



Acuity Series AC4080 Series DIP Amplified Low Pressure Sensor Module

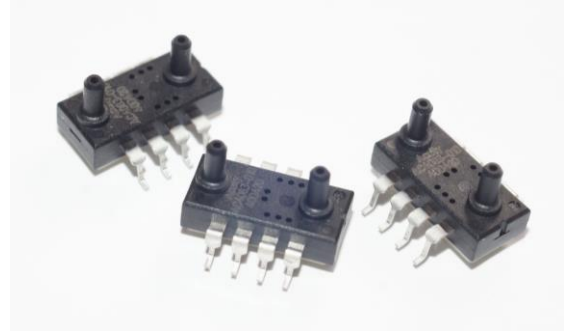
Acuity Incorporated
Fremont, California
USA 94539

The AC4080 series amplified pressure sensor is a low-pressure amplified product featuring the Acuity low pressure die housed with an ASIC signal conditioner in a plastic housing. It comes in both Gauge and Differential Versions and either with an Analog output or an I2C output.

AC4080	Analog Gauge Output – 0.5 V zero; 4 V Span
AC4081	Analog Differential Output – 2.5 V zero; +/- 2 V Span
AC4082	Digital I2C Gauge output - 1638 count zero; 13108 count Span
AC4083	Digital I2C Differential output - 8192 count zero; +/- 6554 count Span

The module corrects the sensor signal with a multi-point calibration algorithm using a dedicated signal processor ASIC over both temperature and pressure. It provides the calibrated and compensated output which enables the part to be used in stand-alone applications.

Because of the stability of the Acuity pressure sensing die, the AC4080 Series can use the full capability of the incorporated ASIC die while achieving at 10 mbar better than a 2.2% total

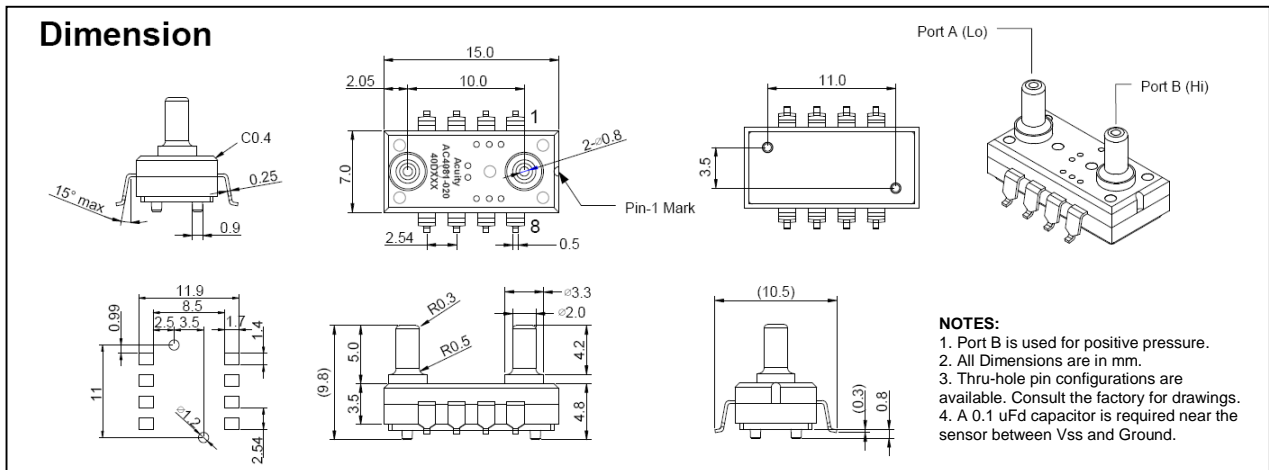


AC4080 Series DIP Pressure sensor

accuracy in calibration over pressure from 0 to 70 C and achieves better than 4.4% accuracy to the 5 mbar part.

The small foot-print of the package (less than 15 mm X 10 mm) allows easy positioning on printed circuit boards for imbedded OEM applications such as HVAC control and low-level air flow.

AC4080-AC4081 – Analog: 10 mbar - standard
AC4082-AC4083 – Digital: 5 and 10 mbar - standard
Special order ranges available on request.





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AC4082	Digital I2C Gauge output - 1638 count zero; 13108 count Span
AC4083	Digital I2C Differential output - 8192 count zero; +/- 6554 count Span

