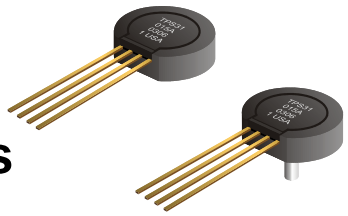
TPS31 Series
Silicon Pressure Sensors



THALER CORPORATION • 2015 N. FORBES BOULEVARD • TUCSON, AZ 85745 • 520-882-4000

FEATURES

- **High stability, low cost**
- **Backside pressurized for harsh environments**
- **15, 30, 60 and 100 psi pressure ranges**
- **Absolute or Gage**
- **Uncompensated, millivolt output**
- **Constant current or voltage excitation**

APPLICATIONS

- **Industrial Controls and Monitoring**
- **Appliances**
- **Altimeters**
- **Digital pressure gauges**

DESCRIPTION

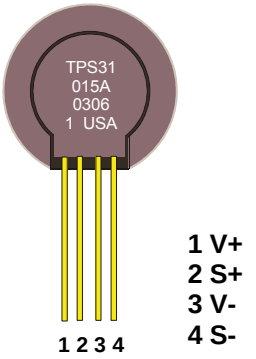
The TPS31 is a high performance, harsh environment micromachined silicon pressure sensor.

The TPS31 series utilizes pressure sensors whose pressure ports are on the bottom of the pressure sensor. This makes the TPS31 series highly resistant to chemicals that will destroy most sensors.

The alumina ceramic (Al_2O_3) packaging is very mechanically stable and by isolating mechanical stresses from the sensor element, contributes greatly to the stability of the device.

The alumina ceramic package also has excellent chemical resistance.

Custom pressures are available for large orders.



PIN CONFIGURATION

FIGURE 1

SELECTOR GUIDE

TPS31 [pressure]	[type]	[port]
15 psi	A absolute	F face seal
30 psi	G gage	T tube port
60 psi		
100 psi		

example part numbers:
TPS31 15 G T – 15psig tube port
TPS31 100 A F – 100psia face seal

MAXIMUM RATINGS (all types)

Operating Temp …….. -40°C to 85°C
Storage Temperature Range ……..-55°C to 150°C
Maximum Soldering Temperature ……...260°C

Proof pressure ……..……....3x full scale pressure
Burst pressure ……..……....5x full scale pressure

TPS31 GAGE PRESSURE OPERATING CHARACTERISTICS

V+ = 5V, V- = 0V, Temperature = 25°C

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Excitation Voltage (Note 1)	V_{EX}		5	10	V
Excitation Current	I_{EX}		1.5	3	mA
Span (FS Range)					
15 psig	V_{OUT}	115	145	175	mV
30 psig		130	165	195	mV
60 psig		130	180	220	mV
100 psig		130	200	250	mV
Offset (Note 2)	V_{OS}	-50	0	50	mV
Linearity (Note 3)		-0.3		0.3	%FS
TC Span (Note 4)		-24	-19	-15.5	%FS/100°C
TC Offset		-7	-1	7	%FS/100°C
TC Resistance		24	27.5	33	%/100°C
Bridge Impedance		2.70	3.15	4.00	kΩ
Response time	t_R		1		ms

TPS31 ABSOLUTE PRESSURE OPERATING CHARACTERISTICS

V+ = 5V, V- = 0V, Temperature = 25°C

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Excitation Voltage (Note 1)	V_{EX}		5	10	V
Excitation Current	I_{EX}		1.5	3	mA
Span (FS Range)					
15 psia	V_{OUT}	75	125	150	mV
30 psia		85	125	150	mV
60 psia		85	125	150	mV
100 psia		85	125	150	mV
Offset (Note 2)	V_{OS}	-50	0	50	mV
Linearity (Note 3)		-0.3		0.3	%FS
TC Span (Note 4)		-24	-19	-15.5	%FS/100°C
TC Offset		-15	2	15	%FS/100°C
TC Resistance		17	26	31	%/100°C
Bridge Impedance		4.0	5.0	6.0	kΩ
Response time	t_R		1		ms

Notes:

1. Sensor must be driven with positive voltage resulting in positive output for positive pressure.
2. Measured at zero pressure differential.
3. Defined as best straight line.
4. Measured from 0°C to 70°C

Application Information

Package:

The package body is made of alumina (Al_2O_3) ceramic, an extremely rigid and stable material that is highly impervious to chemicals. This results in extremely high stability.

The sensor package is not sealed. This is necessary for operation of the sensor.

Stability:

The small difference in coefficient of thermal expansion between sensor and package sets the TPS31 series apart from other pressure sensors.

The micromachined pressure sensor has a pyrex base and is mounted with a flexible, chemical resistant material into the ceramic package. Flexible die attach allows for some tolerance of small changes and helps isolate the sensor die from other changes due to temperature, sensor mounting and package mounting.

Additional stability is gained from factory stabilization of all sensors.

Pressure port:

The F (face seal) port option is a highly reliable connection method that allows direct mounting to a measurement point with methods such as an o-ring or epoxy. An o-ring provides for a leak resistant seal and very robust connection. Designs for o-ring seals may be found in the “Parker O-Ring Handbook”.

