

# Miniature Amplified Pressure Sensors

±0.3 psi to 100 psi Pressure Sensors



## Features

- 0 to ±0.3 to 0 to 30 psi Pressure Ranges
- Ratiometric 4V Output
- Temperature Compensated
- Calibrated Zero and Span

## Applications

- Medical Instrumentation
- Environmental Instrumentation
- HVAC Instrumentation

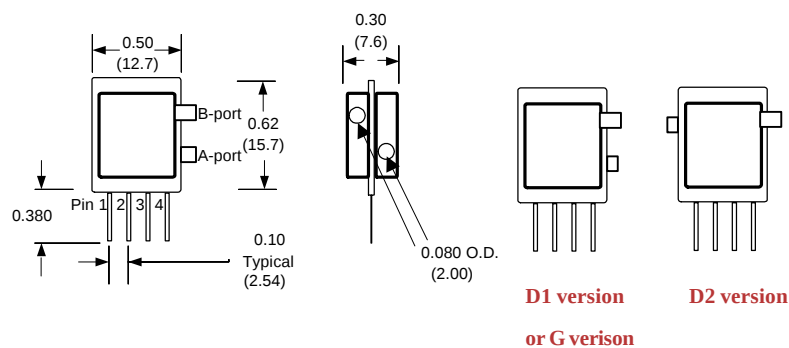
## General Description

The Miniature Amplified line of pressure sensors is based upon technology developed over years of development in the pressure sensor industry. This model provides a ratiometric 4-volt output with superior output characteristics. The sensor housing has been designed specifically to reduce package induced parasitic stress and strain. In addition the sensor utilizes a silicon, micromachined, stress concentration enhanced structure to provide a very linear output to measured pressure.

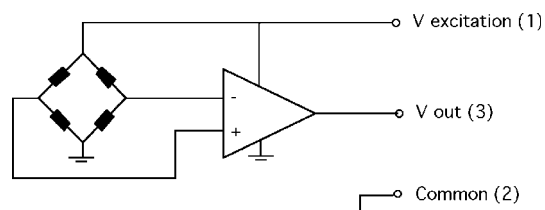
These calibrated and temperature compensated sensors give an accurate and stable output over a wide temperature range. Each sensor is internally compensated using an ASIC compensation technique. This series is intended for use with non-corrosive, non-ionic working fluids such as air, dry gases and the like.

The output of the device is ratiometric to the supply voltage over a supply voltage range of 4.5 to 5.5 volts.

## Physical Dimensions



## Equivalent Circuit



## Pressure Sensor Ratings

|                                                       |                  |
|-------------------------------------------------------|------------------|
| <b>Supply Voltage, Vs</b>                             | +4.5 to +5.5 Vdc |
| <b>Common-mode pressure</b>                           | -10 to +10 psig  |
| <b>Lead Temperature, max<br/>(soldering 2-4 sec.)</b> | 250°C            |

## Environmental Specifications

|                           |                                 |
|---------------------------|---------------------------------|
| <b>Temperature Ranges</b> |                                 |
| <b>Compensated</b>        | 5 to 50° C                      |
| <b>Operating</b>          | -25 to 85° C                    |
| <b>Storage</b>            | -40 to 125° C                   |
| <b>Humidity Limits</b>    | 0 to 95% RH<br>(non condensing) |

## Standard Pressure Ranges

| Part Number        | Operating Pressure | Nominal Span | Proof Pressure | Burst Pressure |
|--------------------|--------------------|--------------|----------------|----------------|
| 0.3 PSI-Dx-4V-MINI | ±0.3 PSI           | 4 V          | 5 PSI          | 10 PSI         |
| 0.3 PSI-G-4V-MINI  | 0 - 0.3 PSI        | 4 V          | 5 PSI          | 10 PSI         |
| 1 PSI-Dx-4V-MINI   | ±1 PSI             | 4 V          | 5 PSI          | 10 PSI         |
| 1 PSI-G-4V-MINI    | 0 - 1 PSI          | 4 V          | 5 PSI          | 10 PSI         |
| 5 PSI-Dx-4V-MINI   | ± 5 PSI            | 4 V          | 15 PSI         | 30 PSI         |
| 5 PSI-G-4V-MINI    | 0 - 5 PSI          | 4 V          | 15 PSI         | 30 PSI         |
| 15 PSI-A-4V-MINI   | 0 - 15 PSIA        | 4 V          | 45 PSI         | 60 PSI         |
| 15 PSI-Dx-4V-MINI  | ±15 PSI            | 4 V          | 45 PSI         | 60 PSI         |
| 15 PSI-G-4V-MINI   | 0 - 15 PSI         | 4V           | 45 PSI         | 60 PSI         |
| 30 PSI-A-4V-MINI   | 0 - 30 PSIA        | 4V           | 60 PSI         | 60 PSI         |
| 30 PSI-Dx-4V-MINI  | ±30 PSI            | 4V           | 60 PSI         | 60 PSI         |
| 30 PSI-G-4V-MINI   | 0 - 30 PSI         | 4V           | 60 PSI         | 100 PSI        |
| BARO-A-4V-MINI     | 600 - 1100 mbar    | 4V           | 45 PSI         | 60 PSI         |

