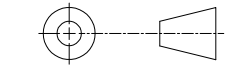
NOMENCLATURE AND ORDER GUIDE

THIRD ANGLE PROJECTION



SA ABPC X XX X XXXXX X X X

Product Series

ABPC	Amplified Basic

Package

D	DIP (Dual Inline Pin)
M	SMT
L	Leadless SMT

Port

	DIP	SMT	Leadless SMT
No port	NN	NN	NN
Single axial barbless port	AN	AN	AN
Single axial barbless port	LN	LN	LN
Single radial barbless port	JN	JN	–
Dual radial barbless port same side	JJ	JJ	–
Single radial barbed port	RN	RN	–
Dual radial barbed port same side	RR	RR	–

Supply Voltage

3	3.3 Vdc
5	5.0 Vdc

Transfer Function

A	10% to 90% of Vsupply (analog), 2^{14} counts (digital) no temperature output, no sleep mode
D	10% to 90% of 2^{14} counts (digital only) temperature output enabled, sleep mode enabled
S	10% to 90% of 2^{14} counts (digital only) no temperature output, sleep mode enabled
T	10% to 90% of 2^{14} counts (digital only) temperature output enabled, no sleep mode

Output Type

A	Analog	3	I^2C, Address 0x38
S	SPI	4	I^2C, Address 0x48
0	I^2C, Address 0x08	5	I^2C, Address 0x58
1	I^2C, Address 0x18	6	I^2C, Address 0x68
2	I^2C, Address 0x28	7	I^2C, Address 0x78

Pressure Range

60 mbar to 10 bar Differential		6 kPa to 1 MPa Differential		1 psi to 150 psi Differential	
060MD	±60 mbar	006KD	±6 kPa	001PD	±1Psi
100MD	±100 mbar	010KD	±10 kPa	005PD	±5psi
160MD	±160 mbar	016KD	±16 kPa	015PD	±15psi
250MD	±250 mbar	025KD	±25 kPa	030PD	±30Psi
400MD	±400 mbar	040KD	±40 kPa	060PD	±60Psi
600MD	±600 mbar	060KD	±60 kPa		
001BD	±1 bar	100KD	±100 kPa		
1.6BD	±1.6 bar	160KD	±160 kPa		
2.5BD	±2.5 bar	250KD	±250 kPa		
004BD	±4 bar	400KD	±400 kPa		

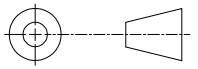
Gage		Gage		Gage	
060MG	0 mbar to 60 mbar	006KG	0 kPa to 6 kPa	001PG	0Psi to 1Psi
100MG	0 mbar to 100 mbar	010KG	0 kPa to 10 kPa	005PG	0Psi to 5Psi
160MG	0 mbar to 160 mbar	016KG	0 kPa to 16 kPa	015PG	0Psi to 15Psi
250MG	0 mbar to 250 mbar	025KG	0 kPa to 25 kPa	030PG	0Psi to 30Psi
400MG	0 bar to 400 mbar	040KG	0 kPa to 40 kPa	060PG	0Psi to 60Psi
600MG	0 bar to 600 mbar	060KG	0 kPa to 60 kPa	100PG	0Psi to 100Psi
001BG	0 bar to 1 bar	100KG	0 kPa to 100 kPa	150PG	0Psi to 150Psi
1.6BG	0 bar to 1.6 bar	160KG	0 kPa to 160 kPa		
2.5BG	0 bar to 2.5 bar	250KG	0 kPa to 250 kPa		
004BG	0 bar to 4 bar	400KG	0 kPa to 400 kPa		
006BG	0 bar to 6 bar	600KG	0 kPa to 600 kPa		
010BG	0 bar to 10 bar	001GG	0 kPa to 1 MPa		

*FIGURE 1

OPTION

N	Dry gases only, no diagnostics
D	Dry gases only, diagnostics on
T	Liquid media, silicone gel, no diagnostics
V	Liquid media, silicone gel, diagnostics on
F	Liquid media, flourosilicone gel, diagnostics on
F	Liquid media, flourosilicone gel, no diagnostics

THIRD ANGLE PROJECTION



OPERATING SPECIFICATIONS

TABLE 1. *ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC		MIN	MAX	UNITS
Supply voltage (Vsupply)		−0.3	6.0	Vdc
Voltage on any pin		−0.3	Vsupply+0.3	V
Digital interface	I^2C	100	400	KHz
clock frequency:	SPI	50	800	
ESD susceptibility (human body model)		2	–	kV
Storage temperature		−40[−40]	85[185]	°C[°F]
Soldering time and temperature:				
lead solder temperature (DIP)		4 s max. at 250°C [482°F]		
peak reflow temperature (Leadless SMT, SMT)		15 s max. at 250°C [482°F]		

*Absolute maximum ratings are the extreme limits the device will withstand without damage.

TABLE 2. ENVIRONMENTAL SPECIFICATIONS

CHARACTERISTIC	PARAMETERS
Humidity:	
all external surfaces	0 %RH to 95 %RH, non−condensing
internal surfaces of Liquid Media Option (T, V, F, G)	0 %RH to 100 %RH, condensing
internal surfaces of Dry Gases Option (N, D)	0 %RH to 95 %RH, non−condensing
Vibration	15 g, 10 Hz to 2 kHz
Shock	100 g, 6 ms duration
*Life	1 million pressure cycles minimum
Solder reflow	J−STD−020−D.1 Moisture Sensitivity Level 1 (unlimited shelf life when stored at <30°C/85 %RH)

*Life may vary depending on specific application in which the sensor is used.

TABLE 3. *WETTED MATERIALS

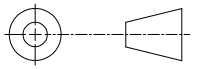
COMPONENT	PRESSURE PORT 1 (P1)		PRESSURE PORT 2 (P2)
	DRY GAS OPTION	LIQUID MEDIA OPTION	
Ports and covers	high temperature polyamide		
Substrate	alumina ceramic	–	alumina ceramic
Adhesives	epoxy, silicone	epoxy, silicone gel	epoxy, silicone
Electronic components	silicon, glass, solder gold,alumina	304 SST	silicon

*Contact SQMEAS Customer Service for detailed material information.

TABLE 4. SENSOR PRESSURE TYPES

PRESSURE TYPE	DESCRIPTION
Gage	Output is proportional to the difference between applied pressure and atmospheric (ambient) pressure.
Differential	Output is proportional to the difference between the pressures applied to each port (Port 1 – Port 2).

