**BPS125 Series - 12 mm Digital Low Pressure Sensor**

### Electrical Characteristics

<table>
<thead>
<tr>
<th>Specification</th>
<th>Specification Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage ($V_s$)</td>
<td>3.0 V minimum, 3.3 V typical, 3.6 V maximum</td>
</tr>
<tr>
<td>Supply Current @ 3.3 V</td>
<td>1.2 mA minimum, 2 mA typical, 3.5 mA maximum</td>
</tr>
</tbody>
</table>

### Performance Characteristics

- **Operating Temperature**: -40 °C to +85 °C (-40 °F to +185 °F)
- **Storage Temperature**: -55 °C to +100 °C (-67 °F to +212 °F)
- **Effective ADC Resolution**: 13 bit
- **Accuracy @ 25 °C**: ±0.5 % FS
- **Total Error Band over 0 °C to 60 °C (+32 °F to +140 °F)**: ± 1.5 % FS
- **Startup Time**: 15 ms maximum
- **Digital Update Time**: 8.5 ms typical
- **Proof Pressure**: 5X full scale pressure
- **Burst Pressure**: 10 psi
- **Supply Voltage ($V_s$)**: 3.0 V minimum, 3.3 V typical, 3.6 V maximum

**Note**: Power supply decoupling included.

### Transfer Function Formula

$$ P_{psi} = \left( P_{\text{counts}} - 0.1 \cdot \frac{\text{Max}}{0.8} \right) \cdot P_{\text{min}} $$

**Where**

- $P_{psi}$ = Measured Pressure in PSI
- $P_{\text{counts}}$ = Pressure Counts
- $P_{\text{min}}$ = Minimum Pressure
- $P_{\text{max}}$ = Maximum Pressure
- Max = 16384 = 14 Bits

Consult factory for custom options such as supply voltage, temperature calibration range, output range accuracy specification, and update rate.

### Additional Information

Click these links for more information:
- [PRODUCT](#)
- [TECHNICAL LIBRARY](#)
- [INVENTORY](#)
- [SAMPLES](#)
- [CONTACT](#)

### Features

- 3.3 volt supply
- Compensated digital output (I2C)
- Ultra-low pressure sensing (250 Pa)
- Gauge and differential types
- For use in clean, dry air and non-corrosive gas environments
- RoHS compliant

### Applications

- Industrial:
  - HVAC systems
  - Process monitoring
  - Packaging automation
- "Medical Devices (low/medium risk)"
- Diagnostic equipment
- Analysis equipment

**Specifications are subject to change without notice.**

Users should verify actual device performance in their specific applications.

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**WARNING** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

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**BPS125 Series - 12 mm Digital Low Pressure Sensor**

### I2C Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCL Clock Frequency fSCL</td>
<td>100 to 400 kHz</td>
</tr>
<tr>
<td>Start Condition Hold Time Relative to SCL Edge tHDSTA</td>
<td>0.1 µs</td>
</tr>
<tr>
<td>Minimum SCL Clock Low Width1 tLOW</td>
<td>0.6 µs</td>
</tr>
<tr>
<td>Minimum SCL Clock High Width1 tHIGH</td>
<td>0.6 µs</td>
</tr>
<tr>
<td>Start Condition Setup Time Relative to SCL Edge tSUSTA</td>
<td>0.1 µs</td>
</tr>
<tr>
<td>Data Hold Time on SDA Relative to SCL Edge tHDDAT</td>
<td>0.0 µs</td>
</tr>
<tr>
<td>Stop Condition Setup Time on SCL tSUSTO</td>
<td>0.1 µs</td>
</tr>
<tr>
<td>Bus Free Time Between Stop Condition and Start Condition tBUS</td>
<td>2 µs</td>
</tr>
</tbody>
</table>

1 Combined low and high widths must equal or exceed minimum SCLK period.

### I2C Communication

Communication to the Model BPS125 is read only. To read the pressure counts, the master performs a read request by asserting a start condition, sending the 7-bit address of the part (0x28), and sets the read/write bit. The master then waits for an acknowledgement. The acknowledgement is sent by the pressure sensor along with 2 bits of status and bits 13:8 of the pressure counts, the master acknowledges the first 8 bits, and the pressure sensor sends the remaining 8 bits of data. The master then does not acknowledge and sends a stop condition, signaling the end of the transaction.

