Uncompensated SO-16 Pressure Sensor

SM9D, SM9G Series

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

DESCRIPTION

Silicon Microstructures provides its most popular pressure sensor die in a surface mount small outline package (SO-16) configuration. All parts in this series are uncompensated high performance die mounted in a rugged plastic package designed for surface mounting.

The low pressure SM9D/G series incorporates Silicon Microstructures' unique pressure die to achieve high performance in pressure ranges of 0.15, 0.6 & 1.5 PSI full-scale in gauge and differential configurations.

Industrial	Consumer	Medical
Handheld Meters	Sports Equipment	Hospital Beds
Pneumatic Gauges	Appliances	Wound Therapy
Pressure Switches		Health Monitoring

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ABSOLUTE MAXIMUM RATING TABLE

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

No.	Characteristic	Symbol	Minimum	Typical	Maximum	Units
1	Supply Voltage[a, c]	V_{DD}	-	-	6.5	V
2	Supply Current[a, c]	I_{VDD}	-	-	1.6	mA
3	Operating Temperature Range[b]	T_{OP}	-40	-	+85	°C
4	Storage Temperature[b]	T_{STG}	-40	-	+125	°C
5	ESD Voltage (HBM)	V_{ESD}	4	-	-	kV

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.

c. Never exceed 6.5 V supply voltage under any operating conditions.

No.	Product Number	Operating Pressure	Proof Pressure (P_{PROOF}) [d, e]	Burst Pressure (P_{BURST}) [d, f]
6	SM9X-BXX-X-001S-000	0.15 PSI	1.5 PSI	3.0 PSI
8	SM9X-BXX-X-006S-000	0.6 PSI	4.8 PSI	6.0 PSI
9	SM9X-BXX-X-015S-000	1.5 PSI	12.0 PSI	15.0 PSI

NOTES:

d. Tested on a sample basis.

e. 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.

f. Burst pressure is the pressure at which the device suffers catastrophic failure resulting in pressure loss through the device.

OPERATING CHARACTERISTICS TABLE

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

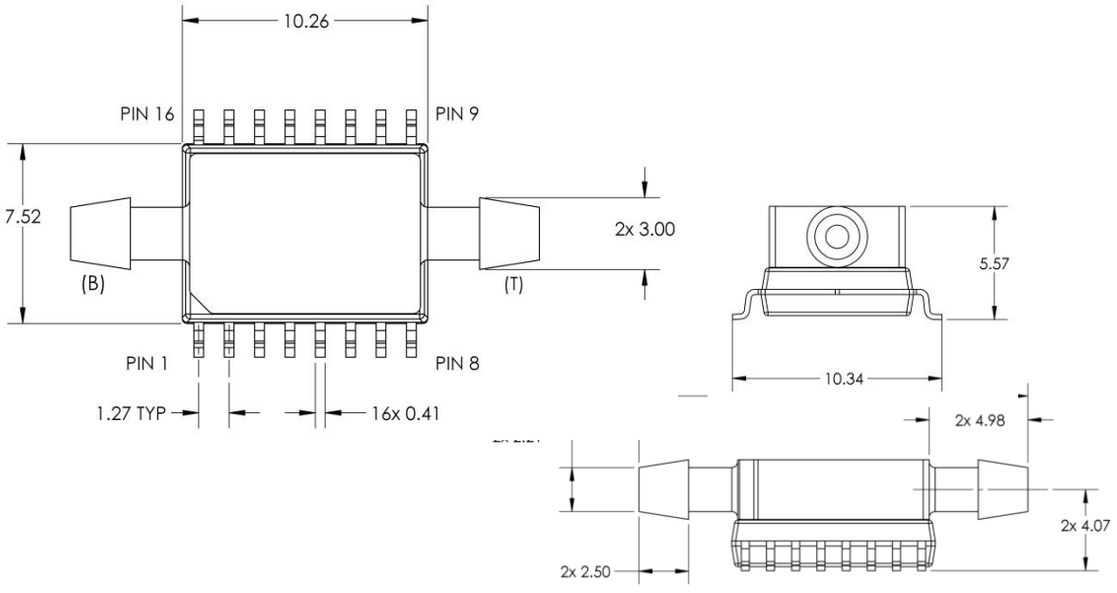
No.	Characteristic	Symbol	Minimum	Typical	Maximum	Units
10a	Span (0.15 PSI) (g)	V_{SPAN}	30	45	60	mV
10b	Span (0.60, 1.5 PSI) (g)		50	90	120	
11	Zero Offset	V_{ZERO}	-55	0	+55	mV
12	TC Span (g, i, j)	TCS	-0.24	-0.21	-0.15	%FS/°C
13	TC Zero Offset (g, i, j)	TCZ	-100	-	100	µV/°C
14	TC Resistance (h, i, j)	TCR	0.17	0.20	0.23	$\%R_B$/°C
15	Topside Linearity (g, j)	NL	-0.15	±0.1	0.15	%FS
16	Backside Linearity (g, j)		-0.35	±0.2	0.35	
17	Bridge Resistance	R_B	4.0	5.0	6.0	kΩ

