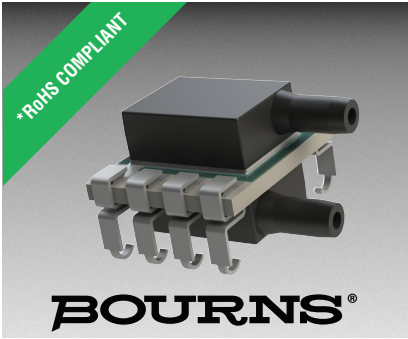


PRELIMINARY



Features

- Compensated digital output
- Ultra-low pressure sensing
- Digital I²C output
- Gage 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:
- 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
Effective ADC Resolution	13 bit
Ratiometric Output Range (V _{out})	0.5 V to 4.5 % V _s
Pressure Accuracy 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	2 ms minimum, 5 ms typical, 125 ms maximum
Proof Pressure	5X full scale pressure
Burst Pressure	10 psi

Product Characteristics

Media Compatibility	Non-corrosive dry gasses
Moisture Sensitivity Level	1
ESD Classification (HBM)	2 kV
Marking	B , model number, pressure, date code
Standard Packaging	250 pcs./13-inch reel
Weight	1.306 grams (0.046 oz)

Transfer Function Formula

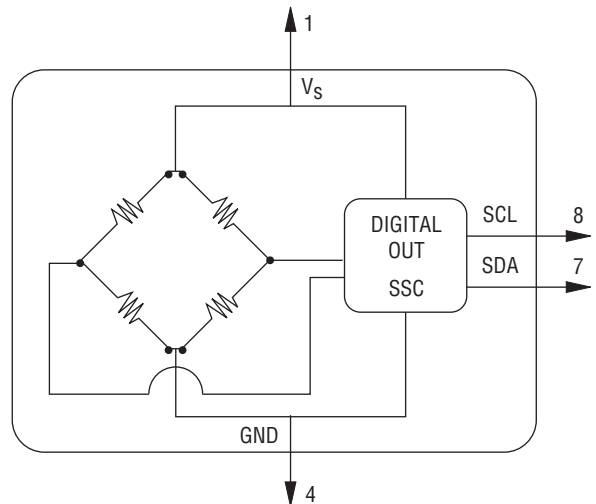
$$P_{\text{psi}} = (P_{\text{max}} - P_{\text{min}}) \cdot \left(\frac{P_{\text{counts}} - 0.1 \cdot \text{Max}}{0.8 \cdot \text{Max}} \right) + P_{\text{min}}$$

Where

- P_{psi} = Measured Pressure in PSI
- P_{counts} = Pressure Counts from Merit Sensor Part
- 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.

* RoHS Directive 2015/863, Mar 31, 2015 and Annex.

** Bourns® products have not been specifically designed and tested for FDA Class III applications and equivalent applications covered by other regulatory authority such as the European Council, and their use in such applications is neither recommended nor supported.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

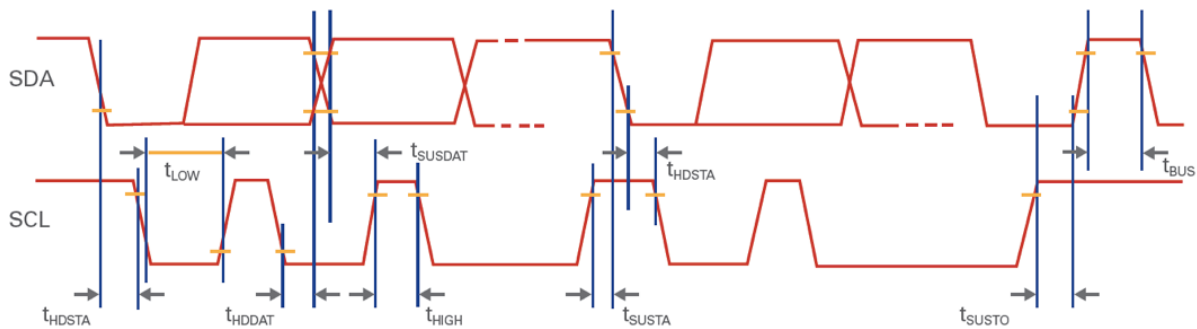
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I²C Parameters

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.

