SILICON MICROSTRUCTURES INCORPORATED
an EXAR company

SM-5310 Std. Pressure SMT
SM-5350 Low Pressure SMT
SM-5410 Std. Pressure DIP
SM-5450 Low Pressure DIP

Surface Mount and DIP Pressure Sensors

Low-cost packaged die

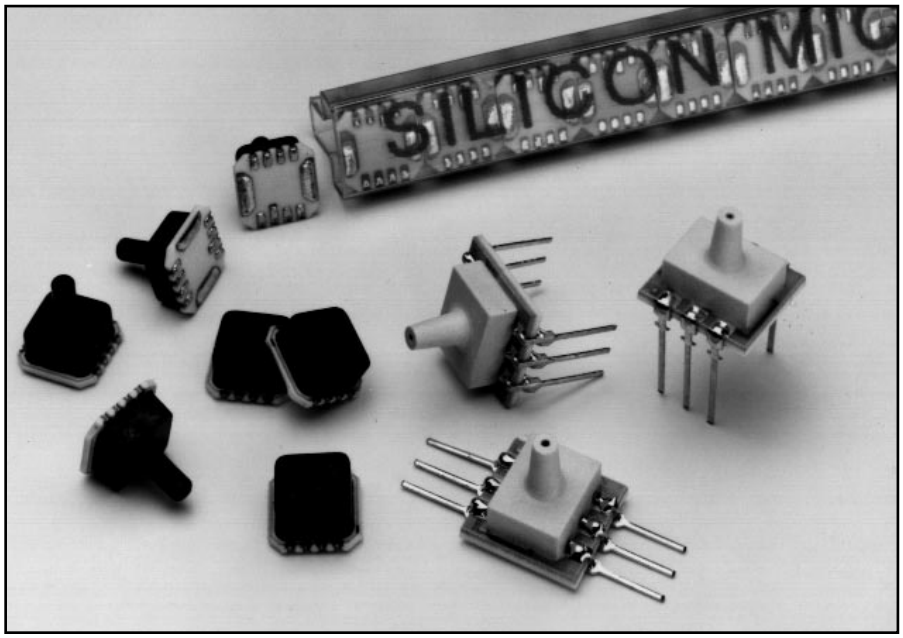
Description

Silicon Microstructures provides its two most popular pressure sensor die in surface mount and 6-pin dual in-line package (DIP) configurations. All parts in these series are uncompensated high-performance die mounted on a substrate with a plastic cap and either pins for through-board assembly or pads for surface mounting.

Both package types provide a low-cost way for OEM manufacturers to incorporate pressure sensors at costs close to raw die prices, without the need to handle, attach, or wire bond silicon sensor die.

Options include pressure range, surface mount or DIP mounting, absolute or gage configuration, and a choice of cap configurations. The result is a versatile product line suitable for a wide range of OEM applications.

The low-pressure series (models SM-5350 and SM-5450) incorporate SMI's unique low-pressure die to achieve high performance in pressure ranges down to 0.3 PSI full-scale.



Features

- Low cost
- Easy to use
- 0.3 to 100 PSI full-scale ranges available
- Compact and light-weight
- High-performance, stable silicon chip and package
- Easily embedded in OEM equipment
- Molded pressure port option for attachment to 1/8 inch tubing
- High-volume

Applications

- Altimeters
- Barometric correction
- Tire gauges
- Digital pressure gauges
- Environmental monitoring
- Appliances
- Consumer and sports
- HVAC
- Medical instrumentation and monitoring
- Pressure differential and flow monitoring
- Hand-held gauges

Silicon Microstructures Incorporated, 48720 Kato Road, Fremont, Ca. 94538 Ph.(510) 668-7000 • Fax (510) 668-7025

Selection

Model SM-5310
Standard pressure range, surface mount

For general purpose applications, the SM-5310 series has the smallest footprint and covers the range from 5 PSI to 100 PSI full scale.

The top cap is available with either a molded port for attaching 1/8 inch plastic tubing or with a hole. The cap with hole provides a low profile for measuring barometric pressure, measuring pressure in the electronics enclosure or “O” ring sealing to another surface.