THIRD ANGLE PROJECTION



OPERATING SPECIFICATIONS

TABLE 5. OPERATING SPECIFICATIONS

CHARACTERISTIC		ANALOG			DIGITAL			UNITS	NOTES
		MIN	TYP	MAX	MIN	TYP	MAX		
Supply voltage	3.3 Vdc	3.0	3.3	3.6	3.0	3.3	3.6	Vdc	1,2,3
	5.0 Vdc	4.75	5.0	5.25	4.75	5.0	5.25		
Supply current	3.3 Vdc	–	2.1	2.8	–	3.1	3.9	mA	
	5.0 Vdc	–	2.7	3.8	–	3.7	4.6	mA	
	sleep mode option	–	–	–	–	1	10	uA	
Operating temperature range		−40	–	+85	−40	–	85	°C	4
Compensated temperature range		0	–	50	0	–	50	°C	5
Temperature output option		–	–	–	–	±4	–	°C	6
Startup time (power up to data ready)		–	–	5	–	–	3	mS	
Response time		–	1	–	–	0.46	–	mS	
Clipping limit	upper	–	–	97.5	–	–	–	%Vsupply	
	lower	2.5	–	–	–	–	–		
I^2C/SPI voltage level	low	–	–	–	–	–	20	%Vsupply	
	high	–	–	–	80	–	–		
Pull up on SDA/MISO, SCL/SCLK, SS		–	–	–	1	–	–	kOhm	
Total Error Band		–	–	±1.5	–	–	±1.5	%FSS	7,8
Accuracy		–	–	±0.25	–	–	±0.25	%FSS BFSL	9
Long term stability (1000 hr, 25°C)		–	–	±0.25	–	–	±0.25	%FSS	
Output resolution		0.3	–	–	–	–	–	%FSS	
		–	–	–	12	–	–	bits	

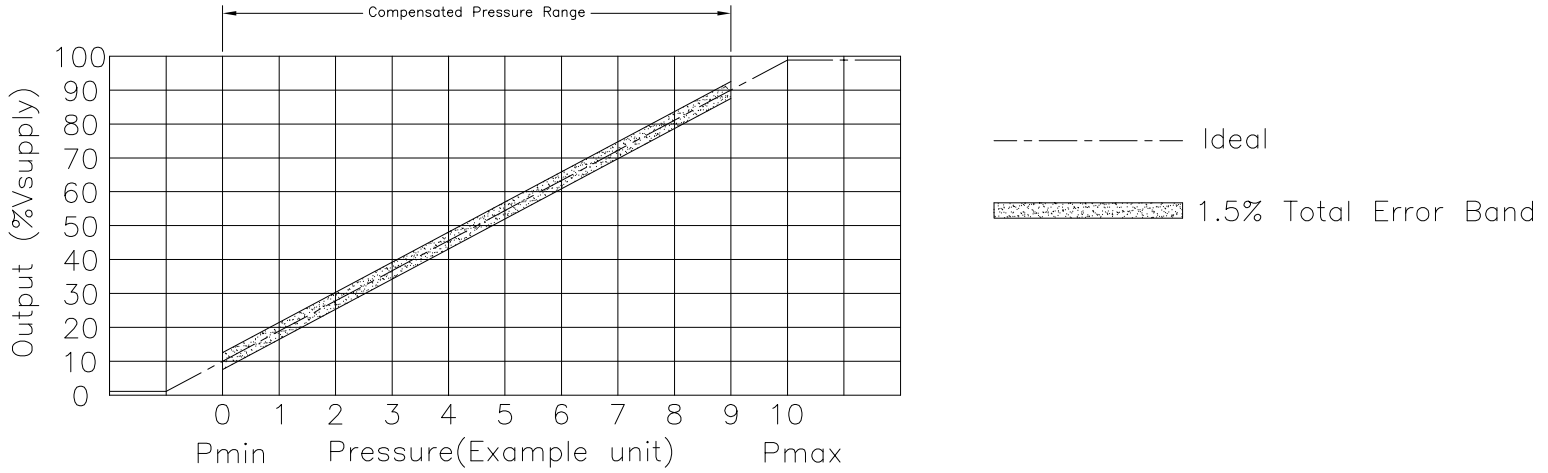
Notes:
1. Sensors are either 3.3 Vdc or 5.0 Vdc based on the catalog listing selected.
2. Ratiometricity of the sensor (the ability of the device output to scale to the supply voltage) is achieved within the specified rating voltage.
3. The sensor is not reverse polarity protected. Incorrect application of supply voltage or ground to the wrong pin may cause electrical failure.
4. Operating temperature range: The temperature range over which the sensor will produce an output proportional to pressure.
5. Compensated temperature range: The temperature range over which the sensor will produce an output proportional to pessure within the specified performance limits.
6. Temperature output option: Typical temperature output error over the compensated temperature range of 0°C to 50°C.
   Operation in Sleep Mode may affect temperature output error depending on duty cycle.
7. Total Error Band: The maximum deviation from the ideal transfer function over the entire compensated temperature and pessure range. Includes all errors due to offset, full scale span, pressure non−linearity, pressure hysteresis, repeatability,thermal effect on offset, thermal effect on span, and thermal hysteresis.
8. Full Scale Span (FSS): The algebraic difference between the output signal measured at the maximum (Pmax.) and minimum (Pmin.) limits of the pressure range. (See Figure 1.)
9. Accuracy: The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range at 25°C [77°F]. Includes all errors due to pressure non−linearity, pressure hysteresis, and non−repeatability.

TABLE 6. SENSOR OUTPUT AT SIGNIFICANT PERCENTAGES (DIGITAL VERSIONS ONLY)

