

NOVA

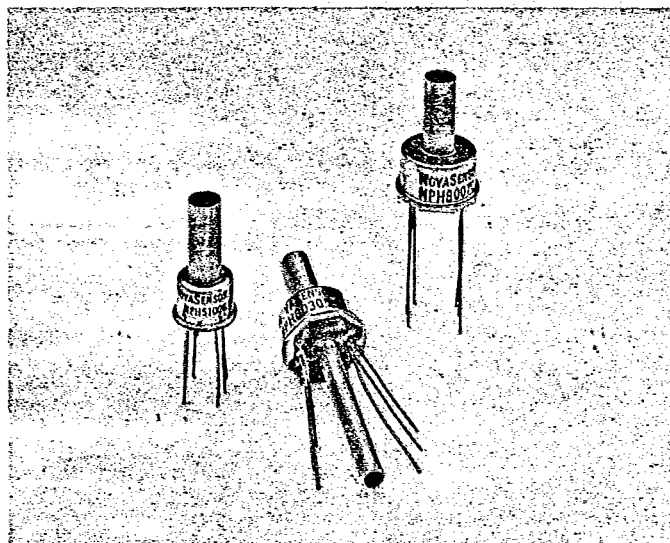
SENSOR

NPH Series

Solid State Pressure Sensor Medium Pressure

FEATURES

- Solid state, high reliability
- Standard TO-8 or TO-5 package suitable for PC board mount
- Low cost, small size
- Available in gage, absolute, and differential pressure versions
- Media compatible with non-corrosive gases and moist air
- Output signal of 100 mv @ 1.5 ma
- Thermal errors 0.5% max.
- Overpressure capability to 4 times maximum rated pressure
- Four standard pressure ranges: 0-15, 0-30, 0-100, and 0-250 psi. Low pressure version: 0-1 psi specified on other data sheet.
- Nonlinearity 0.1% max.
- Standard $\frac{3}{16}$ " OD pressure port
- Ceramic substrate with temperature compensation resistors is available as standard option with TO-8 package
- Custom configurations available



APPLICATIONS

- Process control, P-to-I converters
- Pneumatic control systems
- HVAC controls
- Biomedical: infusion pumps, sphygmomanometers, respirators
- Aerospace: altimeters, barometers, cabin pressure sensors
- Computer peripherals

DESCRIPTION

An integrated circuit silicon sensor chip is housed in a standard TO-8 or TO-5 electrical package which is printed circuit board mountable.

The latest techniques in VLSI and micromachining have been used to ion implant piezoresistive strain gages into a Wheatstone bridge configuration which is integrally formed on a micromachined silicon diaphragm. Most recently, new die design further improved *outstanding stability*. The application of a constant current source to the sensor produces a voltage output that is linearly proportional to the input pressure.

For temperature compensation, each sensor is shipped with its specific calibration card. The card lists the resistor values which set the zero offset and full-scale output voltages in addition to optimizing the sensor's performance over temperature.

The user can provide standard signal conditioning circuitry to amplify the 100 mV output signal. The sensor is compatible with most non-corrosive gases and moist air.

A laser-timed, thick-film resistor network on a hybrid ceramic substrate is available with the TO-8 package.

