

## Pressure Sensor

### PS-A (ADP5) series

(Built-in amplification and temperature compensating circuit)



### Built-in amplifier and compensating circuit

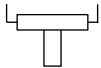
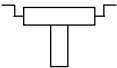
#### Feature

- Built-in amplifier and temperature compensation circuit, no need for circuit design and characteristic adjustment.
- High accuracy and reliability : overall accuracy  $\pm 1.25\%$  FS (Standard),  $\pm 2.5\%$  FS (Low-pressure type)
- Compact size, space-saving : compatible size for PS type (Standard/Economy, S and M packages)
- RoHS compliant

#### Typical applications

- Industrial use : Pressure switches and pneumatic components, compressed air pressure measuring devices
  - Medical use : Airbeds
  - Others : Pressure sensing devices for air pressure mediums
- [Low-pressure type]
- Water level detection for domestic appliances : Washing machines and dishwashers
  - Air pressure control : Cleanrooms and smoking rooms






#### Ordering information

| ADP5  | 1           | 5                            | 1   |
|---|-------------|------------------------------|---|
| <b>Terminal profile</b>   |             |                              |   |
| 1 : DIP terminal  |             |                              |   |
|  |             |                              |   |
| 2 : SMD terminal  |             |                              |   |
|  |             |                              |   |
|   | <b>Code</b> | <b>Rated pressure</b>        | <b>Code</b>   |
|   | 0           | $\pm 100$ kPa                | 0   |
|   | 1           | $-100$ kPa                   | S package<br>length : 3 mm 0.118 inch, dia : 3 mm 0.118 inch                                |
|   | 2           | 25 kPa                       |   |
|   | 4           | 100 kPa                      | 1   |
|   | 5           | 200 kPa                      | M package<br>length : 5 mm 0.197 inch, dia : 3 mm 0.118 inch                                |
|   | 6           | 500 kPa                      | 3   |
|   | 7           | 1000 kPa                     | P package (Only low pressure type)<br>length : 15.6 mm 0.615 inch, dia : 5.45 mm 0.215 inch |
|   | B6          | 6 kPa<br>(Low pressure type) |   |

Note : Some part numbers may not be available depending on the combination.  
Please refer to the Table of PRODUCT TYPES on the next page.

#### Product types

Standard packing : Carton : 100 pcs.; Case : 1,000 pcs.

| Pressure                               | Terminal | Package (Pressure inlet hole length)   |  | Part No.  |  |  |  |          |
|--|----------|--|--|---|--|--|--|----------|
|  |          | Standard type  |  | Standard / Economy type   |  | Low pressure type  |  |          |
|  |          | S package (3 mm 0.118 inch)  |  | M package (5 mm 0.118 inch)   |  | P package (15.6 mm 0.614 inch)   |  |          |
|  |          | DIP terminal  | SMD terminal  | DIP terminal  | SMD terminal  | DIP terminal  |  |          |
| <b>Standard type (with glass base)</b> |          |  |  |   |  |  |  |          |
| $\pm 100$ kPa                          |          | ADP5100  | ADP5200  | ADP5101   | ADP5201  |  |  | —        |
| $-100$ kPa                             |          | ADP5110  | ADP5210  | ADP5111   | ADP5211  |  |  | —        |
| 25 kPa                                 |          | ADP5120  | —  | ADP5121   | —  |  |  | —        |
| 100 kPa                                |          | ADP5140  | ADP5240  | ADP5141   | ADP5241  |  |  | —        |
| 200 kPa                                |          | ADP5150  | ADP5250  | ADP5151   | ADP5251  |  |  | —        |
| 500 kPa                                |          | ADP5160  | ADP5260  | ADP5161   | ADP5261  |  |  | —        |
| 1000 kPa                               |          | ADP5170  | ADP5270  | ADP5171   | ADP5271  |  |  | —        |
| <b>Low pressure type</b>               |          |  |  |   |  |  |  |          |
| 6 kPa                                  |          | —  | —  | —   | —  |  |  | ADP51B63 |

## Rating

### ● Standard type

| Item                                   | Standard type (with glass base)                                 |      |    |     |     |     |                              |
|--|---|------|----|-----|-----|-----|------------------------------|
| Type of pressure                       | Gauge pressure  |      |    |     |     |     |                              |
| Pressure medium                        | Air <sup>*1</sup>   |      |    |     |     |     |                              |
| Rated pressure (kPa)                   | ±100  | -100 | 25 | 100 | 200 | 500 | 1000                         |
| Max. applied pressure                  | Twice of the rated pressure                                     |      |    |     |     |     | 1.5 times the rated pressure |
| Ambient temperature                    | -10 °C to +60 °C 14 °F to +140 °F (no freezing or condensation) |      |    |     |     |     |                              |
| Storage temperature                    | -20 °C to +85 °C -4 °F to +185 °F (no freezing or condensation) |      |    |     |     |     |                              |
| Drive voltage                          | 5±0.25 V  |      |    |     |     |     |                              |
| Temperature compensation range         | 0 °C to 50 °C 32 °F to 122 °F                                   |      |    |     |     |     |                              |
| Offset voltage <sup>*2,3,5</sup>       | 2.5±0.05  |      |    |     |     |     | 0.5±0.05 V                   |
| Rated output voltage <sup>*2,3,5</sup> | 4.5±0.05<br>(+when +100kPa)                                     |      |    |     |     |     | 4.5±0.05 V                   |
| Overall accuracy                       | ±1.25 %FS <sup>*3,4,5</sup>                                     |      |    |     |     |     |                              |
| Current consumption                    | Max. 10 mA <sup>*2,3</sup>                                      |      |    |     |     |     |                              |

\*1: Please consult us for pressure media other than dry air, nitrogen, oxygen, carbon dioxide.

\*2: Indicates output when temperature is 25 °C 77 °F.

\*3: Indicates output when drive voltage is 5 V. Although output fluctuates due to fluctuations in the drive voltage, this is not included.

