

# NPA

## Surface-Mount Pressure Sensor Series

The NPA product series is provided in a miniature size as a cost effective solution for applications that require calibrated performance. Packaged in a SOIC14 pin surface mount, the NPA Series is available in Gauge, Absolute or Differential pressure ranges with either mV, amplified analog or digital outputs. The sensor is intended for printed circuit board mounting and delivered in tape and reel form to simplify manufacturing handling.



### Features

- Surface Mountable
- Differential, Gauge, Absolute & Low Pressure
- 10" H<sub>2</sub>O to 30 PSI Full Scale
- Output Options: Amplified Analog, Digital Serial (14bit), Digital I<sup>2</sup>C, Uncalibrated mV
- On chip temperature sensor in digital mode
- Operating temperature range of -40 to 125°C
- Total Error Band < ±1.5% FSO
- 60 psi proof pressure on all ranges



# General NPA Specifications

Parameter	Value	Units	Notes
<b>Environmental</b>			
<b>Temperature Range</b>			
Operating	-40 to +125	°C	-40 to +257°F
Compensated	0 to 60	°C	+32 to +157°F
Storage	-40 to +125	°C	-40 to +257°F
<b>Mechanical</b>			
<b>Weight</b>	~1	grams	
<b>Media Compatibility</b>			
Positive differential and gauge ports	Compatible with exposed materials		1
Negative differential ports	Dry gases only		

Notes: 1. Exposed materials are thermoset plastic, silicon, epoxy, RTV, pyrex and silicone

Parameter	Units	Min	Typ	Max	Notes
<b>Common Parameters</b>					
Accuracy (Total Error Band)	%FSO	-1.5		1.5	
Proof Pressure (10"H2O to 1 psi)	psi		35		
Proof Pressure (>1 psi to 30 psi)	psi		60		
Maximum Package Pressure			60		
Pressure ranges		10"H2O		30psi	

Series	Excitation Voltage	Min/Max	Notes
NPA-100	1.5mA		NPA Uncompensated, mV
NPA-300	3.3V	3.135 V to 3.465 V	NPA Compensated, low power amplified analog
NPA-500	5.0V	4.75 V to 5.25 V	NPA Compensated, amplified analog
NPA-600	5.0V *	4.75 V to 5.25 V	NPA Compensated, digital serial
NPA-700	5.0V *	4.75 V to 5.25 V	NPA Compensated, digital I <sup>2</sup> C

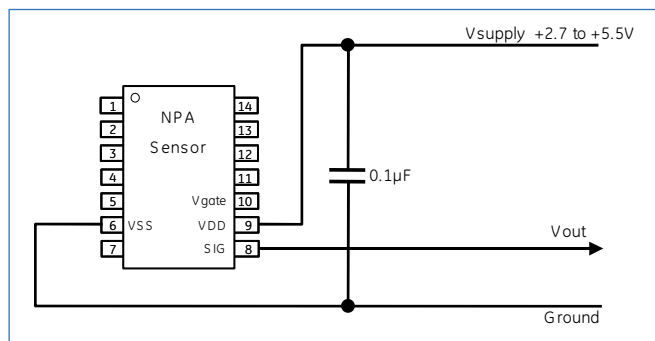
\* 3.3V optional, contact factory for more details

# Output Option: Amplified Analog

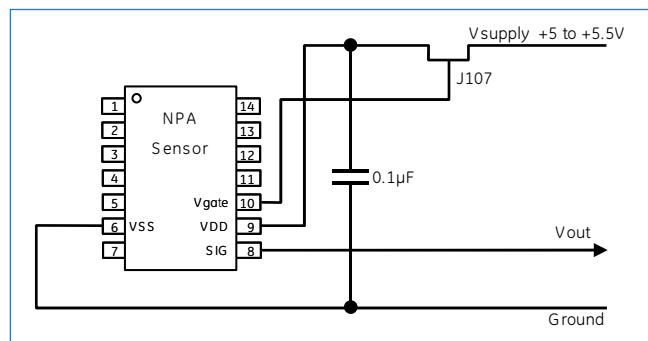
Parameter	Units	Min	Typ	Max
<b>Analog Performance Parameters 5 volt Excitation</b>				
Offset	Volts	0.44	0.5	0.56
Span	Volts		4	
<b>Analog Performance Parameters 3.3 volt Excitation</b>				
Offset	Volts	0.46	0.5	0.54
Span	Volts		2.5	

