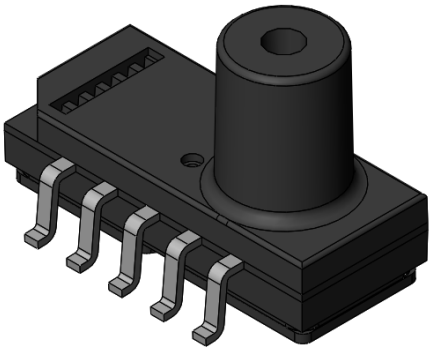
PRESSURE SENSORS

# Medium Pressure Analog Sensor

## SM1216-HGC-S-060-001
## Gauge Pressure Sensor



### FEATURES

- Pressure range of -60 to 0kPa (-8.7 to 0PSI) gauge output
- Accuracy: ±1.5% full scale
- Pressure calibrated and temperature compensated output
- Analog and $I^2C$ Digital Interface
- Compensated temperature range: -5 to +65°C
- Insensitive to mounting orientation
- Robust JEDEC SOIC-10 package for automated assembly
- Manufactured according to ISO9001 and ISO/TS 16949 standards

### DESCRIPTION

The SM1216 is a analog, medium pressure MEMS sensor, with an optional analog output, offering state-of-the-art pressure transducer technology and CMOS mixed signal processing technology to produce a analog, fully conditioned, pressure and temperature compensated sensor in JEDEC standard SOIC-10 package with vertical port. It is a gauge pressure sensor.

Combining the pressure sensor with a signal-conditioning ASIC in a single package simplifies the use of advanced silicon micro-machined pressure sensors. The pressure sensor can be mounted directly on a standard printed circuit board and a high level, calibrated pressure signal can be acquired from the output interface. This eliminates the need for additional circuitry, such as a compensation network or microcontroller containing a custom correction algorithm.

The SM1216 is available for shipment in sticks or tape & reel.




+1-(408) 577-0100 / sales@si-micro.com / www.si-micro.com

## 1. Absolute Maximum Ratings

| No. | Characteristic | Symbol | Minimum | Maximum | Units |
|---|---|---|---|---|---|
| 1 | Supply Voltage | $V_{DD}$ | -0.3 | 6.0 | V |
| 2 | Digital IO Voltage | $V_{IO,DIG}$ | -0.3 | VDD+0.3 | V |
| 3 | Max. Digital IO Current (DC) | $I_{IO,DIG}$ | -10 | +10 | mA |
| 4 | Storage Temperature[a] | $T_{STG}$ | -40 | +125 | °C |

| No. | Characteristic | Symbol | Minimum |
|---|---|---|---|
| 5 | Proof Pressure[a, b, c] | $P_{Proof}$ | 172 kPa (25 PSI) |
| 6 | Burst Pressure[a, b, d] | $P_{Burst}$ | 276 kPa (40 PSI) |

**Notes:**

a. Tested on a sample basis.
b. Clean, dry gas compatible with wetted materials. Wetted materials include plastic, silicon and RTV.
c. Proof pressure is defined as the maximum pressure to which the device can be taken and still perform within specifications after returning to the operating pressure range
d. Burst pressure is the pressure at which the device suffers catastrophic failure resulting in pressure loss through the device.

## 2. ESD

| No. | Description | Symbol | Minimum | Maximum | Units |
|---|---|---|---|---|---|
| 1 | ESD HBM Protection at all Pins | $V_{ESD(HBM)}$ | -2 | 2 | kV |

## 3. External Components

| No. | Description | Symbol | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| 1 | Supply bypass capacitor* | $C_{VDD}$ | | 100 | | nF |
| 2 | Pull Up Resistance at Analog Out Pin* | $R_{LP}$ | 2 | | | kΩ |
| 3 | Pull Down Resistance at Analog Out Pin* | $R_{LU}$ | 2 | | | kΩ |
| 4 | Load Capacitance at Analog Out Pin* | CL | | | 22 | nF |

* Not tested in production

## 4. Recommended Operating Conditions

The recommended operating conditions must not be exceeded in order to ensure proper functionality of the device. All parameters specified in the following sections refer to these recommended operating conditions unless stated otherwise.

| No. | Description | Symbol | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| 1 | Supply Voltage | $V_{VDD}$ | 4.75 | 5.0 | 5.25 | V |
| 2 | Low level input voltage at SDA, SCL | $V_{IN,I2C,lo}$ | -0.3 | | 0.9 | V |
| 3 | High level input voltage at SDA, SCL | $V_{IN,I2C,hi}$ | 0.8 * $V_{VDD}$ | | $V_{VDD}$+0.3 | V |
| 4 | Compensated Temperature | $T_{COMP}$ | -5 | | +65 | °C |
| 5 | Operating Temperature | $T_A$ | -20 | | +65 | °C |

## 5. Operating Characteristics Table

All parameters are specified at Vdd = 5.0 V DC supply voltage at 25°C, unless otherwise noted.

