

ULTRA-SMALL PRESSURE SENSOR



PRESSURE SENSORS

Product Number: SM5420C

HIGHLIGHTS

- Small, low cost, robust SO8 package
- For high-volume applications

TYPICAL APPLICATIONS

- Automotive tire pressure (TPMS)
- Engine control
- Barometric sensing
- Altitude correction detection
- Pneumatic gauges
- Hand-held meters
- Home appliances

BASICS

- Absolute pressure
- PCB mountable
- Ported or non-porting configurations
- Tape and reel

FEATURES

- 15, 30, 60, & 100 PSI (103, 207, 414 & 689 kPa)
- Wide temperature range (-40° to +125°C)
- Suitable for automated assembly
- Constant current or constant voltage drive
- High millivolt output
- Automotive Qualified (AEC-Q100)
- RoHS & REACH Compliant



SOIC8 Packaged Pressure Sensor

DESCRIPTION

The SM5420C is a small outline SO-8 packaged pressure sensor that incorporates SMI's new SM5108C MEMS piezoresistive pressure sensing die. The SM5420C has been optimized to provide the highest possible accuracy for a package of this size. Performance is achieved through careful resistor placement and mechanical configuration along with advanced MEMS processing.

The packaged sensor is intended for high volume applications where cost is a critical factor, such as consumer and automotive products. The SM5420C is available as an absolute pressure sensor in full-scale range of 15, 30, 60, 100 PSI (103, 207, 414 and 689 kPa). It is designed to be surface-mounted on ceramic or PC board substrates by high-volume OEM manufacturers.

The SM5420C is available in a ported and non-porting option. Either option can be used to sense environmental pressure or measure pressure in a manifold configuration with an O-ring seal. The port position has been chosen to minimize pressure pulses directly impacting the face of the sensor die for added long-term reliability in hostile environments.

The standard configuration offers a protective gel over the die. A non-gelled version is also available for high volumes where the maximum stability is required, such as in barometric, weather station sensing applications. The SM5420C is shipped tape & reel.



Product Number: SM5420C

ABSOLUTE MAXIMUM RATING TABLE FOR SM5420C SENSOR

All parameters are specified at $V_{SUPPLY} = 5.00$ V DC supply at room temperature, unless otherwise noted. All parts are covered with gel.

| No. | Characteristic | Symbol | Minimum | Typical | Maximum | Units |
|-----|--------------------------------------|--------------|---------|---------|---------|-----------|
| 1 | Excitation Voltage ^(a) | V_{SUPPLY} | 0.0 | 5.0 | 10.0 | V |
| 2 | Excitation Current ^(a) | I_{SUPPLY} | 0.0 | 1.0 | 1.6 | mA |
| 3 | Proof Pressure ^(b) | P_{PROOF} | 3× | — | — | FS pRANGE |
| 4 | Burst Pressure ^(b) | P_{BURST} | 5× | — | — | FS pRANGE |
| 5 | Operating Temperature ^(b) | T_{OP} | -40 | — | +125 | °C |
| 6 | Storage Temperature ^(b) | T_{STG} | -55 | — | +150 | °C |

NOTES:

- (a) The device can only be driven with the supply voltage connected to the pins as shown. The positive output will increase with increasing pressure applied to the package.
 (b) Tested on a sample basis.

OPERATING CHARACTERISTICS FOR SM5420 SENSOR - SPECIFICATIONS

All parameters are specified at $V_{SUPPLY} = 5.00$ V DC supply at room temperature, unless otherwise noted. All parts are covered with gel.

| No. | Characteristic | Symbol | Minimum | Typical | Maximum | Units |
|-----|--|------------|---------|---------|---------|-------------|
| 7 | Span (15 PSI) ^(e) | V_{SPAN} | 95 | 127 | 160 | mV |
| 8 | Span (30, 60 & 100 PSI) ^(e) | V_{SPAN} | 65 | 100 | 135 | mV |
| 9 | Zero Offset | V_{ZERO} | -35 | 0 | 35 | mV |
| 10 | TC Span ^(b, e) | TCS | -0.24 | -0.19 | -0.155 | %FS/°C |
| 11 | TC Zero Offset ^(b, e) | TCZ | -0.07 | -0.01 | +0.07 | %FS/°C |
| 12 | TC Resistance ^(b, c, e) | TCR | 0.24 | 0.275 | 0.33 | % R_B /°C |
| 13 | Linearity ^(d) | NL | -0.2 | -0.07 | 0.2 | %FS |
| 14 | Bridge Resistance | R_B | 4.0 | 5.0 | 6.0 | k Ω |
| 15 | Input Capacitance ^(b) | C_{IN} | — | < 2 | — | pF |