The T (tube) port option is also a reliable connection method if the user finds a tube connection more effective for their design. Pressure ports with tubing barbs are designed for 1/8” OD, flexible tubing.

NOTE: DO NOT apply clamping pressure on the package cover. It is possible to damage the package if excessive pressure is applied. Proper care should be exercised when mounting.

Media:

The bottom pressure port is tolerant of harsh environments and many different media.

Wetted parts:

F (face seal) port option wetted surfaces are composed of alumina ceramic, silicone die attach, pyrex glass and silicon.

T (tube) port option adds 305 stainless steel.

Pressure ranges:

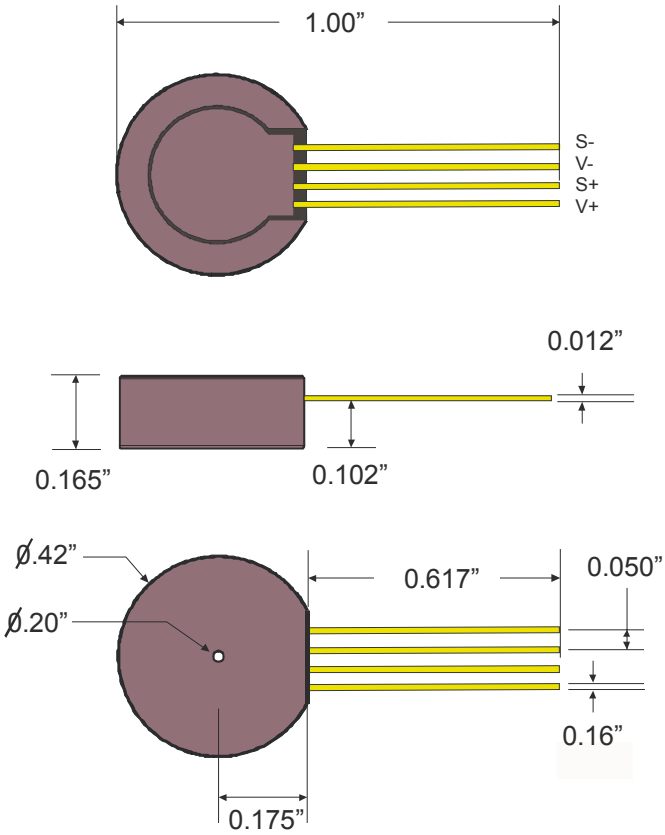
Standard pressure ranges are 15, 30, 60 and 100 psi in both gage and absolute types. Custom pressure ranges are available for large orders.

Soldering and contamination:

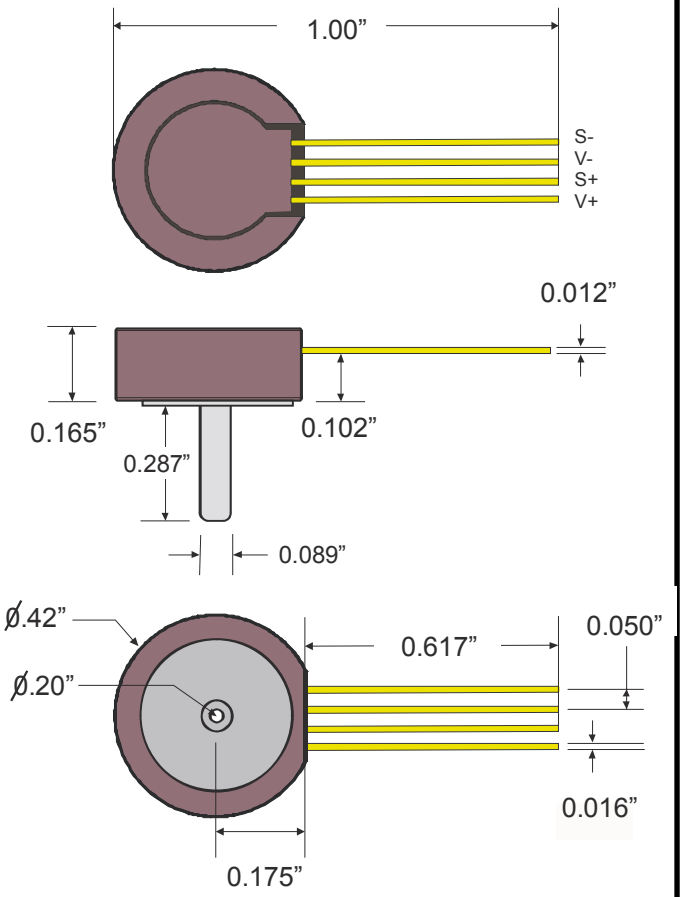
The TPS31 series packaging is not sealed due to the need to provide an atmospheric port in gage pressure application. This means that the TPS31 series are not suitable for application where flux residue is to be cleaned from the finished circuit assembly. Foreign materials and contamination should be prevented from entering the sensor package cavity.

MECHANICAL DIMENSIONS (in inches)

F (face seal) port type



T (tube fitting) port type



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