\*4: Overall accuracy indicates the accuracy of the offset voltage and rated output voltage at a temperature compensation range of 0 to 50 °C 32 to 122 °F.

\*5: Accuracy is the value at the time of our shipping. Please set Zero-point calibration function on your products in order to safely use if the offset voltage is shifted.

### ● Low pressure type

| Item                           | Economy type (without glass base)                                 |  |  |  |  |  |  |
|--------------------------------|---|--|--|--|--|--|--|
| Type of pressure               | Gauge pressure  |  |  |  |  |  |  |
| Pressure medium                | Air <sup>*1</sup>   |  |  |  |  |  |  |
| Rated pressure (kPa)           | 6   |  |  |  |  |  |  |
| Max. applied pressure          | Twice of the rated pressure                                       |  |  |  |  |  |  |
| Ambient temperature            | 0 °C to +70 °C 32 °F to +158 °F (no freezing or condensation)     |  |  |  |  |  |  |
| Storage temperature            | -30 °C to +100 °C -22 °F to +212 °F (no freezing or condensation) |  |  |  |  |  |  |
| Drive voltage                  | 5±0.25 V  |  |  |  |  |  |  |
| Temperature compensation range | 0 °C to 70 °C 32 °F to 158 °F                                     |  |  |  |  |  |  |
| Offset voltage                 | 0.5 V (Typical) <sup>*2</sup>                                     |  |  |  |  |  |  |
| Span voltage                   | 4.0 V (Typical) <sup>*2</sup>                                     |  |  |  |  |  |  |
| Overall accuracy               | ±2.5 %FS <sup>*2,3,4</sup>  |  |  |  |  |  |  |
| Current consumption            | Max. 10 mA  |  |  |  |  |  |  |

\*1: Please consult us for pressure media other than dry air, nitrogen, oxygen, carbon dioxide.

\*2: Indicates output when drive voltage is 5 V. Although output fluctuates due to fluctuations in the drive voltage, this is not included.

\*3: Overall accuracy indicates the accuracy of the offset voltage and span voltage at temperatures between 0 to 70 °C 32 to 158 °F (FS=4V)

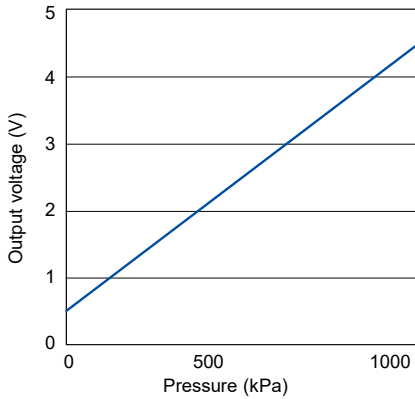
\*4: The initial offset voltage error is not included in the overall accuracy.

Reference data

[Standard type]

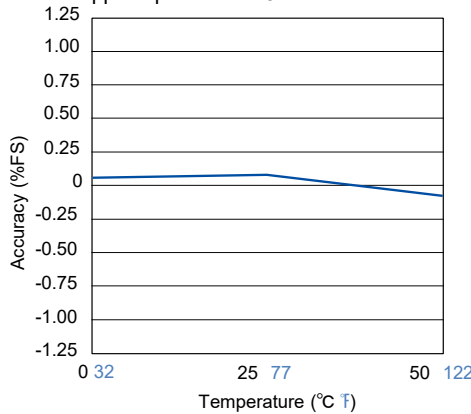
1. - ① Output voltage

(Representative example : ADP5170)  
 Drive voltage : 5 V  
 Temperature : 25 °C 77 °F  
 Applied pressure : 0 to +1,000 kPa



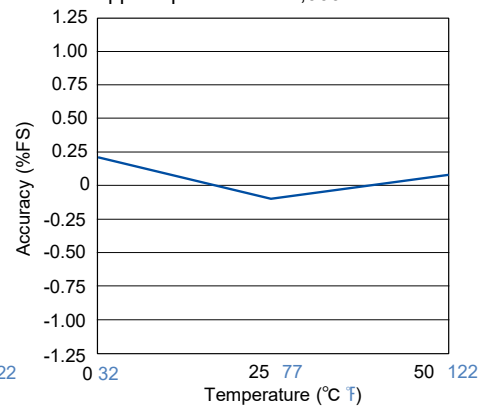
1. - ② Overall accuracy (Offset voltage)

(Representative example : ADP5170)  
 Drive voltage : 5 V  
 Temperature : 0 to 50 °C 32 to 122 °F  
 Applied pressure : 0 kPa



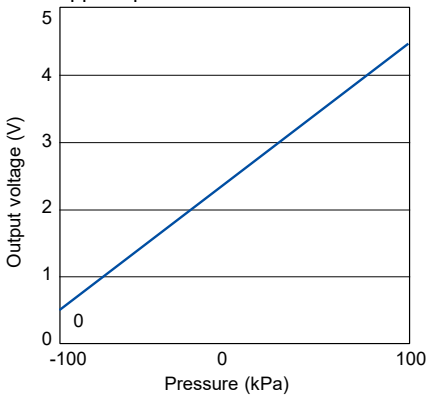
1. - ③ Overall accuracy (Rated output voltage)

(Representative example : ADP5170)  
 Drive voltage : 5 V  
 Temperature : 0 to 50 °C 32 to 122 °F  
 Applied pressure : +1,000 kPa



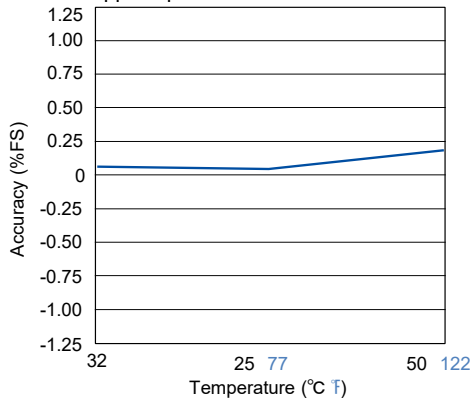
2. - ① Output voltage

(Representative example : ADP5100)  
 Drive voltage : 5 V  
 Temperature : 25 °C 77 °F  
 Applied pressure : -100 to +100 kPa



