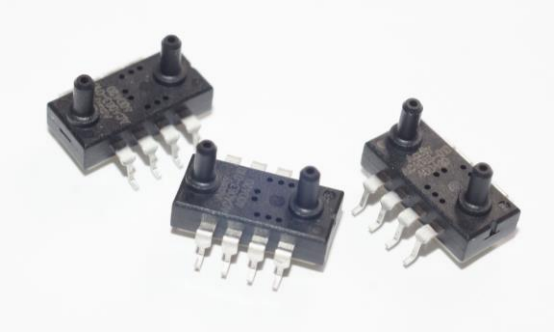
Acuity Series AC4080 Series DIP Amplified Low Pressure Sensor Module

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



AC4080 Series DIP Pressure sensor

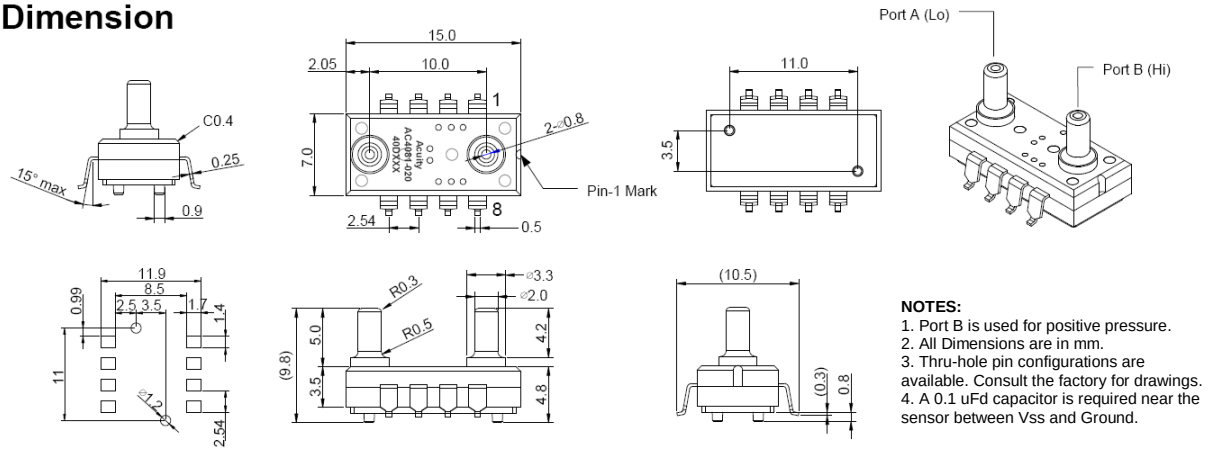
The module corrects the sensor signal with a multi-point calibration algorithm using a dedicated signal processor ASIC over both temperature and pressure. It provides the calibrated and compensated output which enables the part to be used in stand-alone applications.

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 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.

Dimension



NOTES:
1. Port B is used for positive pressure.
2. All Dimensions are in mm.
3. Thru-hole pin configurations are available. Consult the factory for drawings.
4. A 0.1 uFd capacitor is required near the sensor between Vss and Ground.

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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**

AC4080 - AC4081 Analog Output Series	Analog Amplified Low Pressure Sensor - 10.0 mBar				Note	Analog Amplified Low Pressure Sensor - 20.0 mBar				Note	Analog Amplified Low Pressure Sensor - 50 mBar				Note
Electrical Drive	Min	Nominal	Max	Unit		Min	Nominal	Max	Unit		Min	Nominal	Max	Unit	
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		**Typical**					**Typical**					**Typical**			
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 Output Series	Digital Amplified Low Pressure Sensor - 5.0 mBar				Note	Digital Amplified Low Pressure Sensor - 10.0 mBar				Note	Digital Amplified Low Pressure Sensor - 20 mBar				Note
Electrical Drive	Min	Nominal	Max	Unit		Min	Nominal	Max	Unit		Min	Nominal	Max	Unit	
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		**Typical**					**Typical**					**Typical**			
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 Amplifed products, the output is limited to slightly above the rated pressure

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Ordering Information:

AC408X-PPP-Z

Where: **X = 0 for Analog Gauge**
1 for Analog Differential
PPP = Pressure Range
Z = S for Surface Mount *
T for Thru-Hole Mount

ANALOG OUTPUT

Range	Full-Scale Pressure
010	10 mbar *
020	20 mbar
050	50 mbar

**** = "In-Stock" Options***

AC4080/AC4081 - Analog Output

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

NC = May not be used as an electrical feed-thru. Pins should be soldered to the board but not connected to any other circuitry.

Ordering Information:

AC408X-PPP

Where: **X = 2 for Digital Gauge**
3 for Digital Differential
PPP = Pressure Range
Z = S for Surface Mount *
T for Thru-Hole Mount

DIGITAL OUTPUT

Range	Full-Scale Pressure
005	5 mbar *
010	10 mbar *
020	20 mbar
050	50 mbar

**** = "In-Stock" Options***

AC4082/AC4083 - Digital Output

Pin #	Description
1	Vss (-Supply voltage)
2	NC
3	Vdd (**+ Supply voltage**)
4	NC
5	NC
6	SDA
7	SDL
8	NC

NC = May not be used as an electrical feed-thru. Pins should be soldered to the board but not connected to any other circuitry.

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 both in port configuration and pressure ranges on large orders. Consult Acuity Sales (Sales@acuitymicro.com) for details.