

Installation Instructions for the

Issue 5

50063864

TruStability® Board Mount Pressure Sensors

TSC Series, Compensated/Unamplified

 ± 60 mbar to ± 10 bar | ± 6 kPa to ± 1 MPa | ± 1 psi to ± 150 psi Millivolt Analog Output

NSC Series, Uncompensated/Unamplified

 ± 2.5 mbar to ± 10 bar $|\pm 250$ Pa to ± 1 MPa $|\pm 1$ inH $_2$ O to ± 150 psi Millivolt Analog Output

Honeywell's TruStability® TSC Series and NSC Series are piezoresistive silicon pressure sensors offering a ratiometric analog output for reading pressure over the specified full scale pressure span and temperature range.

TSC Series:

- Temperature compensated and unamplified.
- Compensation makes it easier to integrate the sensor into a system by eliminating the need to calibrate the system over temperature and also offers reduced part-to-part variation.
- Compensated temperature range is 0 °C to 85 °C [-32 °F to 185 °F].
- Operating temperature range is -40 °C to 85 °C [-40 °F to 185 °Fl
- Measures differential or gage pressures

NSC Series:

- Uncompensated and unamplified.
- Allows customers the flexibility of performing their own calibration while still benefiting from the industry-leading stability, accuracy, and repeatability that the Honeywell TruStability® Pressure Sensors provide.
- Operates as specified from -40 °C to 85 °C [-40 °F to 185 °F].
- Measures absolute, differential or gage pressures.

The absolute versions have an internal vacuum reference and an output value proportional to absolute pressure. Differential versions allow measurement of pressure between two pressure ports. Gage versions are referenced to atmospheric pressure and provide an output proportional to pressure variations from atmosphere.

The TSC Series and NSC Series sensors are intended for use with non-corrosive, non-ionic gases, such as air. Port 1 can also be used for non-corrosive, non-ionic liquids on sensors rated above 60 mbar | 6 kPa | 1 psi.

The TSC and NSC Series offer numerous package styles and mounting options, making it easier for device manufacturers to integrate the product into their applications. These sensors offer infinite resolution on the pressure signal. Frequency response is also typically limited only by the end user's system. All products are designed and manufactured according to ISO 9001.

Table 1. Absolute Maximum Ratings¹

Characteristic	Min.	Max.	Unit
Supply voltage (V _{supply}) ² : pressure ranges ≥60 mbar 6 kPa 1 psi pressure ranges ≤40 mbar 4 kPa 20 inH ₂ O	-12.0 0	12.0 7	Vdc
Storage temperature	-40 [-40]	85 [185]	°C [°F]
Soldering time and temperature: lead solder temperature (SIP, DIP) peak reflow temperature (SMT)		4 s max. at 250 °C [482 °F] 15 s max. at 250 °C [482 °F]	

¹Absolute maximum ratings are the extreme limits the device will withstand without damage.

²Incorrect application of supply voltage or ground to the wrong pin may cause electrical failure.

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Table 2. Operating Specifications

Characteristic	Min.	Тур.	Max.	Unit
Supply voltage (V_{supply}): ^{1, 2} pressure ranges \geq 60 mbar 6 kPa 1 psi pressure ranges \leq 40 mbar 4 kPa 20 H $_2$ O	1.5 2.7	5.0 5.0	12.0 6.5	Vdc
Supply current (at 5.0 Vdc supply) TSC Series NSC Series	_ _	0.6 1.5	1 2.2	mA
Operating temperature range ³	-40 [-40]	_	85 [185]	°C [°F]
Compensated temperature range ⁴	0 [32]	_	85 [185]	°C [°F]
Startup time	_	_	5	ms
TSC Series output resistance	_	2.5	_	kOhm

Ratiometricity of the sensor (the ability of the device output to scale to the supply voltage) is achieved within the specified operating voltage.

Table 3. Environmental Specifications

Characteristic	Parameter			
Humidity	0% to 95% RH, non-condensing			
Vibration	MIL-STD-202F, Method 214A, Condition 1E (15 g, 10 Hz to 2 kHz)			
Shock	MIL-STD-202F, Method 213B, Condition F (100 g, 6 ms duration)			
Life ¹	1 million pressure cycles minimum			
Solder reflow	J-STD-020-D MSL1 (unlimited shelf life when stored at less than 30 °C and 85 %RH)			

¹Life may vary depending on the specific application in which the sensor is utilized.

Table 4. Wetted Materials¹

Component	Port 1 (Pressure Port)	Port 2 (Reference Port)
Ports and covers	high temperature polyamide	high temperature polyamide
Substrate	alumina ceramic	alumina ceramic
Adhesives	epoxy, RTV	epoxy, RTV
Electronic components	silicon	silicon, glass, gold

¹Contact Honeywell Customer Service for detailed material information.

