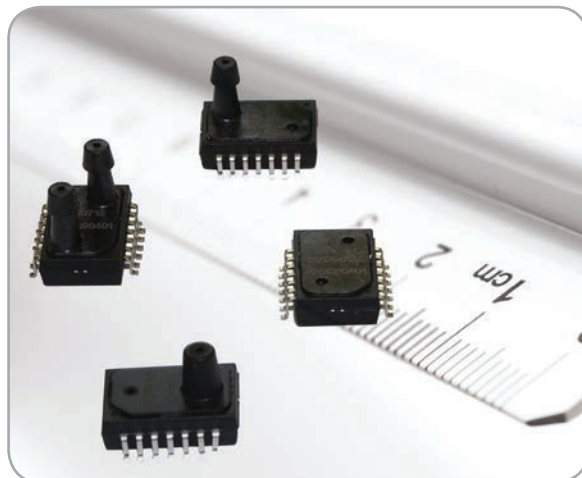


# NPA Low Pressure Surface-Mount Pressure Sensor Series



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-Low Pressure Series is available in Gauge or Differential pressure ranges with either 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, Low Pressure
- 2" and 5" H<sub>2</sub>O Full Scale
- Output Options: Amplified Analog, Digital Serial (14bit), Digital I<sup>2</sup>C
- On chip temperature sensor in digital mode
- Operating temperature range of -40 to 125°C
- Total Error Band:
  - +/-1.5% Span at 5"H<sub>2</sub>O full scale
  - +/-2.5% Span at 2"H<sub>2</sub>O full scale

# Low Pressure NPA Specifications

| Parameter                                        | Value                                                                                 | Units               | Notes                                        |                               |
|--------------------------------------------------|---------------------------------------------------------------------------------------|---------------------|----------------------------------------------|-------------------------------|
| Pressure Range                                   | 2 or 5                                                                                | In H <sub>2</sub> O | 498 or 1245 Pa                               |                               |
| Maximum Overpressure                             | 140                                                                                   | In H <sub>2</sub> O | 400 in H <sub>2</sub> O Package Overpressure |                               |
| Electrical @ 25°C (77°F) unless otherwise stated |                                                                                       |                     |                                              |                               |
| Input Excitation                                 | 3.3 or 5.0                                                                            | VDC                 |                                              |                               |
| Environmental                                    |                                                                                       |                     |                                              |                               |
| Temperature Range                                |                                                                                       |                     |                                              |                               |
| Operating                                        | -40 to +125                                                                           | °C                  | -40 to +257°F                                |                               |
| Compensated                                      | 0 to +60                                                                              | °C                  | +32 to +140°F                                |                               |
| Storage                                          | -40 to +125                                                                           | °C                  | -40 to +257°F                                |                               |
| Mechanical/Package                               |                                                                                       |                     |                                              |                               |
| Weight                                           | ~1                                                                                    | grams               |                                              |                               |
| Media Compatibility                              |                                                                                       |                     |                                              |                               |
| Positive differential and gage ports             | Media compatible with thermoset plastic, silicon, epoxy, RTV, Pyrex, and silicone gel |                     |                                              |                               |
| Negative differential ports                      | Dry gasses only                                                                       |                     |                                              |                               |
| Performance Parameters                           | Units                                                                                 | Minimum             | Maximum                                      | Notes                         |
| Accuracy (Total Error Band)                      | % Span                                                                                | -1.5                | 1.5                                          | 5”H <sub>2</sub> O Full Scale |
|                                                  |                                                                                       | -2.5                | 2.5                                          | 2”H <sub>2</sub> O Full Scale |
| Response Time                                    | ms                                                                                    |                     | 2                                            | 0.5 ms Typical                |
| Current Consumption                              | mA                                                                                    | 1.2                 |                                              | Typical                       |

