SOIC Pressure Sensors – Overview -

AMSYS (www.amsys-sensor.com) presents the SOIC sensors, a versatile class of SMD pressure sensors for automated assembly with an impressive performance. They are available for all types of pressures (differential, relative and absolute) and are ready-to-use thanks to the factory calibration.

The compact sensors are available in the pressure range from ±1.25 mbar to ±2 bar and can be adapted in multiple ways to individual applications.

The output signals available are either a digital pressure signal in I²C format or SPI and/or an analog voltage proportional to the pressure. In some cases, the bridge signal can also be tapped as a direct analog signal. Reliable measurements are guaranteed by checksums and diagnostic bits.

SOIC pressure sensors in different housings

With an ADC resolution of 14 to 24 bits and an accuracy of typ. ±0.5 % FS in the entire calibration temperature range (usually -20 to 85° C), the sensors are particularly suitable for industrial applications. AMSYS defines accuracy as the total error band (TEB) including all calibration, temperature and stochastic errors (hysteresis, nonlinearity, reproducibility).

Long-term drift is specified as low as ±1 % within 10 years, offering the user excellent stability and long-term reliability in addition to high accuracy. The service costs are reduced as interchangeability is guaranteed at all times.

The compact 10.2×7.5 mm² housing is based on the standard SOIC16 (w) package (300 mil) known from integrated circuits. Thanks to modern assembly and connection technology it is possible to install the silicon measuring cell together with the ASIC in the housing. Depending on the type, versions with one or two horizontal or vertical connection pieces are available.

The OEM sensors are suited for automatic SMD mounting (see JEDEC J-STD.-020D.1). They can be placed like an IC in circuit board design and reflow soldered to standard PCBs.

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Overview of the most common SOIC types:

	SMxx21	SMxx91	SM9543	SM9336/3	MS5225
Pressure range bidirectional differential [mbar]	±10 .. ±1000	±10 .. ±1000	±5	±2,5 / ±1,25	±70 .. ±2000
Pressure range gauge / differential [mbar]	10 .. 1000	10 .. 1000	×	×	140 / 350
Pressure range absolute [mbar]	×	×	×	×	1000 / 2000
Total error band [% FS]	1	1	1,5	1,5 / 2,75	2,5
Output I^2C / SPI	✓/×	✓/×	✓/×	✓/×	✓/✓
Output analogue	×	✓	×	×	✓
Power supply voltage 3,3V / 5,0V	✓/✓	✓/✓	✓/×	✓/×	✓/×

Naming Scheme

Example: SM-**a**-**b**-**c**-**d**

a: Pressure range: from <0,07 psi (SM9xxx) up to ≥15 psi maximum pressure (SM1xxx)

b: Pressure type: SMx2xx: gauge or unidirectional differential (0 .. xxx mbar)
SMx3xx and SMx5xx: bidirectional differential (± xxx mbar)
SMx4xx: asymmetric differential, i.e. -0,5..+10 mbar

c: Output: 1: analog voltage, ratiometric
2/4: 14 bit I^2C
3: 16 bit I^2C
9: 16 bit I^2C and ratiometric analog voltage

d: Accuracy: 1: 1 %FS (= 1 % of the total measurement range, i.e. ± 10 mbar sensor: 0,2 mbar)
3: ~3 %FS, except SM9543, here: 1,5 %FS
6: 1,5 %FS

Customizations:

With most SOIC sensors you can not only choose the direction of the pressure connections (horizontal or vertical) and temperature range (typically -20 bis 85 °C) but starting with orders of 5000+ pieces you can choose your own calibrated pressure range ideally adapted to your needs. E.g. for some special applications you could order a sensor with a full scale pressure range of -8 .. +85 mbar for example.