CAUTION PRODUCT DAMAGE

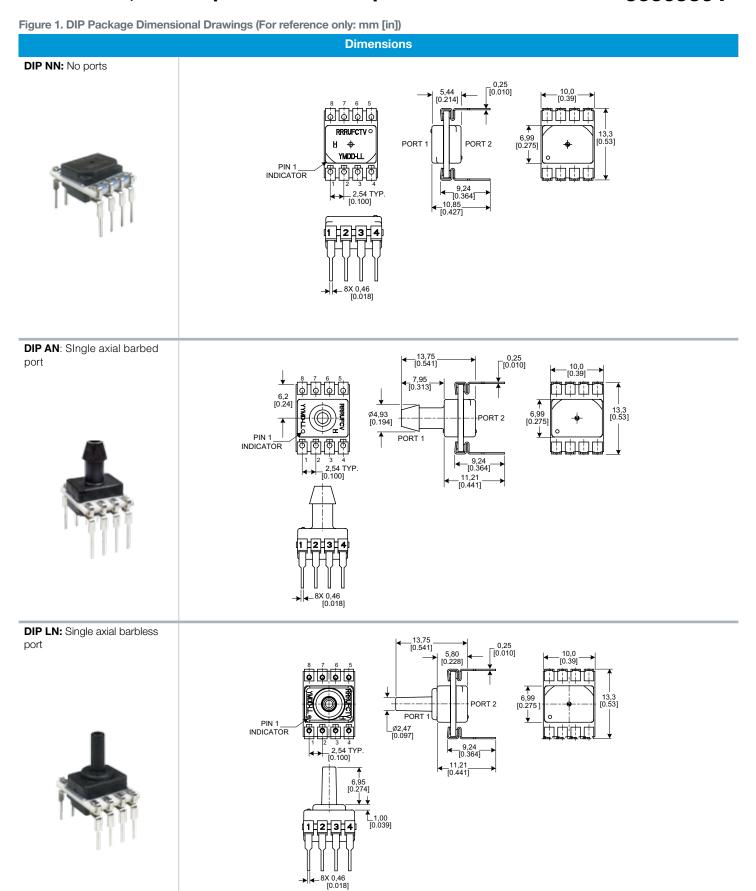
- Ensure liquid media is applied to Port 1 only; Port 2 is not compatible with liquids.
- Ensure liquid media contains no particulates. All TruStability® sensors are dead-ended devices. Particulates can accumulate inside the sensor, causing damage or affecting sensor output.
- Recommend that the sensor be positioned with Port 1 facing downwards; any particulates in the system are less likely to enter and settle within the pressure sensor if it is in this position.
- Ensure liquid media does not create a residue when dried; build-up inside the sensor may affect sensor output.
 Rinsing of a dead-ended sensor is difficult and has limited effectiveness for removing residue.
- Ensure liquid media are compatible with wetted materials.
 Non-compatible liquid media will degrade sensor performance and may lead to sensor failure.

Failure to comply with these instructions may result in product damage.

²Incorrect application of supply voltage or ground to the wrong pin may cause electrical failure.

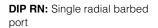
³Operating temperature range: The temperature range over which the sensor will produce an output proportional to pressure.

⁴Compensated temperature range: The temperature range over which the sensor will produce an output proportional to pressure within the specified performance limits.

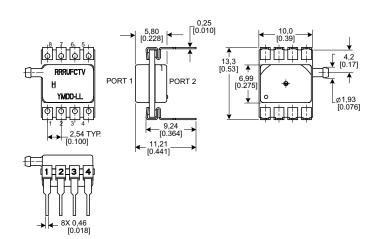


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Figure 1. DIP Package Dimensional Drawings (continued)



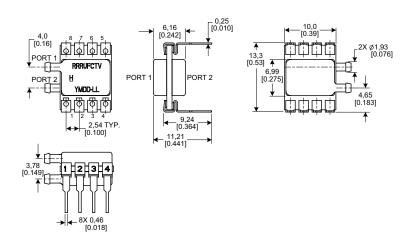




Dimensions

DIP RR: Dual radial barbed ports, same side





DIP DR: Dual radial barbed ports, opposite sides



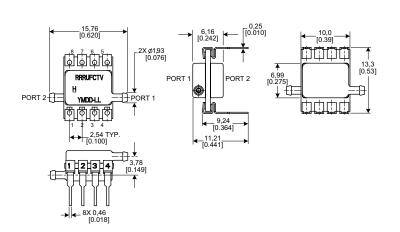


Figure 1. DIP Package Dimensional Drawings (continued)

