



## UNCOMPENSATED SO-16 LOW PRESSURE SENSOR SM9D/SM9G SERIES

The low pressure SM9D/G series is available in pressure ranges of 0.15, 0.6 & 1.5 PSI full-scale in gauge and differential configurations. All parts in this series are uncompensated die mounted in a rugged plastic package designed for surface mounting. The surface mount small outline package (SO-16) is available horizontal and vertical configuration for differential pressure and in vertical configuration for gage pressure.

### Features

- Uncompensated millivolt analog output
- Differential or gage pressure options
- Vertical or horizontal porting configurations
- Pressure ranges: 0.15, 0.6 & 1.5 PSI
- Variable supply voltage
- Built in ESD protection

### Applications

- Patient Monitoring
- Wound Therapy
- Handheld Meters
- Pneumatic Gauges
- Pressure Switches
- Sports Equipment
- Appliances

# UNCOMPENSATED SO-16 PRESSURE SENSOR

SM9D/SM9G Series

## 1. Absolute Maximum Ratings

All parameters are specified at  $V_{DD} = 5.00$  V DC SUPPLY at 25°C, unless otherwise noted

Characteristic	Symbol	Min	Typ	Max	Units
Supply Voltage <sup>(a, c)</sup>	$V_{DD}$	-	-	6.5	V
Supply Current <sup>(a, c)</sup>	$I_{VDD}$	-	-	1.6	mA
Operating Temperature Range <sup>(b)</sup>	$T_{OP}$	-40	-	+85	°C
Storage Temperature <sup>(b)</sup>	$T_{STG}$	-40	-	+125	°C
ESD Voltage (HBM)	$V_{ESD}$	4	-	-	kV

Product	Operating Pressure	Proof Pressure ( $P_{PROOF}$ ) <sup>(d, e)</sup>	Burst Pressure ( $P_{BURST}$ ) <sup>(d, f)</sup>
SM9X-BXX-X-001S-000	0.15 PSI	1.5 PSI	3.0 PSI
SM9X-BXX-X-006S-000	0.6 PSI	4.8 PSI	6.0 PSI
SM9X-BXX-X-015S-000	1.5 PSI	12.0 PSI	15.0 PSI

## 2. Operating Characteristics Table

All parameters are specified at  $V_{DD} = 5.0$  V DC SUPPLY at 25°C, unless otherwise noted.

Characteristic	Symbol	Min	Typ	Max	Units
Span <sup>(0.15 PSI) (g)</sup>	$V_{SPAN}$	30	45	60	mV
Span <sup>(0.60, 1.5 PSI) (g)</sup>		50	90	120	
Zero Offset	$V_{ZERO}$	-55	0	+55	mV
TC Span <sup>(g, i, j)</sup>	TCS	-0.24	-0.21	-0.15	%FS/°C
TC Zero Offset <sup>(g, i, j)</sup>	TCZ		0 to +100		$\mu$ V/°C
TC Resistance <sup>(h, i, j)</sup>	TCR	0.17	0.20	0.23	% $R_B$ /°C
Topside Linearity <sup>(g, j)</sup>	NL	-0.15	$\pm$ 0.1	0.15	%FS
Backside Linearity <sup>(g, j)</sup>		-0.35	$\pm$ 0.2	0.35	
Bridge Resistance	$R_B$	4.0	5.0	6.0	k $\Omega$

