



ALL SENSORS®
an Amphenol company

AABP Pressure Sensor Series

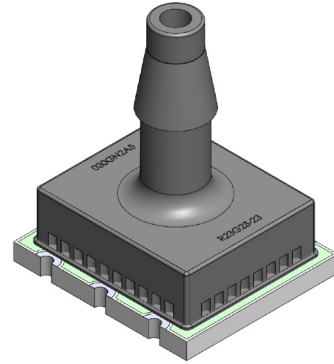
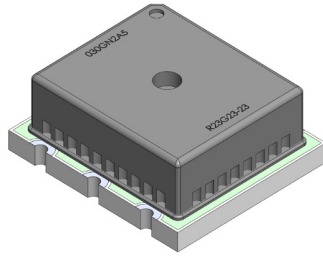
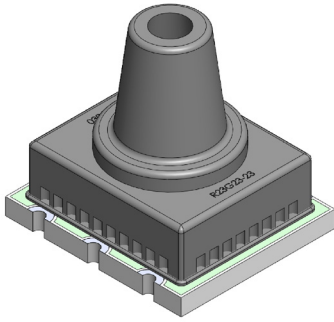


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Introduction

The AABP series are piezoresistive silicon pressure sensors offering a digital or ratiometric analog output over the specified pressure and temperature range.

The sensors in this series are fully calibrated and temperature compensated using on board Application Specific Integrated Circuit (ASIC) in a compact package.



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AABP SERIES PRESSURE SENSORS

Features

- Compact footprint 8mm x 7mm
- Total Error Band $\pm 1.5\%$ FSS
- Wide Pressure Range: 5PSI to 150PSIG
- Output: Digital I2C or SPI or Ratiometric Analog
- Single Power Supply of 3.3V or 5V
- Calibrated Over Temperature Range: 0°C to 50°C [32°F to 122°F]

Applications

- Medical Instrumentation
- Environmental Controls
- HVAC

Pressure Ranges

| Device | Pressure Range | Proof Pressure ¹ | Burst Pressure ² |
|--------|----------------|-----------------------------|-----------------------------|
| 005G | 0 to 5 PSIG | 15 PSIG | 25 PSIG |
| 015G | 0 to 15 PSIG | 45 PSIG | 75 PSIG |
| 030G | 0 to 30 PSIG | 90 PSIG | 150 PSIG |
| 060G | 0 to 60 PSIG | 120 PSIG | 200 PSIG |
| 100G | 0 to 100 PSIG | 200 PSIG | 250 PSIG |
| 150G | 0 to 150 PSIG | 200 PSIG | 250 PSIG |

Note 1: Proof Pressure: The maximum pressure which may safely be applied to the sensor for it to remain in specification once pressure is returned to the operating pressure range.

Note 2: Burst pressure: The maximum pressure that may be applied to the sensor without causing escape of pressure media. The sensor should not be expected to function after exposure to any pressure beyond the burst pressure.

| Pressure Sensor Maximum Ratings | | Environmental Specifications | |
|--------------------------------------|---------------------|--|--------------------------------|
| Supply Voltage (Vs) | 6 Vdc | Temperature Ranges | |
| Voltage on any pin | -0.3 to Vs+ 0.3 Vdc | Operating | -40°C to 85°C [-40°F to 185°F] |
| Digital Interface Frequency | | Compensated | 0°C to 50°C [32°F to 122°F] |
| I2C | 100 to 400 kHz | Storage | -40°C to 85°C [-40°F to 185°F] |
| SPI | 50 to 800 kHz | Humidity Limits (non condensing) | 0 to 95% RH |
| Reflow Temperature & Time | 15s max at 250°C | Media | non-corrosive gases |
| | | Wetted Materials | |
| | | Alumina ceramic, high temp polyamide, epoxy, silicone, glass, gold, aluminum | |