% OUTPUT	DIGITAL COUNTS	
	DECIMAL	HEX
0	0	0X0000
10	1638	0X0666
50	8192	0X2000
90	14746	0X399A
100	16383	0X3FFF

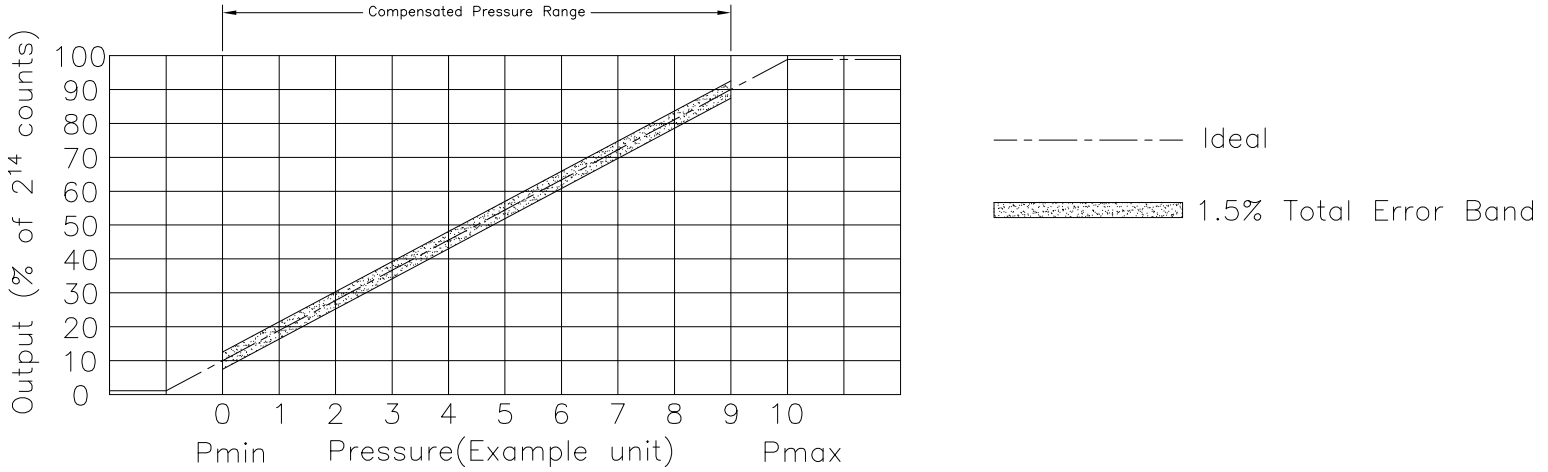
FIGURE 1. PRESSURE FUNCTION

Analog Versions



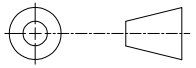
$$\text{Output(V)} = \frac{0.8*\text{Vsuuply}}{\text{Pmax}-\text{Pmin}} * (\text{Papplied}-\text{Pmin})+0.1*\text{Vsuuply}$$

Digital Versions



$$\text{Output (\% of } 2^{14} \text{ counts)} = \frac{80\%}{\text{Pmax}-\text{Pmin}} * (\text{Papplied}-\text{Pmin})+10\%$$

THIRD ANGLE PROJECTION

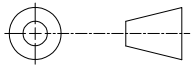


PRESSURE RANGE SPECIFICATIONS

RANGE (SEE FIGURE1.)	PRESSURE RANGE			OVERPRESSURE		BURST PRESSURE		COMMON MODE PRESSURE
	PMIN.	PMAX.	UNIT	Port 1 (P1)	Port 2 (P2)	Port 1 (P1)	Port 2 (P2)	
60 mbar to 10 bar (Differential)								
060MD	−60	60	mbar	2000	850	3500	1000	10000
100MD	−100	100	mbar	4000	1400	7000	2500	10000
160MD	−160	160	mbar	4000	1400	7000	2500	10000
250MD	−250	250	mbar	10000	2000	19000	4000	10000
400MD	−400	400	mbar	10000	2000	19000	4000	10000
600MD	−600	6	mbar	17000	2000	19000	4000	10000
001BD	−1	1	bar	17	4	19	8	17
1.6BD	−1.6	1.6	bar	17	8	19	16	17
2.5BD	−2.5	2.5	bar	17	8	19	16	17
004BD	−4.0	4.0	bar	17	16	19	19	17
60 mbar to 10 bar (Gage)								
060MG	0	60	mbar	2000	–	3500	–	5500
100MG	0	100	mbar	2000	–	3500	–	10000
160MG	0	160	mbar	2000	–	3500	–	10000
250MG	0	250	mbar	4000	–	7000	–	10000
400MG	0	400	mbar	10000	–	19000	–	10000
600MG	0	600	mbar	10000	–	19000	–	10000
001BG	0	1	bar	17	–	19	–	17
1.6BG	0	1.6	bar	17	–	19	–	17
2.5BG	0	2.5	bar	17	–	19	–	17
004BG	0	4	bar	17	–	19	–	17
006BG	0	6	bar	17	–	19	–	17
010BG	0	10	bar	17	–	19	–	17
6 kPa to 1 MPa (Differential)								
006KD	−6	6	kPa	200	85	350	100	1000
010KD	−10	10	kPa	400	140	700	250	1000
016KD	−16	16	kPa	400	140	700	250	1000
025KD	−25	25	kPa	1000	200	1900	400	1000
040KD	−40	40	kPa	1000	200	1900	400	1000
060KD	−60	60	kPa	1700	200	1900	400	1000
100KD	−100	100	kPa	1700	400	1900	800	1700
160KD	−160	160	kPa	1700	800	1900	1600	1700
250KD	−250	250	kPa	1700	800	1900	1600	1700
400KD	−400	400	kPa	1700	1600	1900	1900	1700

TO BE CONTINUED

THIRD ANGLE PROJECTION



PRESSURE RANGE SPECIFICATIONS (CONTINUED)

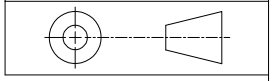
RANGE (SEE FIGURE1.)	PRESSURE RANGE			OVERPRESSURE		BURST PRESSURE		COMMON MODE PRESSURE
	PMIN.	PMAX.	UNIT	Port 1 (P1)	Port 2 (P2)	Port 1 (P1)	Port 2 (P2)	
6 kPa to 1 MPa (Gage)								
006KG	0	6	kPa	200	–	350	–	550
010KG	0	10	kPa	200	–	350	–	1000
016KG	0	16	kPa	200	–	350	–	1000
025KG	0	25	kPa	400	–	700	–	1000
040KG	0	40	kPa	1000	–	1900	–	1000
060KG	0	60	kPa	1000	–	1900	–	1000
100KG	0	100	kPa	1700	–	1900	–	1700
160KG	0	160	kPa	1700	–	1900	–	1700
250KG	0	250	kPa	1700	–	1900	–	1700
400KG	0	400	kPa	1700	–	1900	–	1700
600KG	0	600	kPa	1700	–	1900	–	1700
001GG	0	1	MPa	1.7	–	1.9	–	1.7
1 psi to 150 psi(Differential)								
001PD	−1	1	psi	30	10	50	15	150
005PD	−5	5	psi	150	30	275	40	150
015PD	−15	15	psi	250	60	275	120	250
030PD	−30	30	psi	250	120	275	240	250
060PD	−60	60	psi	250	250	275	275	250
1 psi to 150 psi(Gage)								
001PG	0	1	psi	30	–	50	–	150
005PG	0	5	psi	150	–	275	–	150
015PG	0	15	psi	250	–	275	–	250
030PG	0	30	psi	250	–	275	–	250
060PG	0	60	psi	250	–	275	–	250
100PG	0	100	psi	250	–	275	–	250
150PG	0	150	psi	250	–	275	–	250

1. Overpressure: The maximum pressure which may safely be applied to the product for it to remain in specification once pressure is returned to the operating pressure range. Exposure to higher pressures may cause permanent damage to the product. Unless otherwise specified this applies to all available pressure ports at any temperature with the operating temperature range.

2. Burst pressure: The maximum pressure that may be applied to the specified port (P1 or P2) of the product without causing escape of pressure media. Product should not be expected to function after exposure to any pressure beyond the burst pressure.