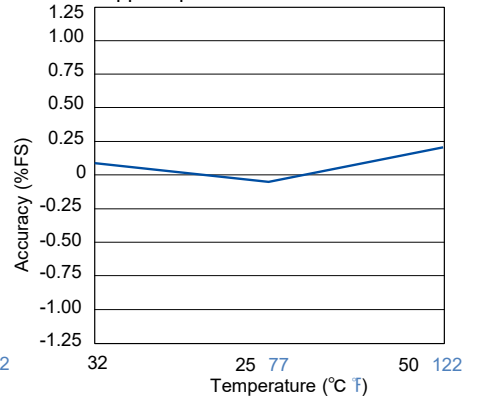
2. - ② Overall accuracy (Offset voltage)

(Representative example : ADP5100)  
 Drive voltage : 5 V  
 Temperature : 0 to 50 °C 32 to 122 °F  
 Applied pressure : 0 kPa



2. - ③ Overall accuracy (Rated output voltage)

(Representative example : ADP5100)  
 Drive voltage : 5 V  
 Temperature : 0 to 50 °C 32 to 122 °F  
 Applied pressure : +100 kPa



Reference data

[Low pressure type]

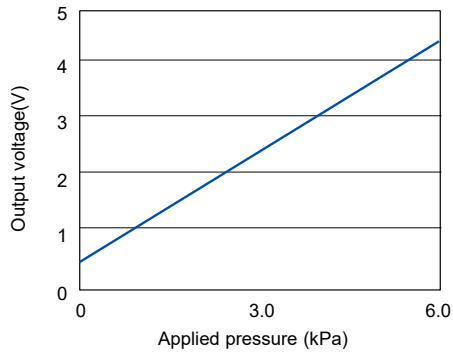
1. Output voltage

(ADP51B63)

Drive voltage : 5 V

Temperature : 25 °C 77 °F

Applied pressure : 0 to 6 kPa



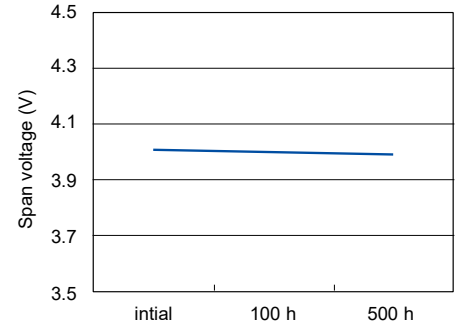
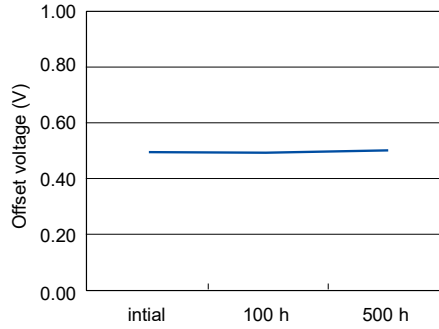
2. THB (high temperature high humidity bias test)

(ADP51B63)

Within 85 °C 185 °F and 85% RH

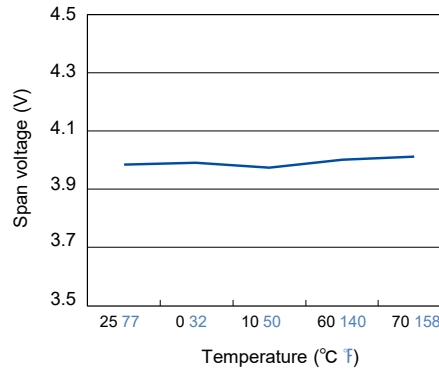
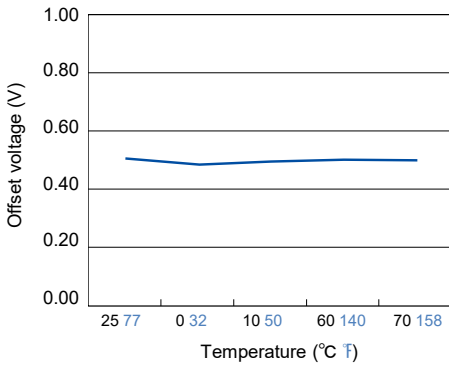
5 V applied between No.2 (Vdd) and No.3 (GND)

Applied pressure : 0 kPa



3. Ambient temperature characteristics (ADP51B63)

Ambient temperature : 25 °C 77 °F → 0 °C 32 °F → 10 °C 50 °F → 60 °C 140 °F → 70 °C 158 °F

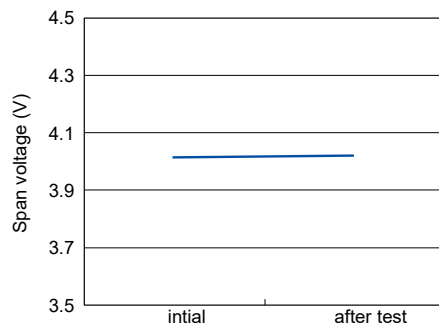
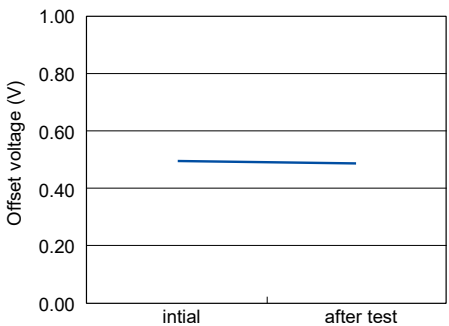


4. Shock test

(ADP51B63)