| No. | Characteristic | Symbol | Minimum | Typical | Maximum | Units |
|---|---|---|---|---|---|---|
| 6 | Current Consumption | $I_{VDD}$ | | 4.5 | 5.6 | mA |
| 7 | Pressure Output @ $P_{MIN}$ = -60 kPa | $OUT_{MIN}$ | | 10% | | $V_{DD}$ |
| 8 | Pressure Output @ $P_{MAX}$ = 0kPa | $OUT_{MAX}$ | | 90% | | $V_{DD}$ |
| 9 | Full Scale Span | FSS | | 80% | | $V_{DD}$ |
| 12 | Bandwidth | | | 125 | | Hz |
| 14 | Analog Accuracy [e] | A ACC | -1.5 | | +1.5 | %FS |

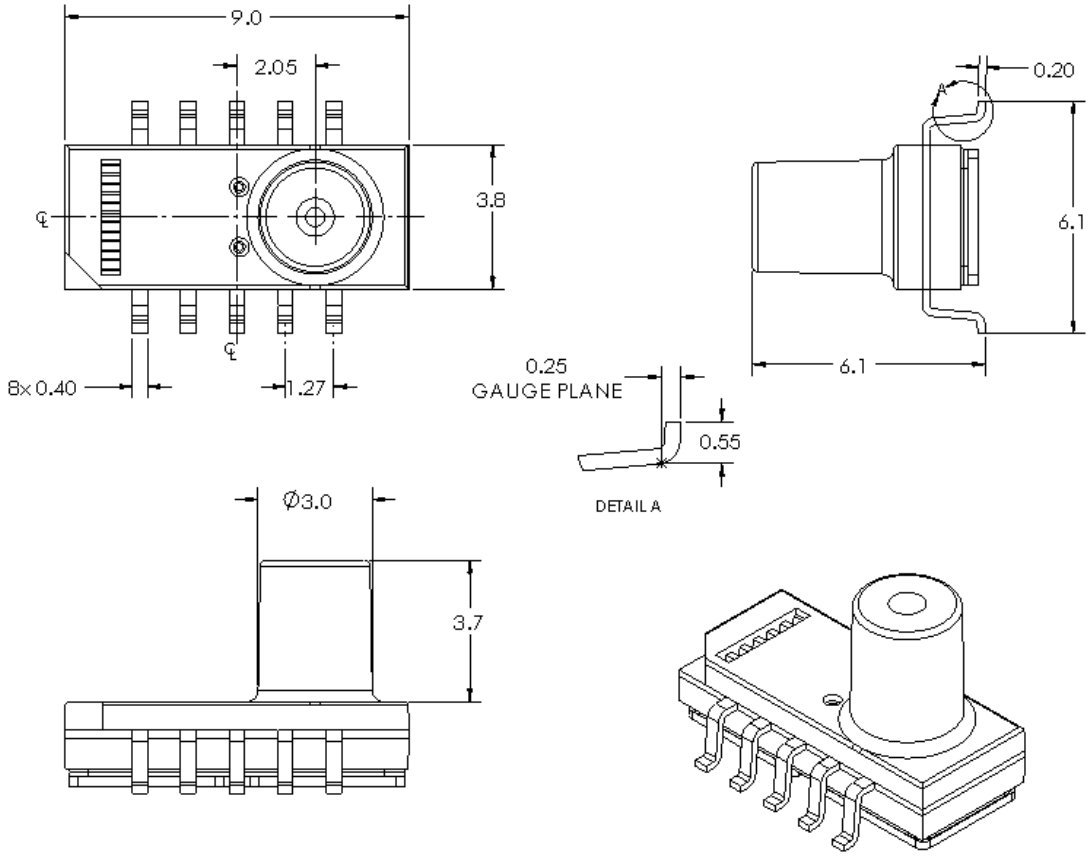


**Notes:**

e. The accuracy specification applies over all operating conditions. This specification includes the combination of linearity, repeatability, and hysteresis errors over pressure, temperature, and voltage.

