

Features

- Compensated digital output
- Ultra-low pressure sensing
- Digital I²C output
- 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

BPS120 Series - 12 mm Digital Low Pressure Sensor

Electrical Characteristics

| | |
|----------------------------------|--|
| Supply Voltage (V _s) | 2.7 V minimum, 5 V typical, 5.5 V maximum |
| Supply Current @ 5 V | 1.2 mA minimum, 2 mA typical, 3.5 mA maximum |

Performance Characteristics

| | |
|---|--|
| Operating Temperature | -40 °C to +85 °C (-40 °F to +185 °F) |
| Storage Temperature | -55 °C to +100 °C (-67 °C to +212 °F) |
| Pressure Range | 0.15 to 1.0 psi (10.3 to 68.9 mbar; 1.03 to 6.89 KPa; 4.2 to 27.7 in H ₂ O) |
| Output | Digital I ² C (1) |
| Effective ADC Resolution | 13 bit |
| Accuracy @ 25 °C | ±0.25 % FS |
| Total Error Band over 0 °C to 60 °C (+32 °F to +140 °F) | ±1.5 % FS |
| Long Term Stability | ±0.5 % FS |
| Startup Time | 15 ms maximum |
| Digital Update Time | 8.5 ms typical |
| Proof Pressure | 5X full scale pressure |
| Burst Pressure | 10 psi |

(1) I²C address is set to (0x28). Alternative addresses are available. Consult the factory for custom options.

Product Characteristics

| | |
|----------------------------|---|
| Media Compatibility | Non-corrosive dry gasses |
| Moisture Sensitivity Level | 1 |
| ESD Classification (HBM) | 2 kV |
| Marking | Partial model number, media compatibility, pressure type, pressure rating, lot code |
| Standard Packaging | 250 pcs./13-inch reel |
| Weight | 1.307 grams (0.046 oz) |

Transfer Function Formula

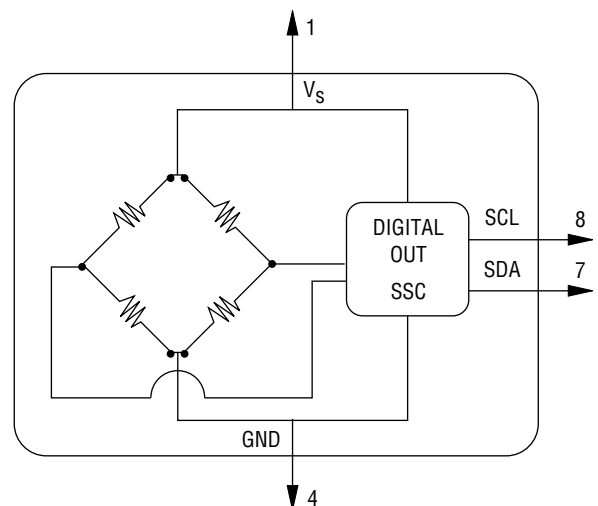
$$P_{\text{psi}} = (P_{\text{max}} - P_{\text{min}}) \cdot \left(\frac{P_{\text{counts}} - 0.1 \cdot \text{Max}}{0.8 \cdot \text{Max}} \right) + P_{\text{min}}$$

Where

| | |
|---------------------|----------------------------|
| P _{psi} | = Measured Pressure in PSI |
| P _{counts} | = Pressure Counts |
| P _{min} | = Minimum Pressure |
| P _{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.

Basic Circuit Schematic



Note: Power supply decoupling included.

