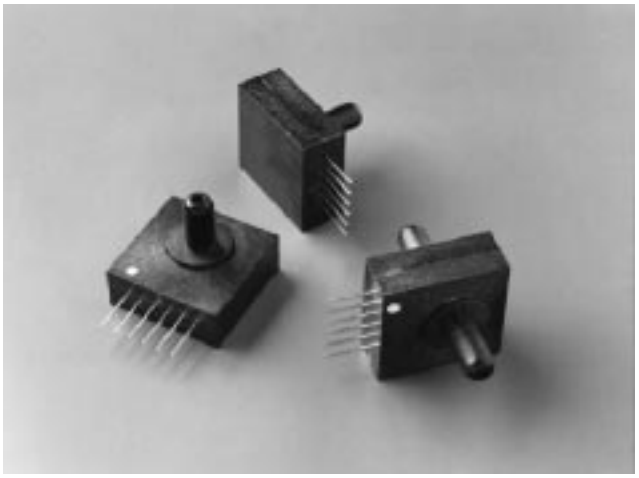
# SM5551/SM5552

Low Pressure, Constant Current
Low Pressure, Constant Voltage

November 1998-2

## Low Pressure Transducer Fully Temperature Compensated and Calibrated



### DESCRIPTION

Pressure sensor models SM5551 and SM5552 are fully temperature compensated and calibrated. Each sensor is housed in a rugged plastic enclosure.

EXAR uses a unique silicon sensor chip structure to optimize low-pressure performance and to provide a true low-pressure sensor–not merely a derated high-pressure part. The result is a device that provides all the performance necessary for low-pressure applications. Both constant current (model SM5551) and constant voltage (model SM5552) are available.

Factory calibration provides either a gain-set resistor (Model SM5551) or a fixed 25mV full-scale output (Model SM5552). By eliminating the need for customer gain adjustments, these parts are truly interchangeable and offer remarkable assembly-cost savings for a wide variety of OEM industrial, medical and consumer products.

Rugged pins, sealed into the package to prevent breakage, allow simple placement in PC boards using standard 0.1 inch center-to center pin spacing. Full high-temperature plastic enclosure prevents substrate drift and eases handling.

### FEATURES

- Low Pressure (from 0-0.15 to 0-3.0 psi)
- Fully Temperature-compensated
- Thoroughly Calibrated and Interchangeable
- Constant Voltage or Constant Current Drive
- Differential or Gage Measurement
- Calibrated to Better Than 2%
- Fully-enclosed, Rugged Plastic Housing
- Solid State Reliability

### APPLICATIONS

- Medical Equipment
- Respiration
- HVAC
- Level Detection
- Flow Measurement
- Industrial Control





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## CHARACTERISTICS

Test Conditions: Model SM5551 w/excitiation =1.500mA @ 25°C, Model SM5552 w/excitation =10.00Vdc @ 25°C, unless otherwise specified.

| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Excitation | | | | |
| Current (SM5551) | 0.00 | 1.50 | 3.00 | mA |
| Voltage (SM5552) | 0.00 | 10.00 | 20.00 | V |
| Output | | | | |
| Span (SM5551)[1] | 25.0 | 50.0 | 75.0 | mV |
| Span (SM5552)[1] | 24.5 | 25.0 | 25.5 | mV |
| Offset | -2.00 | ±0.20 | 2.00 | mV |
| Temperature Performance | | | | |
| TC Span[2] | -1.20 | ±0.20 | 1.20 | %FS/100°C[4] |
| TC Offset[2,3] | -2.40 | ±0.20 | 2.40 | %FS/100°C |
| Temperature Hysteresis[5] | -0.30 | ±0.05 | 0.30 | %FS |
| Accuracy | | | | |
| Linearity[6,7] | -0.30 | ±0.05 | 0.30 | %FS |
| Repeatability | -0.30 | ±0.05 | 0.30 | %FS |
| Pressure Hysteresis | -0.30 | ±0.05 | 0.30 | %FS |
| Sensitivity Matching[8] | | | 2.00 | ±% |
| Impedance (SM5551) | | | | |
| Z Input | 2.20 | 3.00 | 4.60 | kΩ |
| Z Output | 2.70 | 3.30 | 3.80 | kΩ |
| Impedance (SM5552) | | | | |
| Z Input | 4.50 | 8.00 | 25.00 | kΩ |
| Z Output | 2.20 | 2.70 | 3.80 | kΩ |
| Temperature Range | | | | |
| Calibration | 0 | | 70 | °C |
| Operating | -40 | | 85 | °C |
| Storage | -55 | | 125 | °C |
| Dynamic Characteristics | | | | |
| Proof Pressure | | >3 times full-scale output | | |
| Burst Pressure | | >5 times full-scale output | | |

***Notes:***

*[1] Gain-set resistor for constant current (SM5551), see application note AN5500. For the SM5552, 0.15 psi range, span is 23.75 (min) to 26.25 (max).*

*[2] RMS error measured over a temperature range of 0 to 70°C. For explanation of RMS error, see application note AN5500. For the 0.15 psi range, the TC span is ±3.0%FS/100°C.*

