

## Microstructure Pressure Sensors

0 psi to 1 psi through 0 psi to 100 psi

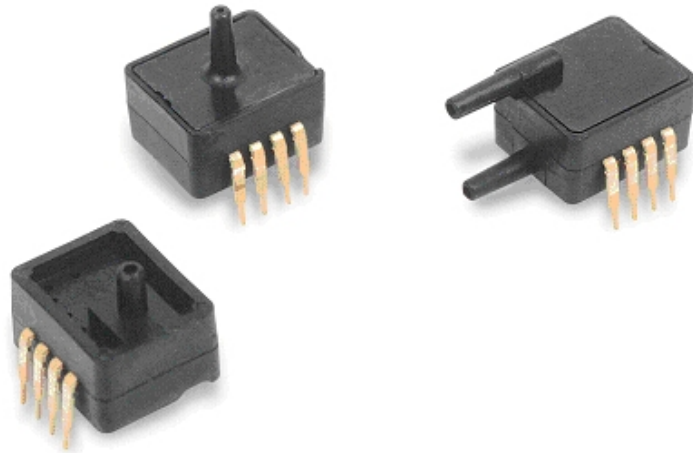
*ASDX DO Series*

### FEATURES

- Available in Absolute, Differential and Gage types
- Calibrated and temperature compensated output
- Pressure ranges from 0 psi to 1 psi through 0 psi to 100 psi
- Response time 8 ms
- Standard DIP package
- ASIC Enhanced Output
- I<sup>2</sup>C Compatible Protocol
- Temperature Compensated

### TYPICAL APPLICATIONS

- Flow calibrators
- Ventilation and air flow monitors
- Gas flow instrumentation
- Dialysis equipment
- Sleep apnea monitoring and therapy equipment
- HVAC Controls
- Barometry
- Pneumatic Controls



The ASDX DO series pressure sensors are fully calibrated and temperature compensated with on-board Application Specific Integrated Circuitry (ASIC). This ASDX DO device is in a standard DIP package and provides digital correction of sensor offset, sensitivity, temperature coefficients and non-linearity. The ASDX family uses I<sup>2</sup>C compatible protocol, which allows easy interfacing to most commonly used microcontrollers and microprocessors without additional components or electronic circuitry.

The 2-wire I<sup>2</sup>C interface has a Serial Clock Line (SCL) input and serial digital output data line. The output of the device is a corrected pressure value in hexadecimal format with 12-bit resolution. Devices are available to measure absolute, differential, and gage pressures. The absolute devices have an internal vacuum reference and an output proportional to absolute pressure. Differential devices allow application of pressure to either side of the sensing diaphragm and can be used for gage or differential measurements.

All ASDX DO devices are accurate to within  $\pm 2.0$  % full scale. The devices are characterized for operation from a single 5 Vdc supply. The sensor is designed and manufactured according to standards laid down in ISO 9001. These devices are intended for use with non-corrosive, non-ionic working fluids such as air and dry gases.

Contact your local Honeywell representative, or go to the Honeywell website at [www.honeywell.com/sensing](http://www.honeywell.com/sensing) for additional product information.

### **WARNING**

#### **PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

### **WARNING**

#### **MISUSE OF DOCUMENTATION**

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

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## GENERAL SPECIFICATIONS

Supply Voltage (Vs)	4.75 Vdc to 5.25 Vdc
Maximum Supply Voltage*	6.50 Vdc max.
Current Consumption	6 mA typ.
Output current - sink	2 mA max.
Output current - source	2 mA max.
Lead Soldering Temperature	2 Sec to 4 Sec @ 250 °C [482 °F]

## ENVIRONMENTAL SPECIFICATIONS (ALL DEVICES)

<b>Temperature Ranges:</b>	
Compensated	0 °C to 85 °C [32 °F to 185 °F]
Operating	-20 °C to 105 °C [-4 °F to 221 °F]
Storage	-40 °C to 125 °C [-40 °F to 257 °F]
Vibration	10 g at 20 Hz to 2000 Hz
Shock	100 g for 11 ms
Life	1 Million cycles minimum