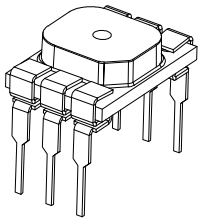
3. Common mode pressure: The maximum pressure that can be applied simultaneously to both ports of a differential pressure sensor without causing changes in specified performance.

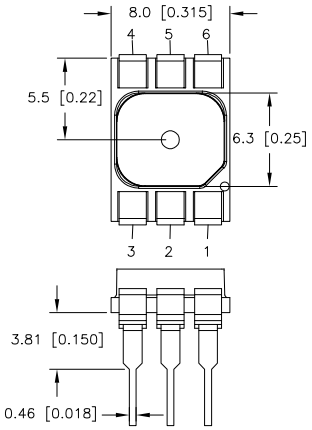
THIRD ANGLE PROJECTION

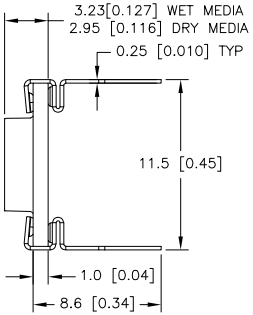


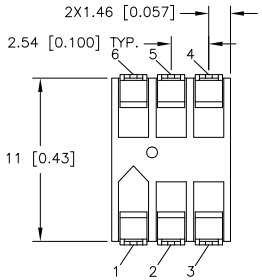
PACKAGE DIMENSIONAL DRAWINGS

DIP NN









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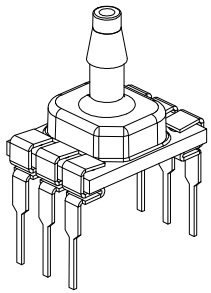

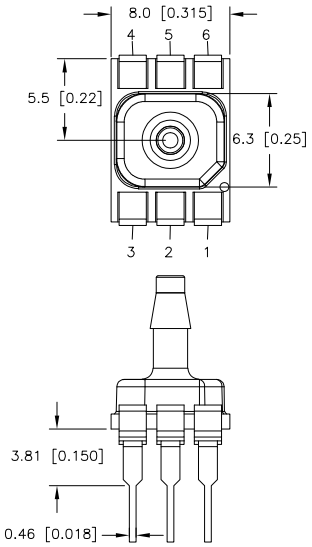

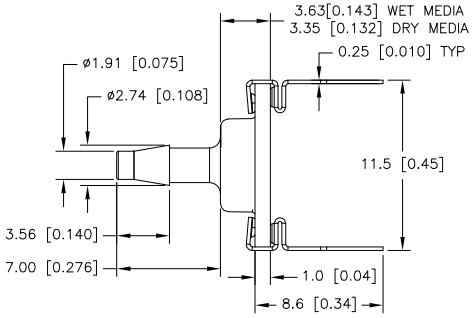

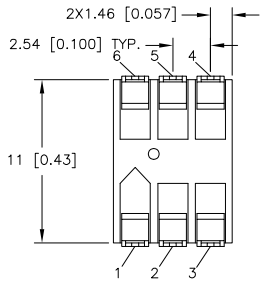

[DIMENSIONS] ARE IN INCHES
TOLERANCES (UNLESS SPECIFIED)
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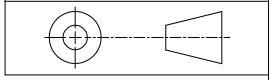
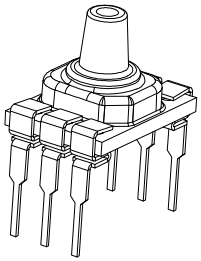
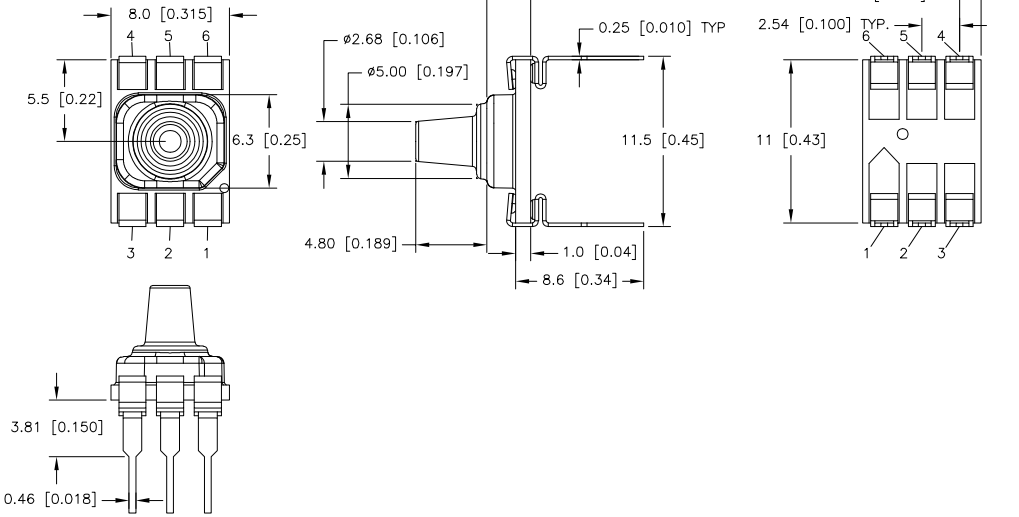
THIRD ANGLE PROJECTION



PACKAGE DIMENSIONAL DRAWINGS

DIP LN





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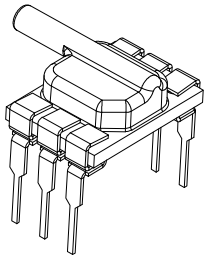

