

# COMPENSATED AND CALIBRATED LOW PRESSURE SENSOR



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

Product Number: SM5652

## HIGHLIGHTS

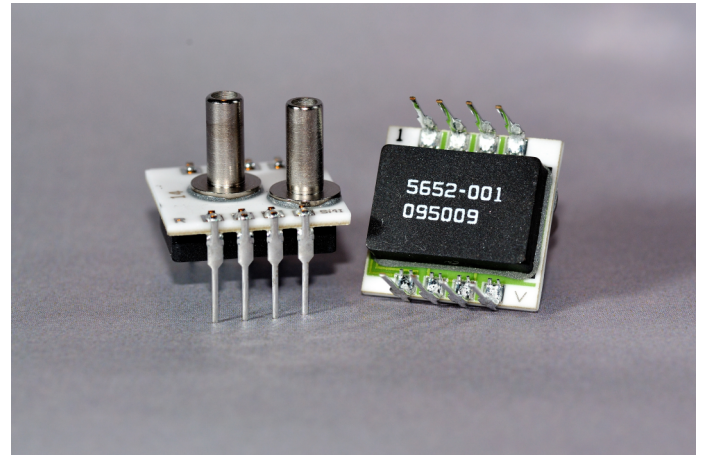
- Low pressures for sensitive applications
- Constant voltage driven
- Dual inline package (DIP)
- Fully temperature compensated and calibrated

## 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, 5.5, 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



## DESCRIPTION

The SM5600 Series of OEM pressure sensors are laser trimmed for enhanced performance, 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 voltage excitation. With the ability to detect pressure ranges as low as 0.15 PSI, the SM5652 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.

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



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## ABSOLUTE MAXIMUM RATING TABLE FOR SM5652

All parameters are specified at  $V_{SUPPLY} = 10.00$  V DC supply at room temperature, unless otherwise noted.

| No. | Characteristic                       | Symbol       | Minimum | Typical | Maximum | Units       |
|-----|--------------------------------------|--------------|---------|---------|---------|-------------|
| 1   | Excitation Voltage                   | $V_{SUPPLY}$ | 0       | 10      | 20      | V           |
| 2   | Proof Pressure <sup>(d)</sup>        | $P_{PROOF}$  | 10x     |         |         | $P_{RANGE}$ |
| 3   | Burst Pressure <sup>(d)</sup>        | $P_{BURST}$  | 15x     |         |         | $P_{RANGE}$ |
| 4   | Operating Temperature <sup>(d)</sup> | $T_{OP}$     | -40     |         | +125    | °C          |
| 5   | Storage Temperature <sup>(d)</sup>   | $T_{STG}$    | -40     |         | +125    | °C          |
| 6   | Media Compatibility <sup>(d)</sup>   |              |         |         |         |             |

## OPERATING CHARACTERISTICS FOR SM5652 - SPECIFICATIONS

All parameters are specified at  $V_{SUPPLY} = 10.00$  V DC supply at room temperature, unless otherwise noted.

| All Pressures | No. | Characteristic                         | Symbol       | Minimum | Typical | Maximum | Units      |
|---------------|-----|--|--------------|---------|---------|---------|------------|
|               | 7   | Zero Offset                            | $V_{ZERO}$   | -2.0    | +0.2    | +2.0    | mV         |
|               | 8   | Pressure Hysteresis <sup>(d)</sup>     | $H_{P,ZERO}$ | -0.30   | 0.05    | 0.30    | %FS        |
|               | 9   | Resistance Input                       | $R_B$        | 4.5     | 8.0     | 25.0    | k $\Omega$ |
|               | 10  | Resistance Output                      | $R_{B,OUT}$  | 2.0     | 2.5     | 3.8     | k $\Omega$ |
|               | 11  | Compensated Temp. Range <sup>(c)</sup> | $T_{COMP}$   | 0       |         | 60      | °C         |

| 0.15 PSI / 1.0 kPa | No. | Characteristic                                | Symbol     | Minimum | Typical | Maximum | Units |
|--------------------|-----|---|------------|---------|---------|---------|-------|
|                    | 12  | Span (FS $p_{RANGE}$ ) <sup>(a),(b)</sup>     | $V_{SPAN}$ | 23.75   | 25.0    | 26.25   | mV    |
|                    | 13  | Thermal Accuracy - Span <sup>(c)</sup>        | TCS        | -2.0    | 0.2     | 2.0     | % FS  |
|                    | 14  | Thermal Accuracy - Zero Offset <sup>(c)</sup> | TCZ        | -2.0    | 0.2     | 2.0     | % FS  |
|                    | 15  | Temperature Hysteresis <sup>(d)</sup>         | $H_T$      | -0.65   | 0.05    | 0.65    | %FS   |
|                    | 16  | Linearity <sup>(d)</sup>                      | NL         | -2.50   | 0.05    | 2.50    | %FS   |
|                    | 17  | Repeatability <sup>(d)</sup>                  | REP        | -0.30   | 0.05    | 0.30    | %FS   |

| 0.3 PSI / 2.1 kPa | No. | Characteristic                                | Symbol     | Minimum | Typical | Maximum | Units |
|-------------------|-----|---|------------|---------|---------|---------|-------|
|                   | 18  | Span (FS $p_{RANGE}$ ) <sup>(a),(b)</sup>     | $V_{SPAN}$ | 24.5    | 25.0    | 25.5    | mV    |
|                   | 19  | Thermal Accuracy - Span <sup>(c)</sup>        | TCS        | -0.75   | 0.2     | 0.75    | % FS  |
|                   | 20  | Thermal Accuracy - Zero Offset <sup>(c)</sup> | TCZ        | -1.0    | 0.2     | 1.0     | % FS  |
|                   | 21  | Temperature Hysteresis <sup>(d)</sup>         | $H_T$      | -0.45   | 0.05    | 0.45    | %FS   |
|                   | 22  | Linearity <sup>(d)</sup>                      | NL         | -0.50   | 0.05    | 0.50    | %FS   |
|                   | 23  | Repeatability <sup>(d)</sup>                  | REP        | -0.30   | 0.05    | 0.30    | %FS   |