## Typical Analog Circuits

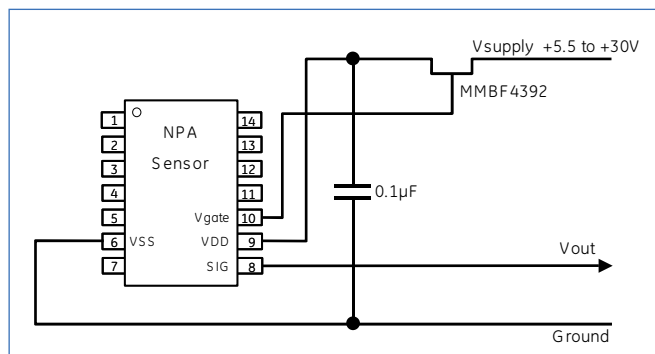
Circuit layout same as "Ratiometric Voltage Output"



Ratiometric Voltage Output - Standard NPA



Ratiometric Voltage Output with Over-Voltage Protection - Request Required



Absolute Voltage Output - Request Required

## NPA Pinout

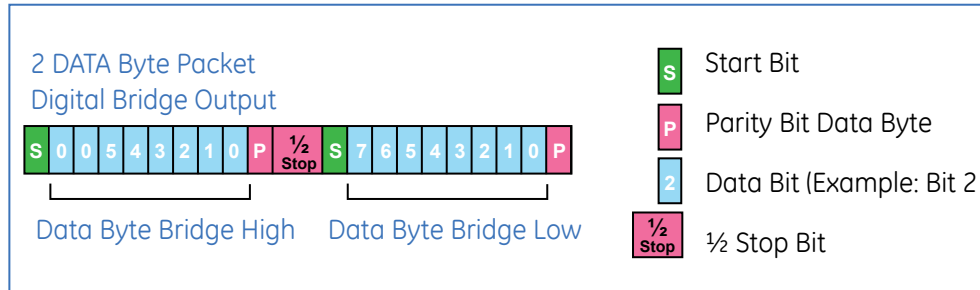
Pin #	Amplified Analog	Function Notes
1	--	
2	--	
3	--	
4	--	
5	--	
6	VSS	Ground Supply
7	--	
8	SIG	Analog Out, Calibration Interface
9	VDD	Supply Voltage
10	--	
11	--	
12	--	
13	--	
14	--	

# Output Option: Digital Serial (14 bit)

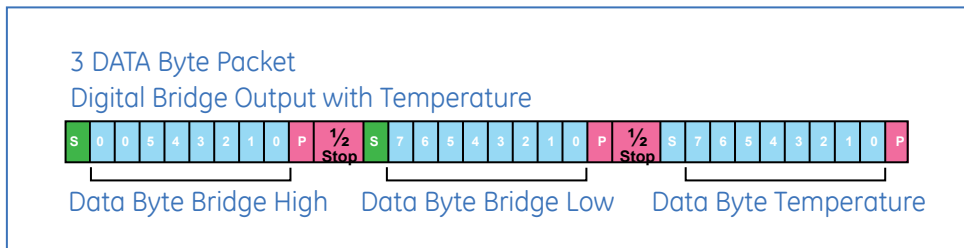
Parameter	Units	Min	Typ	Max	Notes
<b>Digital Performance</b>					
Resolution	ADC		14bit		16383 steps
Sampling Rate	kHz		1		
<b>Digital Serial Output</b>					
Temperature Sensor Accuracy			4°C		8bit

## Digital Output Options

Streaming serial output is a 14 bit number proportional to the full scale.