*[3] For 0.15 psi range, TC Offset is ±2.5%FS.*

*[4] FS denotes full scale output.*

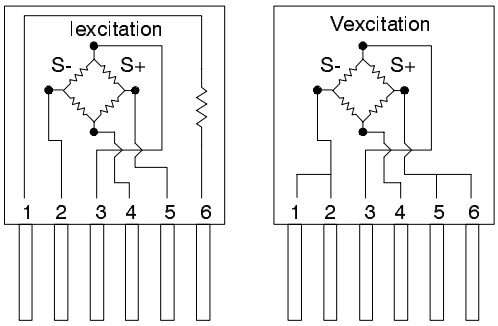
*[5] For the 0.15 psi range, the hysteresis is ±0.65%FS. For the 0.3 psi range, the hysteresis is ±0.45%FS.*

*[6] Best fit straight line.*

*[7] For the 0.3 psi range, linearity is ±0.5%FS. For the 0.15 psi range, the linearity is ±1.2%FS.*

*[8] Sensitivity matching relates to interchangeability of the span when used with gain set resistor Rs shown in application note AN5500. The specification applies to the accuracy of the thick film resistor where GSR=Gain Set Resistor Rs= Span * 200,000/(3.0-span). For model 5551, the sensitivity matching is ±2.0%, except for the 0.15 psi range. For the 0.15 psi range, the sensitivity matching is ±5.0%FS.*

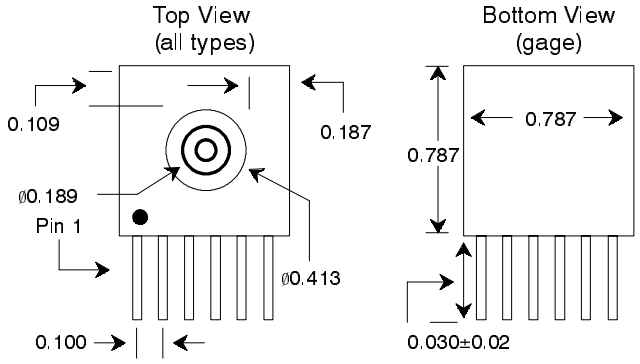
## DEVICE PINOUTS

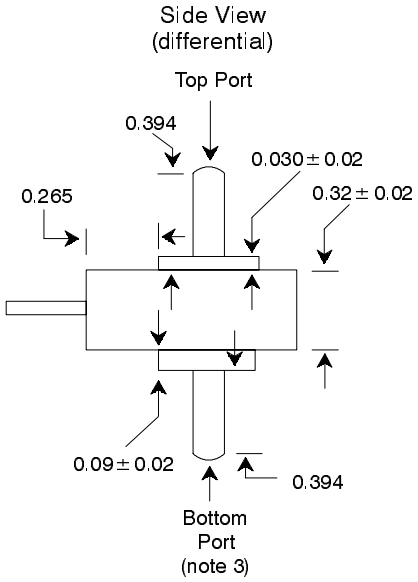



| Model SM5551 Constant Current | Model SM5552 Constant Voltage |
|---|---|
| 1. Rs (Span Cal.) | 1. -Signal Out |
| 2. -Signal Out | 2. -Signal Out |
| 3. I excitation | 3. V excitation |
| 4. Ground | 4. Ground |
| 5. +Signal Out* | 5. +Signal Out* |
| 6. Rs (Span Cal.) | 6. +Signal Out* |

*Output increases as top-port pressure is increased.

## DIMENSIONS




***Notes:***
- *All dimensions are shown in inches.*
- *Tolerance on all dimensions ±0.005" unless otherwise specified.*
- *Side view for gage/absolute parts is same as the differential without the bottom port.*

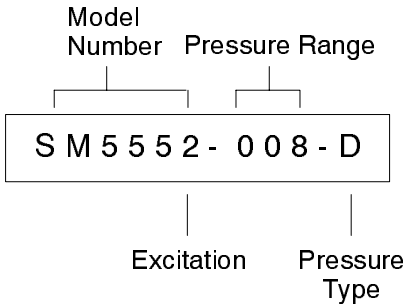
## ORDERING INFORMATION

**Excitation**

1: Current
2: Voltage

**Pressure Type**

D: Differential
G: Gage




**Pressure Range**

| Ord. Info | psi | BAR | kPa | Hg[1] (mm) | $H_20$[2] (Inches) | $H_20$[3] (mm) |
|---|---|---|---|---|---|---|
| 001 | 0.15 | 0.010 | 1.03 | 7.8 | 4.152 | 105.5 |
| 003 | 0.3 | 0.021 | 2.07 | 15.5 | 8.304 | 210.9 |
| 008 | 0.8 | 0.055 | 5.52 | 41.4 | 22.144 | 562.5 |
| 015 | 1.5 | 0.103 | 10.34 | 77.6 | 41.52 | 1024.6 |
| 030 | 3.0 | 0.207 | 20.68 | 155.1 | 83.04 | 2109.2 |

1 At 0° C
2 At 39° F
3 At 4°C

***Note:***
- *Low Pressure Devices are not available as absolute sensors.*

Special Configurations are available. Contact EXAR Corporation for more information.

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