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0.8 PSI / 5.5 kPa &amp; 1.5 PSI / 10.3 kPa

| No. | Characteristic                                | Symbol     | Minimum | Typical | Maximum | Units |
|-----|---|------------|---------|---------|---------|-------|
| 24  | Span (FS $p_{RANGE}$ ) <sup>(a),(b)</sup>     | $V_{SPAN}$ | 24.5    | 25.0    | 25.5    | mV    |
| 25  | Thermal Accuracy - Span <sup>(c)</sup>        | TCS        | -0.65   | 0.2     | 0.65    | % FS  |
| 26  | Thermal Accuracy - Zero Offset <sup>(c)</sup> | TCZ        | -1.0    | 0.2     | 1.0     | % FS  |
| 27  | Temperature Hysteresis <sup>(d)</sup>         | $H_T$      | -0.30   | 0.05    | 0.30    | %FS   |
| 28  | Linearity <sup>(d)</sup>                      | NL         | -0.30   | 0.05    | 0.30    | %FS   |
| 29  | Repeatability <sup>(d)</sup>                  | REP        | -0.30   | 0.05    | 0.30    | %FS   |

## NOTES:

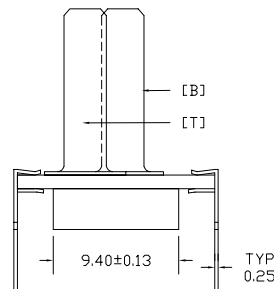
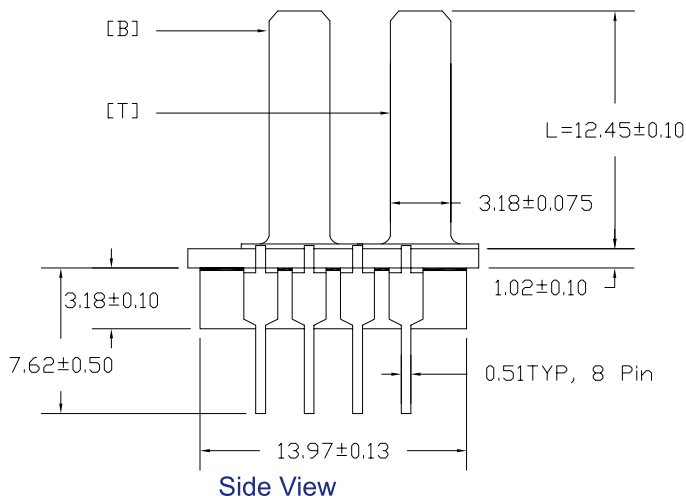
- (a) Positive Pressure is defined as entry on the bottom side of the die; gain, during factory calibration, is set using negative pressure.  
 (b) Values given for top side.  
 (c) Measured over a temperature range of 22°C to 58°C.  
 (d) Tested on a sample basis.

## QUALIFICATION STANDARDS

→ For qualification specifications, please contact Sales at sales@si-micro.com

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## Package Dimensions & Pin-Out



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

All dimensions are shown in millimeters

### NOTES:

- Do not connect to NC pins.
- External connections to NC pins will cause part malfunction.
- Tolerance on all dimensions  $\pm 0.13$  mm unless otherwise specified.
- [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.

### Pin Configuration

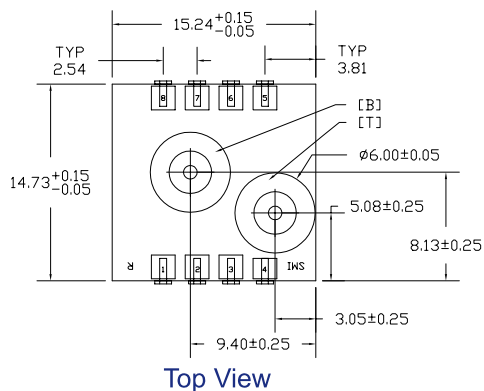
- Pins opposite direction of tube

### Tube Length

- L: Long (12.45 mm  $\pm$  0.10 mm)
- S: Short (8.25 mm  $\pm$  0.10 mm)

### Pressure Type

- D: Differential (2 Tubes)
- G: Gauge (1 Tube, [B] tube only)



## Ordering information

| Order Code      | Pressure Type | Full-Scale Pressure Range | Tube Length |
|-----------------|---------------|---------------------------|-------------|
| 5652-001-D-3-LR | Differential  | 0.15 PSI / 1.0 kPa        | Long        |
| 5652-001-D-3-SR | Differential  | 0.15 PSI / 1.0 kPa        | Short       |
| 5652-003-D-3-LR | Differential  | 0.3 PSI / 2.1 kPa         | Long        |
| 5652-003-D-3-SR | Differential  | 0.3 PSI / 2.1 kPa         | Short       |
| 5652-003-G-3-SR | Gauge         | 0.3 PSI / 2.1 kPa         | Short       |
| 5652-008-G-3-SR | Gauge         | 0.8 PSI / 5.5 kPa         | Short       |
| 5652-015-D-3-LR | Differential  | 1.5 PSI / 10.3 kPa        | Long        |
| 5652-015-D-3-SR | Differential  | 1.5 PSI / 10.3 kPa        | Short       |

For samples please contact [sales@si-micro.com](mailto:sales@si-micro.com).

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