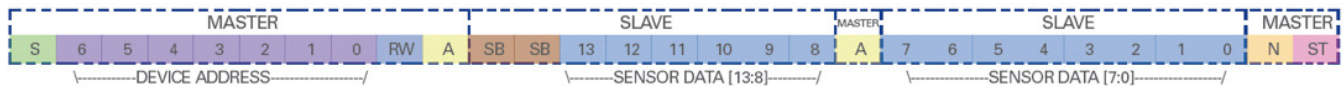
I²C Parameters



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 (if the part has an open address, 7 bits of anything is acceptable), 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	
RW Read/Write Bit	A Acknowledge Bit	N No Acknowledge Bit	0 0	Normal Operation, Good Packet
ST Stop Condition	SB Status Bits		0 1	Device in Command Mode
			1 0	Stale Data
			1 1	Diagnostic Condition Exists

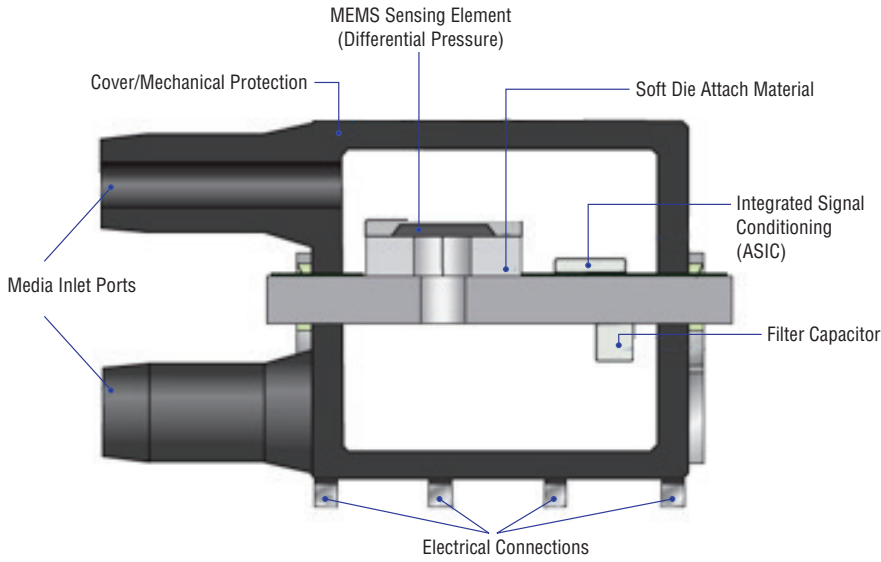
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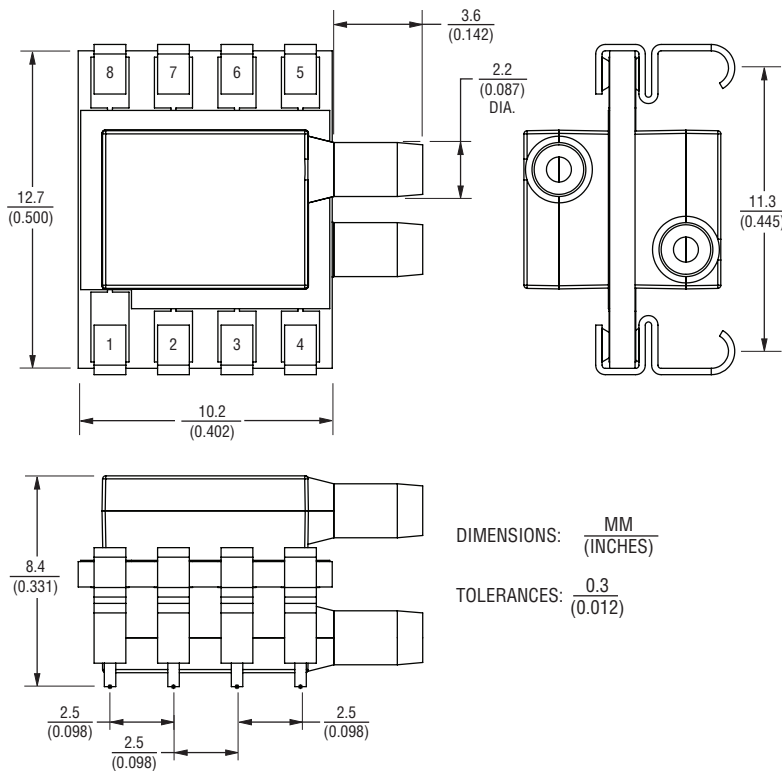
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BPS120 Series - 12 mm Digital Low Pressure Sensor

Cross Section



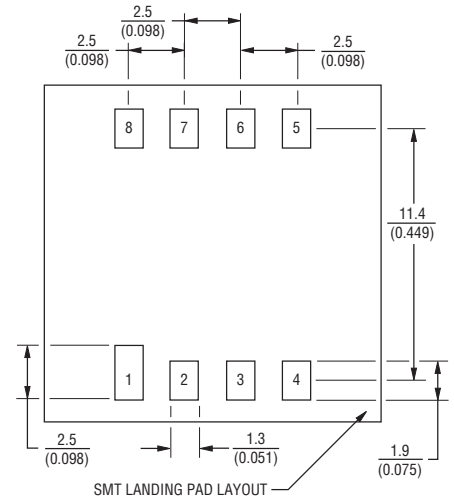
Product Dimensions



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



Specifications are subject to change without notice.