It is also available in both absolute and gage configurations. In absolute configuration, the pressure is applied to the top of the sensor (through either the molded port or the hole in the cap). A reference vacuum chamber is formed in the die during manufacturing.

In gage configuration, pressure is applied to the top cap (either through plastic tubing over the molded port or an “O” ring seal to the cap) and the gage reference pressure is applied through a hole in the bottom of the substrate. The mating board must be designed to leave a clear path to this hole for accurate gage measurements.

The standard configuration uses a ceramic substrate. An optional epoxy glass substrate is available for critical PC Board mounting.

Model SM-5350
Low pressure range, surface mount

The model SM-5350 uses SMI‘s unique low-pressure die, which is a true low-pressure structure (not just a derated standard die). As a result, it has very good stability, linearity and dynamic range down to 0.3 PSI full scale.

This die is larger than the standard pressure die and therefore the footprint is larger than the model SM-5310. It uses the same substrate as the models SM-5410 and SM-5450.

It is also available with the option of a molded port for tubing or a cap with hole.

Low-pressure parts are typically used in gage configuration, and the model SM-5350 is only available as a gage part.

This part is configured only on a ceramic substrate.

Model SM-5410
Standard pressure range, dual in-line pins (DIP)

The model SM-5410 DIP configuration is similar to the model SM-5310 surface mount except that it uses a slightly larger substrate to accommodate six pins for through-board printed circuit mounting.

It is also available with or without a pressure port, and in absolute or gage configurations. It is available only with a ceramic substrate.

Models SM-5310 and SM-5410 are available in 5, 15, 30.0, 60, and 100 PSI full scale ranges.

Model SM-5450
Low pressure range dual in-line pins (DIP)

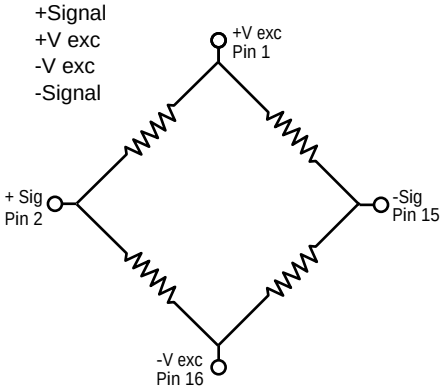
The model SM-5450 is identical to the SM-5350 with the addition of six pins to allow through-board printed circuit mounting.

Models SM-5350 and SM-5450 are available in 0.3, 0.8, 1.5, and 3.0 PSI full scale ranges.

Device Pinouts

Figure 1: Model SM-5310

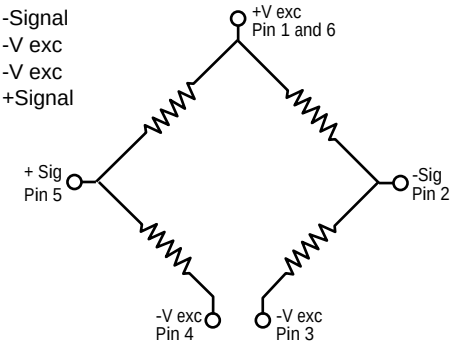
pin 2	+Signal
pin 1	+V exc
pin 16	-V exc
pin 15	-Signal



NOTE: Model SM-5310 is a closed bridge device.

Figure 2: Model SM-5350, SM-5410, and SM-5450

pin 1 and 6	+V exc
pin 2	-Signal
pin 3	-V exc
pin 4	-V exc
pin 5	+Signal



NOTE: Models SM-5350, SM-5410, SM-5450 are open bridge devices: pins 1 and 6 are connected internally (only one needs to be connected to +Vexc). Pins 3 and 4 must both be connected to a -Vexc supply.