NOTES:

- (c) Determined by measurements taken at 0°C and 70°C.
 (d) Defined as best fit straight line.
 (e) For specifications regarding zero offset and span stability, please contact SMI Sales at +1-(408) 577-0100 or sales@si-micro.com

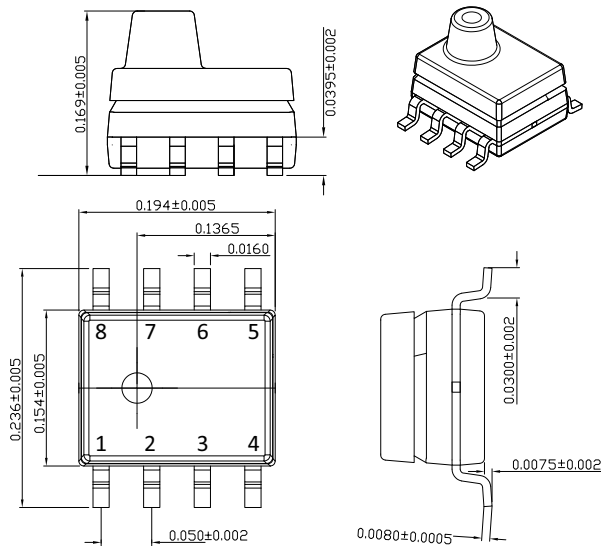
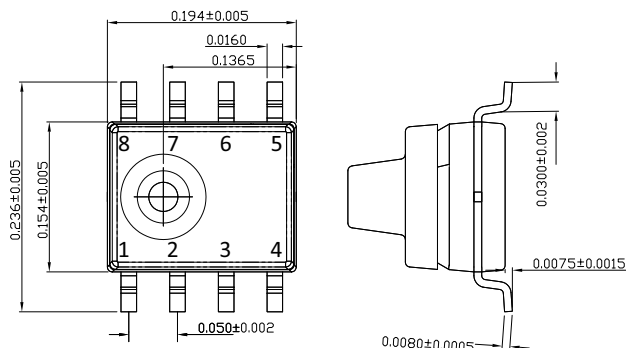
QUALIFICATION STANDARDS

- REACH compliant
- RoHS compliant
- PFOS/PFOA compliant
- Qualified to meet AEC Q100 standards
- For qualification specifications please contact Sales at sales@si-micro.com

Product Number: SM5420C

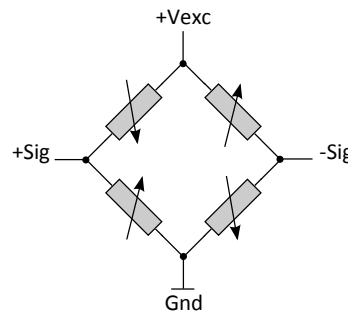
Diagrams and Dimensions

P(port) Configuration



Note:
 • All dimensions in inches
 • MSL = 3

Pin-Out



| PIN | DESCRIPTION |
|-----|-------------|
| 1 | NC |
| 2 | +Sig |
| 3 | NC |
| 4 | Gnd |
| 5 | NC |
| 6 | -Sig |
| 7 | NC |
| 8 | +Vexc |

Typical Operation

| PIN | DESCRIPTION | TYPE | VALUE |
|-----|-------------|------------|-------|
| 2 | +Sig | Analog Out | - |
| 4 | Gnd | Gnd | 0 V |
| 6 | -Sig | Analog Out | - |
| 8 | +Vexc | Power | +5 V |

Ordering information

| Order Code | Full-Scale Pressure Range | Pressure Type | Minimum Order Quantity |
|-------------------|---------------------------|---------------|------------------------|
| SM5420C-015-A-H-T | 15 PSI / 103.4 kPa | Absolute | 2,000 units |
| SM5420C-015-A-P-T | 15 PSI / 103.4 kPa | Absolute | 1,500 units |
| SM5420C-030-A-H-T | 30 PSI / 206.8 kPa | Absolute | 2,000 units |
| SM5420C-030-A-P-T | 30 PSI / 206.8 kPa | Absolute | 1,500 units |
| SM5420C-060-A-H-T | 60 PSI / 413.6 kPa | Absolute | 2,000 units |
| SM5420C-060-A-P-T | 60 PSI / 413.6 kPa | Absolute | 1,500 units |
| SM5420C-100-A-H-T | 100 PSI / 689.5 kPa | Absolute | 2,000 units |
| SM5420C-100-A-P-T | 100 PSI / 689.5 kPa | Absolute | 1,500 units |

For samples, please contact the Sales Department at: sales@si-micro.com

Product Number: SM5420C

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