

# Automotive Electronics

## Barometric pressure sensor for engine management systems

### SMP480



**BOSCH**

Invented for life



Absolute pressure sensor SMP480

#### Customer benefit/features

- ▶ Pressure range: 40 kPa...115 kPa
- ▶ Custom specific ranges and transfer functions upon request
- ▶ Highly linear pressure signal (over the full temp range)
- ▶ Broad temperature range -40 °C...+130 °C
- ▶ Integrated temperature sensor
- ▶ On-chip calibration and temperature compensation
- ▶ Digital output via Serial Peripheral Interface (SPI) (resolution: pressure & temperature 12 bit)
- ▶ Surface mount package
- ▶ Stable single-crystalline membrane (APSM process)
- ▶ ESD-protection
- ▶ Short circuit protected
- ▶ Self-test capability
- ▶ Lead-free soldering capability

#### Overview

The SMP480 belongs to a new family of digital pressure sensors. The main application for this device is the barometric air pressure measurement in diesel or gasoline engine management control units.

#### Product description

The new barometric pressure sensor SMP480 is designed for a standard pressure range of 40 kPa...115 kPa. It is composed of a 2-chip-architecture. The sensor element is manufactured with the Bosch APSM (Advanced Porous Silicon Membrane) process. The APSM technology allows producing a stable single-crystalline membrane with a surface micro-mechanic process.

The pressure signal is amplified and temperature compensated by a separate ASIC manufactured in a highly integrated CMOS technology. The digital signal evaluation enables elaborate self tests. Additionally to the pressure signal the sensor provides a temperature signal.

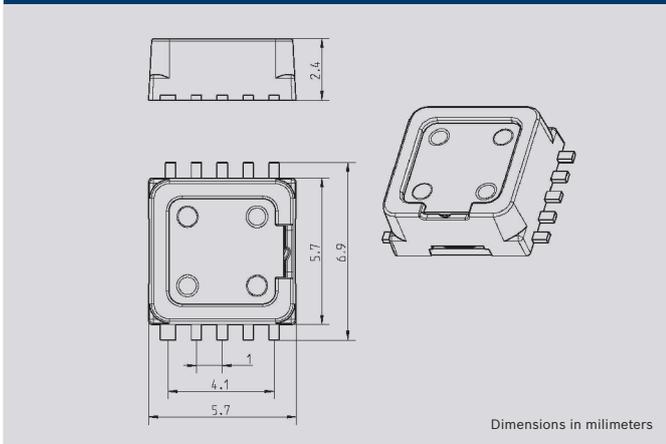
With these technologies we realized a very robust design and achieved high sensor accuracy. The sensor is protected against short circuit and ESD and is also RoHS compliant.

**Parameters SMP480****Measurement and functional characteristics**

Rated pressure	40...115 kPa
Accuracy pressure	≤ 1.0 kPa
Resolution pressure	51.48 LSB/kPa
Accuracy temperature	≤ 3 K (25...85°C)
Resolution temperature	21.55 LSB/°C

**Operating conditions**

Supply voltage	3.3 V
Supply current	≤ 8.0 mA
Ambient temperature	-40 °C...+130 °C

**Outline PM10 package****Working principle**

The measurement principle is based on four piezo-resistors located on the 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 a separate ASIC which is located in the same premold package.

**Interface**

The SMP480 supplies digital output signals over a SPI slave interface with 12 bit resolution for pressure and 12 bit resolution for temperature.

**Package**

The SMP480 is packaged in a 10 pin premold housing. It is easy to equip in standard assembly lines.

**Portfolio**

The SMP480 sensor is part of a larger sensor portfolio. The portfolio consists of acceleration sensors, angular rate sensors, pressure sensors, and torque sensors for occupant safety systems, Vehicle Dynamics Control VDC, active suspension systems, motor management, steering systems, or A/C systems.

Bosch has been active in the field of micro-electro-mechanical systems (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 far more than 2 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](http://www.bosch-sensors.com).

**Regional sales contacts**

Europe/Japan	<a href="mailto:bosch.semiconductors@de.bosch.com">bosch.semiconductors@de.bosch.com</a>
USA/Canada	<a href="mailto:bosch.semiconductors@us.bosch.com">bosch.semiconductors@us.bosch.com</a>
China	<a href="mailto:bosch.semiconductors@cn.bosch.com">bosch.semiconductors@cn.bosch.com</a>
Korea	<a href="mailto:bosch.semiconductors@kr.bosch.com">bosch.semiconductors@kr.bosch.com</a>

[www.bosch-semiconductors.com](http://www.bosch-semiconductors.com)  
[www.bosch-sensors.com](http://www.bosch-sensors.com)

**Robert Bosch GmbH**  
 AE/SCS2  
 Postfach 13 42  
 72703 Reutlingen  
 Germany  
[www.bosch.de](http://www.bosch.de)