MERIT SENSOR™

DATA SHEET

LP Series – Analog

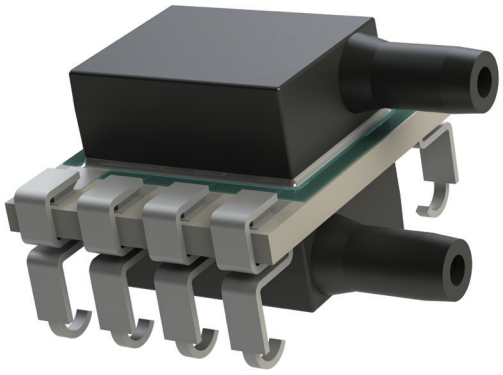
LP Series - Analog is a surface mountable pressure sensor package with a compensated analog output suitable for **ultra-low pressure sensing applications.**

COMPANY: Merit Sensor is a leader in piezoresistive pressure sensing and partners with clients to create high performing solutions for a variety of applications and industries.

SENTIUM: Merit Sensor products incorporate a proprietary Sentium® technology developed to provide a best-in-class operating temperature range (-40°C to 85°C) and superior stability.

TECHNOLOGY: Merit Sensor utilizes a piezoresistive Wheatstone bridge in a design that anodically bonds glass to a chemically etched silicon diaphragm. All products are RoHS compliant.

CAPABILITIES: Merit Sensor designs, engineers, fabricates, dices, assembles, tests, sells and services die and packaged products from a state-of-the-art facility near Salt Lake City, Utah



RoHS Compliant

FEATURES

Pressure Range	0.15 to 1 psi (10.3 to 68.9 mbar; 1.03 to 6.89 KPa; 4.2 to 27.7 in H_2O)
Output	Amplified Analog
Type	Gage and Differential
Media	Clean, Dry Air and Non-corrosive Gases
Packaging	Tape and Reel
Customization	Sensitivity, Resistance, Bridge, Constraint, etc.

BENEFITS

Performance	Enjoy best-in-class performance due to Merit's proprietary Sentium technology
Cost	Save money over time with high-performing die
Security	Feel confident doing business with an experienced company backed by a solid parent company (NASDAQ: MMSI)
Speed	Get to market quickly with creative and flexible solutions
Service	Experience prompt, personal and professional support

1410 Family Part Number Configurator

1410-XXXX-XX-XX

Pressure
P15 = .15psi
P30 = .30psi
P50 = .50psi

Reference
D = Differential
G = Gage

Supply Voltage
1 = 5.0V

Output Range
2 = 0.5V to 4.5V

Pin Type
1 = J-lead

Port
1 = Dual horizontal, facing same direction

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1600 W. Merit Parkway • South Jordan, Utah • 84095 • USA

SPECIFICATIONS

Parameter	Minimum	Typical	Maximum	Units	Notes
Electrical					
Supply Voltage (Vdd)	4.75	5	5.25	V	
Supply Current	0.25	1	1.4	mA	(1)
Output Current	2.2			mA	
Operating Temperature	-40		85	°C	
Storage Temperature	-55		100	°C	
Min Output Load Resistance	5			kΩ	(2)
Recommended Input Capacitance		0.1		µF	
Performance					
ADC Resolution			12	Bit	
Ratiometric output voltage	.5V		4.5	V	(1)
Accuracy	-1.5		1.5	% FSO	(3) (4)
Startup time			8	ms	
Analog update time		5		ms	
Sampling range			200	Hz	
Proof Pressure	5X				(5)
Burst Pressure	10psi				(5)

Notes:
(1) @5V input voltage
(2) Must be added at the point of use
(3) Over 0°C to 60°C
(4) Applicable if Vdd = 4.75V to 5.25V
(5) Full scale pressure

Transfer Function Formula

$$P_{psi} = (P_{max} - P_{min}) \cdot \left(\frac{V_{out} - V_{minCompV}}{V_{maxCompV} - V_{minCompV}} \right) + P_{min}$$

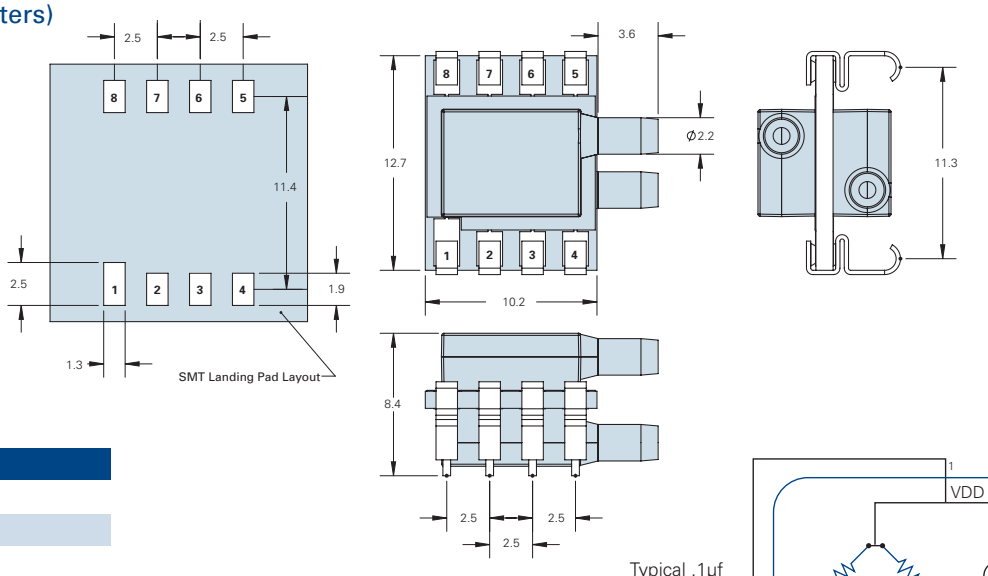
Where

P_{psi} = *Measured Pressure in PSI*
P_{Max} = Maximum Calibrated Pressure
P_{Min} = Minimum Calibrated Pressure
$V_{minComV}$ = *Minimum Compesated Volatage (Usually 0.5V)*
$V_{maxComV}$ = *Maximum Compesated Volatage (Usually 4.5V)*
V_{out} = *Output voltage (pin 6)*

