

BMM150

3-axis digital geomagnetic sensor

Bosch Sensortec



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General description

BMM150 is a low-power and low-noise 3-axis digital geomagnetic sensor to be used in eCompass applications. The 12-pin wafer level chip scale package (WLCSP) with a footprint of only 1.56 x 1.56 mm² and 0.60 mm height provides highest design flexibility to the developer of mobile devices. Applications like virtual reality or gaming on mobile devices such as mobile phones, tablet PCs or portable media players require 9-axis inertial sensing including magnetic heading information. BMM150 combines harmonically with an inertial measurement unit (IMU) consisting of a 3-axis accelerometer and a 3-axis gyroscope like Bosch Sensortec's BMI055. By means of sensor data fusion software tailored to the hardware, also available from Bosch Sensortec, the solution determines the absolute spatial orientation as well as motion vectors with high accuracy and dynamics.

The terrestrial field sensor BMM150 is based on Bosch's high-volume proprietary FlipCore™ technology. Customers benefit from Bosch's renowned high quality and delivery performance.

With its subsidiaries in Korea, Taiwan, China, Japan, the U.S. and Europe Bosch Sensortec provides fast and customer-oriented support.

BMM150 target applications

- ▶ Augmented reality applications and locationbased services
- ▶ Indoor and outdoor navigation
- ▶ Gaming
- ▶ Pointing devices

BMM150	Technical details
Package	WLCSP- (12 pin) 1.56x1.56x0.6 mm ³ 0.4 mm diagonal ball pitch
Temperature range	-40°C ... +85°C
Digital interfaces	I ² C and SPI (2 interrupt pins)
Resolution	0.3µT
Supply voltage	V _{DD} : 1.62V to 3.6V V _{DDIO} : 1.2V to 3.6V
Zero-B offset	±40µT
Non-linearity	<1% FS
Magnetic range (typ.)	±1300µT (x,y-axis) ±2500µT (z-axis)
Avg. current consumption	170 µA (low power preset) 500 µA (normal mode)
Interrupts	New data, magnetic threshold high / low

Sensor features

BMM150 features I²C and SPI (3-wire/4-wire) digital, serial interfaces. The on-chip interrupt controller sends signals to the host controller when the sensor data have changed or when customer-defined threshold values are exceeded. In addition, the BMM150 offers four programmable power presets which enable designers to optimize the device for their specific requirements. Minimum power consumption of 170 µA at a data rate of 10 Hz can be achieved in the low power preset. The sensor can also be operated in the high accuracy preset – resulting in 0.3 µT RMS-noise – for applications requiring high precision measurement.

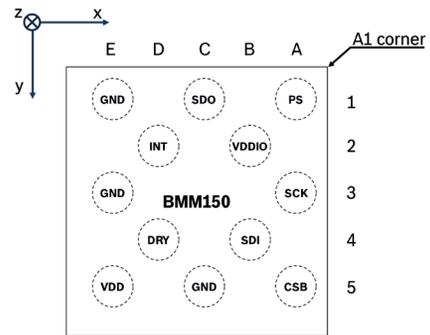
New features of BMM150

Backed by Bosch’s huge technology and IP portfolio, Bosch Sensortec now introduces BMM150 in the premium segment of stand-alone geomagnetic sensors. Since most permanent magnets on the target PCB such as speaker magnets or camera modules are magnetized perpendicular to the PCB plane a high magnetic measurement is needed in z-direction. With an extended measurement range of $\pm 1300 \mu\text{T}$ (x-, y- axis) and $\pm 2500 \mu\text{T}$ (z-axis), BMM150 gives additional freedom in the placement of the sensor on the PCB.

About Bosch Sensortec

Bosch Sensortec GmbH is a fully owned subsidiary of Robert Bosch GmbH. It develops and markets micro-mechanical sensors for consumer electronics, mobile phones, safety systems, industrial technology and logistics. The product portfolio includes triaxial geomagnetic and acceleration sensors, triaxial gyroscopes, barometric pressure sensors and a comprehensive software portfolio for various applications. Since its foundation in 2005 Bosch Sensortec emerged as the technology leader in the addressed markets. The Bosch Group has been the global market leader for MEMS sensors since 1998 and has to date sold more than 2 billion MEMS sensors.

Pin configuration (top view, pads not visible)



Pin #	Name	Description
E1	GND	Ground
C1	SDO	SPI: Data out
A1	PS	Protocol select
D2	INT	Interrupt output
B2	V _{DDIO}	I/O voltage
E3	GND	Ground
A3	SCK	Serial clock
D4	DRDY	Data ready
B4	SDI	SPI: Data I ² C: Data
E5	V _{DD}	Supply voltage
C5	GND	Ground
A5	CSB	Chip select

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