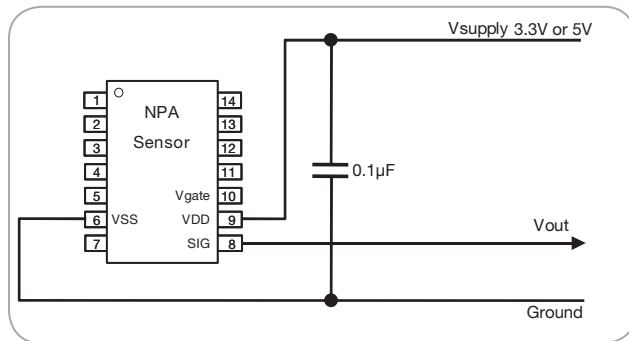
| Series  | Excitation Voltage | Min (V) | Max (V) | Notes                |
|---------|--------------------|---------|---------|----------------------|
| NPA-300 | 3.3V               | 3.28    | 3.32    | NPA amplified analog |
| NPA-500 | 5.0V               | 4.97    | 5.03    | NPA amplified analog |
| NPA-730 | 3.3V               | 3.28    | 3.32    | NPA digital I2C      |
| NPA-700 | 5.0V               | 4.97    | 5.03    | NPA digital I2C      |

# Output Option: Amplified Analog

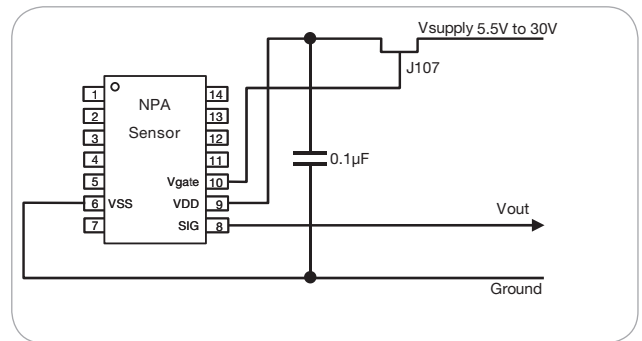
| Analog Performance Parameters 5 volt Excitation |       |                      |      |                      |      |
|-------------------------------------------------|-------|----------------------|------|----------------------|------|
|                                                 |       | 2 inH <sub>2</sub> O |      | 5 inH <sub>2</sub> O |      |
| Parameter                                       | Units | Min                  | Max  | Min                  | Max  |
| Offset                                          | Volts | 0.40                 | 0.60 | 0.44                 | 0.56 |
| Span                                            | Volts | 4                    |      | 4                    |      |

| Analog Performance Parameters 3.3 volt Excitation |       |                      |      |                      |      |
|---------------------------------------------------|-------|----------------------|------|----------------------|------|
|                                                   |       | 2 inH <sub>2</sub> O |      | 5 inH <sub>2</sub> O |      |
| Parameter                                         | Units | Min                  | Max  | Min                  | Max  |
| Offset                                            | Volts | 0.44                 | 0.56 | 0.46                 | 0.54 |
| Span                                              | Volts | 2.5                  |      | 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

## NPA Amplified Output Pinout

| Pin # | Amplified Analog | Function Notes                    |
|-------|------------------|-----------------------------------|
| 1     | --               |                                   |
| 2     | --               |                                   |
| 3     | NC               | Do Not Connect                    |
| 4     | NC               | Do Not Connect                    |
| 5     | --               |                                   |
| 6     | VSS              | Ground Supply                     |
| 7     | --               |                                   |
| 8     | SIG              | Analog Out, Calibration Interface |
| 9     | VDD              | Supply Voltage                    |
| 10    | --               |                                   |
| 11    | NC               | Do Not Connect                    |
| 12    | NC               | Do Not Connect                    |
| 13    | --               |                                   |
| 14    | --               |                                   |

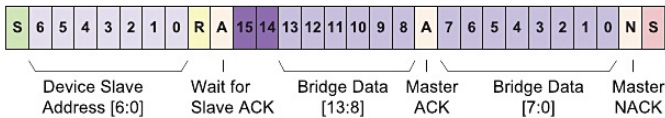
## Output Option: Digital I<sup>2</sup>C

