

# ULTRA-SMALL PRESSURE SENSOR



**SILICON  
MICROSTRUCTURES**  
INCORPORATED  
*Member of the ELMOS Group*

Product Number: SM5420C

## HIGHLIGHTS

- For high-volume applications
- Ultra-small
- Low-cost OEM pressure package

## TYPICAL APPLICATIONS

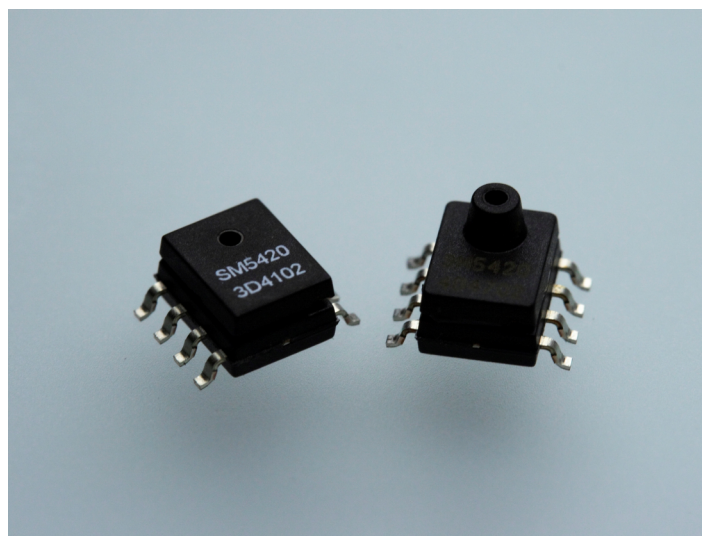
- Tire pressure monitoring system (TPMS)
- Engine management
- Barometric sensing
- Altitude correction detection
- Pneumatic gauges
- Hand-held meters
- Home appliances

## BASICS

- Absolute pressure
- PCB mountable
- Ported and non-porting configuration
- Tape and reel

## FEATURES

- 15, 30, 60 & 100 PSI (103, 207, 414 & 689 kPa)  
(Additional pressure ranges available on request)
- Wide operating temperature range (-40° to +125°C)
- Suitable for automated assembly
- Cost effective
- Constant current or constant voltage drive
- High millivolt output



SOIC-8 Package

## DESCRIPTION

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

This sensor is intended for high volume applications where cost is a critical factor, such as consumer tire pressure gauges or automotive tire pressure monitoring. The SM5420C is available as an absolute pressure sensor in full-scale ranges of 15, 30, 60 and 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.

Gel protects the die as a standard offering. The part can be ordered without gel in high volumes where the maximum stability is required, such as in barometric, weather station sensing applications. The SM5420C is shipped in tape-and-reel format.



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## 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 <sup>(a)</sup>	$V_{SUPPLY}$	0.0	5.0	10.0	V
2	Excitation Current <sup>(a)</sup>	$I_{SUPPLY}$	0.0	1.0	1.6	mA
3	Proof Pressure <sup>(b)</sup>	$P_{PROOF}$	3×	—	—	FS pRANGE
4	Burst Pressure <sup>(b)</sup>	$P_{BURST}$	5×	—	—	FS pRANGE
5	Operating Temperature <sup>(b)</sup>	$T_{OP}$	-40	—	+125	°C
6	Storage Temperature <sup>(b)</sup>	$T_{STG}$	-40	—	+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 SM5420C 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) <sup>(e)</sup>	$V_{SPAN}$	95	127	160	mV
8	Span (30 PSI) <sup>(e)</sup>	$V_{SPAN}$	65	100	135	mV
9	Span (60 PSI) <sup>(e)</sup>	$V_{SPAN}$	65	100	135	mV
10	Span (100 PSI) <sup>(e)</sup>	$V_{SPAN}$	65	100	135	mV
11	Zero Offset <sup>(e)</sup>	$V_{ZERO}$	-35	0	35	mV
12	TC Span <sup>(b)</sup>	TCS	-0.24	-0.19	-0.155	%FS/°C
13	TC Zero Offset <sup>(b)</sup>	TCZ	-0.07	-0.01	+0.07	%FS/°C
14	TC Resistance <sup>(b),(c)</sup>	TCR	0.24	0.275	0.33	%RB/°C
15	Linearity <sup>(d)</sup>	NL	-0.2	-0.07	0.2	%FS
16	Bridge Resistance	$R_B$	4.0	5.0	6.0	kΩ
17	Input Capacitance <sup>(b)</sup>	$C_{IN}$	-	< 2	-	pF

### NOTES:

(c) Determined by measurements taken at 0°C and 70°C.

