BMM150

DevLab: I2C BMM150 Magnetometer Sensor

Professional electronic component

v1.0

2025-12-02
Rev. A

PRODUCT OVERVIEW

The BMM150 is a triaxial digital geomagnetic sensor optimized for low-power, high-precision applications. Engineered by Bosch Sensortec, it provides absolute magnetic field measurements along the X, Y, and Z axes, suitable for electronic compassing and inertial navigation tasks. The device integrates seamlessly via I²C or SPI, ensuring compatibility with a wide range of host controllers, including Arduino, ESP32, and Raspberry Pi. Its compact form factor and minimal power profile make it ideal for space- and energy-constrained systems such as wearables, mobile robotics, and UAVs. Built-in compensation algorithms correct soft-iron and hard-iron distortions, supporting reliable heading estimation in real-world environments. When used in conjunction with accelerometers and gyroscopes, the BMM150 enables robust 9DoF sensor fusion for advanced motion tracking and orientation systems.

PRODUCT VIEWS

TOP VIEW

Top View

Component placement and connectors

BOTTOM VIEW

Bottom View

Underside components and connections

KEY TECHNICAL SPECIFICATIONS

POWER SUPPLY

Operating Voltage:	**3.3V**
Supply Current:	**170µA**

CONNECTIVITY

Interfaces:	**I²C, SPI**
Connector:	**Qwiic + Pin Headers**

TECHNICAL FEATURES

Axes: 3 (X, Y, Z)

Measurement Range: ±1300 µT

Resolution: ~0.3 µT

Power Consumption: Ultra-low power consumption for battery-operated devices

Interfaces: I²C and SPI

Operating Voltage (VDD / VDDIO): 3.3 V (regulated internal voltage for sensor operation)

Input Voltage via VCC Pin: 3.6–6.0 V (through onboard voltage regulator)

Operating Temperature: Wide operating range suitable for various environments

Additional Signals:

DRDY (Data Ready)

INT (Programmable Interrupt)

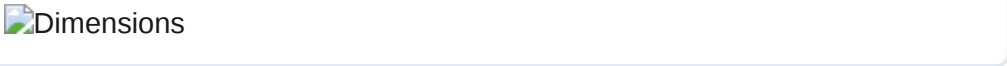
TECHNICAL SPECIFICATIONS

TYPICAL APPLICATIONS

APPLICATION	DESCRIPTION
Electronic Compass	Detects Earth’s magnetic field to determine the device orientation.
Inertial Navigation (INS)	Integrates with accelerometers and gyroscopes to improve position and orientation estimation.
Augmented Reality (AR)	Dynamically adjusts AR content on smart devices based on precise orientation data.
Metal Detection / Proximity Sensing	Monitors magnetic field variations to detect metallic objects and machinery anomalies.
Mobile Robotics and Drones	Provides reliable heading information, essential for indoor navigation and autonomous operation.
Wearables and Portable Devices	Enhances personal navigation in smartwatches, fitness trackers, and other portable devices.
Indoor Geolocation	Improves indoor positioning accuracy by compensating for sensor drift and interference.

HARDWARE DOCUMENTATION

MECHANICAL DIMENSIONS



Physical dimensions and mounting specifications (measurements in millimeters)

SYSTEM TOPOLOGY

Connection topology and system integration diagram

Click image to open in full size

COMPONENT REFERENCE

REF.	DESCRIPTION
IC1	BMM150 Magnetometer
U1	AP2112K 3V3 Regulator
L1	Power On LED
SW1	Dip Switch for Mode and Address Selector
J1	QWIIC Connector (JST 1mm for I2C)
J2	QWIIC Connector (JST 1mm for I2C)
J3	JST Connector 1mm Pitch for SPI
JP1	2.54mm Castellated Holes

CIRCUIT SCHEMATIC

Circuit Schematic

Complete circuit schematic showing all component connections

View Complete Schematic PDF

PIN DESCRIPTION

Detailed pin assignment and electrical specifications

SIGNAL DESCRIPTION

SIGNAL	DESCRIPTION
VCC	Power supply
GND	Ground
SCL	I²C clock
SDA	I²C data
SDO / ADDR	SPI MISO / I²C address select
CS	SPI chip-select (active LOW) / must be HIGH for I²C mode
PS	Protocol select (LOW=I²C, HIGH=SPI)
DRDY	Data-Ready flag (new data available)
INT	Programmable interrupt output (e.g. threshold, flip-over)

PIN CONFIGURATION LAYOUT

Physical connector layout and pin positioning

Pin Configuration Layout

Complete pin configuration diagram showing all connectors, pin assignments, and electrical connections for proper integration

BMM150 v1.0
Professional Technical Datasheet

Date: 2025-12-02
For commercial distribution