NPH Series Medium Pressure

SOLID STATE PRESSURE SENSOR

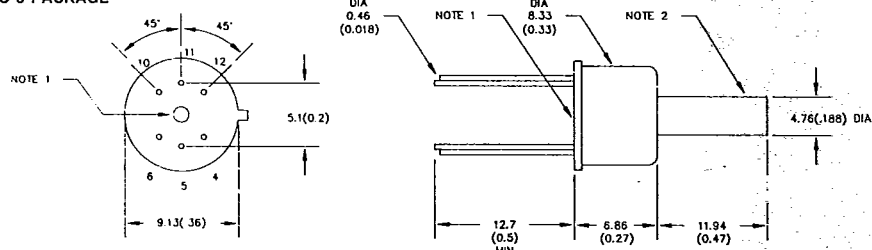
OPERATING CHARACTERISTICS

Parameter	Value	Units	Notes	Parameter	Value	Units	Notes
GENERAL				ENVIRONMENTAL			
Pressure Range	0-100	kPa	0-15 psi	Temperature Range			
	0-200	kPa	0-30 psi	Operating	-40 to +125	°C	-40° to +257°F
	0-700	kPa	0-100 psi	Compensated	0 to +70	°C	+32° to +158°F
	0-1700	kPa	0-250 psi	Vibration	10	g _{RMS}	20 to 2000 Hz
Maximum Pressure	4 times rated pressure			Shock	100	g	11 milliseconds
Notes: Media compatibility-Noncorrosive gas and moist air Maximum proof pressure for 250 psid version is 400 psi				Life	100 × 10 ⁶ minimum cycles		
ELECTRICAL @ 25°C (77°F) unless otherwise stated				MECHANICAL			
Input Excitation	1.5	mA	2 mA max.	Weight	<5	grams	<0.2 oz.
Insulation Resistance	100	MΩ	@ 50 V _{DC}	Case Material	Nickel and gold plated Kovar		
Bridge Resistance	5000	Ω	± 20% typical without R5				

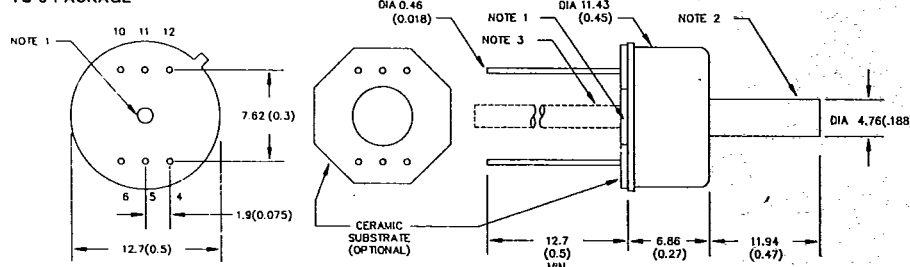
PERFORMANCE	COMPENSATED (R or H) ¹				STATISTICAL COMPENSATION ⁶		
Parameter	Units	Typ.	Min/Max	Notes	Typ.	Min/Max	Notes
Offset	mV	1	± 2		5	± 10	
Thermal Accuracy — Offset	% FSO	0.25	± 0.5	2	5	± 10	
Thermal Accuracy FSO	% FSO	0.25	± 0.5	2	2	± 4	
Full-scale Output	mV	100	100 ± 25	3	100	100 ± 60	3
Nonlinearity	% FSO	0.05	± 0.1	4	.1	± 0.25	4
Hysteresis	% FSO	0.01	± 0.025		.05	± 0.10	
Repeatability	% FSO	0.01	± 0.025		.05	± 0.10	
Thermal Hysteresis	% FSO	0.05	± 0.1	5	.15	± 0.3	5
Short-term Stability							
Offset	μV/V	2	± 5	7	5	± 10	7
FSO	μV/V	0.0	± 1	7	0.0	± 1	7
Long-term Stability							
Offset	% FSO	0.05	± 0.1	8	.25	± 0.5	8
FSO	% FSO	0.05	± 0.1	8	.25	± 0.5	8
Notes:	1. Performance with compensating resistors 2. 0 to 70°C with reference to 25°C 3. With 1.5 ma input excitation 4. Best fit straight line 5. 0 to 70°C 6. R5 = 23kΩ R1 = R2 = open R3 = R4 = 0 7. Normalized: Offset/Bridge voltage; 100 hours 8. 1 year						

PACKAGE DIAGRAMS

TO-5 PACKAGE



TO-8 PACKAGE



NOTE 1—GAGE UNITS SUPPLIED WITH HOLE, DO NOT OBSTRUCT.
 NOTE 2—DIFFERENT INPUT PRESSURE PORTS AVAILABLE AS AN OPTION.