* RoHS3 Directive 2015/863 Amendments of Annex II on March 31, 2015

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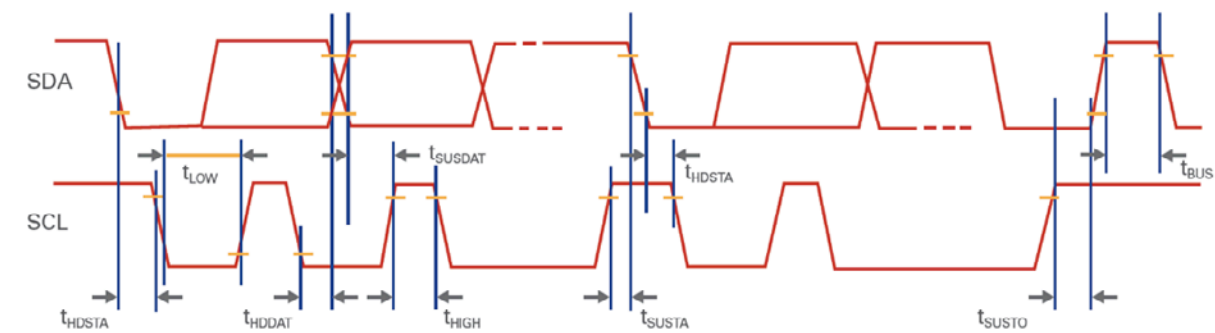
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I²C Parameters

| | |
|--|----------------|
| SCL Clock Frequency f_{SCL} | 100 to 400 kHz |
| Start Condition Hold Time Relative to SCL Edge t_{HDSTA} | 0.1 μ s |
| Minimum SCL Clock Low Width ¹ t_{LOW} | 0.6 μ s |
| Minimum SCL Clock High Width ¹ t_{HIGH} | 0.6 μ s |
| Start Condition Setup Time Relative to SCL Edge t_{SUSTA} | 0.1 μ s |
| Data Hold Time on SDA Relative to SCL Edge t_{HDDAT} | 0.0 μ s |
| Data Setup Time on SDA Relative to SCL Edge t_{SUDAT} | 0.1 μ s |
| Stop Condition Setup Time on SCL t_{SUSTO} | 0.1 μ s |
| Bus Free Time Between Stop Condition and Start Condition t_{BUS} | 2 μ s |

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

I²C Parameters



Used by permission, ZMDI

I²C Communication

Communication to the Model BPS120 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.



| | | | | | | | | |
|----|--------------------|----|----------------------|---|--------------------|-------------|---|-------------------------------|
| S | Start Conditioning | # | Device Slave Address | # | Data Bit | Status Bits | | |
| | | | | | | 0 | 0 | Normal Operation, Good Packet |
| RW | Read/Write Bit | A | Acknowledge Bit | N | No Acknowledge Bit | 0 | 1 | Device in Command Mode |
| | | | | | | 1 | 0 | Stale Data |
| ST | Stop Condition | SB | Status Bits | | | 1 | 1 | Diagnostic Condition Exists |