AC4080 - AC4081 Analog	Analog Amplified Low Pressure Sensor - 10.0 mBar					Analog Amplified Low Pressure Sensor - 20.0 mBar					Analog Amplified Low Pressure Sensor - 50 mBar				
Output Series	Min	Nominal	Max	Unit	Note	Min	Nominal	Max	Unit	Note	Min	Nominal	Max	Unit	Note
Electrical Drive															
Supply Voltage	4.75	5.000	5.25	Volts	1	4.75	5.000	5.25	Volts	1	4.75	5.000	5.25	Volts	1
Supply Voltage Absolute Maximum			6	Volts				6	Volts				6	Volts	
Supply Current		2.5		mA			2.5		mA			2.5		mA	
Output Drive Current	-1		1	mA		-1		1	mA		-1		1	mA	
Step Response Delay		25		mS			25		mS			25		mS	
Internal Conversion Resolution			12	bits (1 in 4096)				12	bits (1 in 4096)				12	bits (1 in 4096)	
Output Resolution			11	bits (1 in 2048)				11	bits (1 in 2048)				11	bits (1 in 2048)	
Electrical	Min	Nominal	Max			Min	Nominal	Max			Min	Nominal	Max		
ZERO															
Zero at 25 C - AC4080	0.320	0.50	0.680	Volts	1	0.412	0.50	0.588	Volts	1	0.412	0.50	0.588	Volts	1
Zero at 25 C - AC4081	2.320	2.50	2.680	Volts	1	2.412	2.50	2.588	Volts	1	2.412	2.50	2.588	Volts	1
SPAN															
Span at 25 C - AC4080		4.0		Volts	1		4.0		Volts	1		4.0		Volts	1
Span at 25 C - AC4081		±2.0		Volts	1		±2.0		Volts	1		±2.0		Volts	1
Total Error															
Total Combined Error	-4.5		4.5	% FS Reading	2	-2.2		2.2	% FS Reading	2	-2.2		2.2	% FS Reading	2
STABILITY															
Warm-up (1 hour after turn-on)		0.5		%FS	3		0.375		%FS	2		0.25		%FS	2
Position Sensitivity		0.125		%FS	4		0.075		%FS	3		0.035		%FS	3
Long-Term Drift (1 year)		0.75		%FS	3		0.625		%FS	2		0.375		%FS	2
Temperature Range	Min		Max			Min	Target	Max			Min	Target	Max		
Calibration	0		50	°C		0		50	°C		0		50	°C	
Operation	-20		85	°C		-20		85	°C		-20		85	°C	
Storage	-55		125	°C		-55		125	°C		-55		125	°C	
Mechanical Pressure	Min	Target	Max			Min	Target	Max			Min	Target	Max		
Full Scale Pressure Ranges	10 mBar					20 mBar					50 mBar				
Overpressure - Burst	>40X			FS Pressure	5	>20X			FS Pressure	5	>10X			FS Pressure	5
Overpressure - Proof	>20X			FS Pressure	6	>10X			FS Pressure	6	>5X			FS Pressure	6

AC4082 - AC4083 Digital	Digital Amplified Low Pressure Sensor - 5.0 mBar					Digital Amplified Low Pressure Sensor - 10.0 mBar					Digital Amplified Low Pressure Sensor - 20 mBar				
Output Series	Min	Nominal	Max	Unit	Note	Min	Nominal	Max	Unit	Note	Min	Nominal	Max	Unit	Note
Electrical Drive															
Supply Voltage	2.7	5.000	5.5	Volts	1	4.5	5.000	5.5	Volts	1	4.5	5.000	5.5	Volts	1
Supply Voltage Absolute Maximum			6	Volts				6	Volts				6	Volts	
Supply Current		2.5		mA			2.5		mA			2.5		mA	
Output Drive Current	-1		1	mA		-1		1	mA		-1		1	mA	
Step Response Delay		25		mS			25		mS			25		mS	
Internal Conversion Resolution			12	bits (1 in 4096)				12	bits (1 in 4096)				12	bits (1 in 4096)	
Output Resolution/Accuracy			11	bits (1 in 2048)				11	bits (1 in 2048)				11	bits (1 in 2048)	
Electrical	Min	Nominal	Max			Min	Target	Max			Min	Target	Max		
ZERO															
Zero at 25 C - AC4082		1638		Count	1		1638		Count	1		1638		Count	1
Zero at 25 C - AC4083		8196		Count			8196		Count			8196		Count	
SPAN															
Span at 25 C - AC4082		13108		Count	1		13108		Count	1		13108		Count	1
Span at 25 C - AC4083		±6554		Count			±6554		Count			±6554		Count	
Total Error															
Total Combined Error	-4.5		4.5	% FS Reading	2	-2.2		2.2	% FS Reading	2	-2.2		2.2	% FS Reading	2
STABILITY															
Warm-up (1 hour after turn-on)		0.5		%FS	3		0.375		%FS	2		0.25		%FS	2
Position Sensitivity		0.125		%FS	4		0.075		%FS	3		0.035		%FS	3
Long-Term Drift (1 year)		0.75		%FS	3		0.625		%FS	2		0.375		%FS	2
Temperature Range	Min		Max			Min	Target	Max			Min	Target	Max		
Calibration	0		50	°C		0		50	°C		0		50	°C	
Operation	-20		85	°C		-20		85	°C		-20		85	°C	
Storage	-55		125	°C		-55		125	°C		-55		125	°C	
Mechanical Pressure	Min	Target	Max			Min	Target	Max			Min	Target	Max		
Full Scale Pressure Ranges	5 mBar					10 mBar					20 mBar				
Overpressure - Burst	>40X			FS Pressure	4	>20X			FS Pressure	4	>10X			FS Pressure	4
Overpressure - Proof	>20X			FS Pressure	6	>10X			FS Pressure	6	>5X			FS Pressure	6

1 Sensor Calibrated at 5.00 Volts but system can operate from 2.7 to 5.5 V. Note that the Analog Output Series (AC4080 and AC4081) are ratiometric to supply voltage. The Digital Output Series (AC4082 and AC4083) are NOT.

