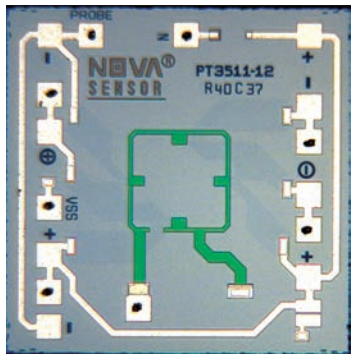
NOVA® SENSOR

PT3512

Pressure & Temperature Sensor Die



The PT3512 piezoresistive sensor die is designed for pressure and temperature measurements using a single chip. When excited by either constant voltage or constant current, a PT3512 pressure sensor produces a differential millivolt output signal directly proportional to the applied pressure. With NovaSensor's SenStable® process, PT3512 die features excellent long-term stability and repeatability (< 0.1% / year typ.). The on-chip temperature sensor powered by constant current allows for high accuracy measurement of temperature and for improvement of pressure measurement accuracy.

Applications

- Process Control Systems
- Pneumatic Controls
- Hydraulic Systems
- Biomedical Controls

Features

- Highly reliable, solid state silicon pressure and temperature sensor die
- Available in Absolute and Gauge versions
- Pressure ranges: 15 to 200 PSI
- Temperature range: -40…150°C
- On-chip temperature sensor
- Die dimensions (L x W x H): 1.6 mm x 1.6 mm x 1.25 mm with glass pedestal
  1.75 mm x 1.75 mm x 0.4 mm without glass pedestal
- Flexible bond pads configuration allows for wire bonding either to only one-side or along perimeter of the die.
- Media Compatibility – Clean dry air, noncorrosive gases and liquids, other fluids compatible with silicon and borosilicate glass.

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Advanced Sensors

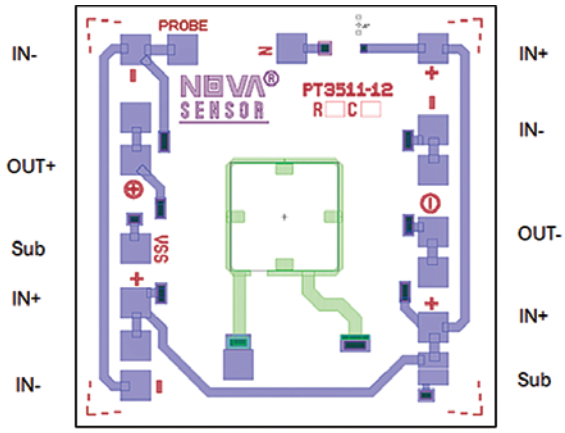
PT3512 Specifications

Parameter		Value			Units	Notes
General						
Pressure		15, 30, 50, 100, 200			psig / psia	Gauge and absolute pressure
Maximum Pressure (Proof pressure)		6X for 15 psi, 5X for 30 psi, 4X for 50 psi, 3X for 100 and 200 psi				1
Environmental						
Electrostatic damage (ESD) Class 2						MIL-STD 883 method
Temperature Range	Operating	–40 to 150			°C	–40°F to 302°F
	Storage	–55 to 160			°C	–47°F to 320°F
Mechanical						
Die Dimensions: with glass (L x W x H)		1.6 mm x 1.6 mm x 1.25 mm (0.84 mm thick glass)				
Weight		0.007 grams				
Metallization		Titanium-Aluminum				
Media Compatibility		Clean dry air, noncorrosive gases and liquids, other fluids compatible with silicon and borosilicate glass				
Electrical Performance – Pressure Sensor						
Parameter	**Range**	**Min**	**Typical**	**Max**	**Units**	**Notes**
Recommended Current Excitation Voltage			1.0	1.6	mA	-
		5.0	10	V		-
Input and Output Impedance		4500	5500	6500	Ohm	2
Zero Offset		-10	within ±2.5	+10	mV/V	2, 3
Sensitivity & Full Scale Output (FSO or Span)		See PT3511 Ordering Information Table				2
Linearity	15 psi, 100 psi, 200	-0.25	within ±0.15	+0.25	%FSO	2, 4
	30 to 150 psi	-0.15	within ±0.10	+0.15		2, 4
Zero Pressure Repeatability		-0.05	within ±0.01	+0.05	%FSO	2
Thermal Coefficient of Zero (TCO)		-15	within ±5	+15	µV/V/°C	5, 6
Thermal Coefficient of Resistance (TCR)		0.31	0.36	0.41	%/°C	5, 6
Thermal Coefficient of Sensitivity (TCS)		-0.22	-0.15…-	-0.13	%/°C	5, 6
Zero Thermal Hysteresis		-0.2	within ±0.01	+0.2	%FSO	5, 6
FSO Thermal Hysteresis		-0.2	within ±0.02	+0.2	%FSO	5, 6
Electrical Performance – Temperature Sensor						
Recommended excitation		10	20	100	µA	7
Temperature Range		-40	-	150	°C	-
Output at 25°C		520	560	600	mV	8
Sensitivity		-2.35	-2.15	-1.95	mV/°C	9
FSO		350	380	410	mV	9
Linearity		-0.6	within ±0.3	0.6	%	4, 9
Pressure Sensitivity			within ±0.1		%FSO	10