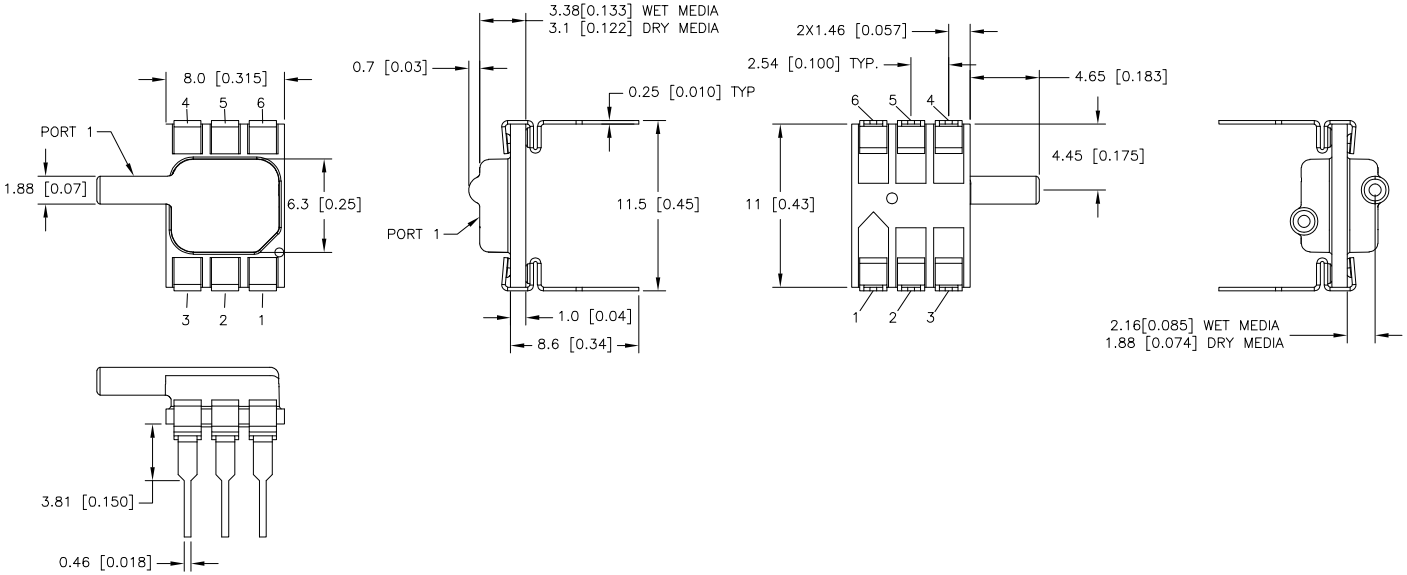

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TOLERANCES (UNLESS SPECIFIED)
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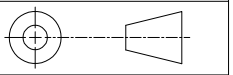
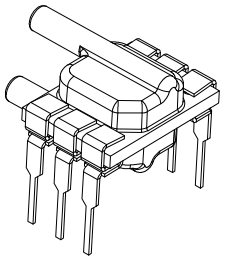
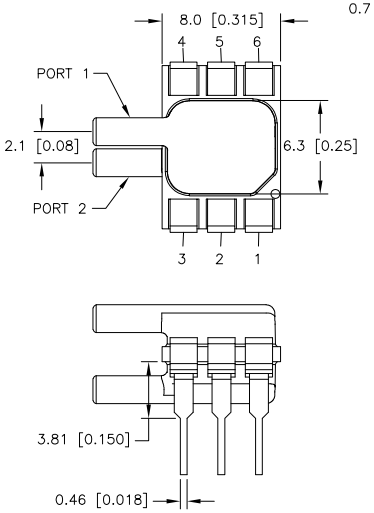
THIRD ANGLE PROJECTION