Zacwire—Digital Output (NOM) Bridge Readings



Zacwire—Digital Output (NOM) Bridge Readings with Temperature Option

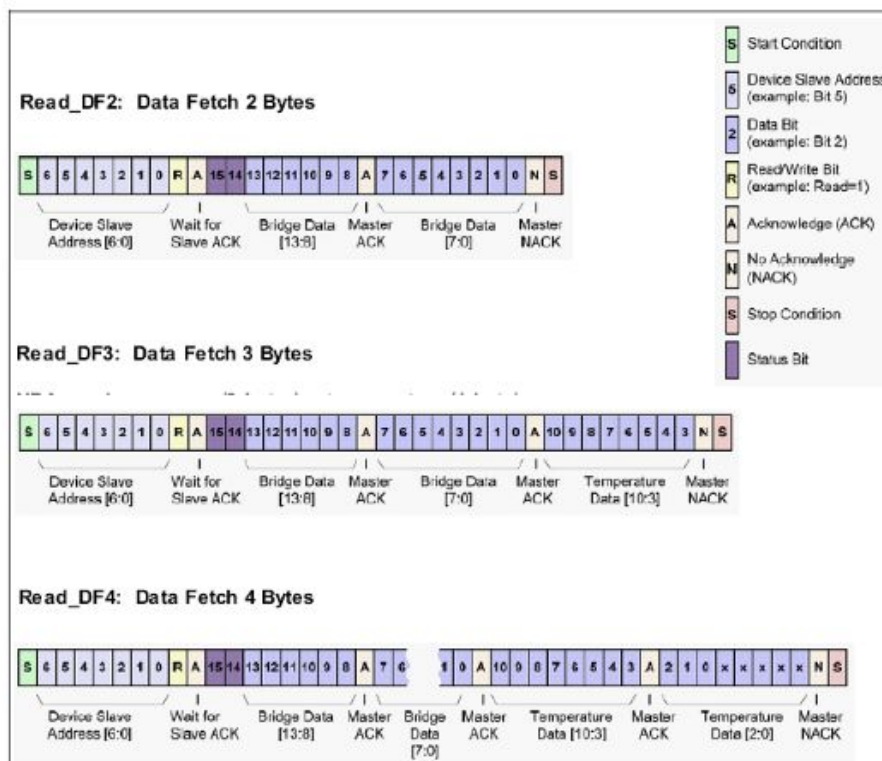
## NPA Pinout

Pin #	Amplified Digital Serial	Function Notes
1	--	
2	--	
3	--	
4	--	
5	--	
6	VSS	Ground Supply
7	--	
8	SIG	Digital Out, Calibration Interface
9	VDD	Supply Voltage
10	--	Not Connected
11	--	
12	--	
13	--	
14	--	

# Output Option: Digital I<sup>2</sup>C

Parameter	Units	Min	Typ	Max	Notes
<b>Digital Performance</b>					
Resolution (ADC)	bit		14		16383 steps
I <sup>2</sup> C Slave Address			0x28		
Sampling Rate	kHz		2		
I <sup>2</sup> C Bit Rate	kbits/s	100		400	
I <sup>2</sup> C Mode			Update		
Temperature Accuracy (0 to 60°C)	°C		2		11 bit

## Digital I<sup>2</sup>C Update Mode Output Options



## NPA Pinout

Pin #	Digital I <sup>2</sup> C	Function Notes
1	--	
2	--	
3	--	
4	--	
5	--	
6	VSS	Ground Supply
7	VDD	Supply Voltage
8	SDA	Serial Data, Calibration Interface
9	SCL	Serial Clock, Calibration Interface
10	--	
11	--	
12	--	
13	--	
14	--	

