

Automotive Electronics

Pressure sensor for transmission control SMP13x



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Absolute pressure sensor SMP13x

Customer benefits/features

- ▶ Pressure range: 50 kPa ... 2.2 MPa (SMP132)
or 50 kPa ... 7 MPa (SMP137)
- ▶ Highly linear pressure signal (over the full temp range)
- ▶ Broad temperature range -40°C ... +150°C
- ▶ On-chip calibration and temperature compensation
- ▶ Ratiometric analog output
- ▶ Integrated ESD protection
- ▶ Easily integrable in transmission control module
- ▶ Short circuit protected
- ▶ Open circuit detection capability
- ▶ Electrical connectivity for wire bonding, soldering or welding

Overview

The SMP13x belongs to a new family of pressure sensors. The main application is the measurement of the hydraulic pressure in automatic transmissions. Due to its small and optimized package the SMP13x can be easily integrated in transmission control modules.

Product description

The new transmission pressure sensor SMP13x is an absolute pressure sensor designed for a standard pressure range of 50 kPa ... 2.2 MPa (SMP132) or 50 kPa ... 7 MPa (SMP137). Custom specific pressure ranges can be realized upon request.

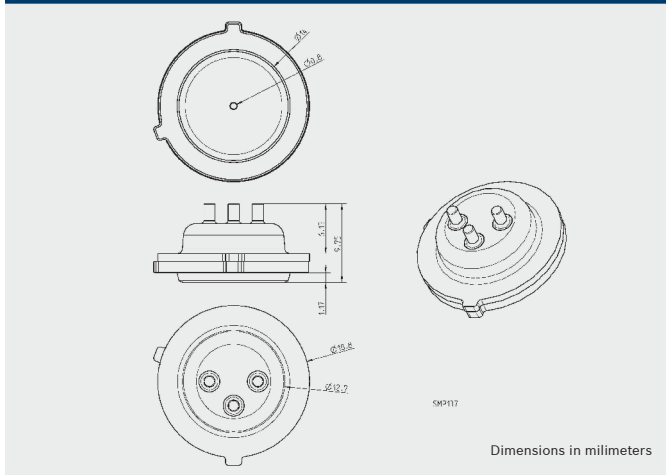
The evaluation circuit which is integrated on the same chip as the micro-mechanical sensing element provides a calibrated and temperature compensated output with high accuracy. The pressure sensor SMP13x supplies an analog output signal, which is proportional to the applied pressure and ratiometric to the supply voltage.

Two capacitors are integrated into the sensor housing for EMC protection.

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

Parameters SMP13x**Measurement and functional characteristics**

Measurement range	50 kPa... 2.2 MPa (SMP132) 50 kPa... 7 MPa (SMP137)
Accuracy ¹	< 2.0 % (0 °C ... 125 °C) < 2.5 % (-40 °C ... 0 °C and 125 °C ... 150 °C)
Start-up time	10 ms
Operating conditions	
Supply voltage	5 V
Supply current	< 12.5 mA
Ambient temperature	-40 °C ... +150 °C

¹ Over lifetime**Outline SMP13x package****Working principle**

The measurement principle is based on four piezo-resistors located on the membrane which are connected to a Wheatstone bridge. A reference vacuum is enclosed between the chip surface and the hermetically sealed metal housing. The applied 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 integrated electronic circuit.

Interface

The SMP13x 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 special 3 pin metal housing. The connection to the pins can be realized by soldering, welding, or bonding.

Portfolio

The SMP13x is part of a larger sensor portfolio. This 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, and 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.

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