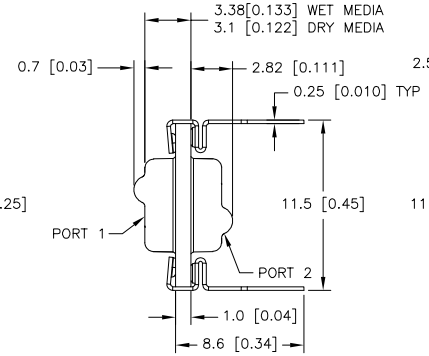


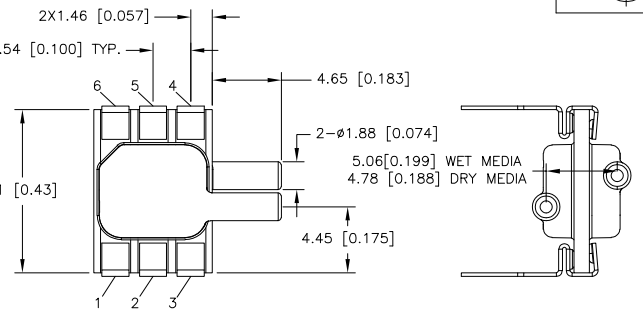
PACKAGE DIMENSIONAL DRAWINGS

DIP JJ

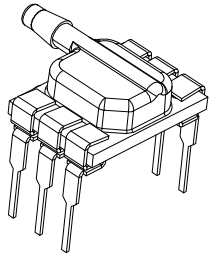


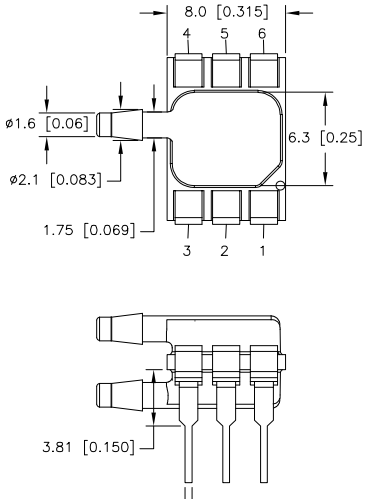


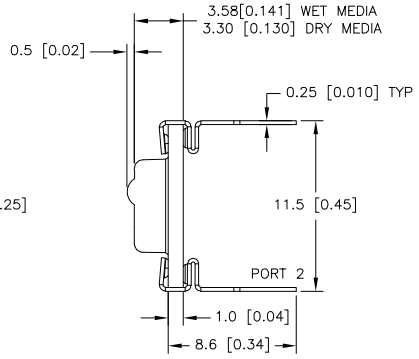


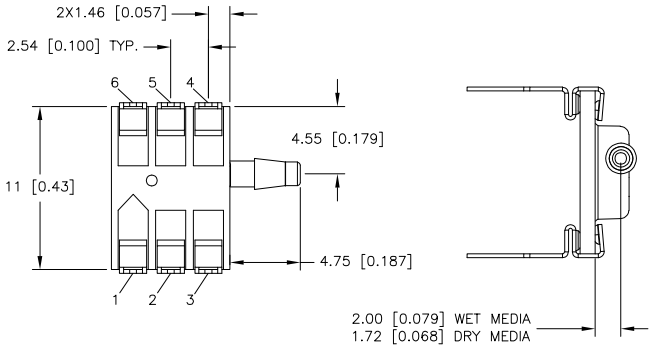


DIP RN





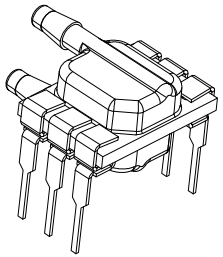


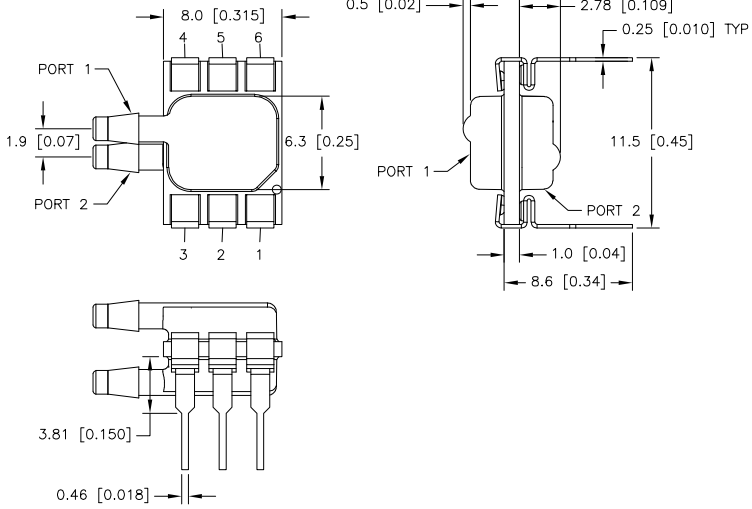


[DIMENSIONS] ARE IN INCHES
TOLERANCES (UNLESS SPECIFIED)
.XX=.01 .XXX=.005 ANGLES=1/2°

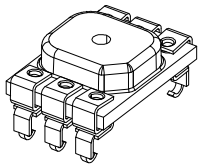
THIRD ANGLE PROJECTION

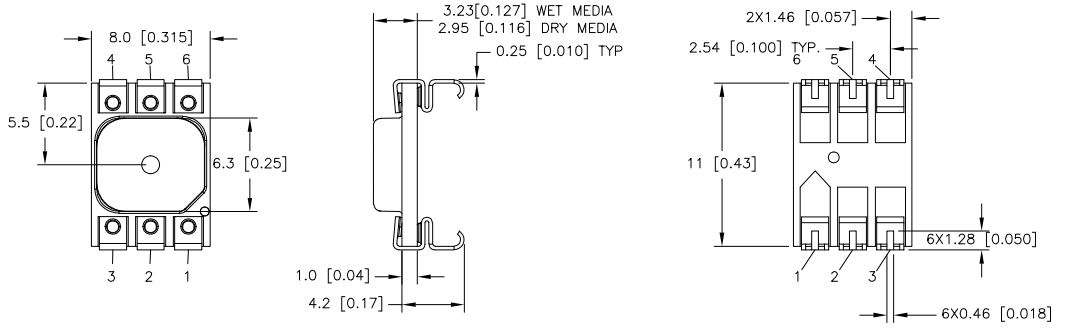
DIP RR





SMT NN





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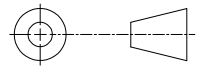
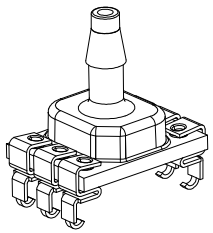
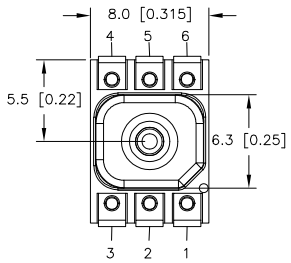
THIRD ANGLE PROJECTION

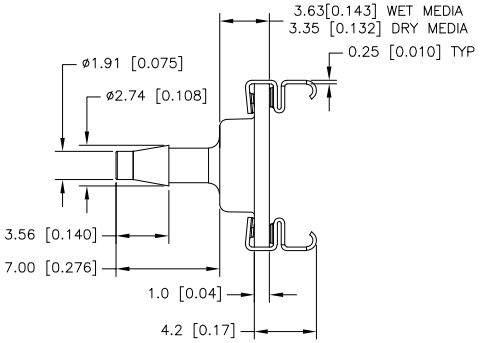


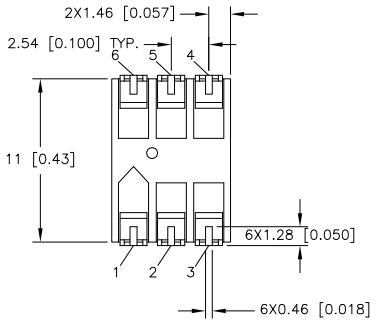
PACKAGE DIMENSIONAL DRAWINGS

SMT AN

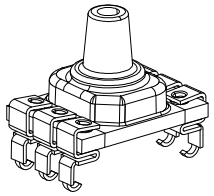


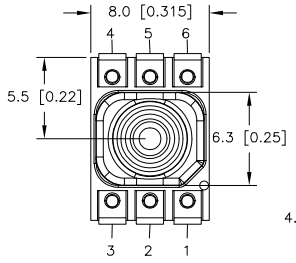


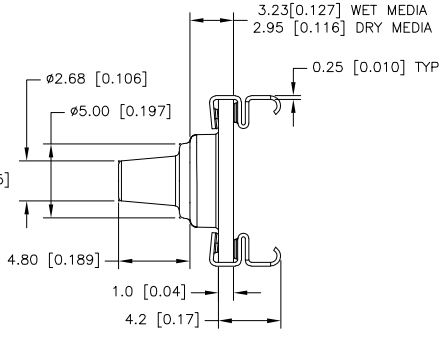


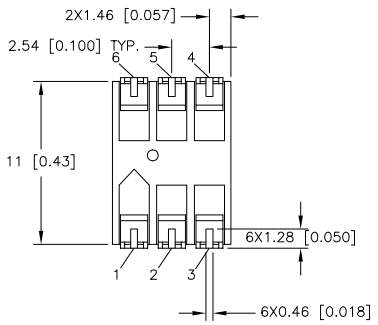


SMT LN



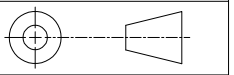






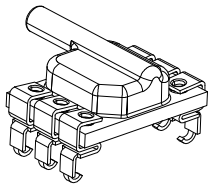
[DIMENSIONS] ARE IN INCHES
TOLERANCES (UNLESS SPECIFIED)
.XX=.01 .XXX=.005 ANGLES=1/2°