## Performance Characteristics for 0.3 PSI-Dx-4V-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure      |         | ±0.3    |         | PSI   |
| Output Span, note 5                         | ±1.90   | ±20     | ±2.10   | volt  |
| Offset Voltage @ zero differential pressure | 2.15    | 2.25    | 2.35    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±40     | mvolt |
| Linearity, hysteresis error, note 4         |         |         | ±0.5    | %fs   |
| Span Shift (5°C-50°C), note 2               |         |         | ±2      | %span |

### Specification Notes

NOTE 1: ALL PARAMETERS ARE MEASURED AT 5.0 VOLT EXCITATION, FOR THE NOMINAL FULL SCALE PRESSURE AND ROOM TEMPERATURE UNLESS OTHERWISE SPECIFIED. PRESSURE MEASUREMENTS ARE WITH POSITIVE PRESSURE APPLIED TO PORT B.

NOTE 2: SHIFT IS RELATIVE TO 25°C.

NOTE 3: SHIFT IS WITHIN THE FIRST HOUR OF EXCITATION APPLIED TO THE DEVICE.

NOTE 4: MEASURED AT ONE-HALF FULL SCALE RATED PRESSURE USING BEST STRAIGHT LINE CURVE FIT.

NOTE 5: THE VOLTAGE ADDED TO THE OFFSET VOLTAGE AT FULL SCALE PRESSURE. NOMINALLY THE OUTPUT VOLTAGE RANGE IS 0.25 TO 4.25 VOLTS FOR MINUS TO PLUS FULL SCALE PRESSURE.

## Performance Characteristics for 0.3 PSI-G-4V-MINI

| Parameter, note 1                           | Minimum | Nominal | Maximum | Units |
|---------------------------------------------|---------|---------|---------|-------|
| Operating Range, gage pressure              |         | 0.3     |         | PSI   |
| Output Span, note 5                         | 3.90    | 4.0     | 4.10    | volt  |
| Offset Voltage @ zero pressure              | 0.15    | 0.25    | 0.35    | volt  |
| Offset Temperature Shift (5°C-50°C), note 2 |         |         | ±40     | mvolt |
| Linearity, hysteresis error, note 4         |         |         | ±0.5    | %fs   |
| Span Shift (5°C-50°C), note 2               |         |         | ±2      | %span |

## Performance Characteristics for 1 PSI-D-4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure         |         | ±1.0    |         | PSI   |
| Output Span, note 5                            | ±1.90   | ±2.0    | ±2.10   | volt  |
| Offset Voltage @ zero differential pressure    | 2.15    | 2.25    | 2.35    | volt  |
| Offset Temperature Shift (5°C to 50°C), note 2 |         |         | ±40     | mvolt |
| Linearity, hysteresis error, note 4            |         |         | ±0.5    | %fs   |
| Span Shift (5°C to 50°C), note 2               |         |         | ±1      | %span |

## Performance Characteristics for: 1 PSI-G-4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, gage pressure                 |         | 1.0     |         | PSI   |
| Output Span, note 5                            | 3.90    | 4.0     | 4.10    | volt  |
| Offset Voltage @ zero pressure                 | 0.15    | 0.25    | 0.35    | volt  |
| Offset Temperature Shift (5°C to 50°C), note 2 |         |         | ±40     | mvolt |
| Linearity, hysteresis error, note 4            |         |         | ±0.5    | %fs   |
| Span Shift (5°C to 50°C), note 2               |         |         | ±1      | %span |

## Performance Characteristics for: 5 PSI-D-4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure         |         | ±5.0    |         | PSI   |
| Output Span, note 5                            | ±1.90   | ±2.0    | ±2.10   | volt  |
| Offset Voltage @ zero differential pressure    | 2.15    | 2.25    | 2.35    | volt  |
| Offset Temperature Shift (5°C to 50°C), note 2 |         |         | ±20     | mvolt |
| Linearity, hysteresis error, note 4            |         |         | ±0.5    | %fs   |
| Span Shift (5°C to 50°C), note 2               |         |         | ±1      | %span |



## Performance Characteristics for: 5 PSI-G-4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, gage pressure                 |         | 50      |         | PSI   |
| Output Span, note 5                            | 3.90    | 40      | 4.10    | volt  |
| Offset Voltage @ zero pressure                 | 0.15    | 0.25    | 0.35    | volt  |
| Offset Temperature Shift (5°C to 50°C), note 2 |         |         | ±20     | mvolt |
| Linearity, hysteresis error, note 4            |         |         | ±0.5    | %fs   |
| Span Shift (5°C to 50°C), note 2               |         |         | ±1      | %span |

## Performance Characteristics for 15 PSI-A-4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, absolute pressure             | 0       |         | 15      | psia  |
| Output Span, note 5                            | 3.90    | 40      | 4.10    | volt  |
| Offset Voltage @ zero pressure                 | 0.15    | 0.25    | 0.35    | volt  |
| Offset Temperature Shift (5°C to 50°C), note 2 |         |         | ±20     | mvolt |
| Linearity, hysteresis error, note 4            |         |         | ±0.5    | %fs   |
| Span Shift (5°C to 50°C), note 2               |         |         | ±1      | %span |

