MS5840-02BA

Low profile, gel-filled, ultra-compact watertight pressure sensor

DESCRIPTION

The MS5840 is an ultra-compact micro altimeter. It is optimized for altimeter and barometer applications. The altitude resolution at sea level is 13 cm of air.

The sensor module includes a high-linearity pressure sensor and an ultra-low power 24-bit ΔΣ ADC with internal factory-calibrated coefficients. It provides a precise digital 24-bit pressure and temperature value and different operation modes that allow the user to optimize for conversion speed and current consumption.

A high-resolution temperature output allows the implementation of an altimeter/thermometer function without any additional sensor. The MS5840 can be interfaced to any microcontroller with I^2C-bus interface. The communication protocol is simple, without the need of programming internal registers in the device. The gel protection and antimagnetic stainless-steel cap makes the module water resistant.

Small dimensions of only 3.3 mm x 3.3 mm x 1.7 mm allows integration in mobile devices. This sensor module generation is based on leading MEMS technology and latest benefits from TE Connectivity (TE) proven experience and know-how in high volume manufacturing of altimeter modules, which has been widely used for over a decade.

FEATURES

- Ceramic - metal package, 3.3 x 3.3 x 1.7mm
- High-resolution module, 13 cm
- Supply voltage: 1.5 to 3.6 V
- Fast conversion down to 0.5 ms
- Low power, 0.6 µA (standby ≤ 0.1 µA at 25°C)
- Integrated digital pressure sensor (24 bit ΔΣ ADC)
- Operating range: 300 to 1200 mbar, -20 to +85 °C
- I^2C interface
- No external components (internal oscillator)
- Protected against direct sunlight
- Lid connected to ground option

APPLICATIONS

- Adventure or multi-mode watches
- Mobile water depth measurement systems

PERFORMANCE SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Conditions	Min.	Typ.	Max	Unit
Supply voltage	V_{DD}		-0.3		+4	V
Storage temperature	T_S		-40		+85	°C
Overpressure	P_{max}	ISO 22810[1]			10	bar
Maximum Soldering Temperature [2]	T_{max}	40 sec. max			250	°C
ESD rating (lid to GND version)		Human Body Model	-2		+2	kV
Latch up		JEDEC JESD78 standard	-100		+100	mA

[1] Pressure ramp up/down min 60s
[2] Refer to application note 808

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions		Min.	Typ.	Max	Unit
Operating Supply voltage	V_{DD}			1.5	3.0	3.6	V
Operating Temperature	T			-20	+25	+85	°C
Supply current (1 sample per sec.)	I_{DD}	OSR	8192 4096 2048 1024 512 256		20.09 10.05 5.02 2.51 1.26 0.63		µA
Peak supply current		during conversion			1.25		mA
Standby supply current		at 25°C (V_{DD} = 3.0 V)			0.01	0.1	µA
Power supply hold off for internal reset [3]		VDD < 0.1V		200			ms
VDD Capacitor		from VDD to GND		100	470		nF
Resistor value between the lid and the GND		Version 02BA2x only			1000		Ω

[3] Supply voltage power up must be continuous from GND to VDD without any step

ANALOG DIGITAL CONVERTER (ADC)

Parameter	Symbol	Conditions		Min.	Typ.	Max	Unit
Output Word					24		bit
ADC Conversion time [4]	t_c	OSR	8192 4096 2048 1024 512 256		16.44 8.22 4.13 2.08 1.06 0.54	17.2 8.61 4.32 2.17 1.10 0.56	ms

[4] Maximum values must be used to determine waiting times in I2C communication