2 Total Combined error is deviation as % Full-Scale from a linear transfer line from the nominal zero count to the nominal full scale count (Span + Zero). It includes zero, tc zero, span, TC span, Pressure nonlinearity, and hysteresis over the calibration range.

3 Test-Rep_Acuity_Validation_G-sensitivity

4 Test-Rep_Acuity_Validation_G-sensitivity

5 Pressure at which sensor may break

6 Pressure where the sensor may routinely see without damage. However, with Amplified products, the output is limited to slightly above the rated pressure

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Preliminary

<p>Ordering Information:</p> <p>AC408X-PPP-Z</p> <p>Where: X = 0 for Analog Gauge 1 for Analog Differential</p> <p>PPP = Pressure Range</p> <p>Z = S for Surface Mount * T for Thru-Hole Mount</p> <p>ANALOG OUTPUT</p>	<table border="1"> <thead> <tr> <th>Range</th> <th>Full-Scale Pressure</th> </tr> </thead> <tbody> <tr> <td>010</td> <td>10 mbar *</td> </tr> <tr> <td>020</td> <td>20 mbar</td> </tr> <tr> <td>050</td> <td>50 mbar</td> </tr> </tbody> </table> <p>* = "In-Stock" Options</p>	Range	Full-Scale Pressure	010	10 mbar *	020	20 mbar	050	50 mbar	<p>AC4080/AC4081 - Analog Output</p> <table border="1"> <thead> <tr> <th>Pin #</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>NC</td> </tr> <tr> <td>2</td> <td>NC</td> </tr> <tr> <td>3</td> <td>NC</td> </tr> <tr> <td>4</td> <td>Vss (-Supply voltage)</td> </tr> <tr> <td>5</td> <td>Vss (-Supply voltage)</td> </tr> <tr> <td>6</td> <td>Analog Signal</td> </tr> <tr> <td>7</td> <td>Vdd (+ Supply voltage)</td> </tr> <tr> <td>8</td> <td>NC</td> </tr> </tbody> </table> <p>NC = May not be used as an electrical feed-thru. Pins should be soldered to the board but not connected to any other circuitry.</p>	Pin #	Description	1	NC	2	NC	3	NC	4	Vss (-Supply voltage)	5	Vss (-Supply voltage)	6	Analog Signal	7	Vdd (+ Supply voltage)	8	NC		
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<p>Ordering Information:</p> <p>AC408X-PPP</p> <p>Where: X = 2 for Digital Gauge 3 for Digital Differential</p> <p>PPP = Pressure Range</p> <p>Z = S for Surface Mount * T for Thru-Hole Mount</p> <p>Default I2C Slave Address: 28HEX</p> <p>DIGITAL OUTPUT</p>	<table border="1"> <thead> <tr> <th>Range</th> <th>Full-Scale Pressure</th> </tr> </thead> <tbody> <tr> <td>005</td> <td>5 mbar *</td> </tr> <tr> <td>010</td> <td>10 mbar *</td> </tr> <tr> <td>020</td> <td>20 mbar</td> </tr> <tr> <td>050</td> <td>50 mbar</td> </tr> </tbody> </table> <p>* = "In-Stock" Options</p>	Range	Full-Scale Pressure	005	5 mbar *	010	10 mbar *	020	20 mbar	050	50 mbar	<p>AC4082/AC4083 - Digital Output</p> <table border="1"> <thead> <tr> <th>Pin #</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Vss (-Supply voltage)</td> </tr> <tr> <td>2</td> <td>NC</td> </tr> <tr> <td>3</td> <td>Vdd (+ Supply voltage)</td> </tr> <tr> <td>4</td> <td>NC</td> </tr> <tr> <td>5</td> <td>NC</td> </tr> <tr> <td>6</td> <td>SDA</td> </tr> <tr> <td>7</td> <td>SDL</td> </tr> <tr> <td>8</td> <td>NC</td> </tr> </tbody> </table> <p>NC = May not be used as an electrical feed-thru. Pins should be soldered to the board but not connected to any other circuitry.</p>	Pin #	Description	1	Vss (-Supply voltage)	2	NC	3	Vdd (+ Supply voltage)	4	NC	5	NC	6	SDA	7	SDL	8	NC
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Ship from Stock – Pressure ranges of 5 mbar and 10 mbar are routinely stocked in limited prototyping quantities for the digital versions (AC4082 and AC4083) and 10 mbar for the analog products (AC4080 and AC4081). Other ranges are available with a typical 4 to 6 week lead-time. Consult Acuity Sales (Sales@acuitymicro.com) for current lead times.

Custom Ranges and Pressure Ports: Acuity will customize products to meet customer needs in port configuration, I2C Slave Address, and pressure ranges on large orders. Consult Acuity Sales (Sales@acuitymicro.com) for details.

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