## Performance Characteristics for 15 PSI-Dx-4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure         |         | ±15.0   |         | PSI   |
| Output Span, note 5                            | ±1.90   | ±20     | ±2.10   | volt  |
| Offset Voltage @ zero differential pressure    | 2.15    | 2.25    | 2.35    | volt  |
| Offset Temperature Shift (5°C to 50°C), note 2 |         |         | ±20     | mvolt |
| Linearity, hysteresis error, note 4            |         |         | ±0.5    | %fs   |
| Span Shift (5°C to 50°C), note 2               |         |         | ±1      | %span |

## Performance Characteristics for BARO-A-4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, absolute pressure             | 600     |         | 1100    | mBar  |
| Output Span, note 5                            | 3.90    | 40      | 4.10    | volt  |
| Offset Voltage @ zero pressure                 | 0.15    | 0.25    | 0.35    | volt  |
| Offset Temperature Shift (5°C to 50°C), note 2 |         |         | ±20     | mvolt |
| Linearity, hysteresis error, note 4            |         |         | ±0.5    | %fs   |
| Span Shift (5°C to 50°C), note 2               |         |         | ±1      | %span |

**Pressure Response:** for any pressure applied the response time to get to 90% of pressure applied is typically less than 100 useconds.

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M in i t u r e   A m p l i f i e d   O u t p u t   M e d i u m   P r e s s u r e   S e n s o r

## Performance Characteristics for 15 PSI-G-4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, gage pressure                 |         | 150     |         | PSI   |
| Output Span, note 5                            | 3.90    | 40      | 4.10    | volt  |
| Offset Voltage @ zero pressure                 | 0.15    | 0.25    | 0.35    | volt  |
| Offset Temperature Shift (5°C to 50°C), note 2 |         |         | ±20     | mvolt |
| Linearity, hysteresis error, note 4            |         |         | ±0.5    | %fs   |
| Span Shift (5°C to 50°C), note 2               |         |         | ±1      | %span |

## Performance Characteristics for 30 PSI-Dx-4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, differential pressure         |         | ±30.0   |         | PSI   |
| Output Span, note 5                            | ±1.90   | ±20     | ±2.10   | volt  |
| Offset Voltage @ zero differential pressure    | 2.15    | 2.25    | 2.35    | volt  |
| Offset Temperature Shift (5°C to 50°C), note 2 |         |         | ±20     | mvolt |
| Linearity, hysteresis error, note 4            |         |         | ±0.5    | %fs   |
| Span Shift (5°C to 50°C), note 2               |         |         | ±1      | %span |

## Performance Characteristics for 30 PSI-G-4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, gage pressure                 |         | 30.0    |         | PSI   |
| Output Span, note 5                            | 3.90    | 40      | 4.10    | volt  |
| Offset Voltage @ zero pressure                 | 0.15    | 0.25    | 0.35    | volt  |
| Offset Temperature Shift (5°C to 50°C), note 2 |         |         | ±20     | mvolt |
| Linearity, hysteresis error, note 4            |         |         | ±0.5    | %fs   |
| Span Shift (5°C to 50°C), note 2               |         |         | ±1      | %span |

## Performance Characteristics for 30 PSI-A-4V-MINI

| Parameter, note 1                              | Minimum | Nominal | Maximum | Units |
|------------------------------------------------|---------|---------|---------|-------|
| Operating Range, absolute pressure             |         | 30.0    |         | PSI   |
| Output Span, note 5                            | 3.90    | 40      | 4.10    | volt  |
| Offset Voltage @ zero pressure                 | 0.15    | 0.25    | 0.35    | volt  |
| Offset Temperature Shift (5°C to 50°C), note 2 |         |         | ±20     | mvolt |
| Linearity, hysteresis error, note 4            |         |         | ±0.5    | %fs   |
| Span Shift (5°C to 50°C), note 2               |         |         | ±1      | %span |

### Specification Notes

NOTE 1: ALL PARAMETERS ARE MEASURED AT 5.0 VOLT EXCITATION, FOR THE NOMINAL FULL SCALE PRESSURE AND ROOM TEMPERATURE UNLESS OTHERWISE SPECIFIED. PRESSURE MEASUREMENTS ARE WITH POSITIVE PRESSURE APPLIED TO PORT B.

NOTE 2: SHIFT IS RELATIVE TO 25°C.

NOTE 3: SHIFT IS WITHIN THE FIRST HOUR OF EXCITATION APPLIED TO THE DEVICE.

NOTE 4: MEASURED AT ONE-HALF FULL SCALE RATED PRESSURE USING BEST STRAIGHT LINE CURVE FIT.

NOTE 5: THE VOLTAGE ADDED TO THE OFFSET VOLTAGE AT FULL SCALE PRESSURE. NOMINALLY THE OUTPUT VOLTAGE RANGE IS 0.25 TO 4.25 VOLTS FOR MINUS TO PLUS FULL SCALE PRESSURE.



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