Dimensions

Figure 3: Model SM-5310

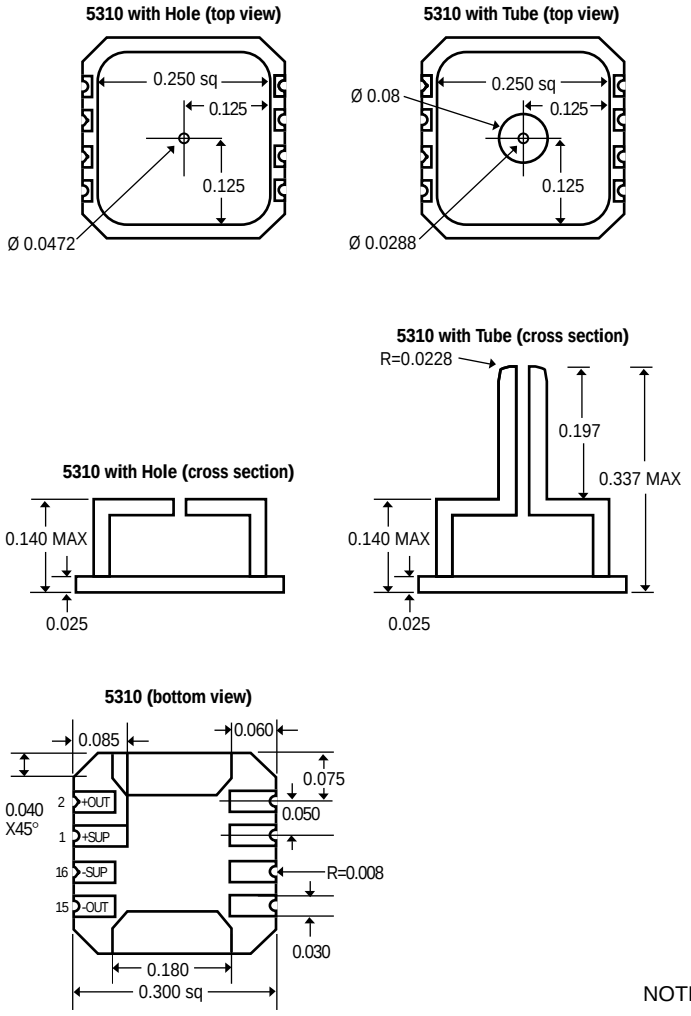
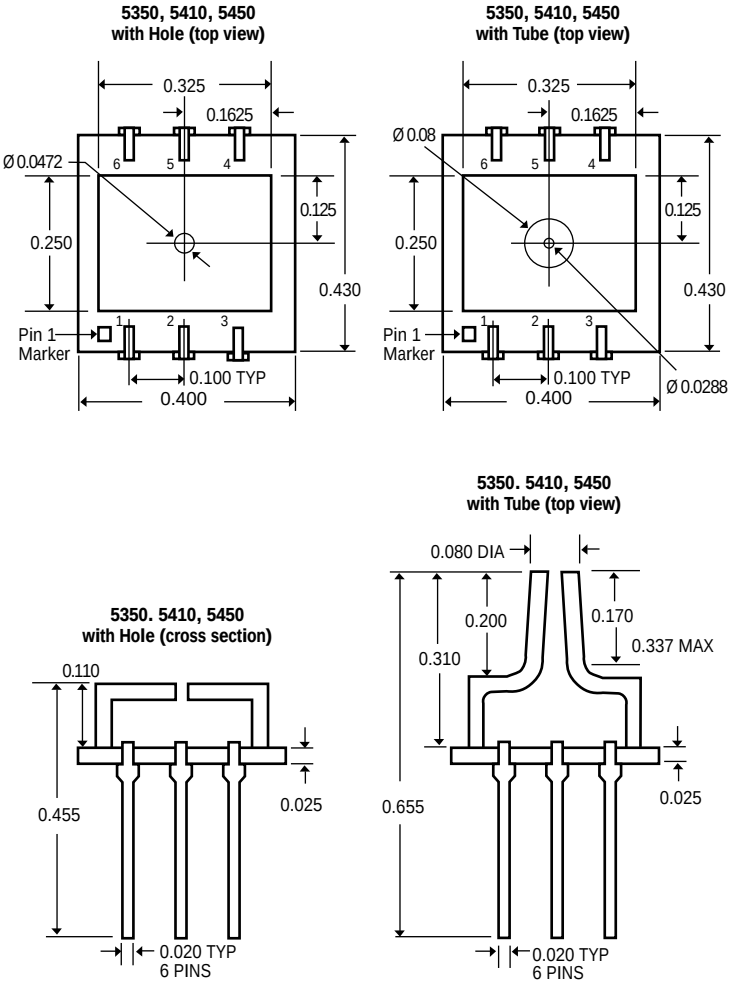