## PERFORMANCE CHARACTERISTICS 4R DO<sup>(1,5)</sup>

Characteristic	Symbol	Min.	Typ.	Max.	Units
Zero pressure offset	Hoff	158	19A	1DB	counts hex
Full scale span <sup>(2)</sup>	Hfss		CCC		counts hex
Output at Full Scale Pressure	Hfso	E25	E66	EA8	counts hex
Accuracy <sup>(3)</sup>	–	–	–	± 2.0	% H full scale
Response time <sup>(4)</sup>	–	–	8	11	ms

## PERFORMANCE CHARACTERISTICS 4D DO<sup>(1,5)</sup>

Characteristic	Symbol	Min.	Typ. <sup>(5)</sup>	Max.	Units
Zero pressure offset	Hoff	7BE	800	841	counts hex
Full scale span <sup>(2)</sup>	Hfss		CCC		counts hex
Output at Full Scale Pressure (P2) <sup>(6)</sup>	Hfso	E25	E66	EA8	counts hex
Output at Full Scale Pressure (P1) <sup>(6)</sup>	Hfso	158	19A	1DB	counts hex
Accuracy <sup>(3)</sup>	–	–	–	± 2.0	% H full scale
Output Resolution	–	–	12	–	Bit
Response time <sup>(4)</sup>	–	–	8	11	ms

## Specification Notes:

- Note 1:** Reference Conditions (unless otherwise noted): Supply voltage,  $V_S=5.0 \pm 0.01$  Vdc;  $T_a=25$  °C [77 °F]. Output is ratiometric within the supply voltage range (Vs).
- Note 2:** Span is the algebraic difference between the output voltage at the specified high pressure and the output at lowest pressure. Span is ratiometric to the supply voltage.
- Note 3:** Accuracy is the combined errors from offset and span calibration, linearity, pressure hysteresis, and temperature effects. Linearity is the measured deviation based on a straight line. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure. Calibration errors include the deviation of offset and full scale from nominal values.
- Note 4:** Response time for 0 psi to full scale pressure step change, 10 % to 90 % rise time.
- Note 5:** Read operation: Start, Slave Address, R/W=1, Data Byte 1 (MSB), Ackn Bit, Data Byte 2 (LSB). The output is corrected pressure as unsigned 12 bits. Slave Address is F0h. Acknowledge Bit - pull data line LOW, master generates an extra clock pulse for this purpose.
- Note 6:** Output of the device when maximum positive pressure is applied on the backside (P2) or the front side (P1) of the sensing element.
- Note 7:** If maximum burst pressure is exceeded, even momentarily, the package may leak or burst, or the pressure sensing die may fracture.

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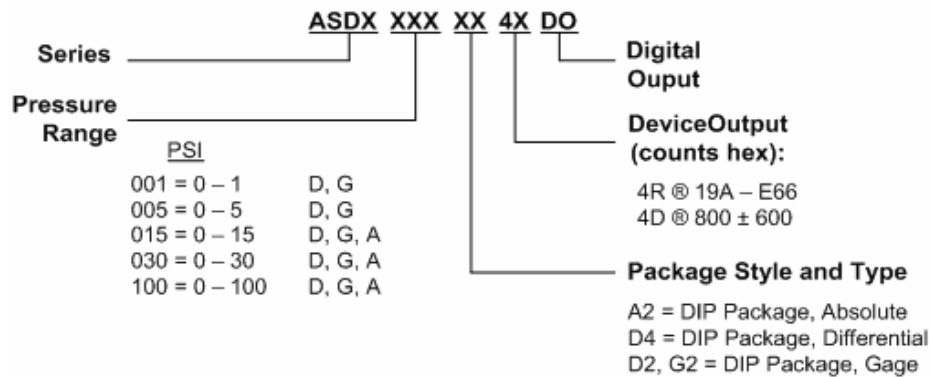
0 psi to 1 psi through 0 psi to 100 psi

ASDX DO Series

## PRESSURE RANGE SPECIFICATIONS

Listing	Pressure Range	Burst Pressure <sup>(6)</sup>
ASDX001	0 psi to 1.0 psi	5 psi
ASDX005	0 psi to 5.0 psi	20 psi
ASDX015	0 psi to 15 psi	30 psi
ASDX030	0 psi to 30 psi	60 psi
ASDX100	0 psi to 100 psi	150 psi