Shock applied (981 m/s<sup>2</sup>, 3 times in x, y and z directions)

Applied pressure : 0 kPa

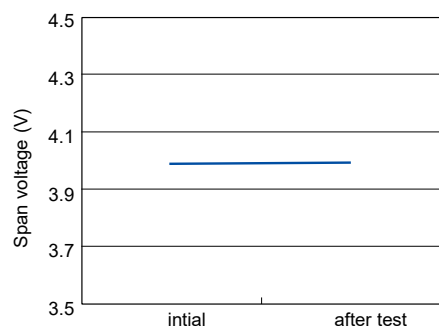
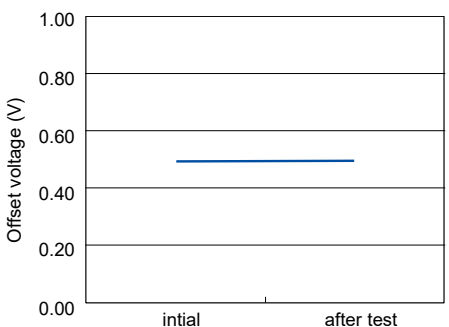


5. Vibration test

(ADP51B63)

Vibration applied (10 to 55 Hz, amplitude : 1.5mm, x, y and z directions, 2 hrs each)

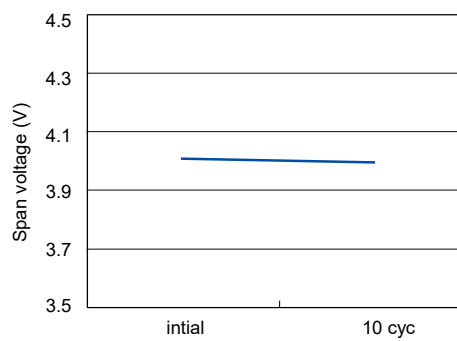
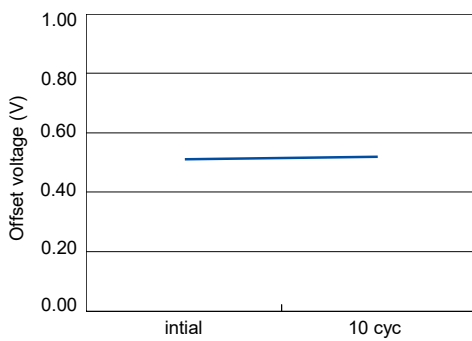
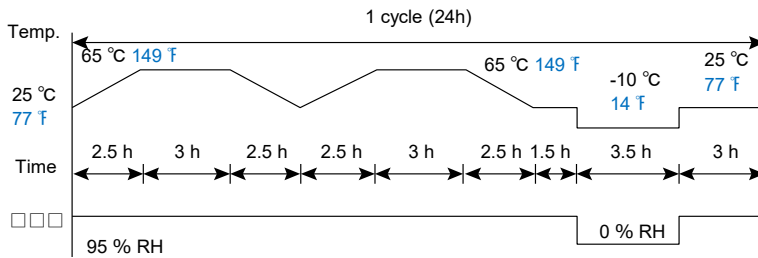
Applied pressure : 0 kPa



**Reference data**

6. Temperature/humidity cycle test  
(ADP51B63)

Exposed to 10 cycles in the temperature and humidity conditions given below.  
Applied pressure : 0 kPa



**Evaluation test**

| Classification                | Tested item                              | Tested condition   | Result |
|-------------------------------|--|--|--------|
| Environmental characteristics | Storage at high temperature              | Temperature : Left in a 85 °C 185 °F constant temperature bath<br>Time : 100 hrs   | Passed |
|                               | Storage at low temperature               | Temperature : Left in a -20 °C -4 °F constant temperature bath<br>Time : 100 hrs   | Passed |
|                               | Humidity                                 | Temperature/humidity : Left at 40 °C 104 °F, 90 % RH<br>Time : 100 時間  | Passed |
|                               | Temperature cycle                        | Temperature : -20 °C to 85 °C -4 °F to 185 °F<br>1 cycle : 30 min<br>Times of cycle : 100 cycle  | Passed |
| Endurance characteristics     | High temperature/high humidity operation | Temperature/humidity : 40 °C 104 °F, 90% RH<br>Operation times : 10 <sup>6</sup> , rated voltage applied                                   | Passed |
| Mechanical characteristics    | Vibration resistance                     | Double amplitude : 1.5 mm 0.059 inch<br>Vibration : 10 to 55 Hz<br>Applied vibration direction : X, Y, Z 3 directions<br>Time : 2 hrs each | Passed |
|                               | Dropping resistance                      | Dropping height : 75 cm 29.528 inch<br>Times : 2 times   | Passed |
|                               | Terminal strength                        | Pulling strength : 9.8 N {1 kgf}, 10 sec<br>Bending strength : 4.9 N {0.5 kgf}, left and right 90 ° 1 time                                 | Passed |
| Soldering characteristics     | Solderability                            | Temperature : 230 °C 446 °F<br>Time : 5 sec  | Passed |
|                               | Heat resistance (DIP)                    | Temperature : 260 °C 500 °F<br>Time : 10 sec   | Passed |

Note: For details other than listed above, please consult us.