Notes:

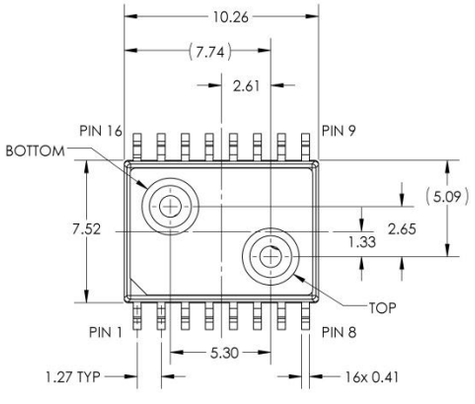
g. Tested on a sample basis.
h. The device can only be driven with the supply voltage connected to the pins as shown.
i. Determined by measurements taken between -40°C and 85°C.
j. Defined as best fit straight line.

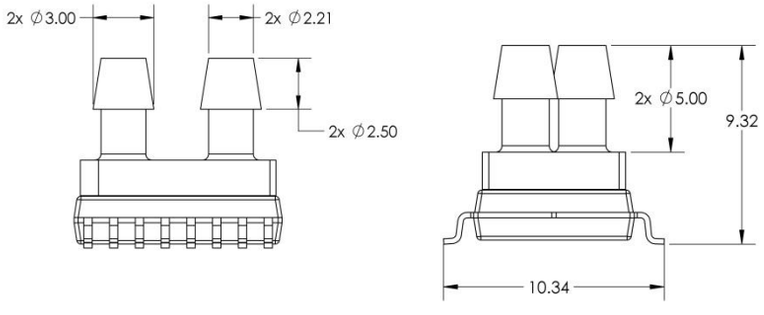
Diagrams & Dimensions

Dual Horizontal Porting Configuration: SM9D-BB



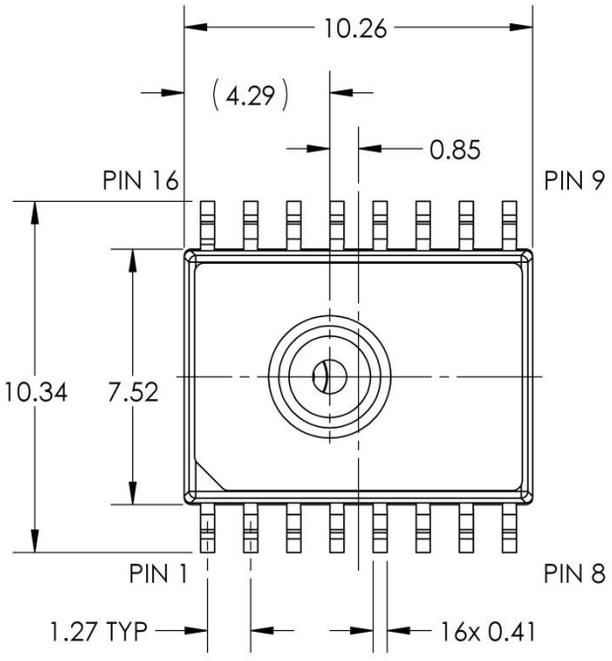
Dual Vertical Porting Configuration: SM9D-BC