| 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 |     |             |

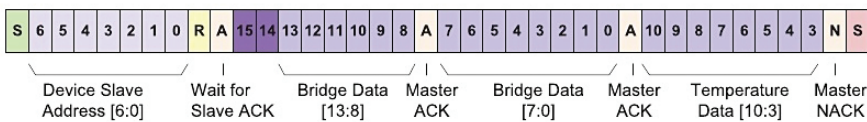
| Digital Performance Parameters 3.3 and 5 volt Excitation |        |                      |      |                      |      |
|----------------------------------------------------------|--------|----------------------|------|----------------------|------|
|                                                          |        | 2 inH <sub>2</sub> O |      | 5 inH <sub>2</sub> O |      |
| Parameter                                                | Units  | Min                  | Max  | Min                  | Max  |
| Offset                                                   | Counts | 1311                 | 1966 | 1442                 | 1835 |
| Span                                                     | Counts | 13106                |      | 13106                |      |

# Digital I2C Update Mode Output Options

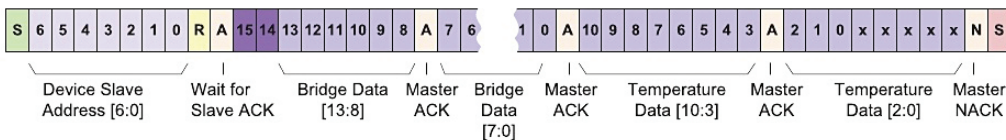
## Read\_DF2: Data Fetch 2 Bytes



## Read\_DF3: Data Fetch 3 Bytes



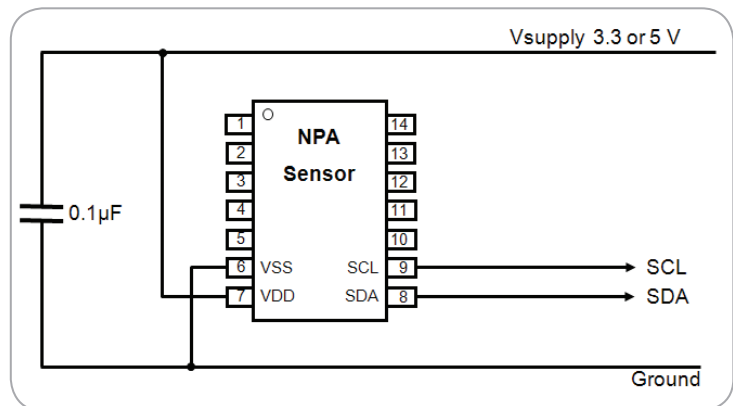
## Read\_DF4: Data Fetch 4 Bytes



- S** Start Condition
- 5** Device Slave Address (example: Bit 5)
- 2** Data Bit (example: Bit 2)
- R** Read/Write Bit (example: Read=1)
- A** Acknowledge (ACK)
- N** No Acknowledge (NACK)
- S** Stop Condition
- Status Bit**