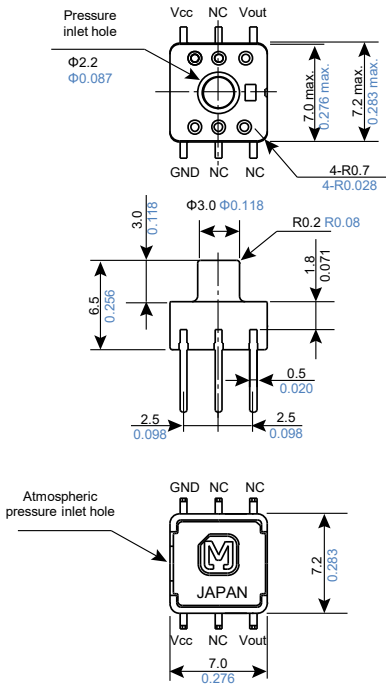
| Items               | Criteria                 |
|---------------------|--------------------------|
| Offset voltage      | Variation amount         |
| Output span voltage | within ±2.5 %FS of value |

Dimensions

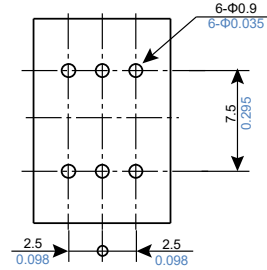
The CAD data of the products with a **CAD data** mark can be downloaded from: <http://industrial.panasonic.com/>

- Standard type S package (Terminal direction : DIP terminal Pressure inlet hole length : 3 mm 0.118 inch) ADP51□0

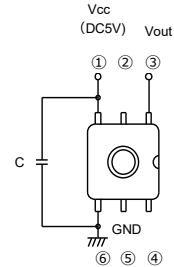
CAD data



Recommended PC board pattern (TOP VIEW)



Terminal connection diagram



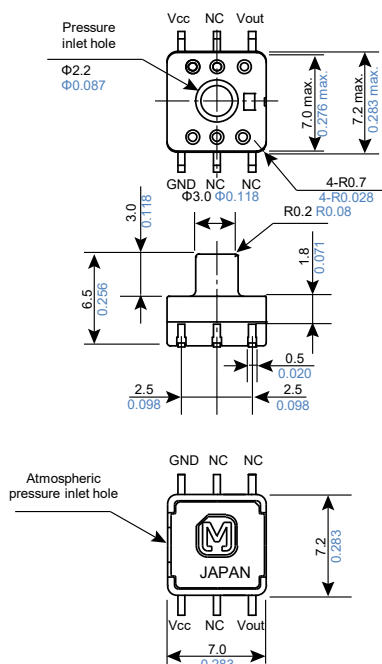
| Terminal No. | Name                 |
|--------------|----------------------|
| 1            | Vcc (Power supply ⊕) |
| 2            | NC (No connection)   |
| 3            | Vout (Output)        |
| 4            | NC (No connection)   |
| 5            | NC (No connection)   |
| 6            | GND (Ground)         |

Note: leave terminal "No connection" unconnected.

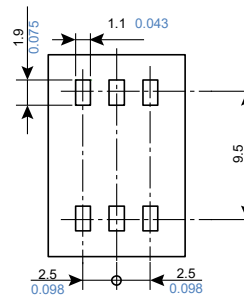
Unit : mm inch, General tolerance  $\pm 0.3 \pm 0.012$

- Standard type S package (Terminal direction : SMD terminal Pressure inlet hole length : 3 mm 0.118 inch) ADP52□0

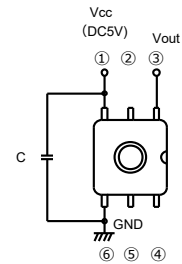
CAD data



Recommended PC board pattern (TOP VIEW)



Terminal connection diagram



| Terminal No. | Name                 |
|--------------|----------------------|
| 1            | Vcc (Power supply ⊕) |
| 2            | NC (No connection)   |
| 3            | Vout (Output)        |
| 4            | NC (No connection)   |
| 5            | NC (No connection)   |
| 6            | GND (Ground)         |

Note: leave terminal "No connection" unconnected.

Unit : mm inch, General tolerance  $\pm 0.3 \pm 0.012$

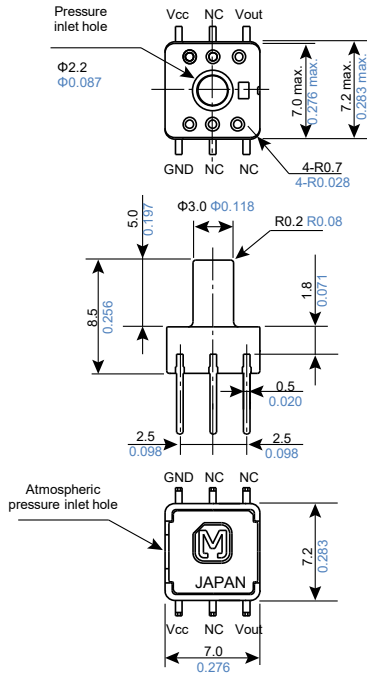
**Dimensions**

The CAD data of the products with a **CAD data** mark can be downloaded from: <http://industrial.panasonic.com/>

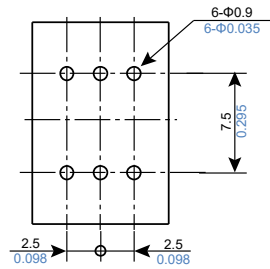
- Standard/Economy type M package (Terminal direction : DIP terminal Pressure inlet hole length : 5 mm 0.197 inch) ADP51□1

ADP51□1/ADP51A11

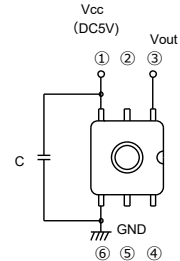
**CAD data**



Recommended PC board pattern (TOP VIEW)



Terminal connection diagram



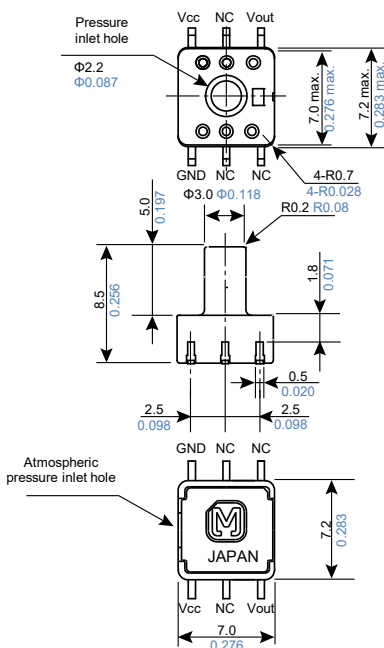
| Terminal No. | Name                 |
|--------------|----------------------|
| 1            | Vcc (Power supply ⊕) |
| 2            | NC (No connection)   |
| 3            | Vout (Output)        |
| 4            | NC (No connection)   |
| 5            | NC (No connection)   |
| 6            | GND (Ground)         |

Note: leave terminal "No connection" unconnected.