### Notes:

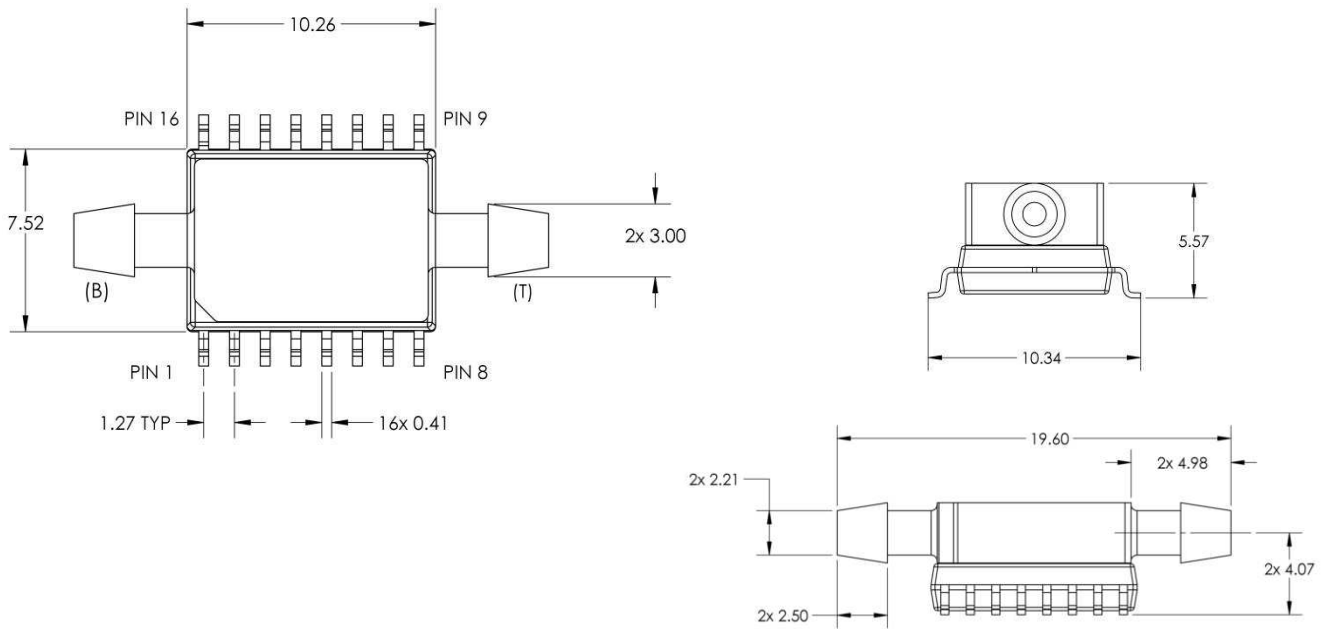
- The device can only be driven with the supply voltage connected to the pins as shown. The positive output will increase with increasing pressure applied to the package.
- Tested on a sample basis.
- Never exceed 6.5 V supply voltage under any operating conditions.
- Tested on a sample basis.
- Proof 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.
- Burst pressure is the pressure at which the device suffers catastrophic failure resulting in pressure loss through the device.
- Tested on a sample basis.
- The device can only be driven with the supply voltage connected to the pins as shown.
- Determined by measurements taken between -40°C and 85°C.
- Defined as best fit straight line.

