BMP085
Digital, barometric pressure sensor

Bosch Sensortec

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General description

The BMP085 is a high-precision, ultra-low power barometric pressure sensor for use in advanced mobile applications.

With an absolute accuracy of 2.5hPa and a noise level of down to 0.03hPa (which is equivalent to an altitude change of merely 0.25m) the BMP085 offers superior performance. At the same time the BMP085 features ultra low power consumption of down to 3µA. This and the very small, ultra-thin package make the BMP085 the sensor of choice for any mobile application requiring precise barometric pressure measurement, like for example mobile phones, PDAs, personal GPS-based navigation devices and advanced outdoor equipment.

The BMP085 sensor is based on piezo-resistive MEMS technology for EMC robustness, high accuracy and linearity as well as long term stability.
It comes in an ultra-thin, but robust 8-pin ceramic lead-less chip carrier (LCC) package. The BMP085 is designed to be connected directly to a micro-controller of a mobile device via the I²C bus.

The BMP085 is the direct successor of the successful SMD500 pressure sensor, that marked a new generation of high-precision digital pressure sensors for consumer applications.

Key features BMP085

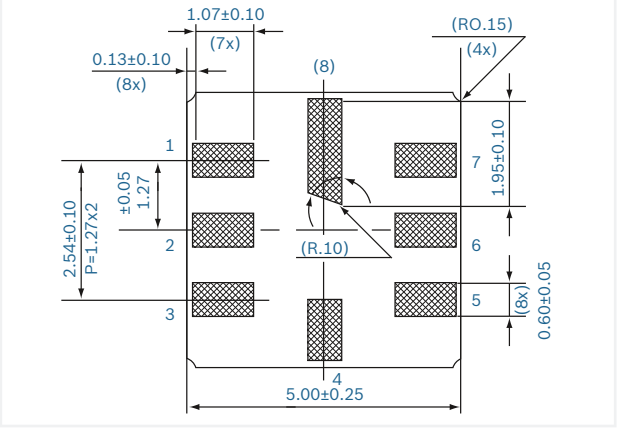
- Wide barometric pressure range
- Flexible supply voltage range
- Ultra-low power consumption
- Low noise measurement
- Fully calibrated
- Temperature measurement included
- Digital two-wire I²C interface
- Ultra-flat, small footprint ceramic package
- Pb-free and RoHS compliant

BMP085 target applications

- GPS navigation enhancement
- Dead reckoning
- In- and outdoor navigation
- Leisure, sports and health monitoring
- Weather forecast
- Vertical velocity indication (rise/sink speed)
- Fan power control

Technical data	BMP085
Pressure range	300 ... 1100 hPa
RMS noise expressed in pressure	0.06 hPa, typ. (ultra-low power mode)
	0.03 hPa, typ. (ultra-high resolution mode)
RMS noise expressed in altitude	0.5 m, typ. (ultra-low power mode)
	0.25 m, typ. (ultra-high resolution mode)
Absolute accuracy p=700 ... 1100hPa (T=0 ... +65°C, V_{DDA}=3.3V)	Pressure: ± 2.5 hPa, max. Temperature: ±2 °C, max.
Average current consumption (1Hz data refresh rate)	3 µA, typ. (ultra-low power mode) 12 µA, typ. (ultra-high resolution mode)
Peak current	600 µA, typ.
Stand-by current	0.1 µA, typ.
Supply voltage V_{DDD}	1.62 ... 3.6 V
Supply voltage V_{DDA}	1.8 ... 3.6 V
Operation temp. range	-40 ... +85 °C
full accuracy	0 ... +65 °C
Pressure conv. time	7.5 msec, max.
I²C data transfer rate	3.4 MHz, max.
Package type / pin no.	LCC / 8
Package dimensions	5 mm x 5 mm x 1.2 mm

Pin configuration (top view, pads shown transparently)



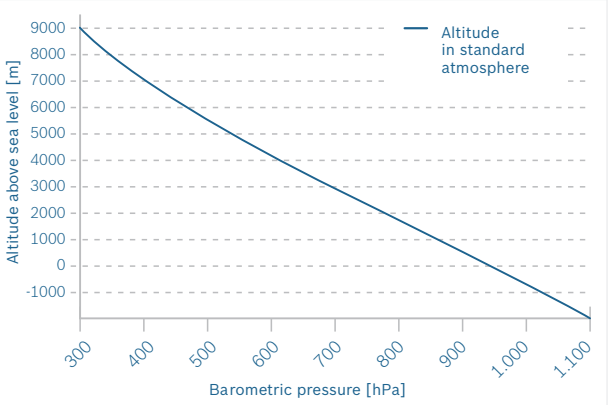
Package dimensions in mm

Pin	Name	Function
1	GND	Ground
2	EOC	End of conversion output
3	V_{DDA}	Power supply analog
4	V_{DDD}	Power supply digital
5	NC	Not connected
6	SCL	I²C serial bus clock input
7	SDA	I²C serial bus data
8	XCLR	Master clear input

Sensor operation

The BMP085 comes as fully calibrated, ready-to-use sensor module without the need for additional external circuitry. Pressure and temperature data are provided as 16 bit values via the I²C interface, together with calibration data for temperature compensation.

The below figure describes the so-called barometric formula by means of which the absolute altitude can be calculated from the measured barometric pressure.



Bosch is the world market leader in MEMS sensors. The BMP085 offers this high experience and reliability for consumer applications. Bosch Sensortec is a subsidiary of Bosch that focuses on micromechanical components for the non-automotive markets.

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

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