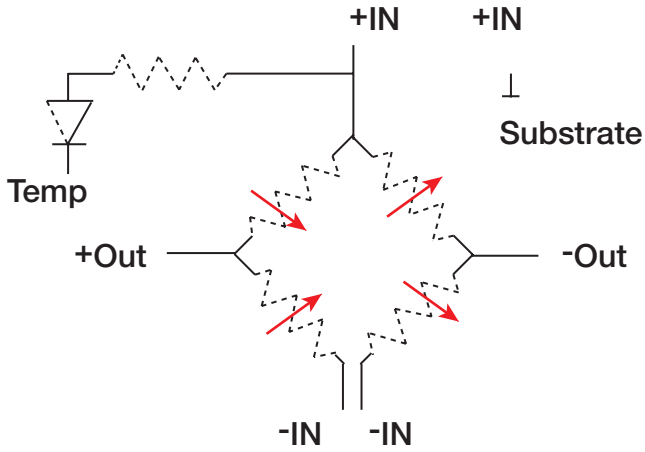
Notes:

1. Proof Pressure: The maximum pressure which the sensor may be subjected to, as an uncommon occurrence & for a short duration of time, without permanent damage & without performance degradation. Die can be used in applications requiring higher overpressure rating after additional characterization. Burst pressure is typically higher than proof pressure
2. Tested using 1.0 mA excitation at 25 °C.
3. 0 kPaA for absolute sensors, 0 kPaG for differential or gage sensors.
4. Best fit straight line.
5. Parameters are evaluated between 86°F and 176°F (30°C and 80°C) by testing samples from each wafer, typical range.
6. Between -48°F and 302°F (–40°C and 150°C) with respect to 25 °C, typical range.
7. 20 µA constant current excitation is recommended.
8. Tested using 20 µA excitation at 25 °C.
9. Sensitivity, FSO and Linearity of temperature sensor provided for -40…+140 °C range using 20 µA excitation.
10. Typical value.

PT3512 Wire Bond Diagram and Schematic



PT3512 Wire Bond Diagram



PT3512 Wire Bond Schematic Diagram

Note: Both IN+ and Sub need to be connected to the highest potential in the circuitry.

PT3512 Ordering Information

PN	Range		Gage/ Absolute	Sensitivity (mV/V/PSI)	FSO (mV)		
	PSI	kPa			Min	Typical	Max
71792	15	103.4	G	1.09-1.64	90	100-110	135
71793	15	103.4	A	1.09-1.64	90	100-110	135
71794	30	206.8	G	0.61-0.91	100	120-140	150
71795	30	206.8	A	0.61-0.91	100	120-140	150
71796	50	344.7	G	0.25-0.38	70	85-95	105
71797	50	344.7	A	0.25-0.38	70	85-95	105
71798	100	689.4	G	0.18-0.27	100	110-130	150
71799	100	689.4	A	0.18-0.27	100	110-130	150
71800	150	1034.2	G	0.12-0.18	100	110-130	150
71801	150	1034.2	A	0.12-0.18	100	110-130	150
71802	15-30	103.4-206.8	G	0.85-1.27	70	80-90	105
71803	15-30	103.4-206.8	A	0.85-1.27	70	80-90	105
71804	30-50	206.8-344.7	G	0.61-0.91	100	110-130	150
71805	30-50	206.8-344.7	A	0.61-0.91	100	110-130	150
71807	30	206.8	G (no glass)	0.67-1.09	110	130-150	180
71822	100	689.4	G (no glass)	0.20-0.33	110	130-150	180

All products are supplied either on 6” wafers or in Gel-Paks. Minimum release quantity: 3700 (sawn wafer on tape), 100 (die in Gel-Paks).
For ordering: sawn wafer on tape, see part number in column A.
For gel-pak option, example part number is 71805-GP.

FSO for all products are reported at 1mA excitation.

Shipping and Handling

The standard products are available on tape with metal frame and are shipped in protective plastic containers. Electrical rejects and visual rejects are inked.

Each wafer will have the following information: Lot #, Wafer #, Part #, and the number of good (yielded) die.

Warranty

NovaSensor warrants its products against defects in material and workmanship for 12 months from date of shipment. Products not subject to misuse will be repaired or replaced. THE FOREGOING IS IN LIEU OF ANY OTHER EXPRESSED OR IMPLIED WARRANTIES. NovaSensor reserves the right to make changes without further notice to any products herein. NovaSensor makes no warranty, representation or guarantee regarding the suitability of its products for any particular application, nor does NovaSensor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims and all liability, including without limitation consequential or incidental damages.

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