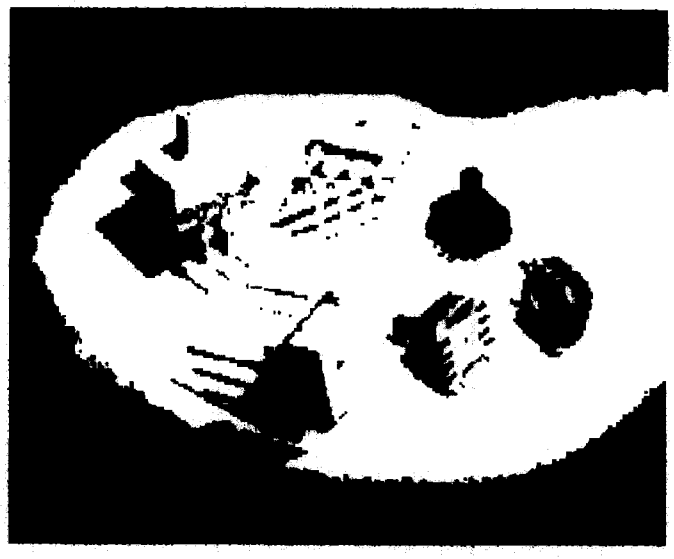
EXAR
SILICON MICROSTRUCTURES
DIVISION

SM5310 Std. Pressure SMT
SM5350 Low Pressure SMT
SM5410 Std. Pressure DIP
SM5450 Low Pressure DIP

October 1997-1

Surface Mount and DIP Pressure Sensors
Low-cost packaged die



DESCRIPTION

EXAR 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 SM5350 and SM5450) incorporate EXAR's unique low-pressure die to achieve high performance in pressure ranges down to 0.15 psi full-scale.

FEATURES

- Low Pressure (from 0-0.15 to 0-100 psi)
- Easy to Use
- 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, Low Cost

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

TQM™

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SELECTION

Model SM5310
Standard Pressure Range, Surface Mount

For general purpose applications, the SM5310 series has the smallest footprint and covers the range from 0-5 psi to 0-100 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.

Model SM5350
Low Pressure Range, Surface Mount

The model SM5350 uses EXAR'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 0.15 psi full scale.

This die is larger than the standard pressure die and therefore the footprint is larger than the model SM5310. It uses the same substrate as the models SM5410 and SM5450.

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 SM5350 is only available as a gage part.

Model SM5410
Standard Pressure Range, Dual In-line Pins (DIP)

The model SM5410 DIP configuration is similar to the model SM5310 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.

Models SM5310 and SM5410 are available in 5, 15, 30, 60, and 100 psi full scale ranges.

Model SM5450
Low Pressure Range Dual In-line Pins (Dip)

The model SM5450 is identical to the SM5350 with the addition of six pins to allow through-board printed circuit mounting.

Models SM5350 and SM5450 are available in 0-0.15, 0-0.3, 0-0.8, 0-1.5, and 0-3.0 psi full scale ranges.

CHARACTERISTICS

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

All Models

Excitation Voltage	0	5.0	10.0	V
Excitation Current	0	1.5	3.0	mA
Offset	-50	0	50	mV
TC Span[1]		-21 ± 5		%FS/100°C
TC Resistance		27 ± 5		%/100°C
Bridge Impedance	2.7	3.3	4.0	kΩ
Burst Pressure[2]	5X			Rated FS Pressure
Operating Temp	-40		85	°C
Storage Temp	-55		125	°C

SM5310 and SM5410 Standard Pressure Series Only

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

SM5350 and SM5450 Low Pressure Series Only

0.15 psi	25	50	75	mV
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:

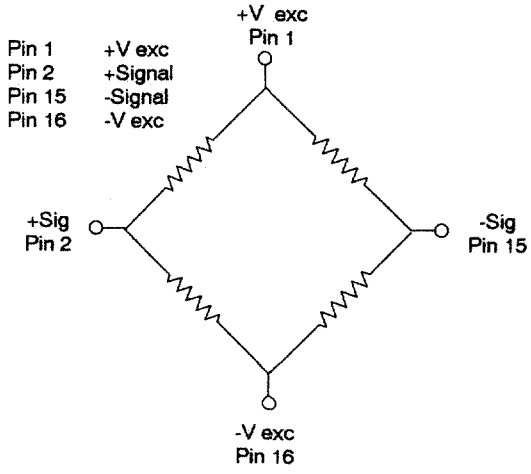
[1] Measured from 0 to 70°C.

[2] Sensor die will survive pressure specified for all ranges. Maximum package pressure is 225 psi.

[3] Measured at 5V, constant voltage excitation.

