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ROHS

TAPE & REEL

PPS50 Board Level Ceramic Pressure Sensor

Uncompensated MEMS piezoresistive sensor for harsh media — 1 to 500 psi, absolute or gauge



FEATURES

- Pressure ranges 1 to 500 psi (0.07 to 34.5 bar)
- Operating temperature -40 to +125 °C
- Backside absolute or gauge reference
- Ceramic package — harsh liquid, air & gas compatible
- 5 kΩ closed Wheatstone bridge, mV output
- Stable in constant-current or constant-voltage drive
- Solder to wire, ribbon cable, flex strip, or SMT pad
- Kovar or ceramic pressure port; supplied tape & reel

DESCRIPTION

The PPS50 is an uncompensated, board-level packaged pressure sensor built on a chemically etched silicon MEMS die with a piezoresistive Wheatstone bridge. It is designed for OEM designs that need a small, low-cost sensing element across a wide pressure span.

Its ceramic package isolates the media to the pressure port and the backside of the MEMS die, so the PPS50 tolerates aggressive liquids and gases that would attack a conventional front-side die. A square ceramic cover protects the bridge and wire bonds, with or without a vent sticker for gauge referencing.

APPLICATIONS

- Medical inflation & disposable pressure lines
- Water pressure & flow management
- Industrial process control
- HVAC/R and pump monitoring
- Appliance & fluid-handling OEM modules
- Board-level pressure sub-assemblies

MAXIMUM ENVIRONMENTAL RATINGS

Operating Temperature	-40 to 125 °C	Burst Pressure	5× full scale
Storage Temperature	-55 to 100 °C	Max Excitation	15 VDC / 3 mA
Wetted Media	Liquid, air & gas	Wetted Material	Ceramic / Kovar, silicon

Electrical, environmental & performance

PARAMETER	MIN	TYP	MAX	UNITS	NOTES
ELECTRICAL & ENVIRONMENTAL					
Excitation (I _n)	—	5	15	VDC	Max current 3 mA
Bridge Impedance	4000	5000	6000	Ω	Closed bridge
Operating Temperature	−40	—	125	°C	
Storage Temperature	−55	—	100	°C	
PERFORMANCE					
Offset	−10	0	10	mV/V	Zero pressure; gauge only; @25 °C
Non-linearity	−0.2	0	0.2	% FS0	Best-fit straight line; @25 °C
Pressure Hysteresis	−0.1	0	0.1	% FS0	@25 °C
Temp Coeff — Zero	−25	0	25	μV/V/°C	−40 to 85 °C
Temp Coeff — Resistance	2300	2800	3300	PPM/°C	−40 to 85 °C
Temp Coeff — Sensitivity	−1500	−2200	−2500	PPM/°C	−40 to 85 °C
Thermal Hysteresis	−0.2	0	0.2	% FS0	Zero pressure
Burst Pressure	5×	—	—	× FS	1500 psi on 500 psi part

FSO at 5 V excitation

RANGE	MIN	TYP	MAX	UNITS
15 psi · 1.0 bar · 103 kPa	60	75	90	mV
100 psi · 6.9 bar · 689 kPa	120	150	180	mV
500 psi · 34.5 bar · 3447 kPa	140	175	210	mV

Closed-bridge configuration only. Intermediate ranges available — consult Phoenix Sensors for FSO at your target pressure.

FIG. 1

Bridge connection

PAD	FUNCTION
E+	Excitation +
E−	Excitation − / ground
O+	Signal output +
O−	Signal output −

Four gold-plated solder pads on the substrate edge, pad order E+ · O− · E− · O+. Output is ratiometric to excitation; drive with a constant-current source to reduce span thermal error.

Package, media, mounting & handling

Package

A ceramic substrate carries the MEMS die under a square ceramic cover, with four gold-plated solder pads brought out to the substrate edge. The substrate measures 0.35 × 0.30 in with a 0.25 in square ceramic cover, making the PPS50 small enough to sit directly on a customer PCB or inside a compact manifold.

Media compatibility

Suitable for air, gases, and liquids including many harsh media. Because compatibility depends on concentration, temperature, and duty cycle, the media list is qualified application by application with Phoenix Sensors engineering.

Electrical connection

Designed for a soldered connection to discrete wires, ribbon cable, flex strip, or a surface-mount PCB pad pattern. Keep soldering time and temperature to the minimum needed; do not apply mechanical load to the ceramic cover.

Signal conditioning

The PPS50 ships uncompensated: offset, span, and their temperature coefficients are corrected in the customer's ASIC, microcontroller, or trim network. This gives OEMs full control over the transfer function and lowers unit cost at volume.

Backside sensing

Pressure is applied through the port to the backside of the silicon diaphragm. The media never contacts the piezoresistors, wire bonds, or bridge metallisation — only the port and the etched cavity of the die.