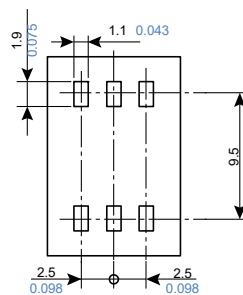
Unit : mm inch, General tolerance  $\pm 0.3 \pm 0.012$

- Standard/Economy type M package (Terminal direction : SMD terminal Pressure inlet hole length : 5 mm 0.197 inch) ADP52□1

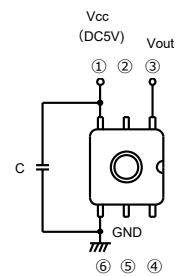
**CAD data**



Recommended PC board pattern (TOP VIEW)



Terminal connection diagram



| Terminal No. | Name                 |
|--------------|----------------------|
| 1            | Vcc (Power supply ⊕) |
| 2            | NC (No connection)   |
| 3            | Vout (Output)        |
| 4            | NC (No connection)   |
| 5            | NC (No connection)   |
| 6            | GND (Ground)         |

Note: leave terminal "No connection" unconnected.

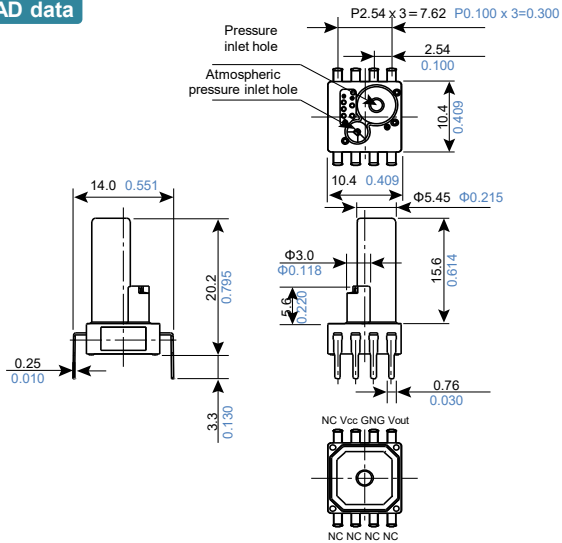
Unit : mm inch, General tolerance  $\pm 0.3 \pm 0.012$

Dimensions

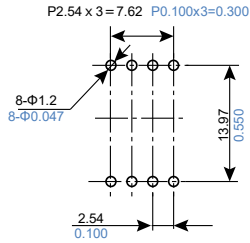
The CAD data of the products with a **CAD data** mark can be downloaded from: <http://industrial.panasonic.com/>

- Low pressure type P package (Terminal direction : DIP terminal, Pressure inlet hole length : 15.6 mm 0.614 inch) ADP51B63

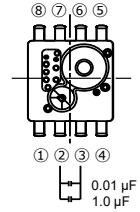
CAD data



Recommended PC board pattern (BOTTOM VIEW)



Terminal connection diagram



Unit : mm inch, General tolerance  $\pm 0.3 \pm 0.012$

| Terminal No. | Name                             |
|--------------|----------------------------------|
| 1            | NC (No connection)               |
| 2            | Vcc (Power supply <sup>Ⓢ</sup> ) |
| 3            | GND (Ground)                     |
| 4            | Vout (Output)                    |

| Terminal No. | Name               |
|--------------|--------------------|
| 5            | NC (No connection) |
| 6            | NC (No connection) |
| 7            | NC (No connection) |
| 8            | NC (No connection) |

Note: leave terminal "No connection" unconnected.



## Explanation of terms

### ■ Pressure object

This is what can be used to activate the pressure sensor.  
(The Panasonic Corporation pressure sensor can be used with gas.)

### ■ Rated pressure

The pressure value up to which the specifications of the pressure sensor are guaranteed.

### ■ Maximum applied pressure

The maximum pressure that can be applied to the pressure sensor, after which, when the pressure is returned to below the rated pressure range, the specifications of the pressure sensor are guaranteed.

### ■ Temperature compensation range

The temperature range across which the specification values of the pressure sensor are guaranteed.

### ■ Drive current (voltage)

The supply current (voltage) required to drive a pressure sensor.

### ■ Output span voltage

The difference between the rated output voltage and the offset voltage. The output span voltage is also called the full-scale voltage (FS).

### ■ Offset voltage

The output voltage of a pressure sensor when no pressure is applied.

### ■ Rated pressure output voltage

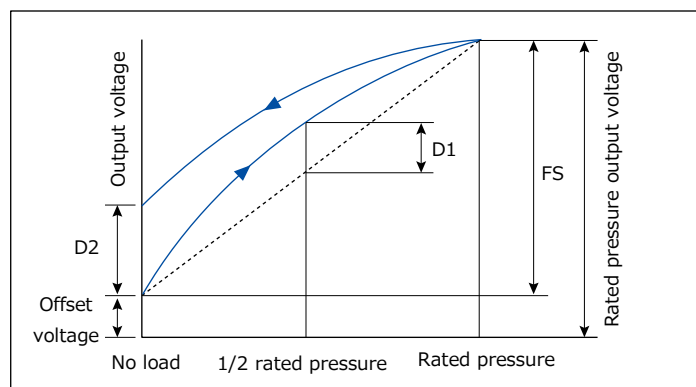
Output voltage when rated pressure is applied.

