

COMPENSATED AND CALIBRATED LOW PRESSURE SENSOR



Product Number: SM5651

HIGHLIGHTS

- Low pressures for sensitive applications
- Constant current driven
- Dual inline package (DIP)
- Fully temperature compensated and calibrated
- Primary pressure port on back-side of sensor die, protecting front-side of sensor
- Span calibration using integrated resistor and external op-amps

TYPICAL APPLICATIONS

- Medical equipment
- Respiration
- HVAC
- Level detection
- Flow measurement
- Industrial control

TECHNICAL FEATURES

- 0.15, 0.3, 0.8, 1.5 PSI / 1.0, 2.1, 10.3 kPa
- Easy-to-use dual inline package (DIP)
- Zero offset calibration
- High-performance, stable packaged silicon chip
- Wide 0-60°C compensated temperature range
- RoHS & REACH Compliant



DESCRIPTION

The SM5600 Series of OEM pressure sensors are laser trimmed, temperature-compensated, low-pressure sensors in dual in-line packages for printed circuit board mounting. These sensors offer improved performance as well as the option for constant current excitation. With the ability to detect pressure ranges as low as 0.15 PSI full scale, the SM5651 is ideal for applications requiring extreme sensitivity, from respiration to air filter obstructions.

The SM5600 Series pressure sensors are constructed by attaching a highly stable piezoresistive pressure sensor chip to a ceramic substrate. Thick film resistors on the ceramic are laser trimmed during manufacturing to provide zero offset calibration, temperature compensation for zero offset, and temperature compensation for sensitivity. In the SM5651 an additional resistor is trimmed to normalize the output of an external differential amplifier to provide span calibration when the sensor is driven by a constant current supply.

Various pressure port configurations are available for flexibility in matching this product to specific applications.



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ABSOLUTE MAXIMUM RATING TABLE FOR SM5651

All parameters are specified with excitation current = 1.5mA at room temperature, unless otherwise noted.

No.	Characteristic	Symbol	Minimum	Typical	Maximum	Units
1	Excitation Current	I_{SUPPLY}	0	1.5	3.0	mA
2	Proof Pressure ^(d)	P_{PROOF}	10x			P_{RANGE}
3	Burst Pressure ^(d)	P_{BURST}	15x			P_{RANGE}
4	Operating Temperature ^(d)	T_{OP}	-40		+125	°C
5	Storage Temperature ^(d)	T_{STG}	-40		+125	°C
6	Media Compatibility ^{(d) (f)}					

OPERATING CHARACTERISTICS FOR SM5651 - SPECIFICATIONS

All parameters are specified with excitation current = 1.5mA at room temperature, unless otherwise noted.

No.	Characteristic	Symbol	Minimum	Typical	Maximum	Units
7	Span (FS p_{RANGE}) ^{(a),(b)}	V_{SPAN}	25.0	45.0	75.0	mV
8	Zero Offset	V_{ZERO}	-2.0	+0.2	+2.0	mV
9	Pressure Hysteresis ^(d)	$H_{P,ZERO}$	-0.30	0.05	0.30	%FS
10	Resistance Input	R_B	1.8	3.0	3.8	kΩ
11	Resistance Output	$R_{B,OUT}$	2.7	3.3	3.8	kΩ
12	Compensated Temp. Range ^(c)	T_{COMP}	0		60	°C

0.15 PSI / 1.0 kPa

No.	Characteristic	Symbol	Minimum	Typical	Maximum	Units
13	Thermal Accuracy - Span ^(c)	TAS	-2.0	0.2	2.0	%FS
14	Thermal Accuracy - Zero Offset ^(c)	TAZ	-2.0	0.2	2.0	%FS
15	Temperature Hysteresis ^(d)	H_T	-0.65	0.05	0.65	%FS
16	Linearity ^(d)	NL	-2.50	0.05	2.50	%FS
17	Repeatability ^(d)	REP	-0.30	0.05	0.30	%FS
18	Sensitivity Matching ^{(a),(b),(d),(e)}	S_M	-2.00	-0.20	2.00	%FS

0.3 PSI / 2.1 kPa

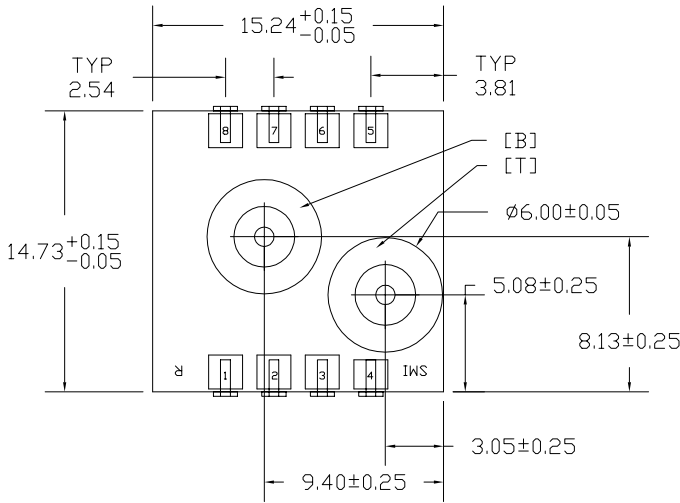
No.	Characteristic	Symbol	Minimum	Typical	Maximum	Units
19	Thermal Accuracy - Span ^(c)	TAS	-0.75	0.2	0.75	%FS
20	Thermal Accuracy - Zero Offset ^(c)	TAZ	-1.0	0.2	1.0	%FS
21	Temperature Hysteresis ^(d)	H_T	-0.45	0.05	0.45	%FS
22	Linearity ^(d)	NL	-0.50	0.05	0.50	%FS
23	Repeatability ^(d)	REP	-0.30	0.05	0.30	%FS
24	Sensitivity Matching ^{(a),(b),(d),(e)}	S_M	-2.00	-0.20	2.00	%FS