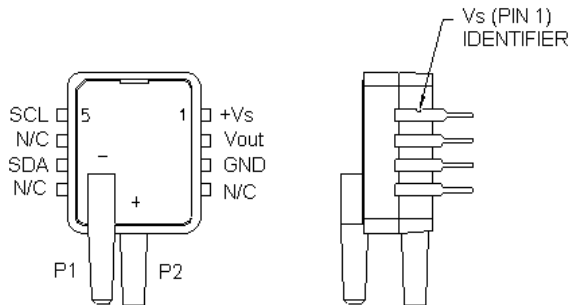
## ORDERING INFORMATION – PART NUMBER DESCRIPTION



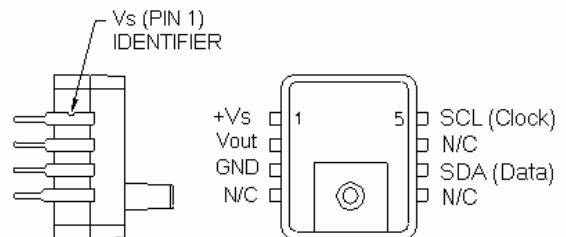
For example: Part #ASDX015A24RDO = ASDX series, 15 psi absolute, A2 Package, 19A – E66 counts output, digital output

## ELECTRICAL CONNECTIONS <sup>(1)(2)(3)(4)</sup>

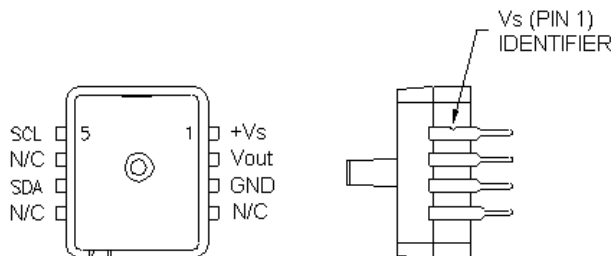
### ASDXXXXD4DO



### ASDXXXXG2DO



### ASDXXXXA2DO



**Note 1:** Pin 6 must be left open

**Note 2:** Capacitor 220 nF required between +Vs and GND, and 15 nF between Vout and GND.

**Note 3:** The sensor is not reverse polarity protected. Incorrect application of excitation voltage or ground to the wrong pin can cause electrical failure. Application of supply voltage above the maximum can cause electrical failure.

**Note 4:** N/C means no connection, connecting to ground or other potential may damage sensor.

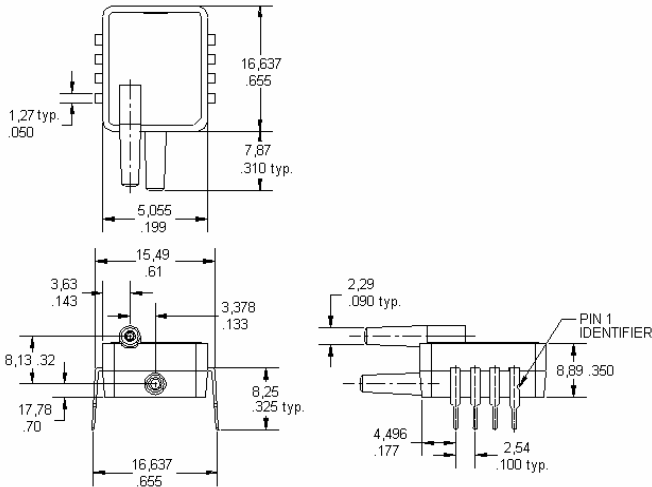
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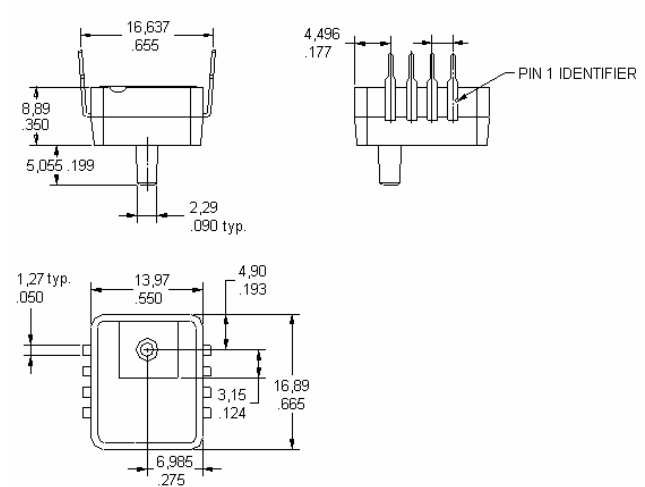
*ASDX DO Series*

