

Engine management systems

SMP580 barometric pressure sensor for ambient pressure measurement



BOSCH

Invented for life



PRODUCT BENEFITS

- ▶ Very high measurement accuracy and long-term stability
- ▶ Digital interface for pressure and temperature output
- ▶ Customized pressure ranges and transfer functions upon request
- ▶ Very robust design

- 1 SOIC8 cavity package, 4.9 mm × 3.9 mm × 1.5 mm

ultra compact

smallest package on the market

TASK

Barometric pressure sensors are a key component in engine management for diesel and gasoline engines. They are designed to measure the current ambient pressure accurately and with low drift. Atmospheric pressure is a function of height above sea level as well as of weather conditions. Based on the sensor measurement data, the engine management system can supply the combustion engine with the optimum air-fuel mixture, irrespective of whether the vehicle is traveling along a coastal road or a road up in the mountains. The benefit of this constant rebalancing of the mixing ratio is that it helps to reduce fuel consumption as well as emissions of CO₂ and other pollutants.

FUNCTION

A piezo-resistive pressure sensor element and a suitable electronic circuitry (ASIC) for the signal amplification and signal processing (digitalization, temperature compensation and calibration) are integrated into a pressure sensor module on two silicon chips which are connected to each other. The pressure is led to the front side of the pressure sensor element. On the back of the membrane, a reference vacuum pressure is encapsulated. The inlet pressure deflects the surface-micro-machined membrane (Advanced Porous Silicon Membrane, APSM) of the pressure sensor element. A wheatstone bridge of piezo-resistance on the membrane transforms pressure into electrically measurable resistance. The complete signal conditioning and processing is performed by the ASIC.

economical

due to very low current consumption of under 15 μ A in power-down mode

TECHNICAL CHARACTERISTICS

Measurement range	40 to 115 kPa (engine management) 60 to 165 kPa (seating systems)
Interface	SPI
Digital resolution	10, 12, or 16 bit
Accuracy pressure*	<1.0 kPa
Accuracy temperature	≤ 3 K

* Over temperature and lifetime

OPERATING CONDITIONS

Supply voltage	3.3–5V
Supply current	≤ 5 mA
Operating temperature	-40 °C to +125 °C