# UNCOMPENSATED SO-16 PRESSURE SENSOR

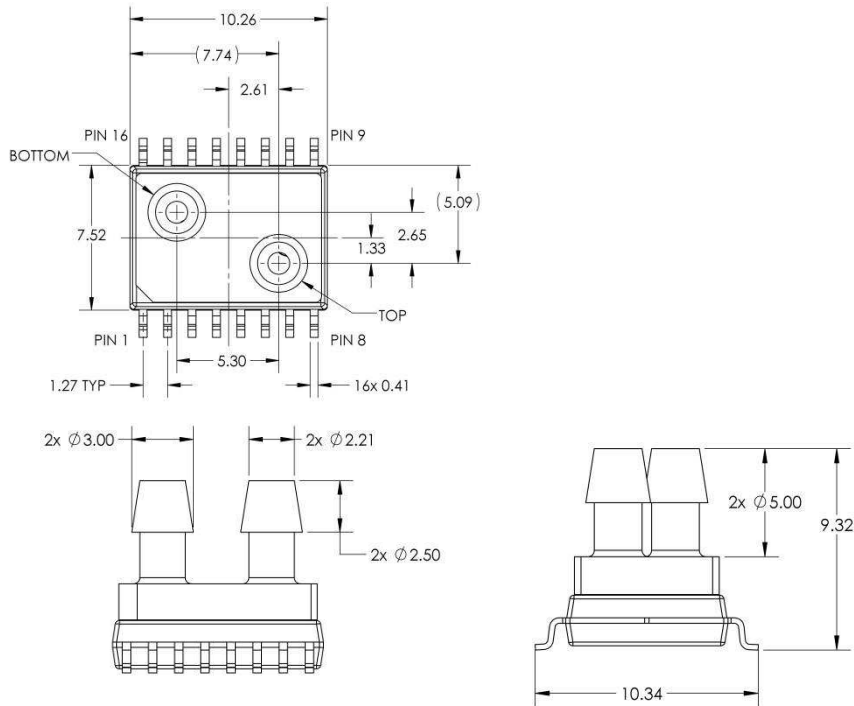
SM9D/SM9G Series

## 3. Diagrams & Dimensions

### Dual Horizontal Porting Configuration: SM9D-BB



### Dual Vertical Porting Configuration: SM9D-BC



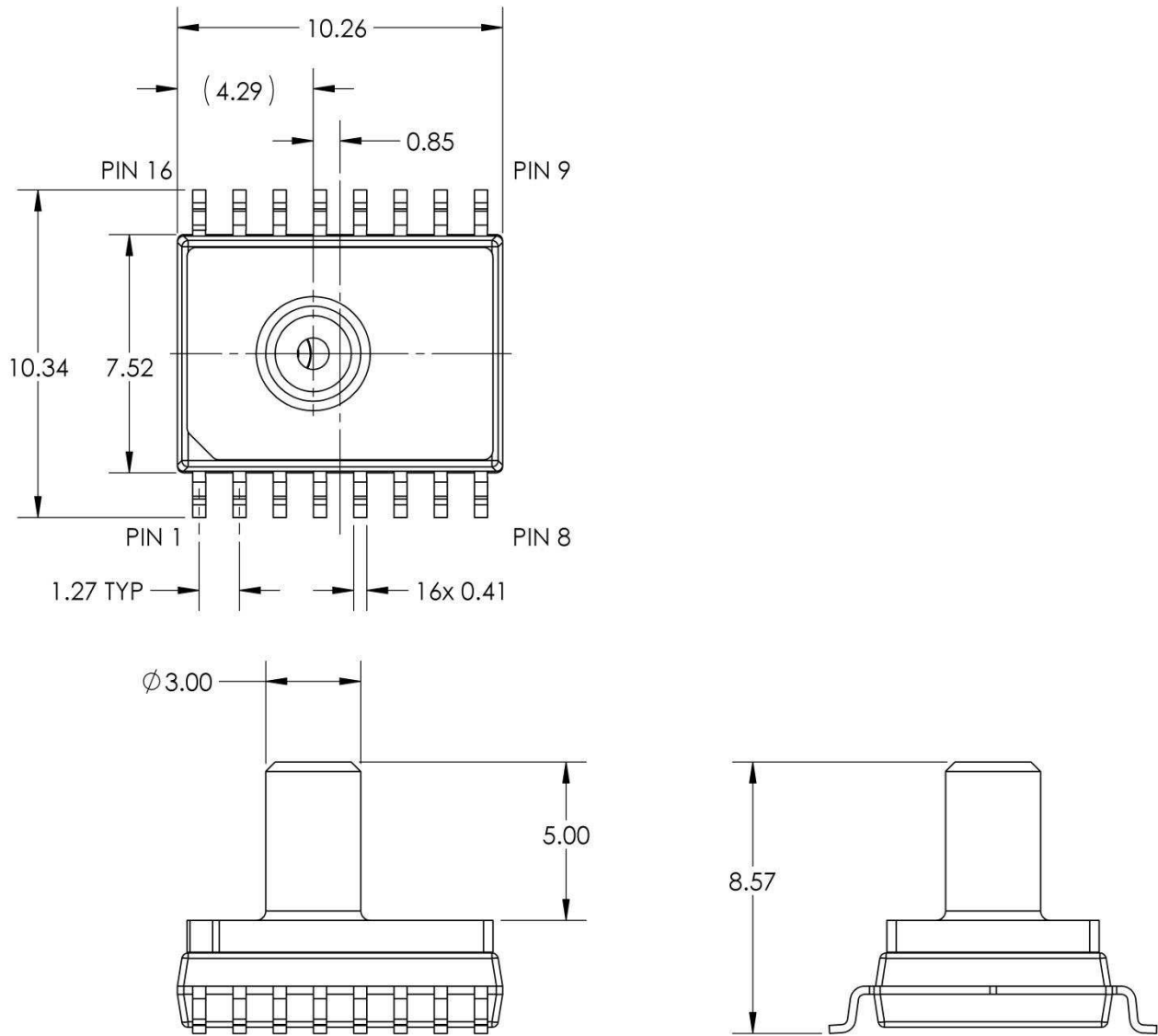
**Notes:**

- All dimensions in units of [mm]
- Moisture Sensitivity Level (MSL): Level 3
- Positive pressure applied to the topside of the die [T] is resulting in a positive change in output.