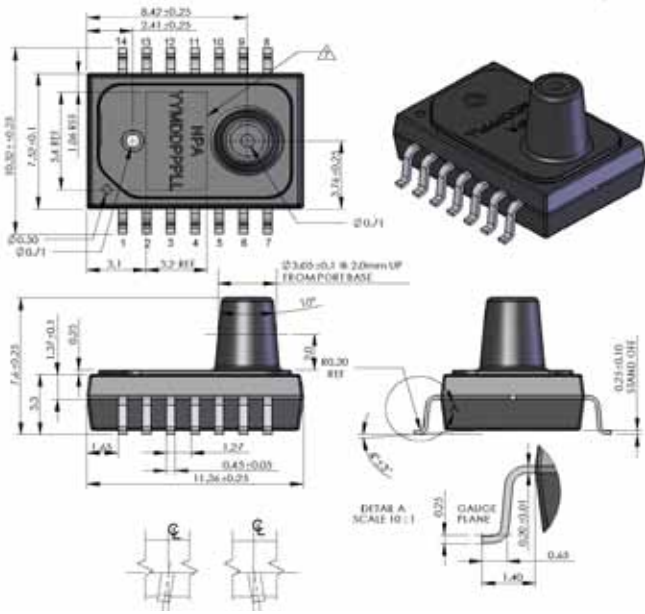
# Output Option: Uncalibrated mV

NPA Uncalibrated Performance									
Parameter	Units	10 "H2O to 1 psi				5 psi to 30 psi			
		Min	Typ	Max	Notes	Min	Typ	Max	Notes
Pressure Range	psi		0.36 to 1		10"H2O = 0.361psi = 2.49KPa		5 to 30		
Excitation	mA		1.5		10 VDC Maximum		1.0		10 VDC Maximum
Input Impedance	$\Omega$		5000 $\pm$ 20%				5000 $\pm$ 20%		
Output Impedance	$\Omega$		5000 $\pm$ 20%				5000 $\pm$ 20%		
Zero Offset	mV		$\pm$ 75				$\pm$ 10		
Full Scale Output	mV		40 to 120		10 "H2O		100 to 166		5 psi to 30 psi
			75 to 135		1 psi				
Linearity	%FSO		$\pm$ 0.25		BFSL		$\pm$ 0.25		
Pressure Hysteresis	%FSO		$\pm$ 0.20				$\pm$ 0.15		
Temperature Coefficient of Zero	$\mu$ V / V / $^{\circ}$ C		$\pm$ 30				$\pm$ 20		
Temperature Coefficient of Resistance	% / $^{\circ}$ C		0.29				0.38		
Temperature Coefficient of Sensitivity	%FSO/ $^{\circ}$ C		-0.2				-0.19		
Thermal Hysteresis of Zero	%FSO		$\pm$ 0.15				$\pm$ 0.2		
Position Sensitivity	%FSO		0.2				N/A		

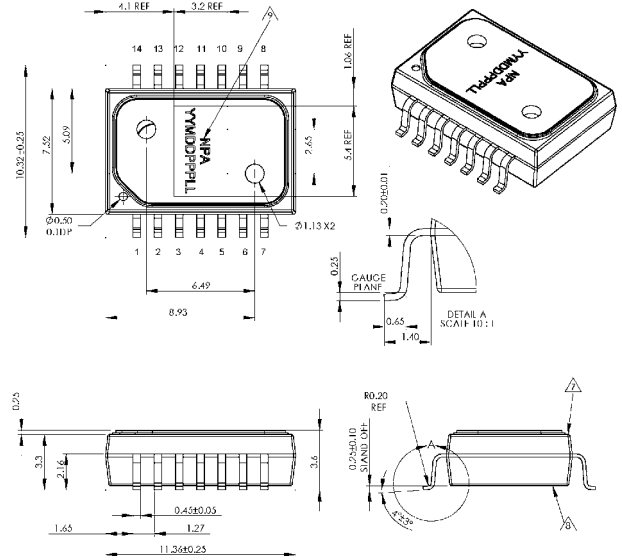
## NPA Pinout

Pin #	Uncalibrated mV	Function Notes
1	--	
2	--	
3	VP	Sensor Interface Positive Output
4	VSSP	Sensor Interface Ground
5	--	
6	--	
7	--	
8	--	
9	--	
10	--	
11	VN	Sensor Interface Negative Output
12	VDDP	Sensor Interface Positive Excitation
13	--	
14	--	