## 7. Package Reference

### SM1216 Package Dimensions

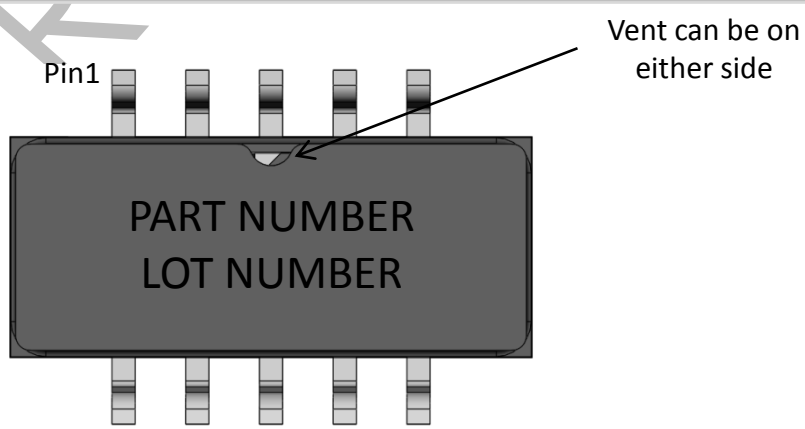



**Notes:**

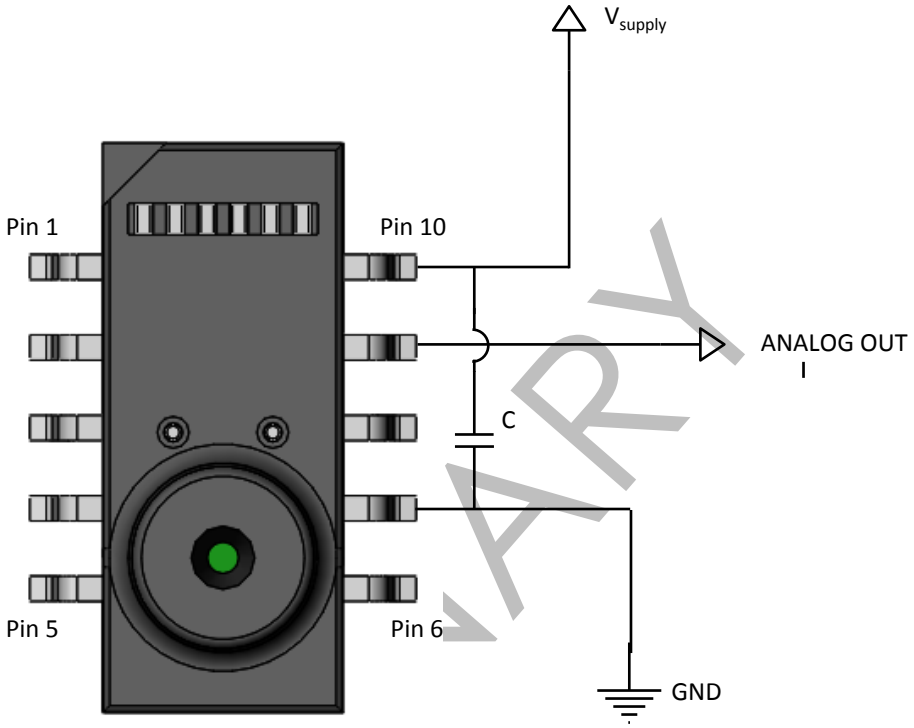
- All dimensions in units of [mm]
- Moisture Sensitivity Level (MSL): Level 1
- Wetted materials: Silicon, RTV, Plastic



### Part & Lot Number Identification



## SM1216-Pin out Diagram



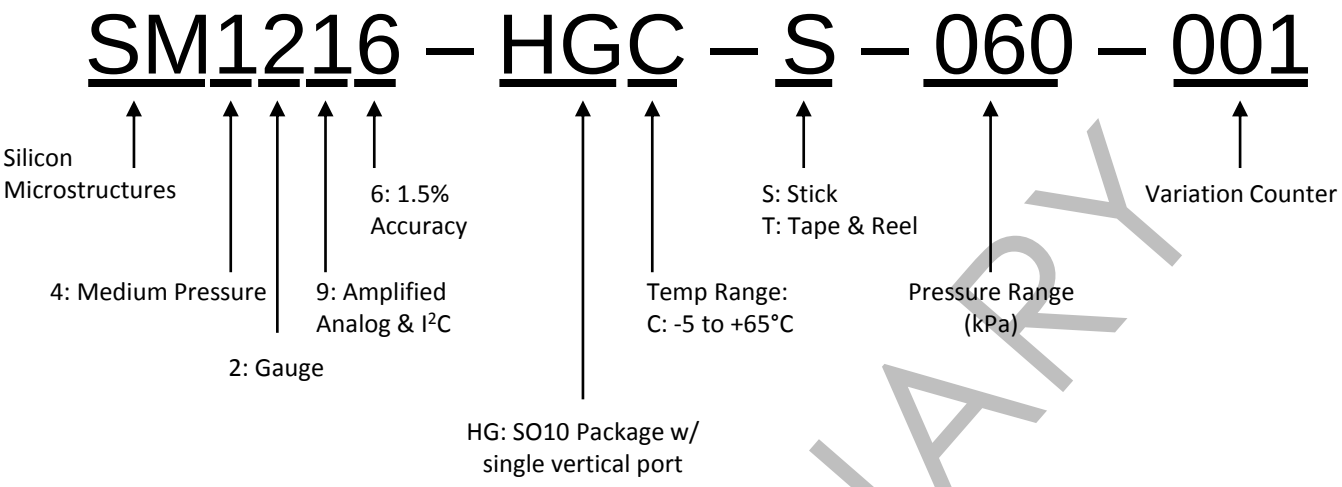



| Pin No. | Pin Function |
|---|---|
| 1 | NC |
| 2 | (SCL)* |
| 3 | (SDA)* |
| 4 | NC |
| 5 | NC |
| 6 | NC |
| 7 | GND |
| 8 | NC |
| 9 | Analog Out |
| 10 | Power |

**NOTES:**

- Do not connect to NC pins
- * Do not connect if only using analog

## 8. Part Number Legend






## Qualification Standards

REACH Compliant
RoHS Compliant
PFOS/PFOA Compliant
For qualification specifications, please contact Sales at sales@si-micro.com

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