# UNCOMPENSATED SO-16 PRESSURE SENSOR

SM9D/SM9G Series

## Single Vertical Porting Configuration: SM9G-BG



### Notes:

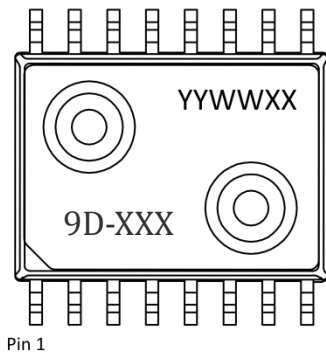
- All dimensions in units of [mm]
- Moisture Sensitivity Level (MSL): Level 3
- Positive pressure applied to the port is resulting in a positive change in output. Pressure is applied to the backside of the die

# UNCOMPENSATED SO-16 PRESSURE SENSOR

SM9D/SM9G Series

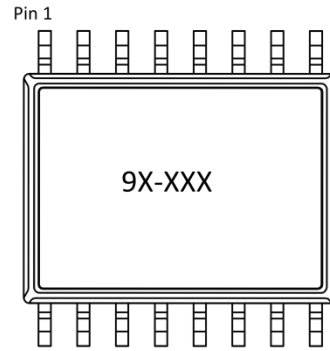
## Part & Lot Number Identification

Top View

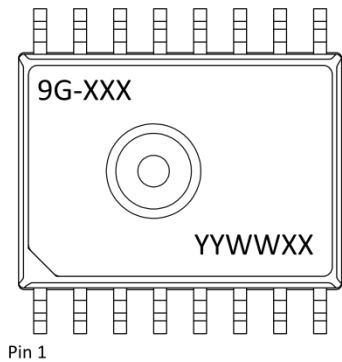


Pin 1

Bottom View

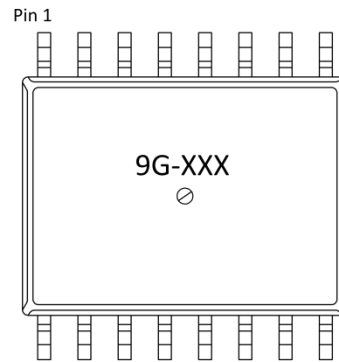


Pin 1

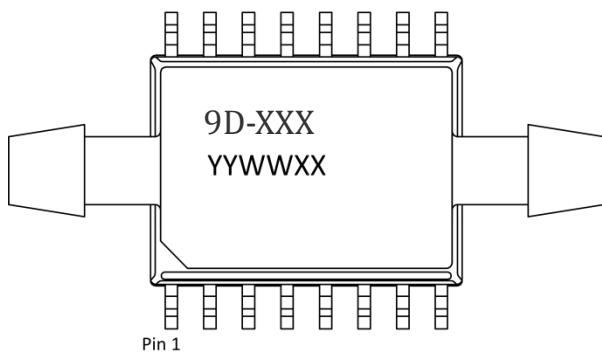


Pin 1

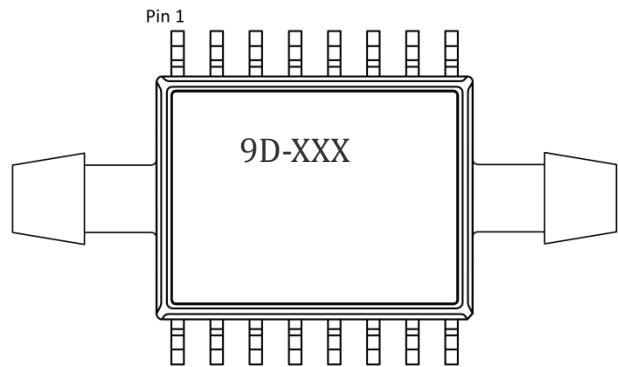
Only in Gage pressure



Pin 1



Pin 1

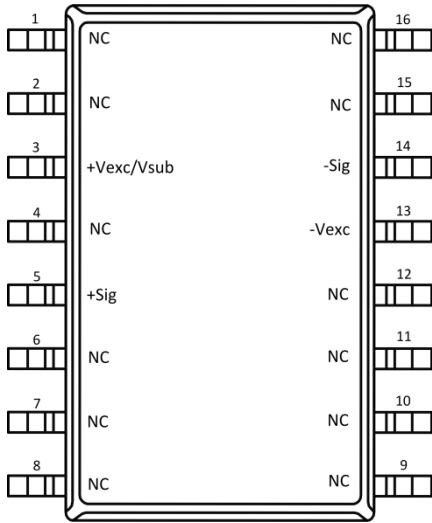


Pin 1

# UNCOMPENSATED SO-16 PRESSURE SENSOR

SM9D/SM9G Series

## SM9D Package Pin-Out (Dual Horizontal & Dual Vertical)

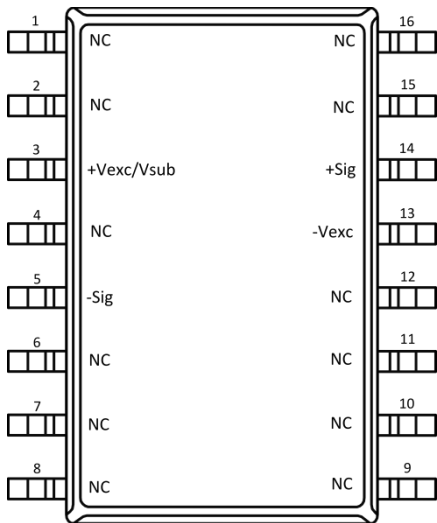


Typical Operation			
Pin	Description	Type	Value
3	+Vexc/Vsub	Power	Up to 5 V
5	-Sig	Analog Out	-
13	-Vexc	Power	Ground
14	+Sig	Analog Out	-

**Notes:**

- Do not connect to NC pins
- Applies dual ported vertical and horizontal packages
- Positive pressure applied to the topside of the die [T] is resulting in a positive change in output.

## SM9G Package Pin-Out (Single Vertical)



Typical Operation			
Pin	Description	Type	Value
3	+Vexc/Vsub	Power	Up to 5 V
5	+Sig	Analog Out	-
13	-Vexc	Power	Ground
14	-Sig	Analog Out	-

**Notes:**

- Do not connect to NC pins