### ■ Linearity

When the pressure is varied from no load to the rated pressure, the linearity is the amount of shift between the straight line that joins the no-load voltage value and the rated pressure voltage value (expressed as the ratio of the amount of shift (D1) at half of the rated pressure value with respect to the full scale voltage (FS)).

### ■ Output hysteresis

The ratio of the difference (D2) in the no-load output voltages when the pressure is varied from no load to the rated pressure then reduced back to no load, with respect to the full scale voltage (FS).



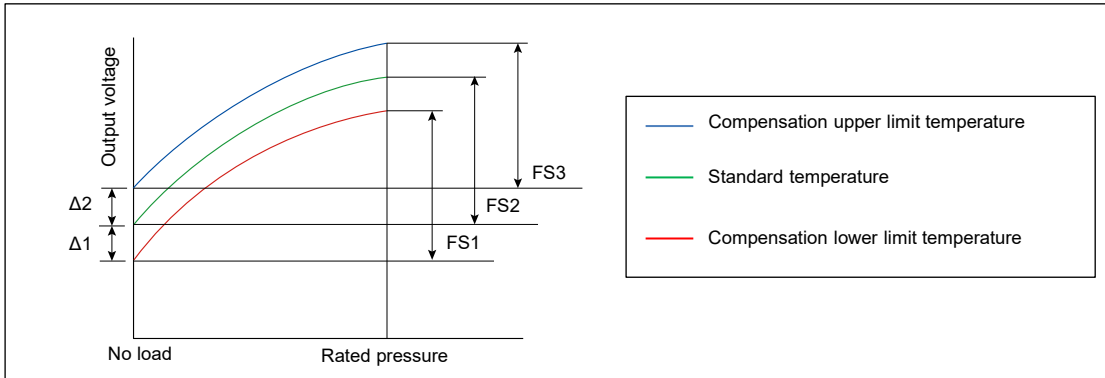
### ■ Offset voltage temperature characteristic

The variation of the offset voltage with changes in ambient temperature. The difference between the offset voltage at the standard temperature and the offset values at the compensation lower limit temperature (low temperature) (D1) and compensation upper limit temperature (high temperature) (D2) are obtained, and the offset voltage temperature characteristic is expressed as the ratio of the larger of these two differences (absolute) with respect to the full scale voltage (FS).

**Explanation of terms**

■ **Temperature sensitivity characteristic**

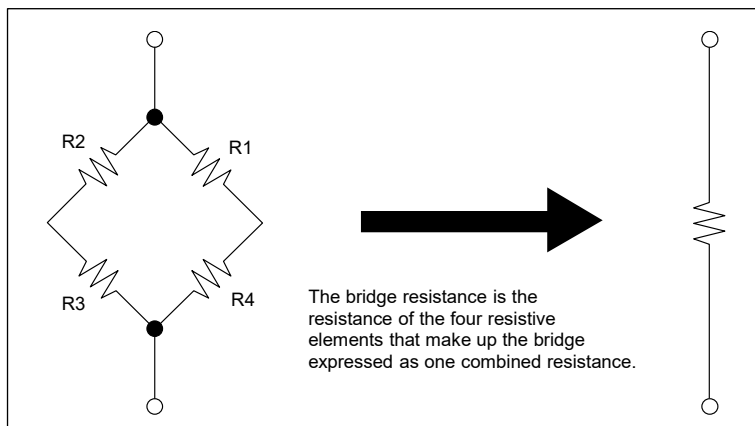
The variation of the sensitivity with changes in ambient temperature (variation in full scale (FS)). The difference between the full scale voltage at the standard temperature (FS) and the full scale values at the compensation lower limit temperature (low temperature) (FS1) and compensation upper limit temperature (high temperature) (FS2) are obtained, and the offset voltage temperature characteristic is expressed as the ratio of the larger of these two differences (FS1 - FS and FS2 - FS (absolute)) with respect to the full scale voltage (FS).



■ **Bridge resistance**

Refers to the resistance value of a piezo resistance formed on a monolithic silicon substrate. For example, the values of the resistances R1 to R4 in the bridge are typically 5 kΩ each.

\* When the resistances of the resistive elements R1 to R4 that comprise the bridge are 5 kΩ each, the equivalent composite resistance of the bridge is 5kΩ (3 kΩ bridges are also available).



■ **Overall accuracy**

Accuracy of offset voltage and rated pressure output voltage within the temperature compensation range.

**Guidelines and precautions regarding the technical information and use of our products described in this online catalog.**

- If you want to use our products described in this online catalog for applications requiring special qualities or reliability, or for applications where the failure or malfunction of the products may directly jeopardize human life or potentially cause personal injury (e.g. aircraft and aerospace equipment, traffic and transportation equipment, combustion equipment, medical equipment, accident prevention, anti-crime equipment, and/or safety equipment), it is necessary to verify whether the specifications of our products fit to such applications. Please ensure that you will ask and check with our inquiry desk as to whether the specifications of our products fit to such applications use before you use our products.
- The quality and performance of our products as described in this online catalog only apply to our products when used in isolation. Therefore, please ensure you evaluate and verify our products under the specific circumstances in which our products are assembled in your own products and in which our products will actually be used.
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**<Regarding the Certificate of Compliance with the EU RoHS Directive/REACH Regulations>**

- The switchover date for compliance with the RoHS Directive/REACH Regulations varies depending on the part number or series of our products.
- When you use the inventory of our products for which it is unclear whether those products are compliant with the RoHS Directive/REACH Regulation, please select "Sales Inquiry" in the website inquiry form and contact us.

**Please note that we do not owe any liability and responsibility if our products are used beyond the description of this catalog or without complying with precautions in this catalog.**

## ! Application Guidelines (PS-A)

### 1. Mounting

Use the land of the printed-circuit board on which the sensor is securely fixed.

### 2. Soldering

Avoid the external thermal influence as the product has a limited thermal capacity due to its compact structure. Heat deformation may damage the sensor or deteriorate its performance. Use the non-corrosive rosin flux. Prevent the flux from entering into the inside of the product as the sensor is exposed to the atmosphere.