Performance Characteristics

| Parameter | Analog | | | Digital | | | Units | Notes |
|--|--------|------|----------|---------|------|----------|---------|---------|
| | Min | Typ | Max | Min | Typ | Max | | |
| Supply Voltage (Vs) | | | | | | | | |
| 3.3 Vdc | 3.00 | 3.30 | 3.60 | 3.00 | 3.30 | 3.60 | VDC | 1, 2, 3 |
| 5 Vdc | 4.75 | 5.00 | 5.25 | 4.75 | 5.00 | 5.25 | VDC | 1, 2, 3 |
| Supply Current | | | | | | | | |
| 3.3 Vdc | - | 2.1 | 2.8 | - | 3.1 | 3.9 | mA | - |
| 5 Vdc | - | 2.7 | 3.8 | - | 3.7 | 4.6 | mA | - |
| Sleep Mode Option | - | - | - | - | 1 | 10 | µA | - |
| Compensated Temperature Range | 0 [32] | - | 50 [122] | 0 [32] | - | 50 [122] | °C [°F] | 4 |
| Temperature Output Option | - | - | - | - | ±2.0 | - | °C | 5 |
| Startup Time (Powerup to Data Ready) | - | - | 5 | - | - | 3 | ms | - |
| Response Time | - | 1.00 | - | - | 0.46 | - | ms | - |
| Clipping Limit | | | | | | | | |
| Upper | - | - | 97.50 | - | - | - | %Vs | - |
| Lower | 2.5 | - | - | - | - | - | %Vs | - |
| I2C/SPI Voltage Level | | | | | | | | |
| Low | - | - | - | - | - | 20 | %Vs | - |
| High | - | - | - | 80 | - | - | %Vs | - |
| Pull Up on SDA/MISO, SCL/SCLK, SS | - | - | - | 1 | - | - | kΩ | - |
| Total Error Band (TEB) | - | - | ±1.5 | - | - | ±1.5 | %FSS | 6, 7 |
| Accuracy (BFSL) | - | - | ±0.25 | - | - | ±0.25 | %FSS | 8 |
| Long Term Stability (1000 hrs, 25°C [77°F]) | - | - | ±0.25 | - | - | ±0.25 | %FSS | - |
| Output Resolution | | | | | | | | |
| | 0.03 | - | - | - | - | - | %FSS | - |
| | - | - | - | 12 | - | - | bits | - |

Specification Notes

NOTE 1: SENSORS ARE EITHER 3.3 VDC OR 5.0 VDC BASED ON THE DEVICE LISTING SELECTED.

NOTE 2: RATIOMETRICITY OF THE SENSOR (OUTPUT IS PROPORTIONAL TO SUPPLY VOLTAGE) IS ACHIEVED WITHIN THE SPECIFIED OPERATING VOLTAGE.

NOTE 3: THE SENSOR IS NOT REVERSE POLARITY PROTECTED. INCORRECT CONNECTION OF SUPPLY VOLTAGE OR GROUND MAY CAUSE ELECTRICAL FAILURE.

NOTE 4: COMPENSATED TEMPERATURE RANGE IS THE TEMPERATURE RANGE OVER WHICH THE SENSOR WILL PRODUCE AN OUTPUT PROPORTIONAL TO THE PRESSURE WITHIN THE SPECIFIED PERFORMANCE LIMITS.

NOTE 5: TEMPERATURE OUTPUT OPTION: TYPICAL TEMPERATURE OUTPUT ERROR OVER THE COMPENSATED TEMPERATURE RANGE OF 0°C TO 50°C. OPERATING IN SLEEP MODE MAY AFFECT TEMPERATURE OUTPUT ERROR DEPENDING ON DUTY CYCLE.

NOTE 6: TOTAL ERROR BAND: THE MAXIMUM DEVIATION FROM AN IDEAL TRANSFER FUNCTION OVER THE ENTIRE COMPENSATED PRESSURE AND TEMPERATURE RANGE. INCLUDES ALL ERRORS FROM OFFSET, SPAN, NON-LINEARITY, PRESSURE HYSTERESIS, REPEATABILITY, THERMAL EFFECT ON OFFSET, SPAN AND HYSTERESIS.

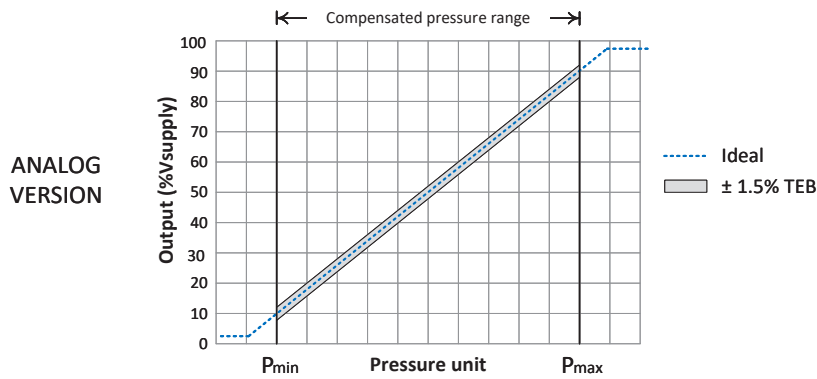
NOTE 7: FULL SCALE SPAN (FSS): THE ALGEBRAIC DIFFERENCE BETWEEN THE OUTPUT MEASURED AT THE MAXIMUM AND MINIMUM LIMITS OF THE SPECIFIED PRESSURE RANGE.