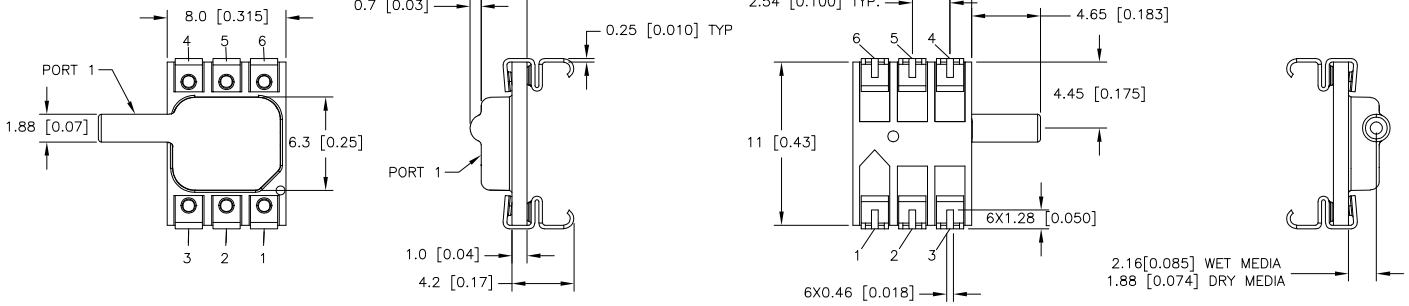
THIRD ANGLE PROJECTION



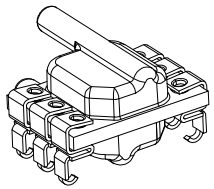
PACKAGE DIMENSIONAL DRAWINGS

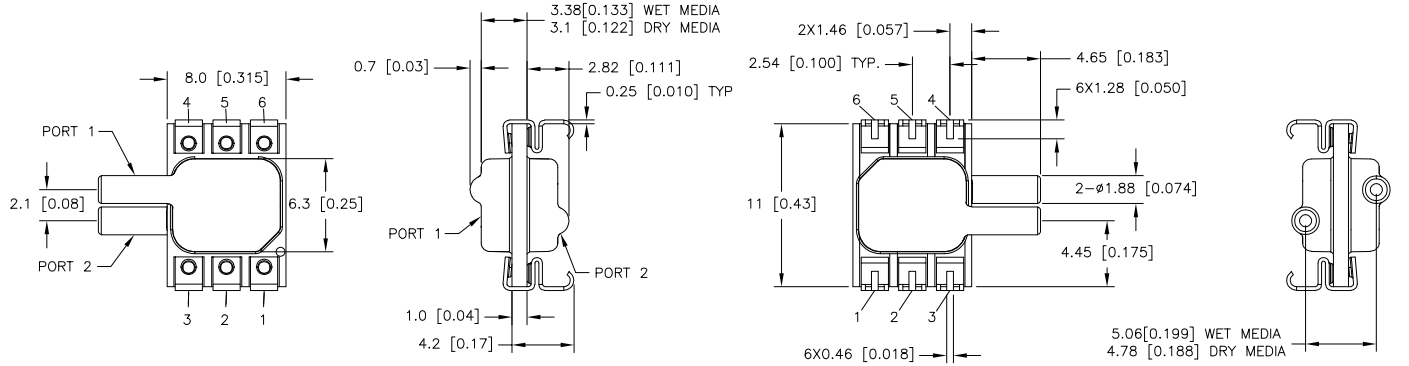
SMT JN





SMT JJ





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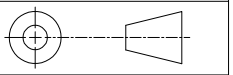
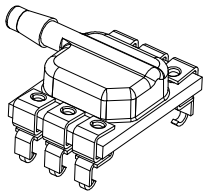
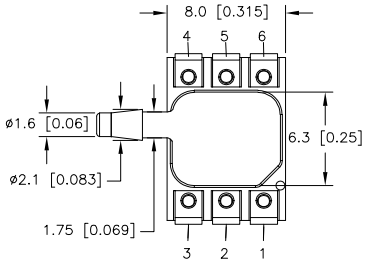
THIRD ANGLE PROJECTION

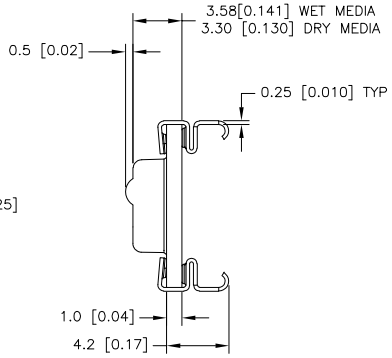


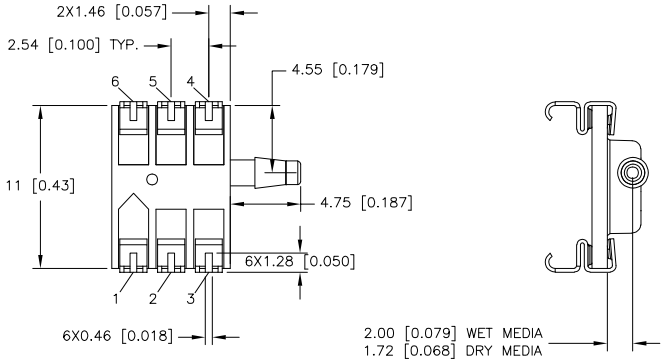
PACKAGE DIMENSIONAL DRAWINGS

SMT RN

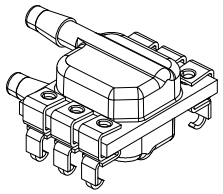


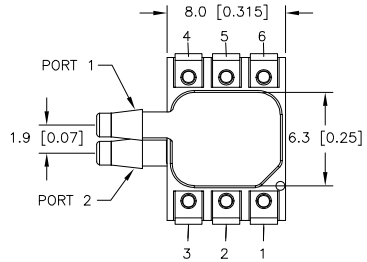


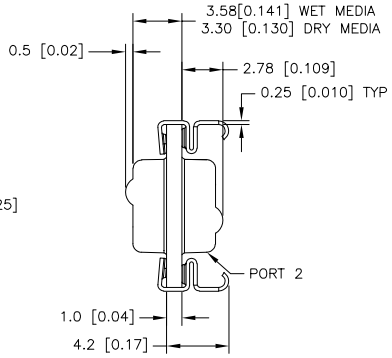


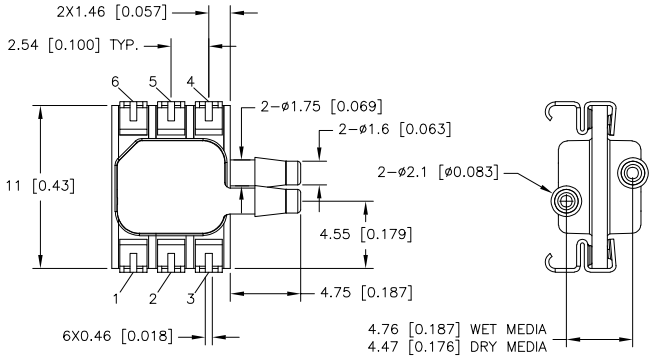


SMT RR









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TOLERANCES (UNLESS SPECIFIED)
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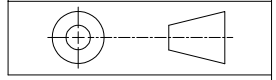
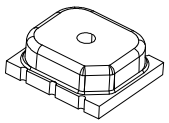
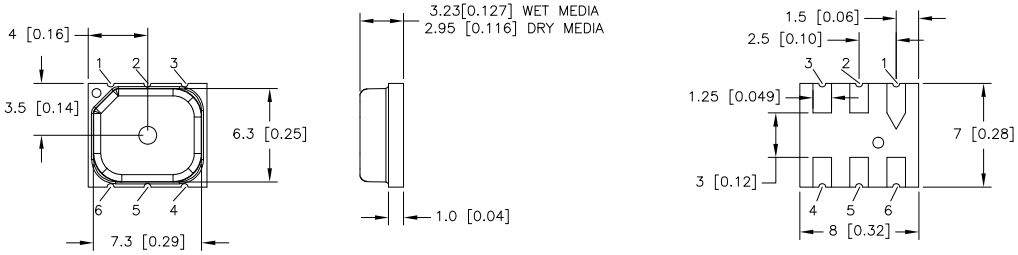
THIRD ANGLE PROJECTION



