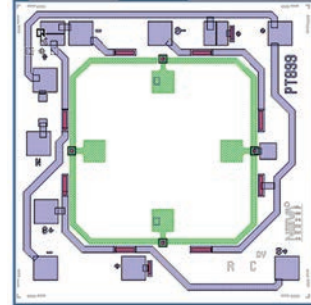


PT899

Pressure & Temperature Sensor Die



The PT899 piezoresistive sensor die is designed for pressure and temperature measurements using a single chip. When excited by either constant voltage or constant current, a PT899 pressure sensor produces a differential millivolt output signal directly proportional to the applied pressure. With NovaSensor's SenStable[®] process, PT899 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
- Transportation
- Pneumatic Controls
- Hydraulic Systems
- Aerospace

Features

- Highly reliable, solid state silicon pressure and temperature sensor die
- Pressure ranges: 250 to 15,000 PSI
- Temperature range: -40...150 °C
- On-chip temperature sensor
- Die dimensions (L x W x H): 1.86 mm x 1.86 mm x 2.0 mm with 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

PT899 Pressure Sensor Specifications

Parameter		Value	Units	Notes
General				
Pressure	Differential and	300, 500, 1000	psig / psia	
	Absolute only	2500, 3000, 5000, 7500, 10000, 15000	psia	
Maximum Pressure		3X pressure		1

Environmental

Electrostatic damage (ESD) Class 1			MIL-STD 883 method 3015	
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)	1.86 mm x 1.86 mm x 2.0 mm
Weight	0.014 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		4000	4800	6000	Ohm	2
Zero Offset		-7.5	within ±2.5	+7.5	mV/V	2, 3
Sensitivity & Full Scale Output (FSO or Span)	See PT899 Ordering Information Table					2
Linearity	300 to 500 psi	-0.20	within ±0.17	+0.20	%FSO	2, 4
	1000 to 5000 psi	-0.15	within ±0.10	+0.15		
	7500 psi	-0.20	within ±0.15	+0.20		2, 4, 6
	10000 to 15000 psi	-0.25	within ±0.15	+0.25		
Zero Pressure Repeatability		-0.05	within ±0.01	+0.05	%FSO	2
Thermal Coefficient of Zero (TCO)		-10	within ±3	+10	µV/V/°C	6, 7
Thermal Coefficient of Resistance (TCR)		0.31	0.40	0.45	%/°C	6, 7
Thermal Coefficient of Sensitivity (TCS)		-0.23	-0.20...-0.21	0.18	%/°C	6, 7
Zero Thermal Hysteresis		-0.2	within ±0.02	+0.2	%FSO	6, 7
FSO Thermal Hysteresis		-0.2	within ±0.03	+0.2	%FSO	6, 7

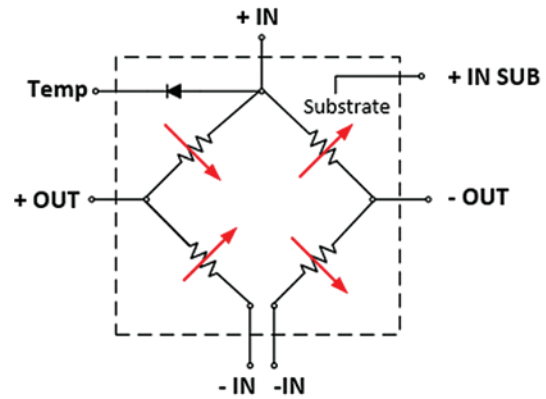
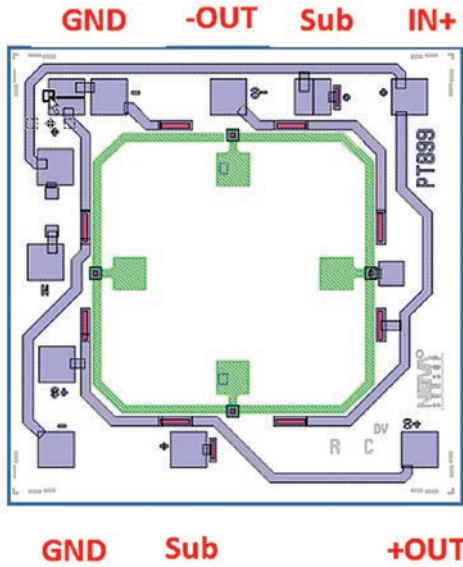
Electrical Performance – Temperature Sensor

Recommended excitation	10	20	100	µA	8
Temperature Range	-40	-	150	°C	-
Output at 25°C	600	640	680	mV	9
Sensitivity	-2.40	-2.10	-1.90	mV/°C	10
FSO	350	375	400	mV	10
Linearity	-0.6	within ±0.2	0.5	%	4, 10
Pressure Sensitivity	-	within ±0.1	-	%FSO	11

Notes:

- 2X rated pressure for 5000 psi and higher. Die can be used in applications requiring higher overpressure rating after additional characterization.
- Tested using 1.0 mA excitation at 25°C.
- 0 kPaA for absolute sensors, 0 kPaG for differential or gage sensors.
- Best fit straight line.
- Typical pressure non-linearity is provided based on testing at 6,000 psi.
- Parameter is evaluated between 86°F and 176°F (30°C and 80°C) by testing samples from each wafer, typical range.
- Between -48°F and 302°F (-40°C and 150°C) with respect to 25°C, typical range.
- 20 µA constant current excitation is recommended.
- Tested using 20 µA excitation at 25°C.
- Sensitivity, FSO and Linearity of temperature sensor provided for -40...+140°C range tested using 20 µA excitation
- Typical value

PT899 Diagram and Schematic



PT899 Wire Bond Schematic Diagram

1. PT899 die is an open bridge die
2. Sub needs to be wire banded to IN+

PT899 Wire Bond Diagram

PT899 Ordering Information *(with cross reference to P123 high pressure sensor die)*

PN	Range		Gage/ Absolute	Sensitivity ($\mu\text{V/V/PSI}$)	FSO (mV)			P122 Ref	FSO (mV)
	PSI	Mpa			Min	Typical	Max		
71691	300	2.07	G	113-167	170	195-205	250	51161	170-254
71692	300	2.07	A	113-167	170	195-206	250	51162	170-254
71693	500	3.45	G	68-100	170	200-210	250	51213	170-254
71694	500	3.45	A	68-100	170	200-210	250	51163	170-254
71695	1000	6.90	G	34-50	170	200-210	250	51165	170-254
71696	1000	6.90	A	34-50	170	200-210	250	51164	170-254
71697	2500	17.2	A	14-20	170	210-220	250	n/a	
71785	3000	20.7	A	20-24	290	310-320	350	51166	170-254
71698	5000	34.5	A	6.8-10.0	170	195-205	250	51167	170-254
71699	7500	51.7	A	5.5-7.3	205	220-230	275	51168	170-254
71700	10000	68.9	A	4.1-5.5	205	230-240	275	51232	170-254
71701	15000	103.4	A	3.2-4.3	240	255-265	320	n/a	
71783	1000	6.90	A	23.2-34.8	116	140-150	174	51120	116-174
71784	1500	103.4	A	15.5-23.2	116	140-150	174	51121	116-174

All products are supplied on 6" wafers. Minimum release quantity: 2700 die.

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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AAS-920-814A - 12/2024