NOTE 8: 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] INCLUDING ALL ERRORS FROM PRESSURE NON-LINEARITY, PRESSURE HYSTERESIS, AND NON-REPEATABILITY.

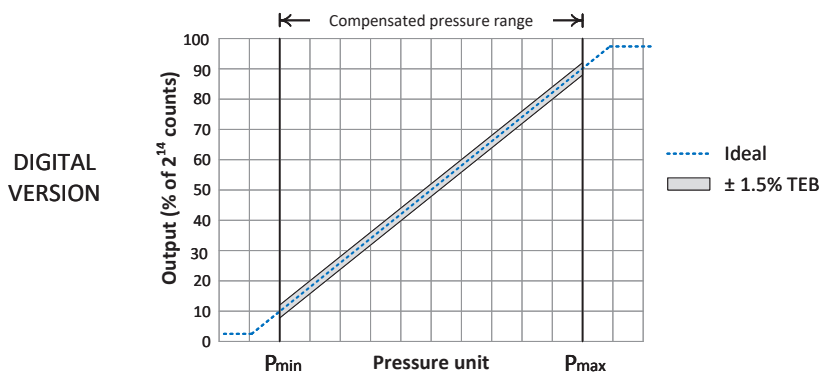
Sensor Output at Significant Percentages (Digital Version Only)

| % OUTPUT | DIGITAL COUNTS | |
|----------|----------------|--------|
| | DECIMAL | HEX |
| 0 | 0 | 0x0000 |
| 10 | 1638 | 0x0666 |
| 50 | 8192 | 0x2000 |
| 90 | 14746 | 0x399A |
| 100 | 16383 | 0x3FFF |

Transfer Functions



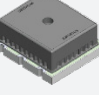


$$\text{Output(V)} = \frac{0.8 \times V_s \times (\text{Pressure}_{\text{applied}} - P_{\min})}{P_{\max} - P_{\min}} + 0.1 \times V_s$$



$$\text{Output(counts)} = \left[\frac{0.8 \times (\text{Pressure}_{\text{applied}} - P_{\min})}{P_{\max} - P_{\min}} + 0.1 \right] \times 2^{14}$$

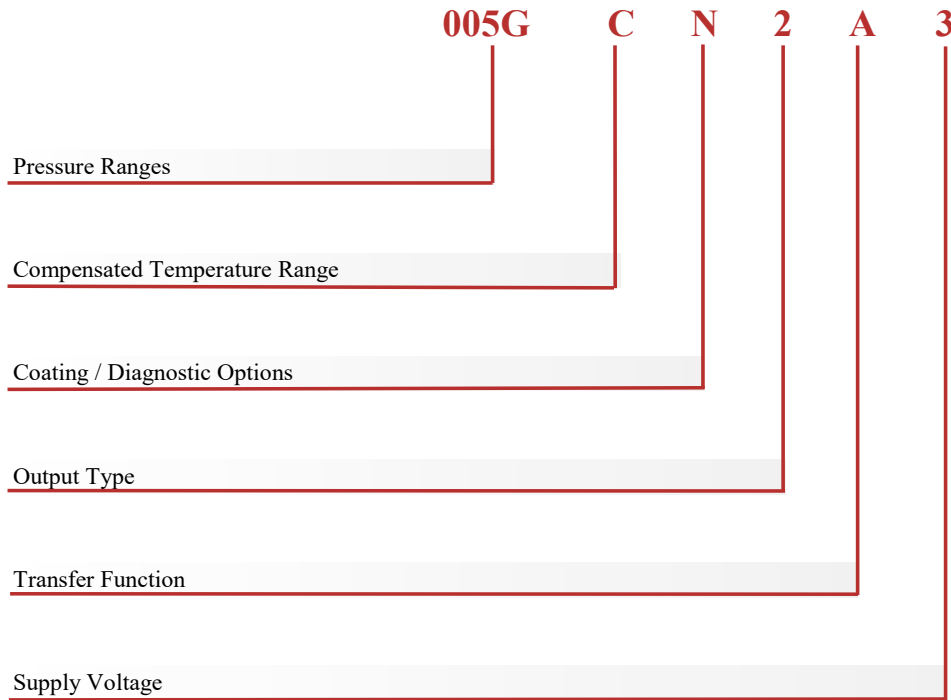
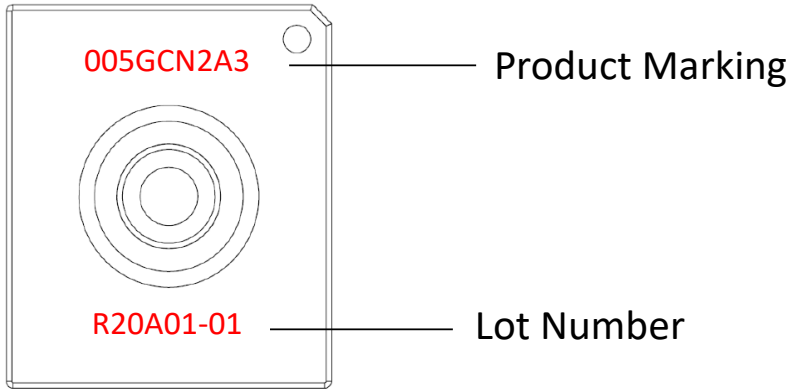
How to Order Table