Absolute vs. gauge

Absolute parts use a sealed vacuum reference cavity formed by a glass pedestal. Gauge parts vent the cover cavity to atmosphere; a vent sticker over the cover hole keeps debris out while allowing the reference path. Specify the cover option accordingly.

Pressure connection

The cylindrical port accepts a simple push-on tube or an O-ring radial seal into a customer bore. Radial sealing keeps axial load off the die and simplifies assembly. Do not seal against the substrate face.

Shipping & handling

Supplied in tape and reel for automated placement. Handle as an ESD-sensitive and pressure-sensitive component: avoid probing the diaphragm, blocking the vent, or exposing the port to pressure spikes beyond 5× full scale.

500 psi

Max full scale

+125 °C

Operating limit

5 kΩ

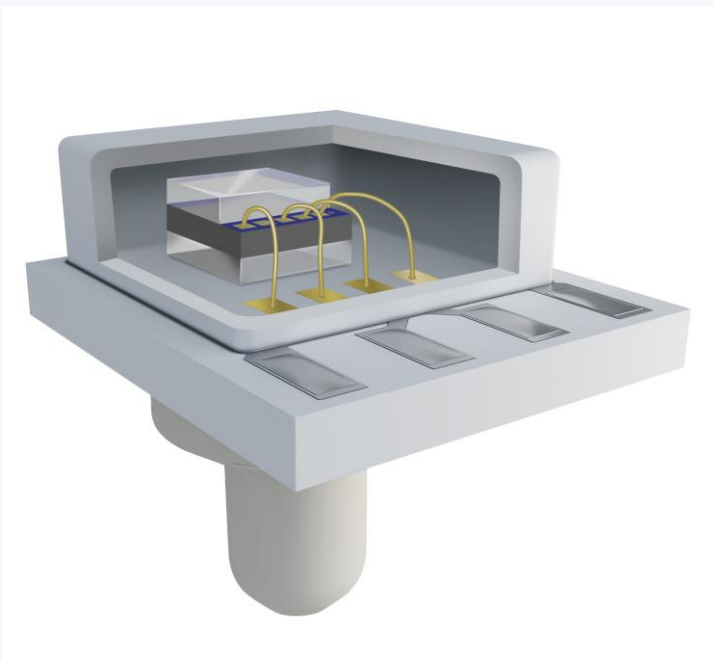
Closed bridge

0.37 in

Overall height

Cross section & material stack

The MEMS die is frit- or eutectic-bonded to a ceramic substrate over the pressure port, wire-bonded to four gold pads, and covered by a square ceramic cap. Media reaches only the port bore and the etched backside cavity of the die.



LAYER	MATERIAL
Cover / cap	Ceramic, square – vented or sealed
Reference cavity	Glass pedestal (absolute parts)
Sensing element	Silicon MEMS, etched diaphragm
Die attach	Glass frit or Au/Sn eutectic
Substrate	Alumina ceramic 99.99%
Pressure port	Ceramic, or Au-plated Kovar
Interconnect	Gold wire bonds to 4 solder pads

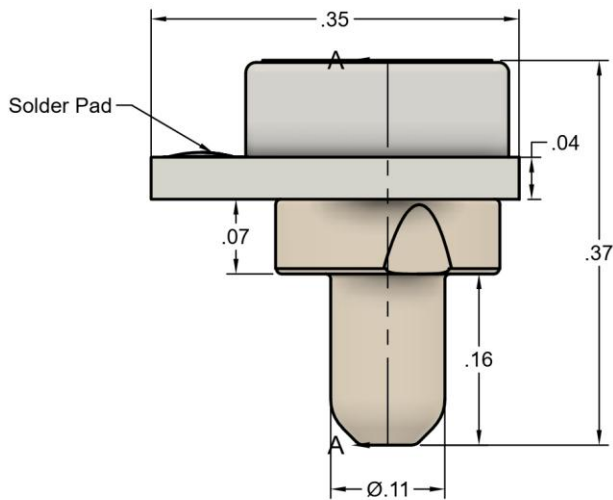
Kovar is specified where a close CTE match to the silicon die is required; ceramic is specified where a fully non-metallic wetted path is required. Both port options share identical outline dimensions.