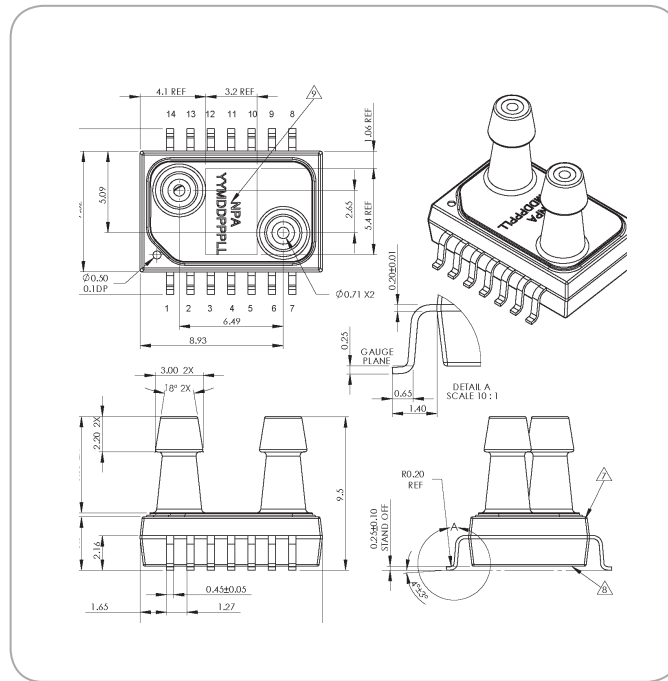
## NPA I<sup>2</sup>C Pinout

| Pin # | Digital I <sup>2</sup> C | Function Notes                      |
|-------|--------------------------|-------------------------------------|
| 1     | --                       |                                     |
| 2     | --                       |                                     |
| 3     | NC                       | Do Not Connect                      |
| 4     | NC                       | Do Not Connect                      |
| 5     | --                       |                                     |
| 6     | VSS                      | Ground Supply                       |
| 7     | VDD                      | Supply Voltage                      |
| 8     | SDA                      | Serial Data, Calibration Interface  |
| 9     | SCL                      | Serial Clock, Calibration Interface |
| 10    | --                       |                                     |
| 11    | NC                       | Do Not Connect                      |
| 12    | NC                       | Do Not Connect                      |
| 13    | --                       |                                     |
| 14    | --                       |                                     |

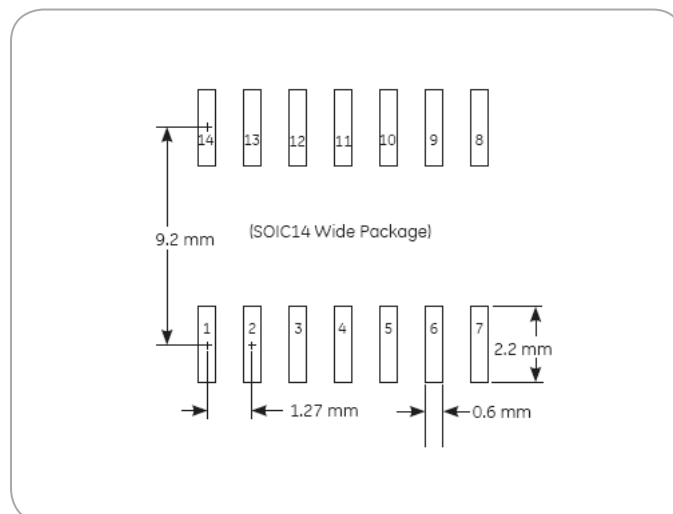


# Barbed Design

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



# Suggested PCB Land Pattern



Package Leadframe Material: Alloy 194, NiPdAu

## Ordering Information

| Model<br>NPA |   | Code       | Description                                                                     |                                                          |            |                         |
|--------------|---|------------|---------------------------------------------------------------------------------|----------------------------------------------------------|------------|-------------------------|
|              |   | 300        | Analog Amplified Output, 3.3Vdc Excitation, Calibrated sensor                   |                                                          |            |                         |
|              |   | 500        | Analog Amplified Output, 5Vdc Excitation, Calibrated sensor                     |                                                          |            |                         |
|              |   | 700        | I <sup>2</sup> C - Digital output, Calibrated Sensor, 2 byte, 5Vdc Excitation   |                                                          |            |                         |
|              |   | 730        | I <sup>2</sup> C - Digital output, Calibrated Sensor, 2 byte, 3.3Vdc Excitation |                                                          |            |                         |
|              |   |            | <b>Code</b>                                                                     | <b>Port Type</b>                                         |            |                         |
|              |   | B          |                                                                                 | 2 barbed ports for Gauge and Differential pressure types |            |                         |
|              |   |            | <b>Code</b>                                                                     | <b>Pressure Range</b>                                    |            |                         |
|              |   | 02W        |                                                                                 | 2"H2O (0.5 KPa)                                          |            |                         |
|              |   | 05W        |                                                                                 | 5"H2O (1.24 KPa)                                         |            |                         |
|              |   |            | <b>Code</b>                                                                     | <b>Pressure Type</b>                                     |            |                         |
|              |   |            | G                                                                               | Gauge                                                    |            |                         |
|              |   |            | D                                                                               | Differential                                             |            |                         |
| <b>NPA</b>   | - | <b>700</b> | <b>B</b>                                                                        | -                                                        | <b>02W</b> | <b>D</b> <b>EXAMPLE</b> |

- Contact NovaSensor for custom port options.
- Refer to application guide 910-289 for more information.
- Product is RoHS:2010 compliant.

## Warranty

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- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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