| Product Series | | Supply Voltage | |
|-------------------------------|--|-------------------|--|
| AABP | Digital and Analog Pressure Sensor Series | 3 | 3.3 VDC |
| | | 5 | 5.0 VDC |
| Pressure Ranges | | Transfer Function | |
| 005G | 0 - 5 PSIG | A | 10% to 90% of V _{supply} (analog), 2 ¹⁴ counts (digital), no temperature output, no sleep mode |
| 015G | 0 - 15 PSIG | D | 10% to 90% of 2 ¹⁴ counts (digital only), temperature output enabled, sleep mode enabled |
| 030G | 0 - 30 PSIG | S | 10% to 90% of 2 ¹⁴ counts (digital only), no temperature output, sleep mode enabled |
| 060G | 0 - 60 PSIG | T | 10% to 90% of 2 ¹⁴ counts (digital only), temperature output enabled, no sleep mode |
| 100G | 0 - 100 PSIG | | |
| 150G | 0 - 150 PSIG | | |
| Package Selection | | Output Type | |
| HANN |  | A | Analog 3 I ² C, Address 0x38 |
| HLNN |  | S | SPI 4 I ² C, Address 0x48 |
| HNNN |  | 0 | I ² C, Address 0x08 5 I ² C, Address 0x58 |
| | | 1 | I ² C, Address 0x18 6 I ² C, Address 0x68 |
| | | 2 | I ² C, Address 0x28 7 I ² C, Address 0x78 |
| Compensated Temperature Range | | Coating | |
| C | 0°C to 50°C | C | No Parylene, Diagnostic On |
| | | E | Parylene, Diagnostic On |
| | | N | No Parylene, Diagnostic Off |
| | | P | Parylene, Diagnostic Off |

Note: Custom pressure ranges are available. Please contact the factory for more information.

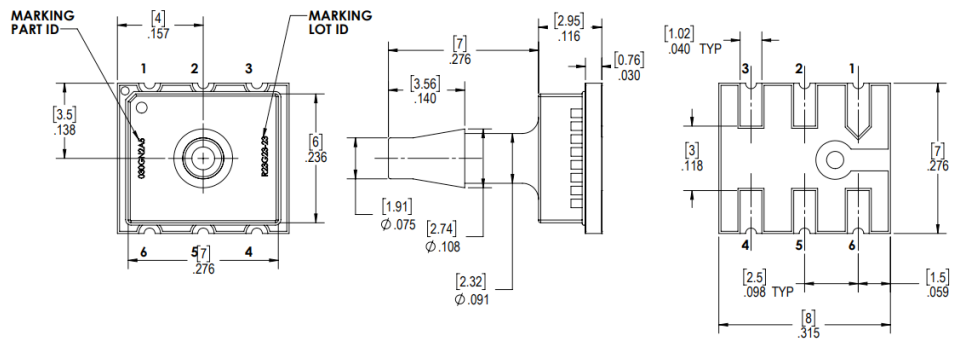
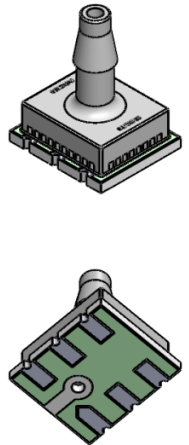
Product Marking