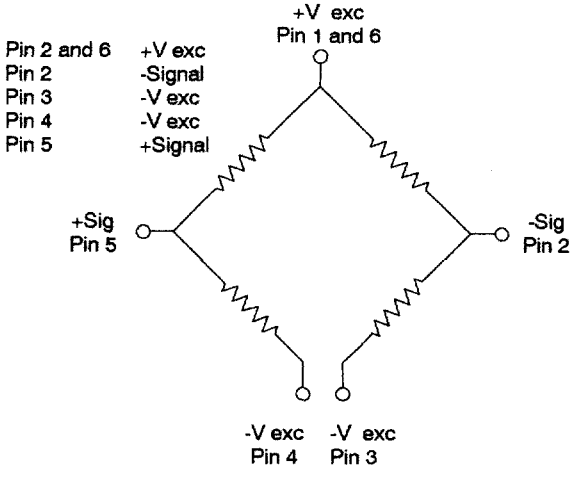
[4] Defined as best fit straight line (BFSL); for 0.3 psi full-scale, linearity is ± 0.5%FS. For 0.15 psi full-scale, linearity is ± 1.0%FS.

DEVICE PINOUTS



Note:
Model SM5310 is a closed bridge device.

Figure 1. Model SM5310

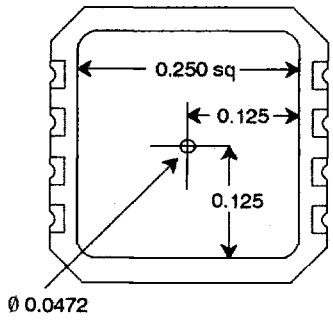


Note:
Models SM5350, SM5410 and SM5450 are open bridge devices: pins 1 and 6 are connected internally (only one needs to be connected to +V exc). Pins 3 and 4 must both be connected to a -V exc supply.

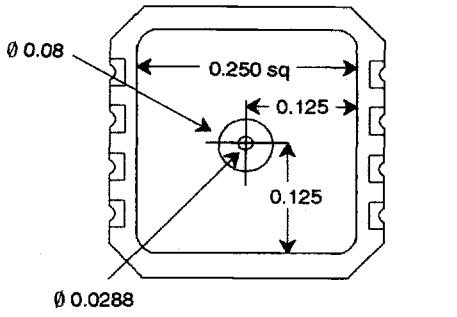
Figure 2. Model SM5350, SM5410, and SM5450

DIMENSIONS

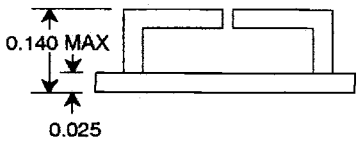
SM5310 with Hole (Top View)



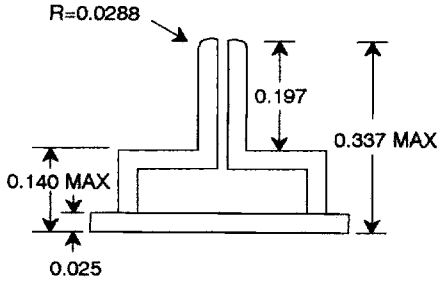
SM5310 with Tube (Top View)



SM5310 with Hole (Cross section)



SM5310 with Tube (Cross section)



SM5310 (Bottom View)

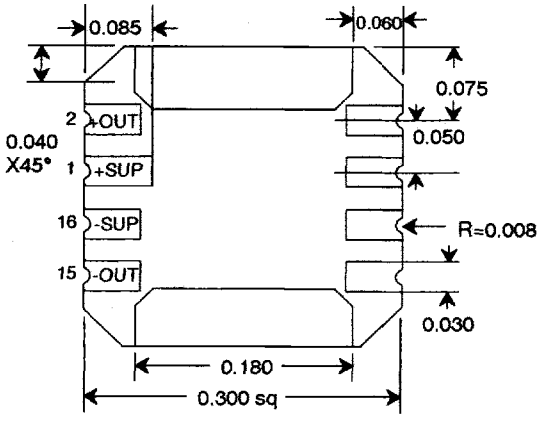
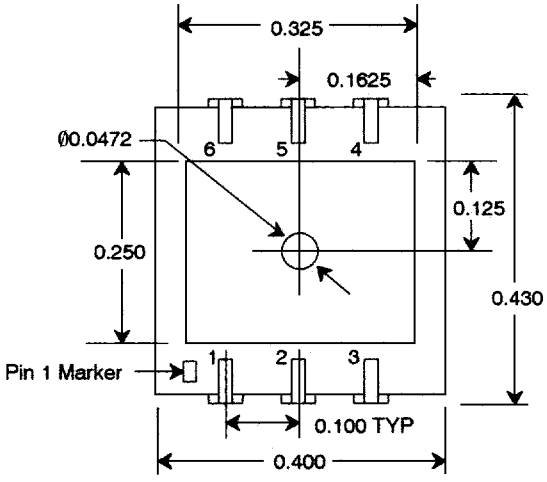