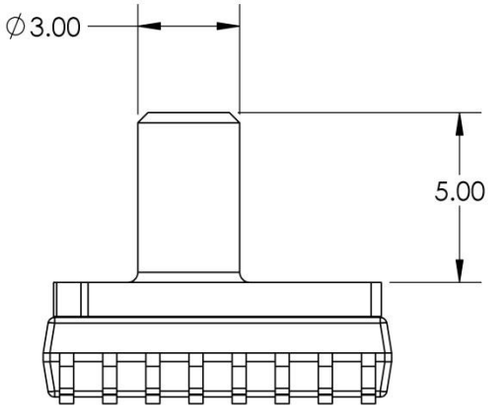


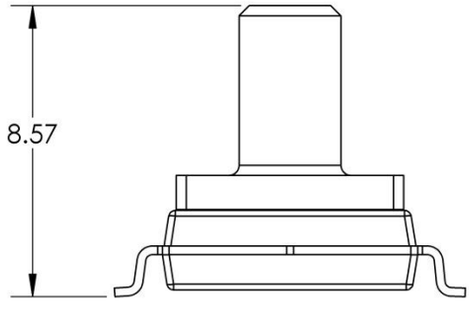


Notes:

- 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.





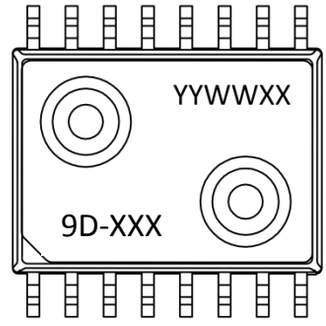


Notes:

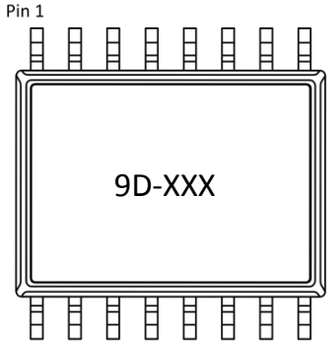
- All dimensions in units of [mm].
- Moisture Sensitivity Level (MSL): Level 3
- Positive pressure applied to the port is resulting in a positive change in output. Pressure is applied to the backside of the die.

