

Automotive Electronics

Barometric pressure sensor for engine management systems

SMD288



BOSCH
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Barometric pressure sensor SMD288

Customer benefit / features:

- ▶ Pressure range: 40 kPa...115 kPa
- ▶ Custom specific ranges upon request
- ▶ Broad temperature range -40°C...+125°C
- ▶ On-chip calibration and temperature compensation
- ▶ Ratiometric analog output
- ▶ Fast analog technology
- ▶ Surface mount package
- ▶ Stable single-crystalline membrane (APSM process)
- ▶ ESD-protection
- ▶ Short circuit protected
- ▶ Inverse polarity protected up to 300 mA supply current
- ▶ Open Circuit Detection capability
- ▶ Lead-free soldering capability

Overview

The SMD288 belongs to a family of various micro-machined pressure sensors. The main application for this device is the barometric air pressure measurement in diesel or gasoline engine management control units. Furthermore the SMD288 can be utilized for height measurements e.g. in navigation devices.

Product description

The barometric pressure sensor SMD288 is designed for a standard pressure range of 40 kPa...115 kPa. Custom specific ranges are available upon request.

In order to offer a cost competitive product, the SMD288 is manufactured with the Bosch APSM (Advanced Porous Silicon Membrane) process. The APSM technology allows to produce a stable single-crystalline membrane with a CMOS compatible surface micro-mechanic process.

The evaluation circuit which is integrated on the same chip as the micro-mechanical sensing element provides a calibrated and temperature compensated output with high accuracy. Additionally it comprises an open circuit detection capability.

The sensor is protected against short circuit to V_{CC} , GND and $V_{BAT} = 16\text{ V}$ and against inverse polarity up to supply currents of 300 mA (for 5 min at room temperature). Furthermore the sensor is protected against ESD (human body model: up to 2 kV, machine model: up to 250 V, charged device model: up to 500 V/750 V for corner pins).

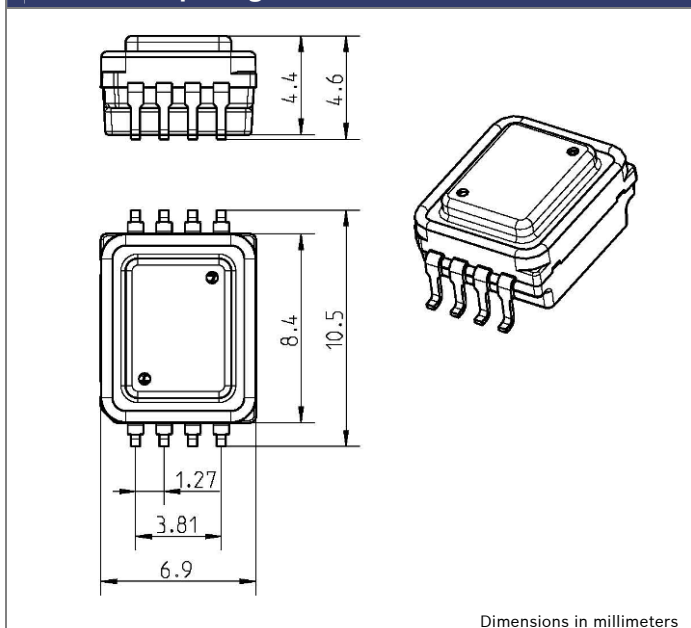
The sensor is RoHS compliant and qualified according to AEC-Q100.

Parameters SMD288**Measurement and functional characteristics**

Minimum rated pressure	40 kPa
Maximum rated pressure	115 kPa
Output	Analog
Sensitivity	45 mV/kPa (@ $V_{DD} = 5\text{ V}$)
Tolerance	1.5 kPa (0 °C...+85 °C/2.25 kPa)

Operating conditions

Operating temperature	-40 °C...+125 °C
Supply voltage	5.0 V
Supply current ($V_{CC}=5.00\text{ V}$)	< 12.0 mA

Outline PM8 package**Working principle**

The measurement principle is based on four piezo-resistors located on a membrane which are connected to a Wheatstone bridge. Beneath the membrane a thin cavity encloses vacuum. The applied barometric pressure leads to a deflection of the membrane which causes a change in the resistors' value. The resulting signal is amplified and temperature compensated by an electronic circuit which is integrated on the same chip with the sensor element.

Interface

The SMD288 supplies an analog output signal which varies linearly with the applied pressure and is ratiometric to the supply voltage.

Package

The sensor is packaged in a premold housing with a SO8 footprint. It is easy to equip in standard assembly lines.

Portfolio

The SMD288 sensor is part of a larger sensor portfolio. This portfolio consists of acceleration sensors, angular rate sensors, pressure sensors, torque sensors, and CO₂ sensors for occupant safety systems, Vehicle Dynamics Control VDC, active suspension systems, motor management, steering systems, and A/C systems.

Bosch has been active in the field of micromechanics (MEMS) for more than 20 years, and is established as one of the pioneers of this technology. With more than 900 MEMS patents, hundreds of engineers in this field, and more than 1.6 billion MEMS sensors shipped to date, Bosch is the global market leader for MEMS sensors.

For more information about automotive MEMS sensors, visit www.bosch-sensors.com.

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