Product Marking Example for Part Number:
AABP-005G-HANN-C-N2A3

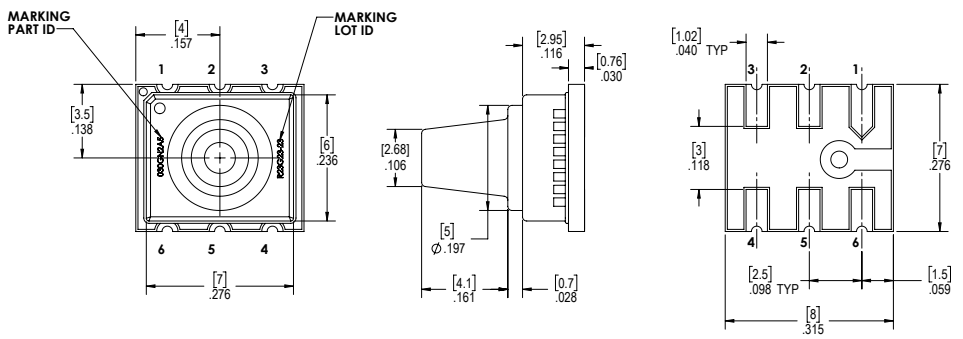
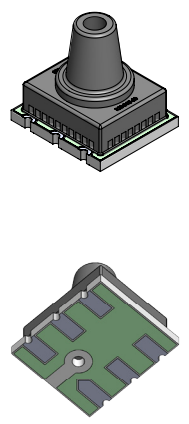


Package Drawings

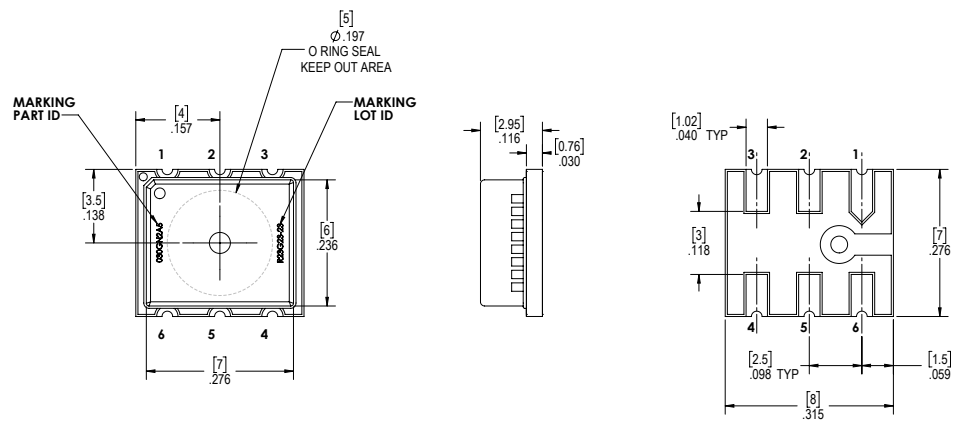
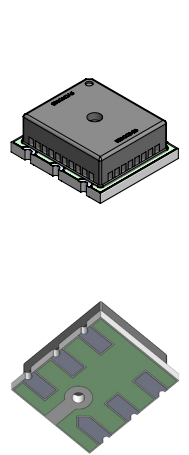
AN: Single Axial Barbed Port



LN: Single Axial Barbless Port

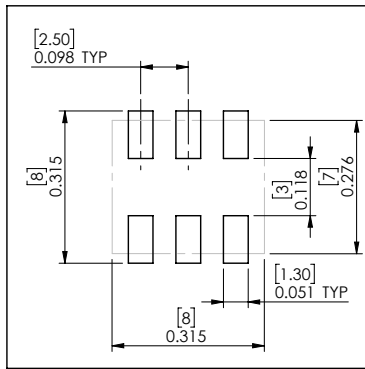


NN: No Port



Dimensions in inches [mm]

Suggested PAD Layout



PAD-36

Pinouts

| OUTPUT TYPE | PIN 1 | PIN 2 | PIN 3 | PIN 4 | PIN 5 | PIN 6 |
|-------------|-------|-------|-------|-------|-------|-------|
| Analog | GND | N/C | Vout | N/C | N/C | Vs |
| I2C | GND | Vs | INT | N/C | SDA | SCL |
| SPI | GND | Vs | SS | N/C | MISO | SCLK |

* N/C: Not internally connected

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