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BPS120 Series - 12 mm Digital Low Pressure Sensor

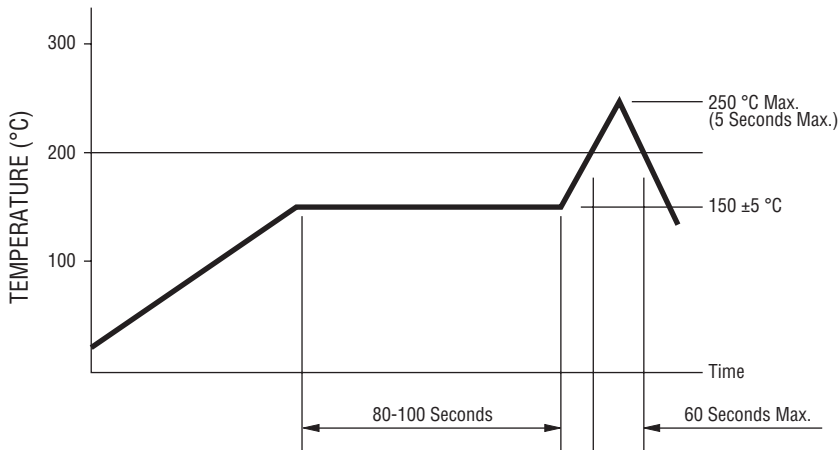
BOURNS®

How To Order

BPS120 - A D 0P30 - 2 D G

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

Specifications are subject to change without notice.

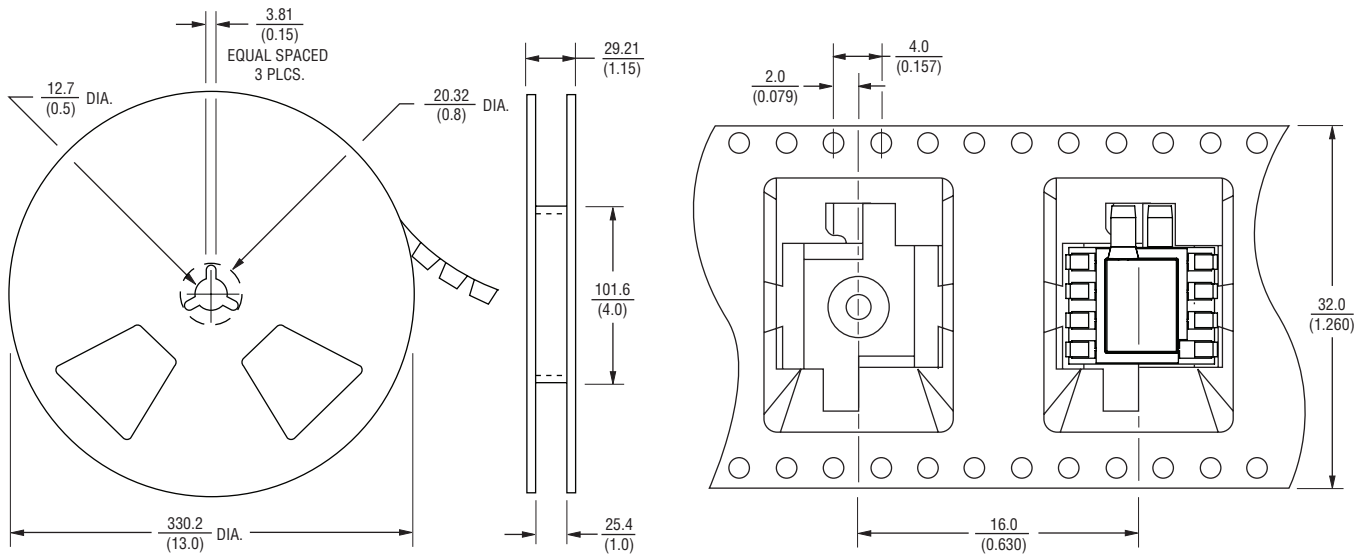
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BPS120 Series - 12 mm Digital Low Pressure Sensor

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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