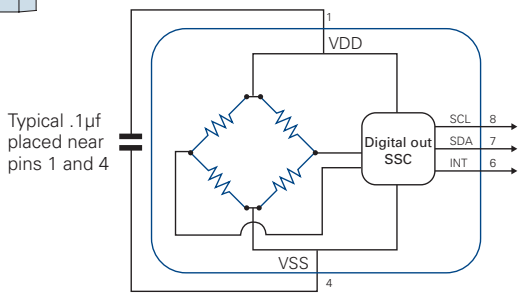
Media Compatibility

For Use With Non-corrosive Dry Gasses
Solder temperature: max 250 °C, 5 seconds max

DIMENSIONS (millimeters)



Device Pinout
P1 = Vdd
P2 = N/C
P3 = N/C
P4 = VSS - Ground
P5 = N/C
P6 = Analog output
P7 = N/C
P8 = N/C



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Example 1: 0.0 to 0.15 PSI Gage 0-60°C

Part: 1410-P15G-12-11

P_{min} =0.0 psi, P_{max} =0.15 psi

V_{out} =2.5 V

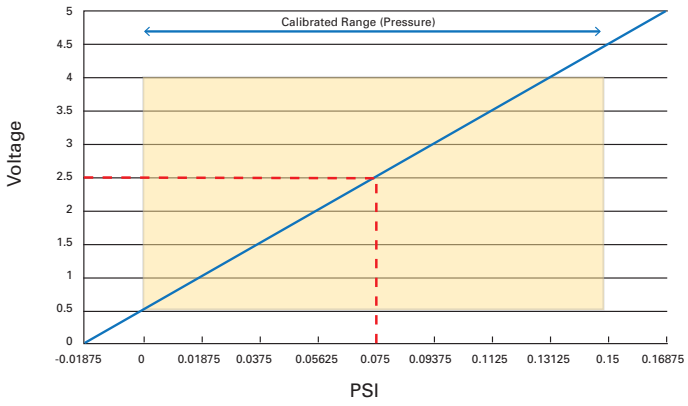
$V_{minCompV}$ = 0.5 V, $V_{maxCompV}$ =4.5 V

$$P_{psi} = (P_{max} - P_{min}) \cdot \left(\frac{V_{out} - V_{minCompV}}{V_{maxCompV} - V_{minCompV}} \right) + P_{min}$$

$$PSI = (0.15 - 0.0) \cdot \left(\frac{2.5 - 0.5}{4.5 - 0.5} \right) + 0$$

PSI = .075

Part: 1410-P15G-12-11



Example 2: -0.15 to 0.15 PSI Differential 0-60°C

Part: 1410-P15D-12-11

P_{min} =-0.15 psi, P_{max} =0.15 psi

V_{out} =3.25 V

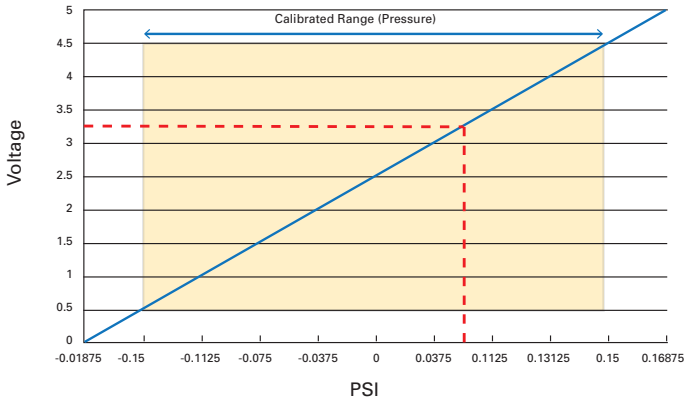
$V_{minCompV}$ =0.5 V, $V_{maxCompV}$ =4.5 V

$$P_{psi} = (P_{max} - P_{min}) \cdot \left(\frac{V_{out} - V_{minCompV}}{V_{maxCompV} - V_{minCompV}} \right) + P_{min}$$

$$PSI = (0.15 - (-0.15)) \cdot \left(\frac{3.25 - 0.5}{4.5 - 0.5} \right) + (-0.15)$$

PSI = .05625

Part: 1410-P15D-12-11



Example 3: 0.0 to .5 PSI Gage 0-60°C

Part: 1410-P50G-12-11

P_{min} = – 0.0 *psi,* P_{max} = 0.15 *psi*

V_{out} = 3.70 V

$V_{minCompV}$ =.5 V, $V_{maxCompV}$ =4.5 V

$$P_{psi} = (P_{max} - P_{min}) \cdot \left(\frac{V_{out} - V_{minCompV}}{V_{maxCompV} - V_{minCompV}} \right) + P_{min}$$

$$PSI = (0.5 - 0) \cdot \left(\frac{3.70 - 0.5}{4.5 - 0.5} \right) + (0)$$

PSI = 0.4

Part: 1410-P50G-12-11