#### (1) Manual soldering

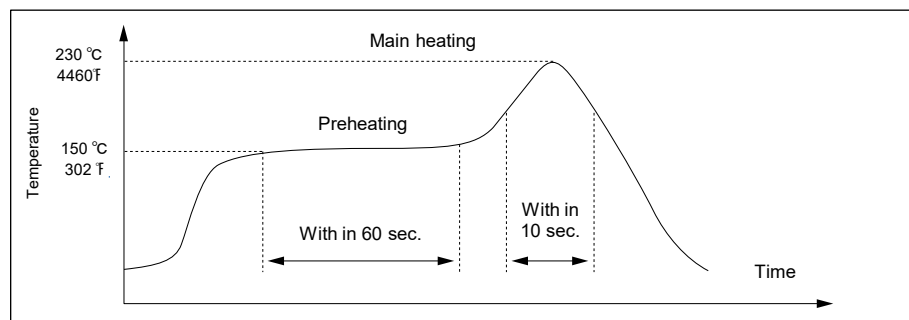
- Raise the temperature of the soldering tip between 260 and 300 °C 500 and 572 °F (30 W) and solder within 5 seconds.
- The sensor output may vary if the load is applied on the terminal during soldering.
- Keep the soldering tip clean.

#### (2) DIP soldering (DIP Terminal)

- Keep the temperature of the DIP solder tank below 260 °C 500 °F and solder within 5 seconds.
- To avoid heat deformation, do not perform DIP soldering when mounting on the circuit board which has a small thermal capacity.

#### (3) Reflow soldering (SMD Terminal)

- The recommended reflow temperature profile conditions are given below.



- We recommend the screen solder printing method as the method of cream.
  - Please refer to the recommended PC board specification diagram for the PC board foot pattern.
  - Self alignment may not always work as expected, therefore, please carefully the position of the terminals and pattern.
  - The temperature of the profile is assumed to be a value measured with the printed wiring board of the terminal neighborhood.
  - Please evaluate solderability under the actual mounting conditions since welding and deformation of the pressure inlet port may occur due to heat stress depending on equipments or conditions.
- (4) Rework soldering
- Complete rework at a time.
  - Use a flattened soldering tip when performing rework on the solder bridge. Do not add the flux.
  - Keep the soldering tip below the temperature described in the specifications.
- (5) Avoid drop and rough handling as excessive force may deform the terminal and damage soldering
- (6) Keep the circuit board warpage within 0.05 mm of the full width of the sensor.
- (7) After soldering, do not apply stress on the soldered part when cutting or bending the circuit board.
- (8) Prevent human hands or metal pieces from contacting with the sensor terminal.  
Such contact may cause anomalous outlets as the terminal is exposed to the atmosphere.
- (9) After soldering, prevent chemical agents from adhering to the sensor when applying coating to avoid insulation deterioration of the circuit board.
- (10) Please consult us concerning leadfree soldering.

### 3. Wire connection

- (1) Correctly wire as in the connection diagram. Reverse connection may damage the product and degrade the performance.
- (2) Do not use idle terminals to prevent damages to the sensor.

## 4. Cleaning

- (1) Prevent cleaning liquid from entering the inside of the product as the sensor is exposed to the atmosphere.
- (2) Do not perform ultrasonic cleaning in order to prevent damages to the product.

## 5. Environment

- (1) Avoid use and storage in the corrosive gas (organic solvent, sulfurous acid and hydrogen sulfide gases) which negatively affects the product.
- (2) Install the capacitor on the power supply terminal of the sensor and stabilize supply voltage to maintain a superimposed noise resistance. Recommended installation is to arrange 0.1  $\mu$ F and 1,000 pF in parallel. Before use, check the noise resistance and select/add the optimal capacitor.
- (3) Use surge absorbers as applying the external surge voltage may damage the internal circuit.
- (4) Malfunction may occur near electric noises from static electricity, lightning, broadcast or amateur radio stations and mobile phones
- (5) Avoid use in a place where these products come in contact with water as the sensor does not have a splash proof construction.
- (6) Avoid use in an environment where these products cause dew condensation. When water attached to the sensor chip freezes, the sensor output may be fluctuated or damaged.
- (7) Due to the structure of the pressure sensor chip, the output varies under light. Do not expose the sensor chip to light when applying a voltage by using a transparent tube.
- (8) Do not apply high-frequency oscillation, such as ultrasonic waves, to the product.

## 6. Quality check under actual use conditions

These specifications are for individual components. Before use, carefully check the performance and quality under actual use conditions to enhance stability.

## 7. Other precautions

- (1) The wrong mounting method and the pressure range may invite the risk of accidents.
- (2) Only applicable pressure medium is dry air. Avoid use in the corrosive gas (organic solvent, sulfurous acid and hydrogen sulfide gases) or other mediums containing moisture or foreign substances. Such mediums may damage or break the product.
- (3) The pressure sensor chip is located inside the pressure introduction port. Do not insert foreign substances, such as wires, into the port as those substances may damage the chip and close the port. Do not block the atmosphere introduction port.
- (4) Use electric power within the rated power range. Use beyond the range may damage the product.
- (5) Follow below instructions as static electricity may damage the product.
  - For Storage, short the circuit between terminals by using conductive substances or wrap the whole chip with aluminum foil. For storage and transportation, avoid plastic containers which are easily electrified.
  - Before use, connect electrified materials on desk and operators to the ground in order to safely discharge static electricity.
- (6) Carefully select and fix tubes, introduction pipes and products based on the working voltage. Please contact us for any inquires.
- (7) After mounding the pressure sensor, prevent the potting agent from entering the pressure and the atmosphere introduction ports when coating the circuit board. Use the elastic resin as the heated resin may expand, contract and apply pressure to the sensor. After coating, carefully check if the sensor can be used.