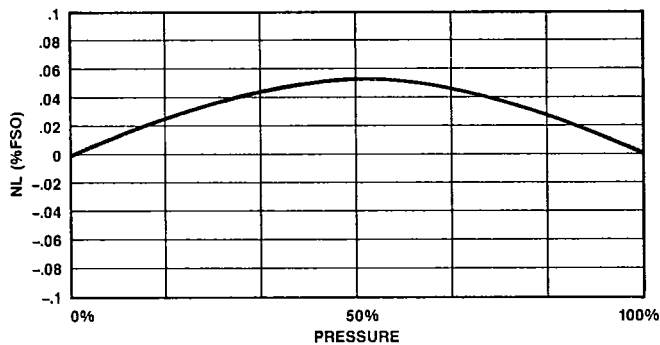
NOTE 3—DIFFERENTIAL VERSION HAS DIA 3.18(0.125) TUBE, 17.14(0.675) LONG.
 NOTE 4—DIMENSIONS SHOWN IN MM(INCHES).

NPH Series Medium Pressure

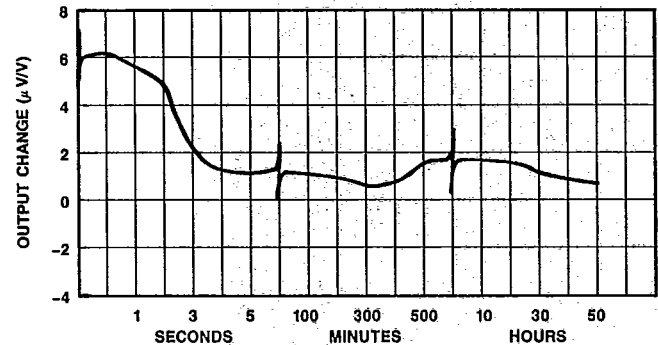
SOLID STATE PRESSURE SENSOR

TYPICAL PERFORMANCE CHARACTERISTICS

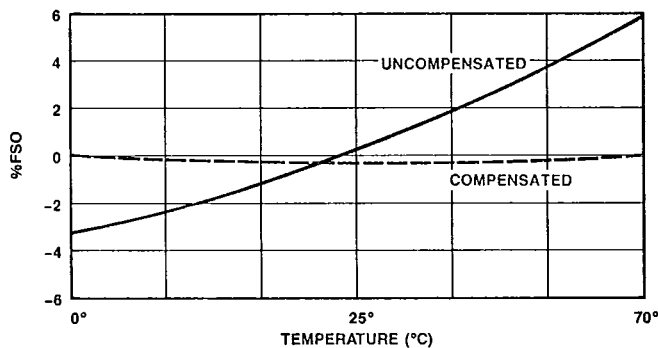
NONLINEARITY



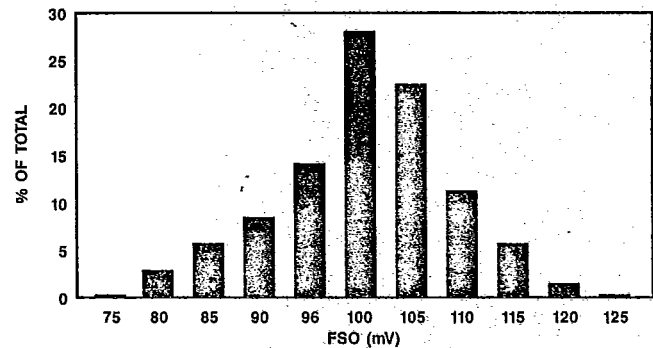
SHORT-TERM STABILITY — OFFSET



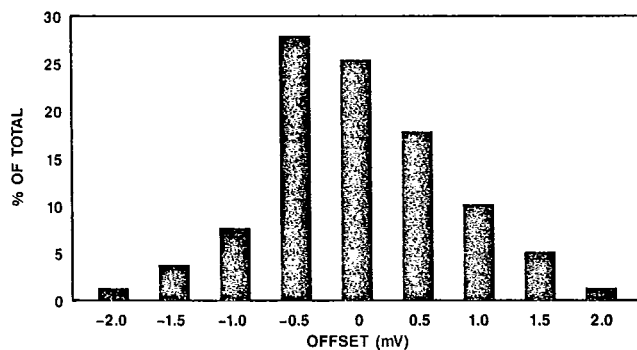
THERMAL ACCURACY — FSO



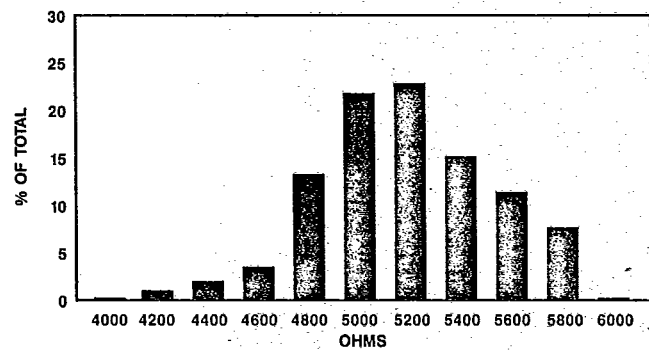
DISTRIBUTION OF FSO



DISTRIBUTION OF ZERO



DISTRIBUTION OF BRIDGE IMPEDANCE Rb

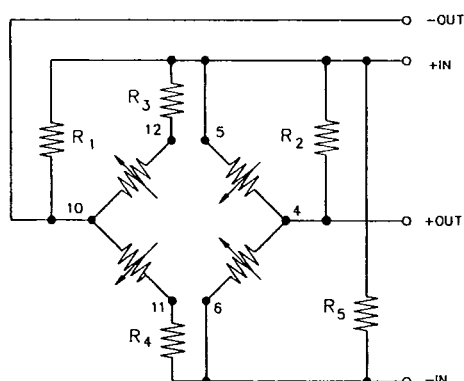
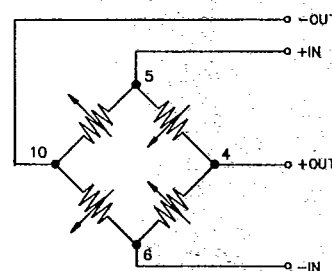


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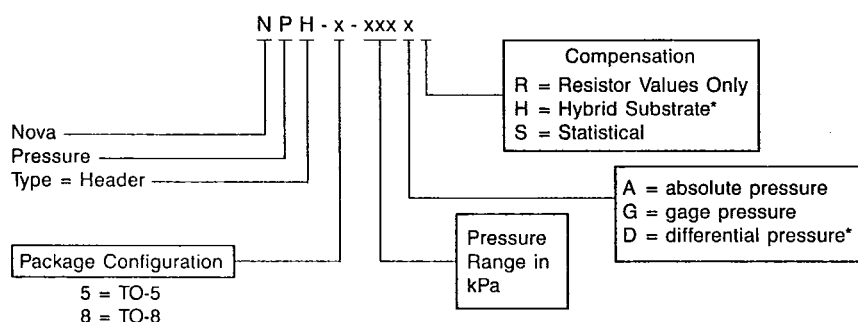
SCHEMATIC DIAGRAMS

STANDARD VERSION

COMPENSATED VERSION
(TO-8 PACKAGE ONLY)

NOTE: VALUES FOR EXTERNAL TEMPERATURE
COMPENSATING RESISTORS ARE PROVIDED.

ORDERING INFORMATION



A $\frac{3}{16}$ " OD pressure port is standard. Optionally a $\frac{1}{8}$ " OD pressure port or $\frac{1}{16}$ " DIA. vent hole on top of the package is available. Lead length of $\frac{1}{2}$ " is standard, optionally $\frac{7}{8}$ " is available. Please consult factory.

*Differential pressure and hybrid (H) available on TO-8 configuration only.

NOTE: See NPH Low Pressure data sheet for 0-1 psi specifications.

Ordering Example: Assume a requirement for gage pressure transducer with a 0-30 kiloPascal range in a TO-8 package. Model number would be: NPH-8-030G.

REPRESENTED BY

Sales Terms: NovaSensor standard sales terms apply. Prices and specifications are subject to change without notice.

Warranty: NovaSensor warrants its products against defects in material and workmanship for 12 months from date of shipment. Products not subjected 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 to any product herein and assumes no liability arising out of the application or use of any product or circuit described or referenced herein.



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