



**Industry-leading accuracy,
reliability and resolution**

The Honeywell HMC5883L is an ultra-small sensor designed for low-field magnetic sensing with a digital interface for applications such as low-cost compassing and magnetometry.

Key Benefits

- Low-power requirements
- High-resolution output
- Easy data interface using I²C serial bus
- Reduced costs using Self-Test

Key Applications

- Mobile phones
- Netbooks
- Consumer electronics
- Auto navigation systems
- Personal navigation devices

The HMC5883L is a magnetic sensor in a 3.0x3.0x0.9 mm surface-mount 16-pin leadless chip carrier (LCC) that includes Honeywell's state-of-the-art, high-resolution magneto-resistive sensors with automatic degaussing (demagnetizing) strap drivers, offset cancellation and a 12-bit ADC for high resolution earth field sensing.

Utilizing Honeywell's anisotropic magneto-resistive (AMR) technology, the solid-state HMC5883L features advanced precision in-axis sensitivity and linearity and is designed to measure both the direction and the magnitude of Earth's magnetic fields.

Key product features include:

- **12-bit ADC coupled with low-noise AMR sensors achieves 2-milli gauss resolution in ± 8 gauss fields** – allows for 1 to 2 degree compass heading accuracy.
- **Built-in self-test** – optional feature built into the internal ASIC that can be used to:
 - quickly verify sensor's full functionality without requiring expensive test equipment
 - sensitivity matching from different axes/sensors
 - adjust sensitivity drift due to temperature

- **Low-voltage operations (2.16 to 3.6V) and low-power consumption (100 μ A)** – compatible for battery powered applications.
- **Built-in strap drive circuits** – provides demagnetization of the sensor for each and every measurement, as well as offset compensation for consistent measurement accuracies up to 1 to 2 degrees, and reduced need for recalibration.
- **I²C digital interface** – popular two-wire serial data interface for consumer electronics.
- **Wide magnetic field range (± 8 Oe)** – sensors can be used in strong magnetic field environments with a 1 to 2 degree compass heading accuracy.
- **Software and Algorithm Support** – heading, hard iron, soft iron, and auto calibration libraries are available.
- **Fast 160 Hz Maximum Output Rate** – ideal for pedestrian navigation and LBS applications.

Honeywell's Magnetic Sensors are among the most sensitive and reliable low-field sensors in the industry.

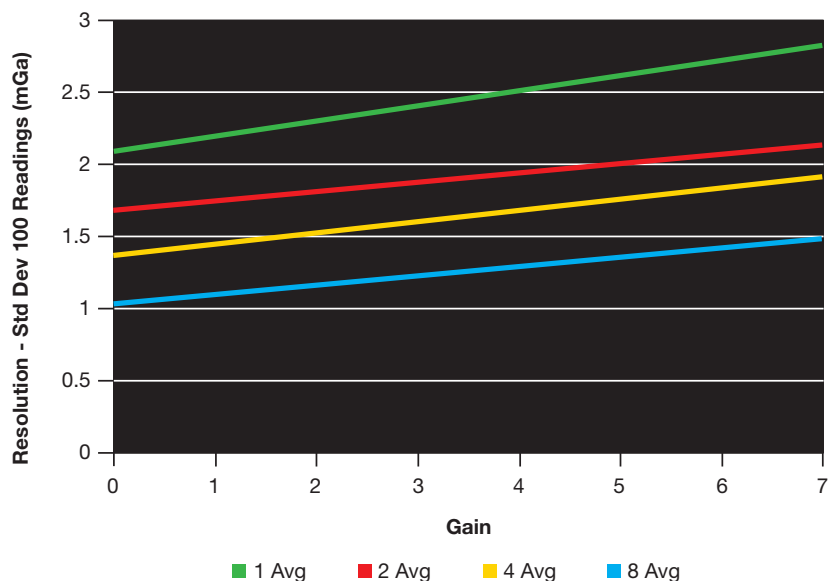
Characteristics	Conditions*	Min.	Typ.	Max.	Units
Power Supply					
Supply Voltage	VDD Referenced to AGND VDDIO Referenced to DGND	2.16 1.71	1.8	3.6 VDD+0.1	volts volts
Average Current Draw	Idle Mode Measurement Mode (7.5 Hz ODR; No measurement average, MA1:MA0 = 00) VDD = 2.5V, VDDIO = 1.8V	– –	2 100	– –	μA μA
Performance					
Field Range	Full scale (FS) – total applied field (Typical)	–8		+8	gauss
Mag-Dynamic Range	3-bit gain control	±1		±8	gauss
Resolution	VDD = 3.0V, GN = 2		2		milli gauss
Linearity	±2.0 gauss input range			0.1	±% FS
Hysteresis	±2.0 gauss input range		±25		ppm
Cross-Axis Sensitivity	Test Conditions: Cross field = 0.5 gauss, Happlied = ±3 gauss		±0.2%		%FS/gauss
Output Data Rate (ODR)	Continuous Measurment Mode Single Measurement Mode	0.75		75 160	Hz Hz
Measurement Period	From receiving command to data ready		6		msec
Turn-on Time	Ready for I ² C commands		200		s
Gain Tolerance	All gain/dynamic range settings		±5		%
I ² C Address	7-bit address 8-bit read address 8-bit write address		0x1E 0x3D 0x3C		hex hex hex
I ² C Rate	Controlled by I ² C Master			400	kHz
I ² C Hysteresis	Hysteresis of Schmitt trigger inputs on SCL and SDA – Fall (VDDIO = 1.8V) Rise (VDDIO = 1.8V)		0.2*VDDIO 0.8*VDDIO		volts volts
Self-Test	X and Y Axes Z Axis		±1.16 ±1.08		gauss
	X and Y Axes (GN = 100) Z Axis (GN = 100)		510		LSb
General					
ESD Voltage	Human Body Model (all pins) CDM			2,000 750	volts
Operating Temperature	Ambient	–30		85	°C
Storage Temperature	Ambient, unbiased	–40		125	°C
Reflow Classification	MSL 3, 260°C Peak Temperature				
Package Size	Length and Width	2.85	3.00	3.15	mm
Package Height		0.8	0.9	1.0	mm

*Tested at 25°C unless stated otherwise.

Performance

The following graph(s) highlight the performance of the HMC5883L.

Typical HMC5883L Resolution



Ordering Information

Order Number	Product
HMC5883L-TR	Tape and Reel 4k pieces/reel



Caution

This part is sensitive to damage by electrostatic discharge. Use ESD precautionary procedures when touching, removing or inserting.

CAUTION: ESDS CAT. 1B

Find out more

For more information on Honeywell's Magnetic Sensors visit us online at www.honeywell.com/magneticsensors or contact us at 1.800.323.8295 (1.763.954.2474 internationally).

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U.S. Patents 4,441,072, 4,533,872, 4,569,742, 4,681,812, 4,847,584 and 6,529,114 apply to the technology described.

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