**DIMENSIONS Drawings - for reference only mm [in]**

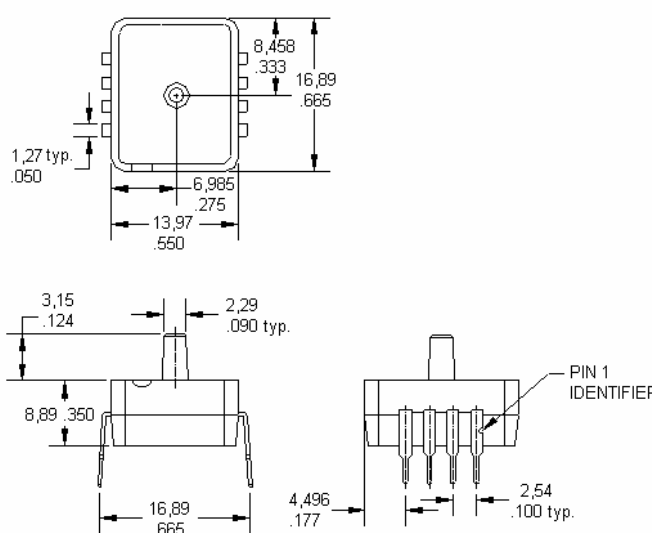
## D4 PACKAGE



## G2 PACKAGE

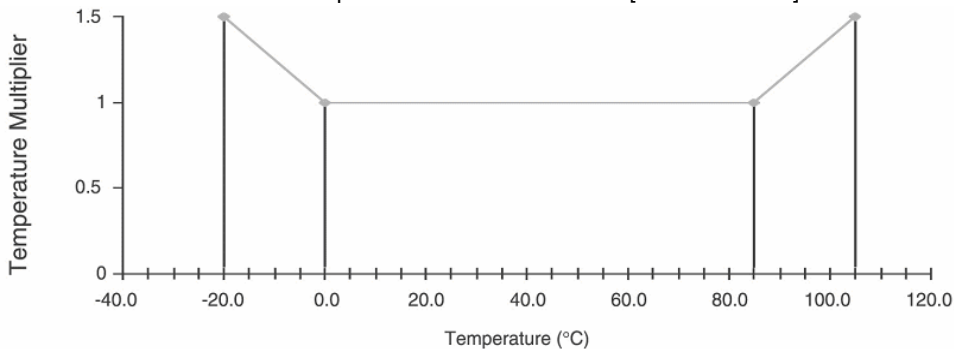


## A2 PACKAGE



## PRESSURE TRANSDUCER PERFORMANCE CHARACTERISTICS

Error Band Multiplier Over -20 °C to 105 °C [-4 °F to 221 °F]