(d) Defined as best fit straight line.

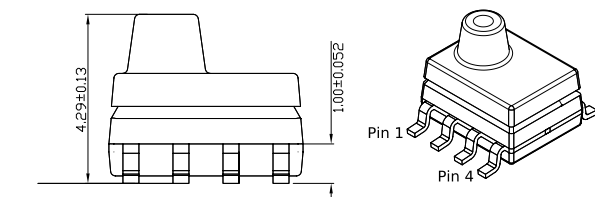
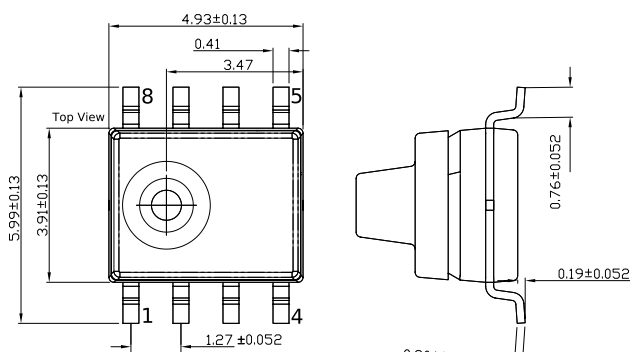
(e) For specifications regarding zero offset and span stability, please contact SMI sales at +1-(408) 577-0100 or [sales@si-micro.com](mailto:sales@si-micro.com).

## QUALIFICATION STANDARDS

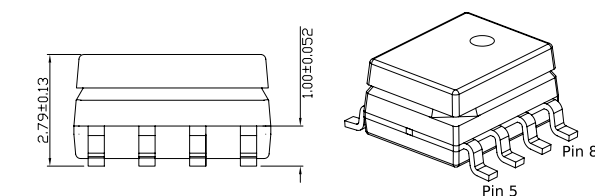
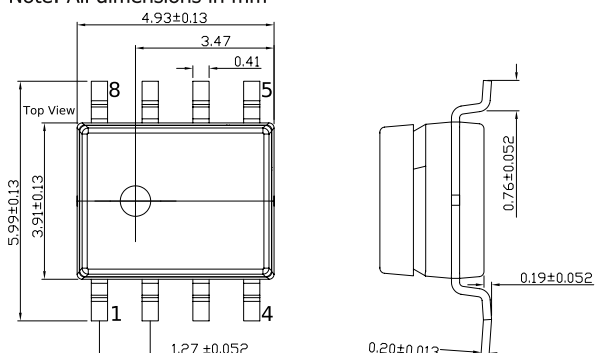
- REACH compliant
- RoHS compliant
- PFOS/PFOA compliant
- Qualified along AEC Q100 standards
- For qualification specifications please contact Sales at [sales@si-micro.com](mailto:sales@si-micro.com)

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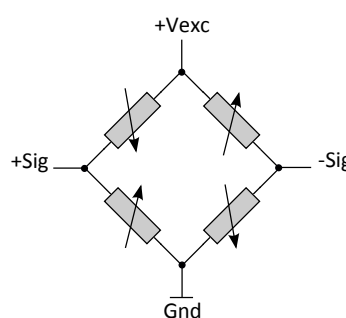
## Diagrams and Dimensions



Note: All dimensions in mm



## 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	Power	0 V
6	-Sig	Analog Out	—
8	+Vexc	Power	+5 V

## Ordering information

Order Code	Full-Scale Pressure Range	Pressure Type	Minimum Order Quantity
5420C-015-A-H-T	15 PSI / 103.4 kPa	Absolute	2,000 units
5420C-015-A-P-T	15 PSI / 103.4 kPa	Absolute	1,500 units
5420C-030-A-H-T	30 PSI / 206.8 kPa	Absolute	2,000 units
5420C-030-A-P-T	30 PSI / 206.8 kPa	Absolute	1,500 units
5420C-060-A-H-T	60 PSI / 413.6 kPa	Absolute	2,000 units
5420C-060-A-P-T	60 PSI / 413.6 kPa	Absolute	1,500 units
5420C-100-A-H-T	100 PSI / 689.5 kPa	Absolute	2,000 units
5420C-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](mailto:sales@si-micro.com)

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Silicon Microstructures, Inc. is an ISO/TS 16949:2009 certified company.

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