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# BPS125 Series - 12 mm Digital Low Pressure Sensor

## Cross Section

![Cross Section Diagram](image)

MEMS Sensing Element (Differential Pressure)

Cover/Mechanical Protection

Soft Die Attach Material

Integrated Signal Conditioning (ASIC)

Filter Capacitor

Media Inlet Ports

Electrical Connections

## Terminal Assignment

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>V&lt;sub&gt;S&lt;/sub&gt;</td>
</tr>
<tr>
<td>P2</td>
<td>N/C</td>
</tr>
<tr>
<td>P3</td>
<td>N/C</td>
</tr>
<tr>
<td>P4</td>
<td>VSS - Ground</td>
</tr>
<tr>
<td>P5</td>
<td>N/C</td>
</tr>
<tr>
<td>P6</td>
<td>N/C</td>
</tr>
<tr>
<td>P7</td>
<td>SDA - I&lt;sup&gt;2&lt;/sup&gt;C Data</td>
</tr>
<tr>
<td>P8</td>
<td>SCL - I&lt;sup&gt;2&lt;/sup&gt;C Clock</td>
</tr>
</tbody>
</table>

## Product Dimensions

- **Dimensions:**
  - MEMS Sensing Element: 12.7 (0.500) mm
  - Cover/Mechanical Protection: 3.6 (0.142) mm
  - Soft Die Attach Material: 2.2 (0.087) mm
  - Integrated Signal Conditioning (ASIC): 2.2 (0.087) mm
  - Filter Capacitor: 2.5 (0.098) mm
  - Media Inlet Ports: 3.6 (0.142) mm
  - Electrical Connections: 10.2 (0.402) mm
  - DIMENSIONS: MM (INCHES)
  - TOLERANCES: 0.3 (0.012)

- **SMT LANDING PAD LAYOUT**
  - SMT LANDING PAD LAYOUT: 1.9 (0.075) mm
  - 2.5 (0.098) mm
  - 2.5 (0.098) mm
  - 2.5 (0.098) mm

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### BPS125 Series - 12 mm Digital Low Pressure Sensor

#### How To Order

<table>
<thead>
<tr>
<th>Model Series</th>
<th>Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media Compatibility</td>
<td>A = Air/Gas</td>
</tr>
<tr>
<td>Pressure Type</td>
<td>G = Gauge, D = Differential</td>
</tr>
<tr>
<td>Pressure</td>
<td>0P04 = 250 Pa, 0P07 = 500 Pa, 0P15 = 0.15 PSI, 0P30 = 0.30 PSI, 01P0 = 1.0 PSI</td>
</tr>
<tr>
<td>Terminal Pins</td>
<td>2 = Surface Mount Terminals</td>
</tr>
<tr>
<td>Port Style</td>
<td>D = Dual Port, Horizontal</td>
</tr>
<tr>
<td>Packaging Designator</td>
<td>G = 250 pcs. per 13-inch Reel</td>
</tr>
</tbody>
</table>

#### Solder Profile

![Solder Profile Diagram](#)

**Notes:**
1. No clean solder paste is recommended.
2. Aqueous wash is not recommended.
3. Use of water soluble soldering flux should be avoided due to possible corrosion.
4. Multiple passes through the soldering process is not recommended.
5. Other SMD processes and profiles should be verified by the customer.

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Packaging Specification

250 pieces per 13-inch reel. 
Meets specifications of EIA-481-1 or EIA-481-2.
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