Figure 4: Models SM-5350, SM-5410, and SM-5450



NOTE: 1) Nominal dimensions in inches.
2) Tube tapers from 0.080 DIA to 0.100 DIA at 0.170 from top of tube.

Characteristics

All parameters measured at 5 volts excitation at room temperature, unless otherwise specified.

All Models

Parameter	Min	Typ	Max	Units
Excitation Voltage	0	5.0	10.0	Volts
Excitation Current	0	1.5	3.0	mA
Offset	-50	0	50	mV
TC Span[1]		-22±5		%FS/100˚C
TC Resistance		28±5		%FS/100˚C
Bridge Impedance	2.7	3.3	4.0	kΩ
Proof Pressure[2]	3X			Rated FS Pressure
Burst Pressure[2]	5X			Rated FS Pressure
Operating Temp	-40		85	˚C
Storage Temp	-55		125	˚C

SM-5310 and SM-5410 Standard Pressure Series Only

Span (FS Range)[3]	Min	Typ	Max	Units
5 PSI	75	100	125	mV
15 PSI	105	145	175	mV
30 PSI	115	165	195	mV
60 PSI	115	180	220	mV
100 PSI	115	200	250	mV
Linearity[4]	-0.3	±0.05	+0.3	%FS
TC Offset[1]		±7		%FS/100˚C

SM-5350 and SM-5450 Low Pressure Series Only

Span (FS Range)[3]	Min	Typ	Max	Units
0.3 PSI	25	50	75	mV
0.8 PSI	25	50	75	mV
1.5 PSI	25	50	75	mV
3.0 PSI	25	50	75	mV
Linearity[4]	-0.3	±0.1	+0.3	%FS
TC Offset[1]		±12		%FS/100˚C

Notes

1) Measured from 0 to 70 ˚C.
2) Sensor die will survive pressure specified for all ranges. Maximum package pressure is 225 PSI.
3) Measured at 5.0 volts, constant voltage excitation.
4) Best fit straight line(BFSL); for 0.3 PSI full-scale, linearity is ±0.5% FS.

Ordering Information

Pressure Range

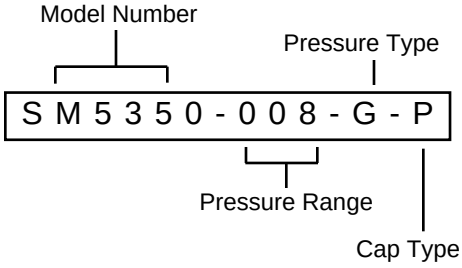
Standard Pressure
- Model SM-5310(SMT)
- Model SM-5410 (DIP)
  - 005: 5 PSI
  - 015: 15 PSI
  - 030: 30 PSI
  - 060: 60 PSI
  - 100: 100 PSI

Low Pressure
- Model SM-5350 (SMT)
- Model SM-5450 (DIP)
  - 003: 0.3 PSIG
  - 008: 0.8 PSIG
  - 015: 1.5 PSIG
  - 030: 3.0 PSIG

Pressure Type

Models SM-5310 and SM-5410 only
- A: Absolute
- G: Gage

Cap Type
- P: Port (tube)
- H: Hole



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48720 Kato Road
Fremont CA 94538 USA
TEL: 510-668-7000
FAX: 510-668-7025

Additional Products
- Accelerometers
- OEM Pressure Transducers
- Custom Designed Products
- Compensated & Calibrated Pressure Sensors