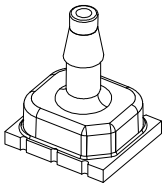
PACKAGE DIMENSIONAL DRAWINGS

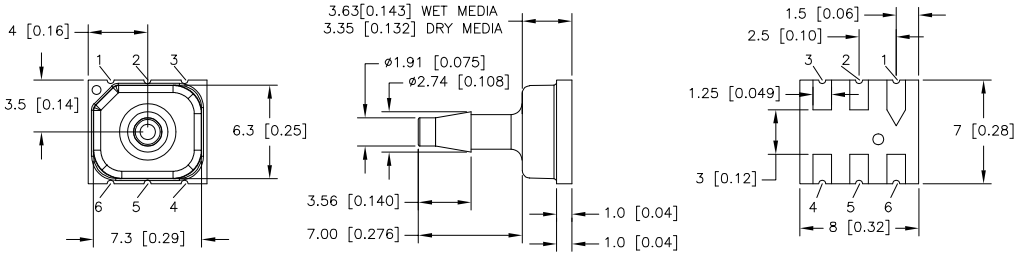
Leadless SMT NN



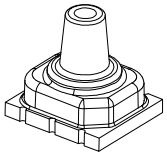


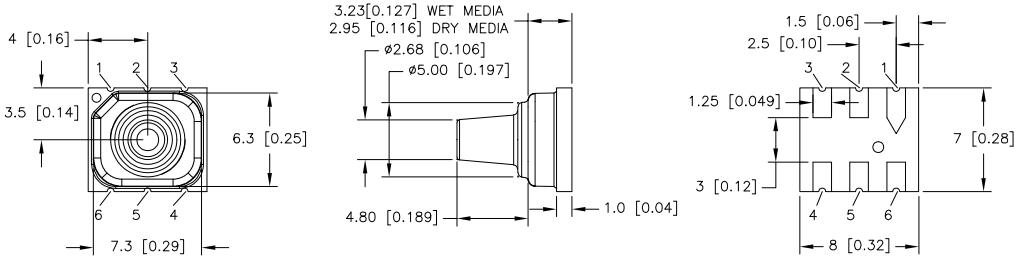
Leadless SMT AN





Leadless SMT LN





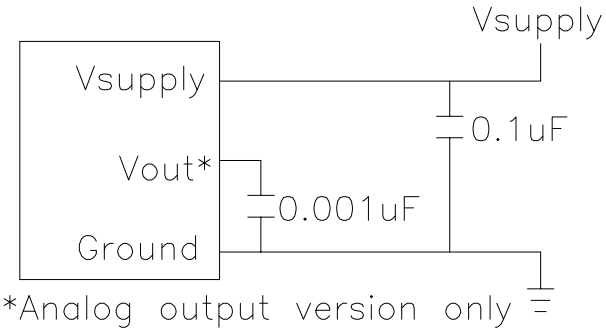
[DIMENSIONS] ARE IN INCHES
TOLERANCES (UNLESS SPECIFIED)
.XX=.01 .XXX=.005 ANGLES=1/2°

THIRD ANGLE PROJECTION

PINOUTS

OUTPUT	PAD 1	PAD 2	PAD 3	PAD 4	PAD 5	PAD 6
I2C	GND	Vsupply	INT	NC	SDA	SCL
SPI	GND	Vsupply	SS	NC	MISO	SCLK
ANALOG	GND	NC	Vout	NC	NC	Vsupply

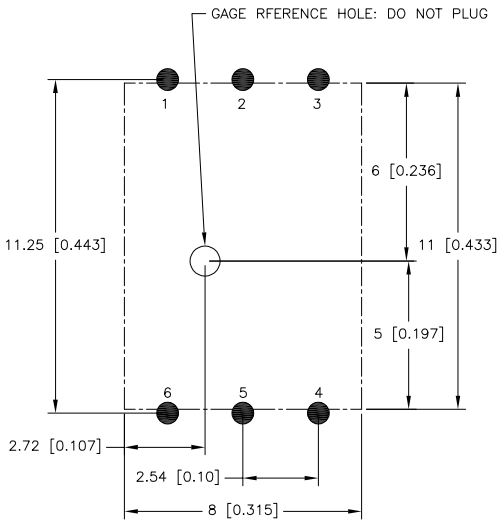
RECOMMENDED FILTER CAP



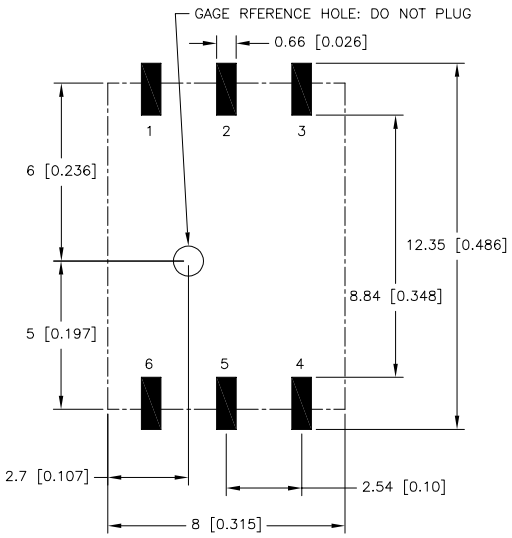
*Analog output version only

RECOMMENDED PCB LAYOUTS

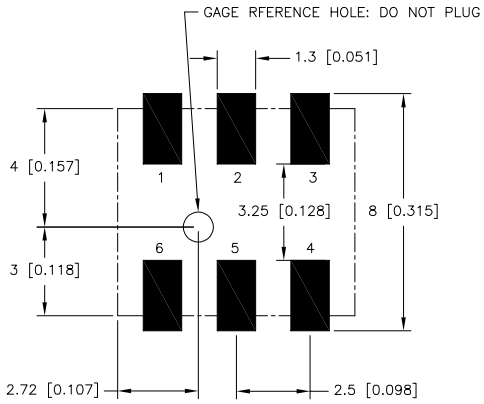
DIP



SMT



Leadless SMT



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