- Applies dual ported vertical and horizontal packages
- Positive pressure applied to the port results in a positive change in output. Pressure is applied to the backside of the die.

# UNCOMPENSATED SO-16 PRESSURE SENSOR

SM9D/SM9G Series

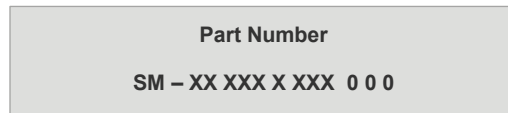
## 4. Ordering Information

Order Code	Pressure Type	Full-Scale Pressure Range	Cap Configuration	Shipping Configuration <sup>(a)</sup>
SM9D-BCK-T-001S-000	Differential	0.15 PSI	Dual Vertical	Tape & Reel 350 devices per reel
SM9D-BCK-T-006S-000		0.60 PSI		
SM9D-BCK-T-015S-000		1.50 PSI		
SM9D-BBK-T-001S-000	Differential	0.15 PSI	Dual Horizontal	Tape & Reel 500 devices per reel
SM9D-BBK-T-006S-000		0.60 PSI		
SM9D-BBK-T-015S-000		1.50 PSI		
SM9G-BGK-T-001S-000	Gage	0.15 PSI	Single Vertical	Tape & Reel 400 devices per reel
SM9G-BGK-T-006S-000		0.60 PSI		
SM9G-BGK-T-015S-000		1.50 PSI		

**Notes:**

- a) All parts also available in shipping configuration Sticks, see section 5. Part Numbering Key for ordering information.

## 5. Part Numbering Key



**Series**

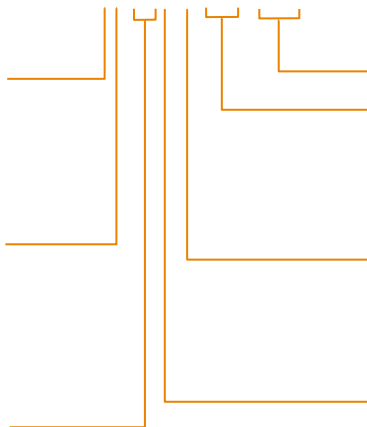
<b>9</b>	Uncompensated Low Pressure
----------	----------------------------

**Pressure Type**

<b>G</b>	Gage
<b>D</b>	Differential

**Package Type and Porting**

<b>BB</b>	S0-16 Dual Horizontal
<b>BC</b>	S0-16 Dual Vertical
<b>BK</b>	S0-16 Single Vertical



**Counter Pressure Range**

**Shipping Format**

<b>S</b>	Stick
<b>T</b>	Tape & Reel

**Operating Temperature Range**

<b>K</b>	-40 to +85°C
----------	--------------