### Manifold Design (All measurements given in mm)

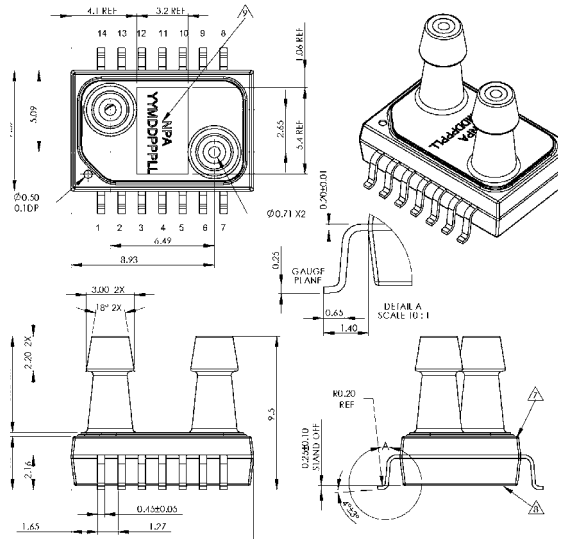
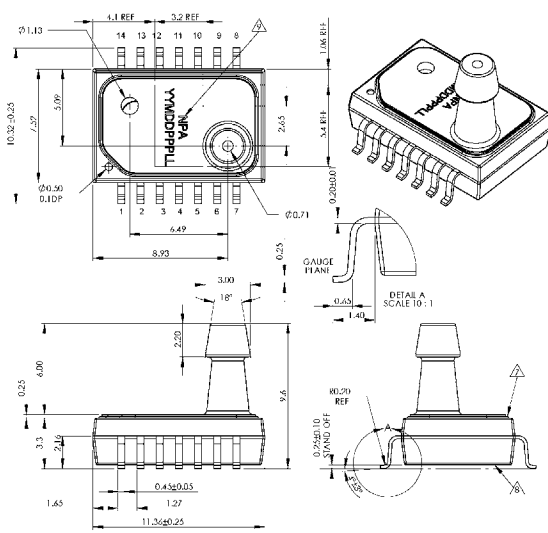


### No Port Design (All measurements given in mm)



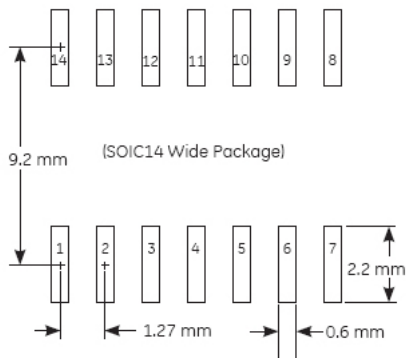
### Barbed Design

Recommended tubing size of 3/32" ID, 7/32" OD, 1/16" wall thickness (All measurements given in mm)



1 Barb Port — Request Required

### Suggested PCB Land Pattern



Package Leadframe Material: Alloy 194, NiPdAu Plated

## Ordering Information

### Model NPA

#### Code Description

100	mV Output, Ratiometric Uncalibrated sensor
300	Analog Amplified Output, 3.3Vdc Excitation, Calibrated sensor
500	Analog Amplified Output, 5Vdc Excitation, Calibrated sensor
600	Zacwire —Digital Serial Output, Calibrated Sensor, 2 byte
601	Zacwire —Digital Serial Output, Calibrated Sensor, 3 byte
700	I <sup>2</sup> C - Digital output, Calibrated Sensor, 2 byte

#### Code Port Type

M	1 manifold port for Gauge and Absolute pressure types
B	2 barbed ports for Gauge, Absolute and Differential pressure types**
N	Non ported

#### Code Pressure Range

10W	10"H2O (2.5 KPa)
001	1 PSI (7 KPa)
005	5 PSI (35 KPa)
015	15 PSI (100 KPa)
030	30 PSI (200 KPa)

#### Code Pressure Type

G	Gauge
D	Differential
A *	Absolute

NPA -   -

Note: \* Absolute pressure ranges are available in 15 PSIA and 30 PSIA only.

\*\* 1 barbed port available upon request

Contact GE for custom pressure ranges.

Refer to application guide 910-289 for more information.

Product is RoHS:2010 compliant.

## Warranty

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