PORT OPTIONS

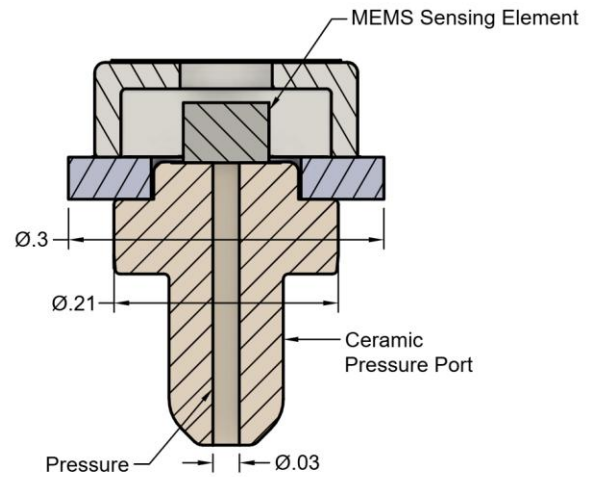
	KOVAR PORT (P = 1)	CERAMIC PORT (P = 2)
Wetted material	Au-plated Kovar	Alumina ceramic
CTE match to die	Excellent	Good
Die attach	Au/Sn	Glass frit
Outline	Identical	Identical

In the gauge configuration media enters the port bore beneath the die and acts on the etched diaphragm cavity, while the vent hole in the cover carries the atmospheric reference. See page 5, Section A-A, for the dimensioned section view.

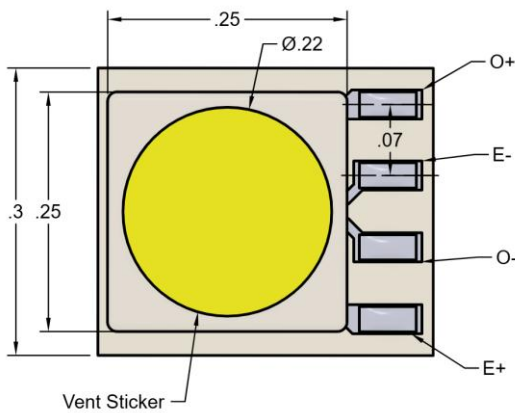
Outline drawing – inches [mm]



FRONT ELEVATION



SECTION A-A



TOP VIEW

DIMENSION	INCH	MM
Substrate – width × depth	.35 × .30	8.89 × 7.62
Ceramic cover footprint	.25 × .25	6.35 × 6.35
Overall height	.37	9.40
Substrate thickness	.04	1.02
Port collar – dia. × height	Ø.30 × .07	Ø7.62 × 1.78
Port step diameter	Ø.21	Ø5.33
Port stem – dia. × length	Ø.11 × .16	Ø2.79 × 4.06
Pressure orifice	Ø.03	Ø0.76
Vent sticker diameter	Ø.22	Ø5.59
Solder pad width (4×)	.07	1.78

NOTES

1) Dimensions and tolerances are in inches. For reference only; engineering drawings with full tolerances available upon order.

3) Solder pads, top view, top to bottom: O+, E-, O-, E+.

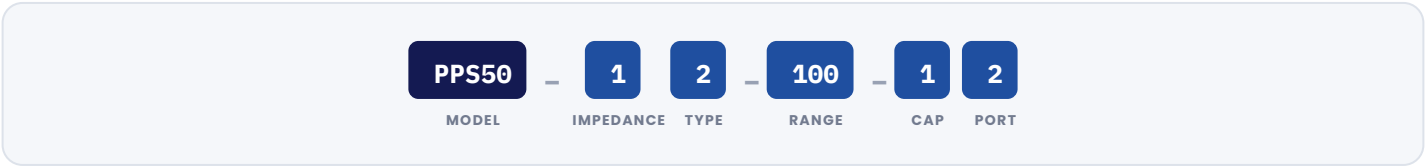
5) Section A-A shown with the ceramic pressure port; the Kovar port shares the same outline.

2) General tolerances: X ±0.5, X.X ±0.15, X.XX ±0.010, X.XXX ±0.005.

4) Vent sticker is placed manually and covers the entirety of the vent hole; offset placement is acceptable. Sealed-cover (absolute) parts omit the sticker and vent hole.

6) Supplied in tape and reel: 24 mm tape width, 16 mm pocket pitch.

Part-number configuration — PPS50-IY-XXX-CP



Model	Impedance (I)	Pressure type (Y)	Pressure range (XXX)	Cap (C)	Port (P)
PPS50	1 = 5 kΩ closed bridge	1 = Absolute 2 = Gauge	001 = 1 psi 015 = 15 psi 100 = 100 psi ... 500 = 500 psi	1 = Ceramic cover with vent sticker 2 = Ceramic cover without vent sticker	1 = Kovar pressure port 2 = Ceramic pressure port

EXAMPLE PART NUMBERS

PPS50-12-100-12 → 5 kΩ · gauge · 100 psi · vented cover · ceramic port

PPS50-11-500-21 → 5 kΩ · absolute · 500 psi · sealed cover · Kovar port

Gauge parts require the vented cover (C = 1). Absolute parts are normally supplied with the sealed cover (C = 2). Intermediate pressure ranges, alternate impedances, and custom outlines are available upon request.

Configure your PPS50

Custom ranges, port geometry, cover options, and media qualification available for OEM volumes. Talk to an engineer to spec your part.

REQUEST A QUOTE

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