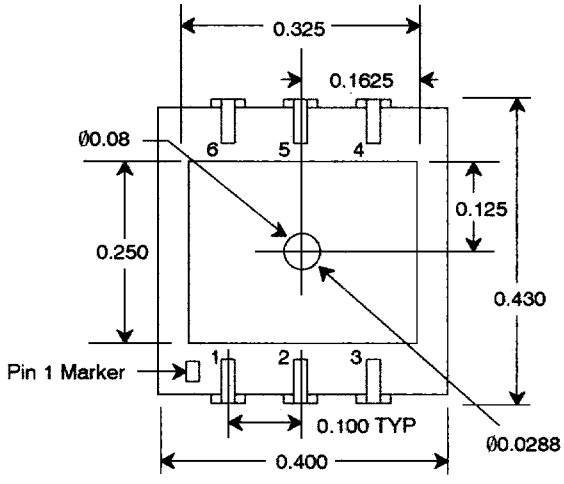
Figure 3. Model SM5310

Note:
- All dimensions are shown in inches.

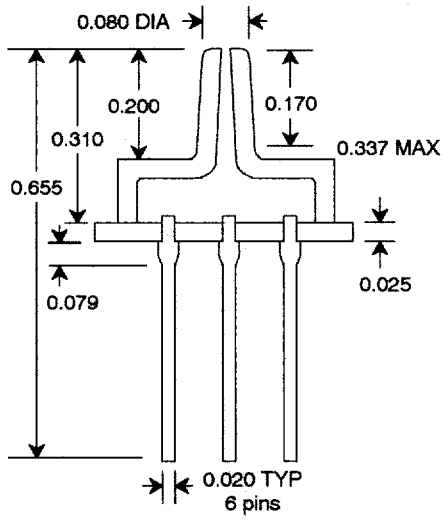
SM5350,SM5410 and SM5450 with Hole (Top view)



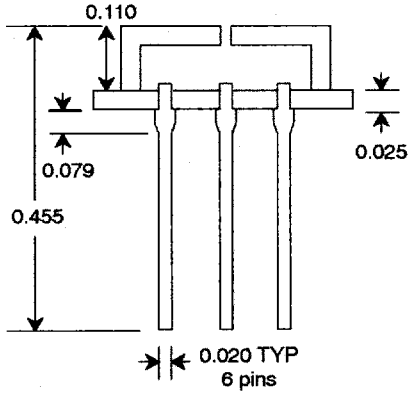
SM5350, SM5410 and SM5450 with Tube (Top view)



SM5350, SM5410 and SM5450 with Tube (Cross section)



SM5350, SM5410 and SM5450 with Hole (Cross section)



Notes:

1) Nominal dimensions in inches.
2) Tube tapers from 0.080 DIA to 0.100 DIA at 0.170 from top of tube.
3) SM5350 pins are out in the plane of the substrate.
4) Maximum temperature for surface mount during mounting is 220°C for one minute, solder composition is 63% tin and 37% lead.
5) Maximum temperature for DIP is 250°C for five seconds maximum.

Figure 4. Models SM5350, SM5410 and SM5450

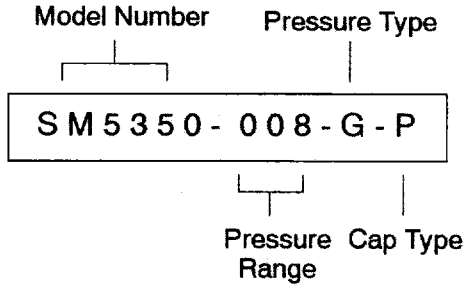
ORDERING INFORMATION

Pressure Type

A: Absolute (Models SM5310 and SM5410)
G: Gage

Cap Type

P: Port (tube)
H: Hole



Pressure Range

Standard Pressure
Models SM5310 (SMT) and SM5410 (DIP)

Ord. Info	psi	BAR	kPa	Hg[1] (mm)	H_2O^2 (Inches)	H_2O^3 (mm)
005	5	0.345	34.47	258.6	138.4	3515.4
015	15	1.034	103.42	775.7	415.2	10546.1
030	30	2.068	206.84	1551.5	830.4	21092.2
060	60	4.137	413.68	3102.9	1660.8	42184.3
100	100	6.895	689.47	5171.5	2768	70307.2

[1] At 0° C
[2] At 39° F
[3] At 4°C

Low Pressure
Models SM5350 (SMT) and SM5450 (DIP)

Ord. Info	psi	BAR	kPa	Hg[1] (mm)	H_2O^2 (Inches)	H_2O^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.

NOTICE

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