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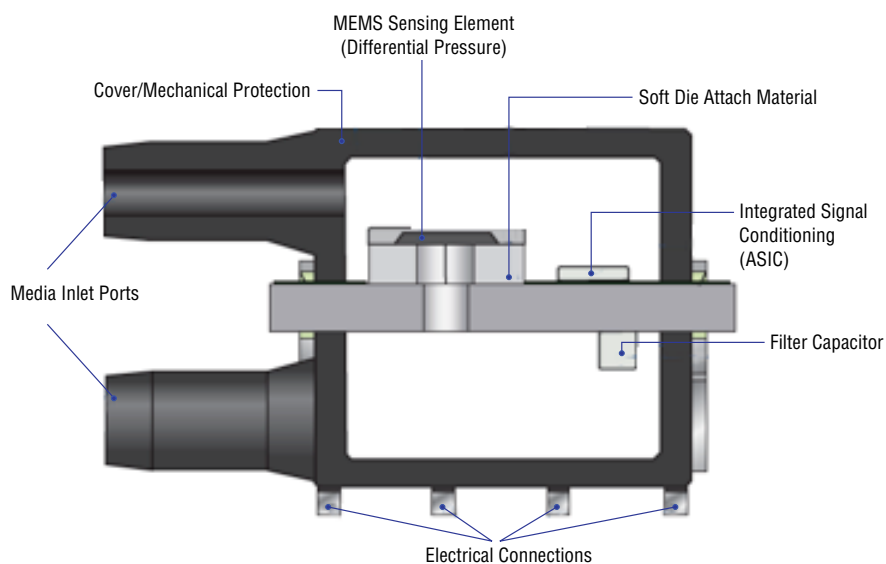
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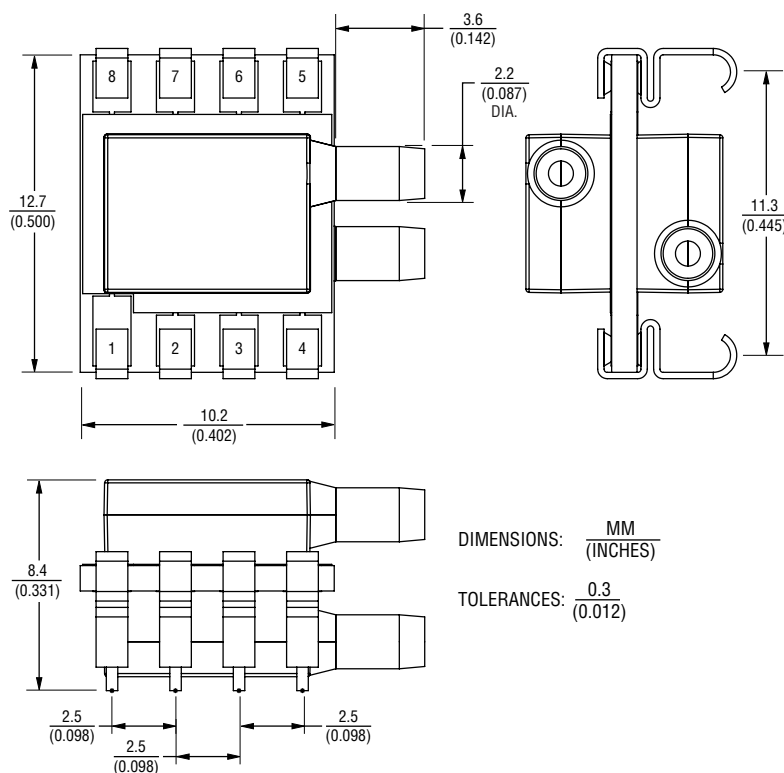
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Cross Section



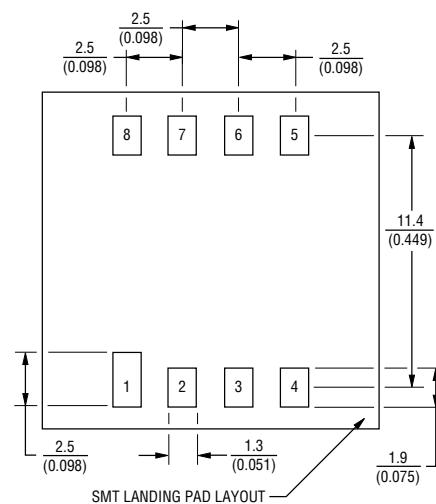
Product Dimensions



Terminal Assignment

| DEVICE PINOUT | |
|---------------|------------------------------|
| P1 | V _s |
| P2 | N/C |
| P3 | N/C |
| P4 | VSS - Ground |
| P5 | N/C |
| P6 | N/C |
| P7 | SDA - I ² C Data |
| P8 | SCL - I ² C Clock |

Recommended PCB Layout



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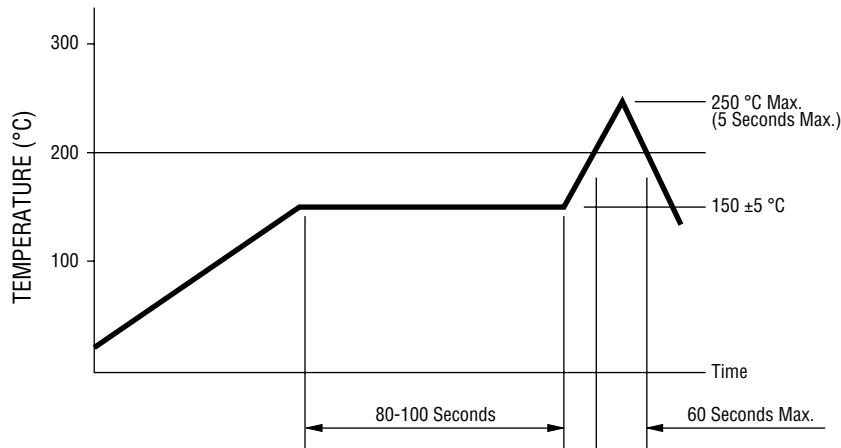
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How To Order