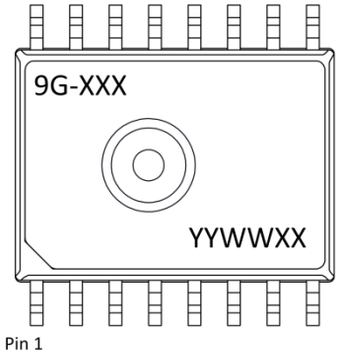
Part & Lot Number Identification

Top View

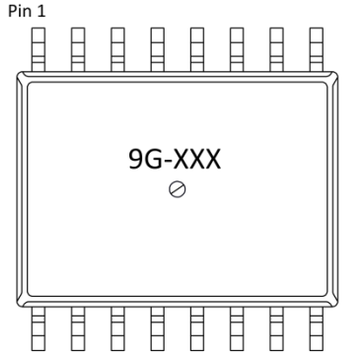


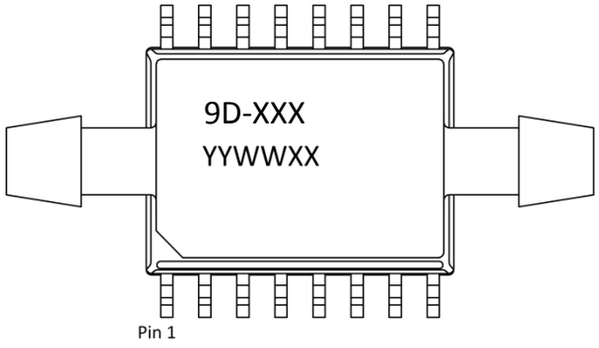
Bottom View

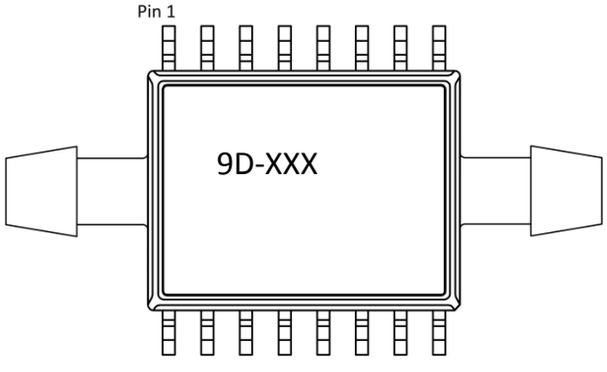




Only in Gage pressure

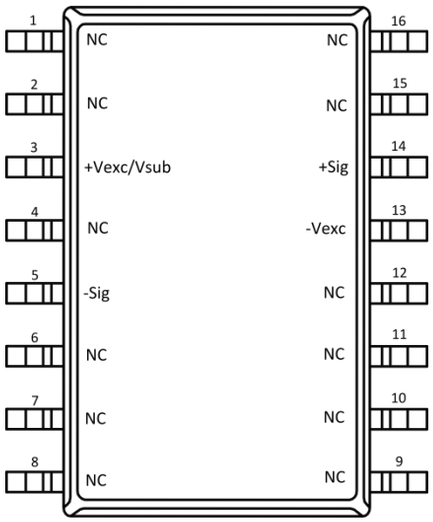






9G- = Gage, 9D- = Differential
-001 = 0.15 PSI, -006 = 0.6 PSI, -015 = 1.5 PSI

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

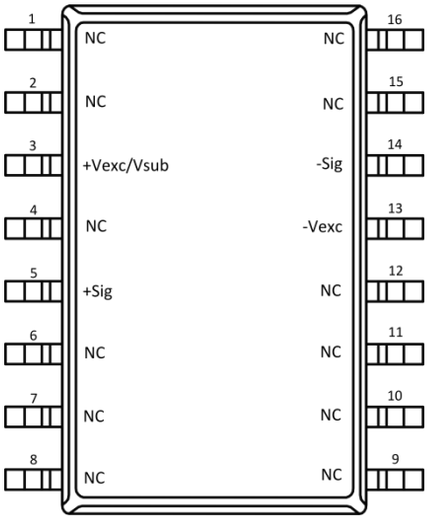


Typical Operation			
PIN	Description	Type	Value
3	+Vexc/Vsub	Power	Up to 5 V
5	-Sig	Analog Out	-
13	-Vexc	Power	Ground
14	+Sig	Analog Out	-

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	-

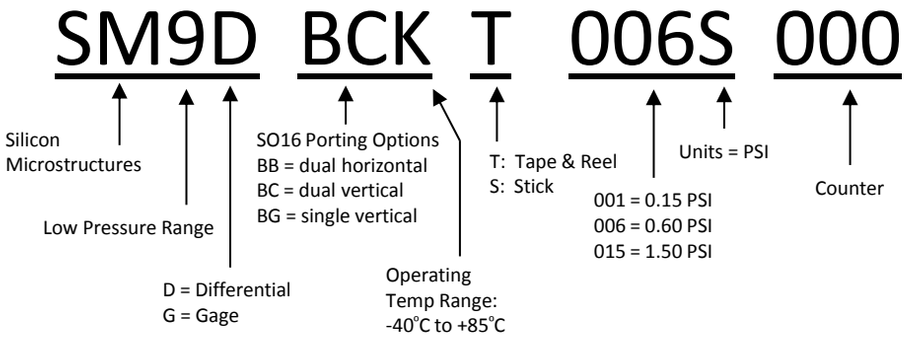
NOTES:

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

Ordering Information

Order Code	Pressure Type	Full-Scale Pressure Range	Cap Configuration	Shipping Configuration
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		

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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