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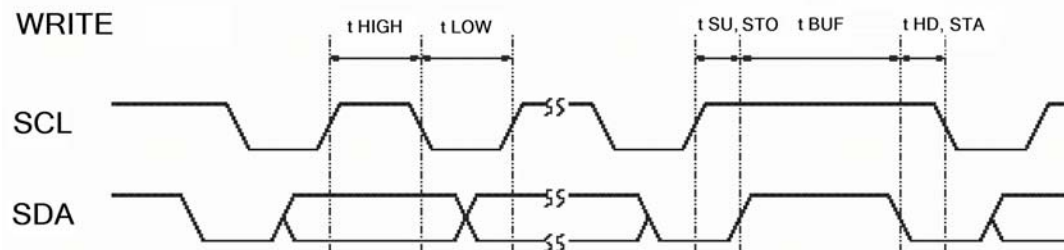
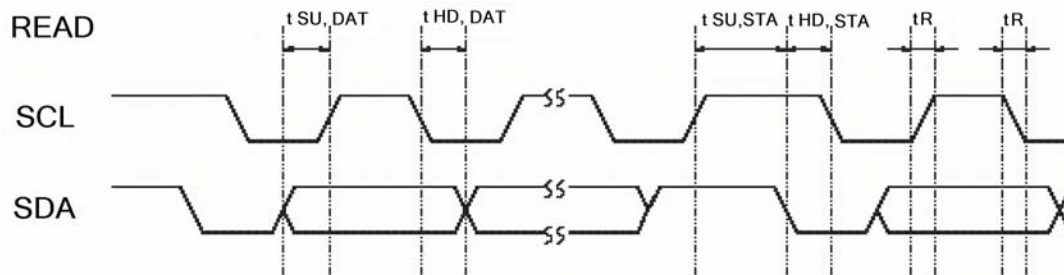
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## SERIAL INTERFACE PARAMETERS

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input High Level	$V_{IH}$		4.5	–	1	Vs
Input Low Level	$V_{IL}$		0	–	0.5	Vs
Output Low Level	$V_{OL}$	Open Drain $I_{OL} = -4$ mA		–	0.1	Vs
Pull up Current	$V_{OH}$	Pin SCL and SDA	5	–	20	$\mu$ A
Load Capacitance SDA	$CL_{SDA}$		–	–	400	pF
SCL clock frequency	$f_{SCL}$		–	–	100	kHz
Bus free time between STOP and START condition	$t_{BUF}$		4.7	–	–	$\mu$ s
Hold time (repeated) START condition	$t_{HD,STA}$	To first clock pulse	4.0	–	–	$\mu$ s
LOW period of SCL	$t_{LOW}$		4.7	–	–	$\mu$ s
High period of SCL	$t_{HIGH}$		4.0	–	–	$\mu$ s
Setup time repeated START condition	$t_{SU,STA}$		4.7	–	–	$\mu$ s
Data hold time	$t_{HD,DAT}$		0	–	–	ns
Data setup time	$t_{SU,DAT}$		250	–	–	ns
Rise time of both SDA and SCL	$t_R$		–	–	300	ns
Fall time of both SDA and SCL			–	–	300	ns
Setup time for STOP condition	$t_{SU,STO}$		4	–	–	$\mu$ s
Input filter spike suppression	$t_{sp}$	Spikes on SDA or SCL of that length are suppressed	–	–	50	$\mu$ s

## SERIAL INTERFACE TIMING CHARACTERISTICS



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## ORDERING INFORMATION To order, use the following part number(s)

Pressure Range	Differential/Gage	Gage	Absolute
0 psi to 1.0 psi	ASDX001D44R-DO	ASDX001G24R-DO	-
	ASDX001D44D-DO	-	-
0 psi to 5.0 psi	ASDX005D44R-DO	ASDX005G24R-DO	-
	ASDX005D44D-DO	-	-
0 psi to 15 psi	ASDX015D44R-DO	ASDX015G24R-DO	ASDX015A24R-DO
	ASDX015D44D-DO	-	-
0 psi to 30 psi	ASDX030D44R-DO	ASDX030G24R-DO	ASDX030A24R-DO
	ASDX030D44D-DO	-	-
0 psi to 100 psi	ASDX100D44R-DO	ASDX100G24R-DO	ASDX100A24R-DO

## WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For application assistance, current specifications, or name of the nearest Authorized Distributor, contact a nearby sales office. Or call:

1-800-537-6945 USA

1-800-737-3360 Canada

1-815-235-6847 International

### FAX

1-815-235-6545 USA

### INTERNET

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[info.sc@honeywell.com](mailto:info.sc@honeywell.com)

**Honeywell**

## Sensing and Control

[www.honeywell.com/sensing](http://www.honeywell.com/sensing)

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