NOTES:

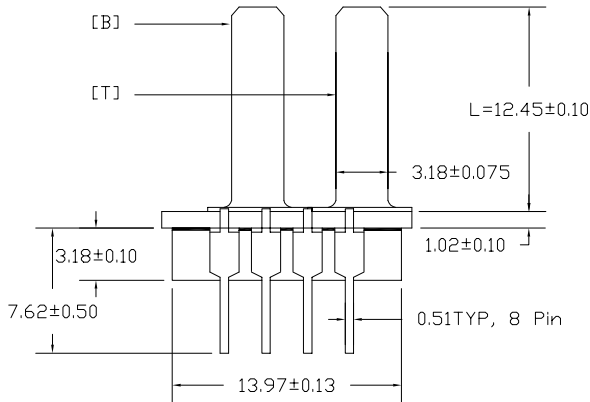
- (a) Positive Pressure is defined as entry on the bottom side of the die; gain, during factory calibration, is set using negative pressure.
- (b) Values given for top side.
- (c) Measured over a temperature range of 22°C to 58°C.
- (d) Tested on a sample basis.
- (e) Sensitivity Matching is measured by the part-to-part matching of span.
- (f) Clean, dry gas compatible with wetted materials. Wetted materials include Pyrex glass, silicon, alumina ceramic, epoxy, RTV, gold, aluminum, and nickel.

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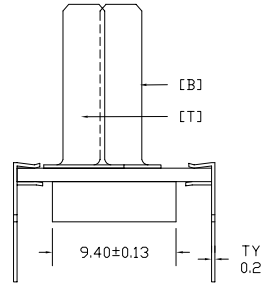
Package Dimensions & Pin-Out



Top View



Side View



All dimensions are shown in millimeters

PIN	DESCRIPTION
1	Sig-
2	lexc-
3	Sig+
4	lexc+
5	Gainset Resistor
6	Gainset Resistor
7	NC
8	NC

NOTES:

- Do not connect to NC pins.
- External connections to NC pins will cause part malfunction.
- [B] is tube connected to bottom side of sensor die.
- [T] is tube connected to top side of sensor die.
- Tube [B] is used for positive differential pressure.
- Not to exceed 5kg force on tubes.

Pressure Type:

D: Differential (2 Tubes)

Tube Length:

L: Long (12.45 mm ± 0.10 mm)
S: Short (8.25 mm ± 0.10 mm)

Qualification Standards

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



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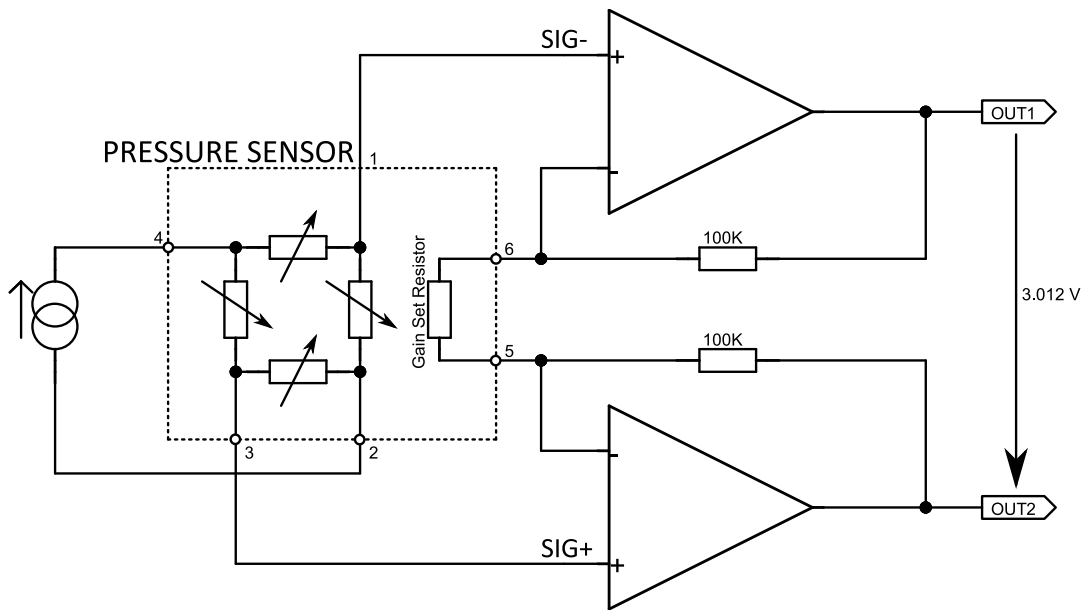
Ordering Information

Order Code	Pressure Type	Full-Scale Pressure Range	Tube Length
5651-001-D-3-LR	Differential	0.15 PSI / 1.0 kPa	Long
5651-001-D-3-SR	Differential	0.15 PSI / 1.0 kPa	Short
5651-003-D-3-SR	Differential	0.3 PSI / 2.1 kPa	Short
5651-008-D-3-SR	Differential	0.8 PSI / 5.5 kPa	Short
5651-015-D-3-SR	Differential	1.5 PSI / 10.3 kPa	Short

For samples, please contact sales@si-micro.com.

Wiring Diagrams

Typical Circuit Configuration for SM5651



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