

Ultra-low power, low voltage Altimeter / barometer module SMD500

Bosch Sensortec



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General description

The SMD500 marks a new generation of high precision digital pressure sensors for consumer applications.

Its ultra-low power, low voltage electronics are optimized for use in mobile phones, PDAs, GPS devices and outdoor equipment. With an altitude noise down to 0.25m, it offers superior performance. The I²C interface allows for easy system integration with a microcontroller.

Robert Bosch is the world market leader for pressure sensors in automotive applications. Based on experience of over 100 million pressure sensors in the field, the SMD500 opens up a new generation of micro-machined pressure sensors.

Typical applications

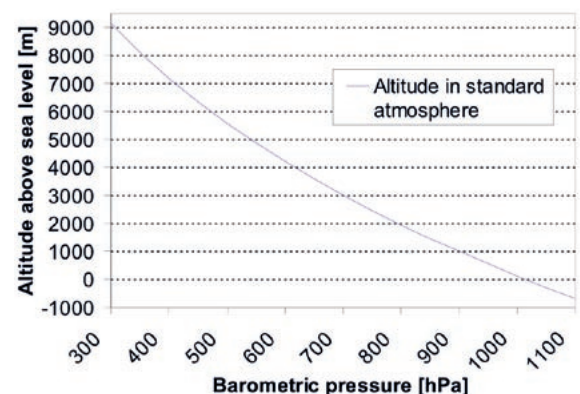
- ▶ Outdoor navigation
- ▶ Dead reckoning
- ▶ Leisure and sports
- ▶ Weather forecast
- ▶ Vertical velocity indication (rise/sink speed)
- ▶ Security systems

Key features SMD500

- ▶ Pressure range 300 ... 1100hPa (+9000 ... -500m)
- ▶ Supply voltage 2.2 ... 3.6V
- ▶ Current consumption (5μA avg. @ 1 sample/sec. 10 μA (high resolution))
- ▶ RMS noise: 0.06hPa (0.5m) std. resolution
0.03hPa (0.25m) high resolution
- ▶ Sigma delta ADC
- ▶ Fully calibrated
- ▶ Temperature measurement included
- ▶ Digital two wire I²C interface
- ▶ Lead-free and RoHS compliant
- ▶ Small footprint LCC8 package

The SMD500 is based on piezoresistive technology for EMC robustness, high accuracy and linearity, as well as long term stability.

Altitude above sea level vs. barometric pressure



Absolute maximum ratings

Storage temperature	-40 ... +125°C
Supply voltage	-0.3 ... 5.0V
ESD rating (HBM)	±2kV
Overpressure	5000hPa

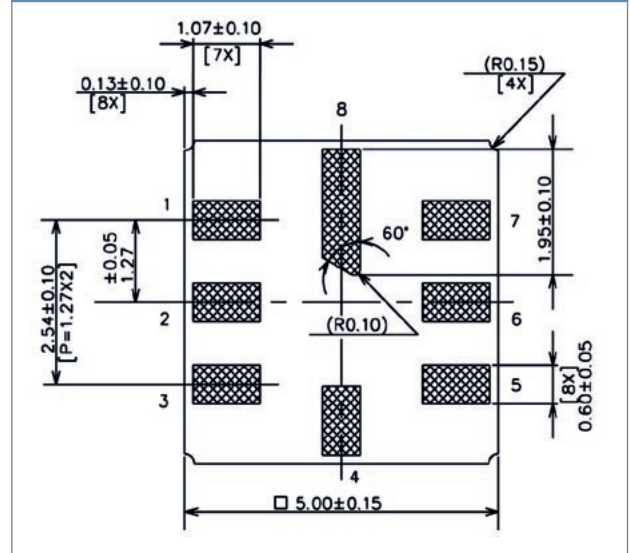
Operating conditions

Temperature, operational full accuracy	-40 ... +85°C 0 ... +65°C
Supply voltage V_{DD}	2.2 ... 3.6V; typ. 3.3V
Standby current	0.7 µA typ.
Avg. current consumption @ 1 Hz data refresh rate	5 µA typ. standard mode 10 µA typ. high res. mode
Pressure range	300 ... 1100 hPa
RMS noise expressed in pressure	0.06 hPa typ. standard 0.03 hPa typ. high res.
RMS noise expressed in altitude	0.5 m typ. standard 0.25 m typ. high res.
Absolute accuracy @ $p = 700 \dots 1100$ hPa, 0 ... +65°C, $V_{DD} = 3.3$ V, MCLK = 32768 Hz	Pressure: ±2.5 hPa max. Temperature: ±2°C max.
Serial data clock	Max. 400 kHz
Master clock frequency (selectable)	32768 Hz ± 3% or 1 MHz ± 3%
Pressure conversion time	34 ms @ 32768 Hz

The SMD500 is designed to be connected directly to the microcontroller of a mobile device via the I²C bus.

The pressure and temperature data each comes as 16-bit and has to be compensated by the calibration data of the PROM of the SMD500.

SMD500 pin-out configuration



Top view LCC8 ceramic package
Dimensions: 5 mm x 5 mm (±0.25 mm) x 1.55 mm (±0.15 mm)

Pin	Name	Description
1	GND	Ground
2	NC	Do not connect
3	V_{DDA}	Power supply analog
4	V_{DD}	Power supply digital
5	MCLK	Master clock input
6	SCL	I ² C serial bus clock input
7	SDA	I ² C serial bus data
8	XCLR	Master clear (low active) input

Bosch Sensortec is a newly-founded subsidiary of Bosch. It focuses on the application and marketing of micromechanical components for all markets except the automotive industry.

Please contact us for further details. We are happy to provide you with further information upon request.

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