero-g offset	±80 mg
Sensitivity tolerance	±4 %

BMC050 TARGET APPLICATIONS

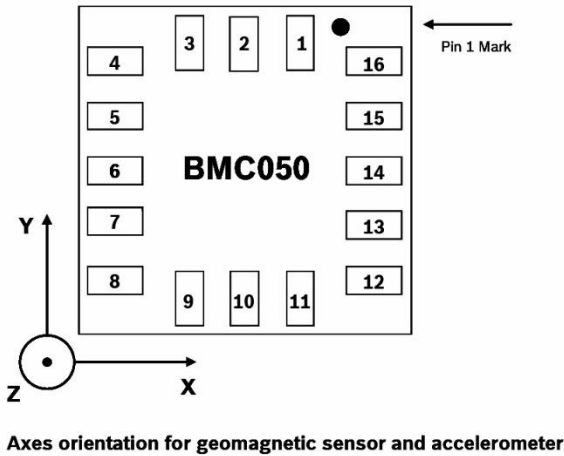
The BMC050 provides accurate tilt-compensated orientation information for navigation (GPS enhancement / map rotation), for location based services (LBS) or augmented reality and in combination with a pressure sensor for indoor navigation. Due to its small footprint, its low power consumption and its high level of functional integration, the BMC050 is ideally suited to fit into all kind of modern personal mobile devices, like mobile telephones, tablet PCs, notebooks, portable media players, etc.

SENSOR FEATURES

The BMC050 eCompass measures the earth's geomagnetic field in three dimensions (3-axis) and it measures dynamic and static acceleration, and thus also the tilt of the sensor by the help of the accelerometer (3-axis). The tilt information is required in situations where the geomagnetic sensor can't be held flat, i.e. parallel to the earth's surface.

By combining this output information of the BMC050 the eCompass software produces precise heading information, independent from the orientation of the device that the BMC050 is integrated in.

In addition to that, the accelerometer integrated within the BMC050 provides all the precision and functionality of Bosch Sensortec's leading-edge 10 bit digital accelerometer BMA250.



INTEGRATED INTERRUPT ENGINE

Acceleration sensor:

- ▶ Data-ready (e.g. for processor synchronization)
- ▶ Any-motion (slope) detection (e.g. for wake-up)
- ▶ Tap sensing (e.g. for tap-sensitive UI control)
- ▶ Orientation change recognition (e.g. for portrait/landscape & face-up/face-down switching)
- ▶ Flat detection (e.g. for position sensitive switching)
- ▶ Low-g/high-g detection (e.g. for shock and free-fall detection)

Geomagnetic Sensor:

- ▶ Overflow detection
- ▶ Low-g / high-g threshold detection

Pin configuration (top view)

TECHNICAL SPECIFICATIONS

Pin configuration

Pin	Name	Sensor	Description
1	INT2	Acc.	Interrupt output #2
2	PS1	Acc.	Protocol select #1
3	PS2	Mag.	Protocol select #2
4	INT3	Mag.	Interrupt output #3
5	CSB1	Acc.	Chip select #1
6	CSB2	Mag.	Chip select #2
7	GND	Mag. + Acc.	Ground
8	GND	Mag. + Acc.	Ground
9	DRDY	Mag.	Data ready
10	SDO	Mag. + Acc.	SPI: Data output
11	SDI	Mag. + Acc.	SPI: Data input I ² C: Data
12	GND	Mag. + Acc.	Ground
13	V _{DD}	Mag. + Acc.	Supply voltage
14	V _{DDIO}	Mag. + Acc.	I/O voltage
15	SCK	Mag. + Acc.	Serial clock
16	INT2	Acc.	Interrupt output #1

ECOMPASS SOFTWARE

Bosch Sensortec licenses proprietary leading-edge software supporting the BMC050 to provide high precision.

- ▶ Magnetic heading
- ▶ 3D device orientation
- ▶ Signal quality information
- ▶ In-use calibration

It includes automatic magnetic offset cancellation and accelerometer tilt-compensation.

For more details on software features and licensing conditions, please contact your Bosch Sensortec representative.

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