BPS120 - A D 0P30 - 2 D G

| | | | | | | | | | | |
|-------------------------------|-------|--------|---|---|---|------|---|---|---|---|
| Model Series | _____ | BPS120 | - | A | D | 0P30 | - | 2 | D | G |
| Digital | _____ | | | | | | | | | |
| Media Compatibility | _____ | | | | | | | | | |
| A = Air/Gas | _____ | | | | | | | | | |
| Pressure Type | _____ | | | | | | | | | |
| G = Gauge | _____ | | | | | | | | | |
| D = Differential | _____ | | | | | | | | | |
| Pressure (psi) | _____ | | | | | | | | | |
| 0P15 = 0.15 | _____ | | | | | | | | | |
| 0P30 = 0.30 | _____ | | | | | | | | | |
| 01P0 = 1.0 | _____ | | | | | | | | | |
| Terminal Pins | _____ | | | | | | | | | |
| 2 = Surface Mount Terminals | _____ | | | | | | | | | |
| Port Style | _____ | | | | | | | | | |
| D = Dual Port, Horizontal | _____ | | | | | | | | | |
| Packaging Designator | _____ | | | | | | | | | |
| G = 250 pcs. per 13-inch Reel | _____ | | | | | | | | | |

Solder Profile



Processing Method: Reflow soldering with infrared heat or forced air convection (only once).

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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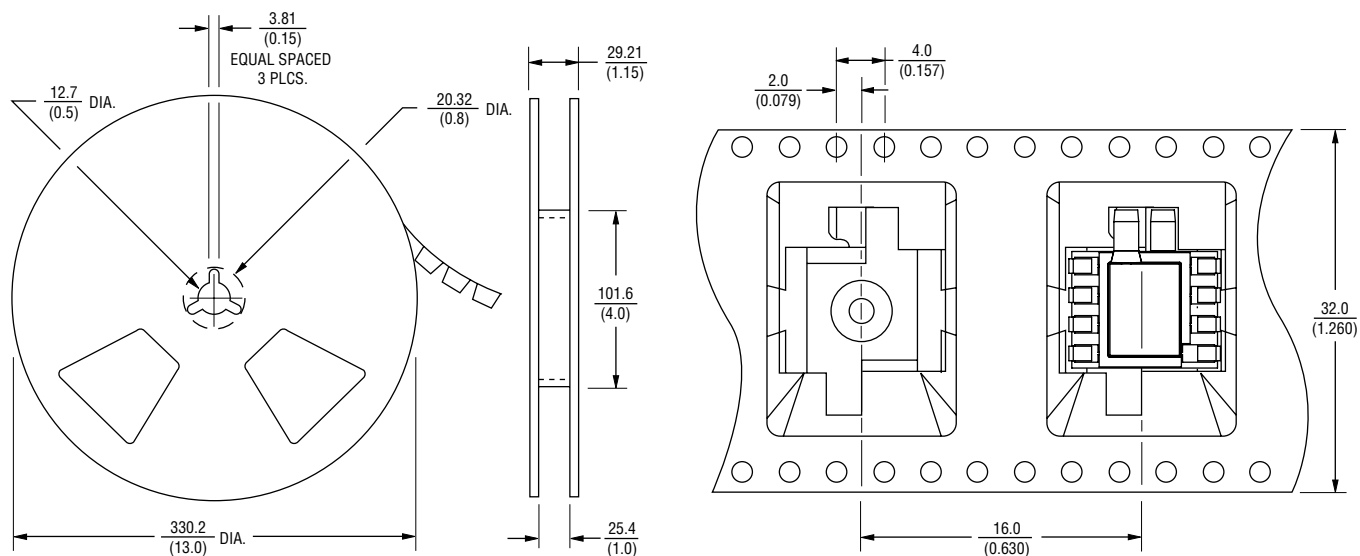
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Packaging Specification

250 pieces per 13-inch reel.

Meets specifications of EIA-481-1 or EIA-481-2.



DIMENSIONS: $\frac{\text{MM}}{(\text{INCHES})}$

TOLERANCES: $\frac{0.25}{(0.010)}$

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