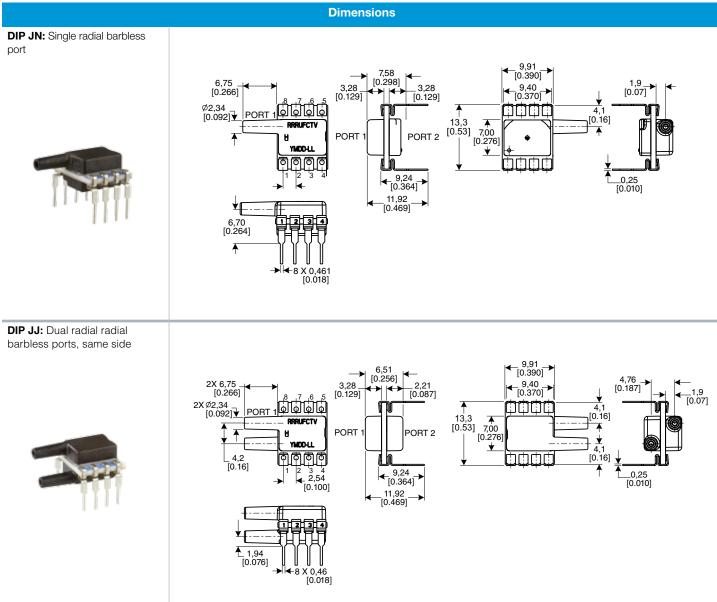
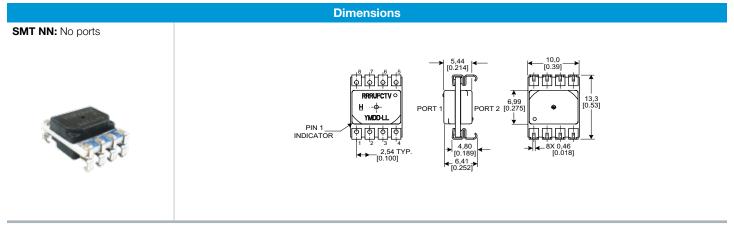


Figure 2. SMT Package Dimensional Drawings (For reference only: mm [in])



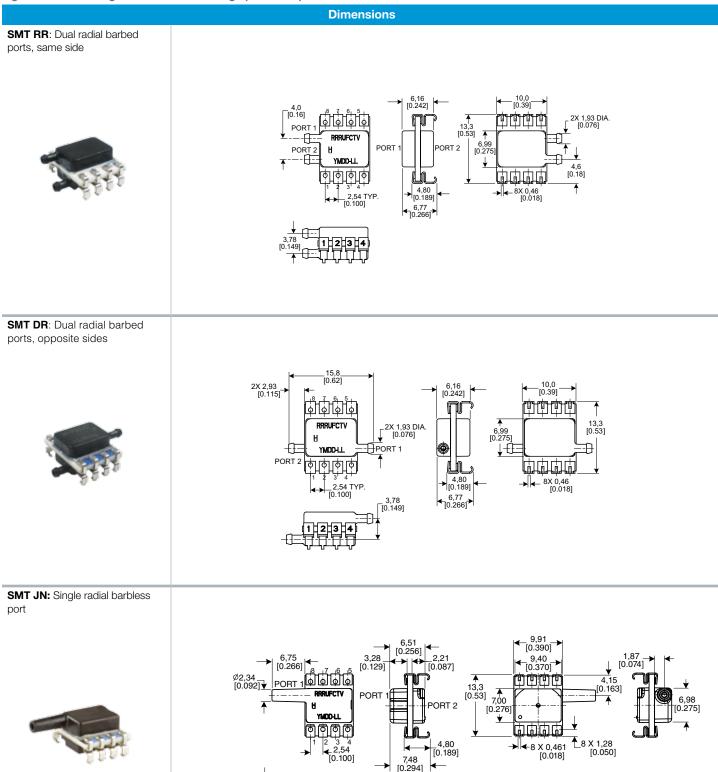
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TSC Series, Compensated/Unamplified NSC Series, Uncompensated/Unamplified

Figure 2. SMT Package Dimensional Drawings (continued) **Dimensions** SMT AN: Single axial barbless port 13,75 [0.541] 13,3 [0.53] PORT 2 INDICATOR € 8X 0,46 [0.018] SMT LN: Single axial barbless port _ 10,0 [0.394] 5,80 [0.228] 0000 PORT 1 PIN 1__ INDICATOR 2,47 DIA. [0.097] **←** 8X 0,46 [0.018] SMT RN: Single radial barbed port 10,0 [0.39] **oo**ot 13,3 [0.53] PORT 1 PORT 1 1,93 DIA. [0.076] _ 2,54 TYP. [0.100]

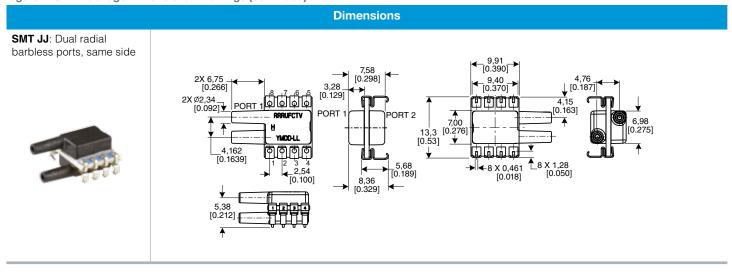
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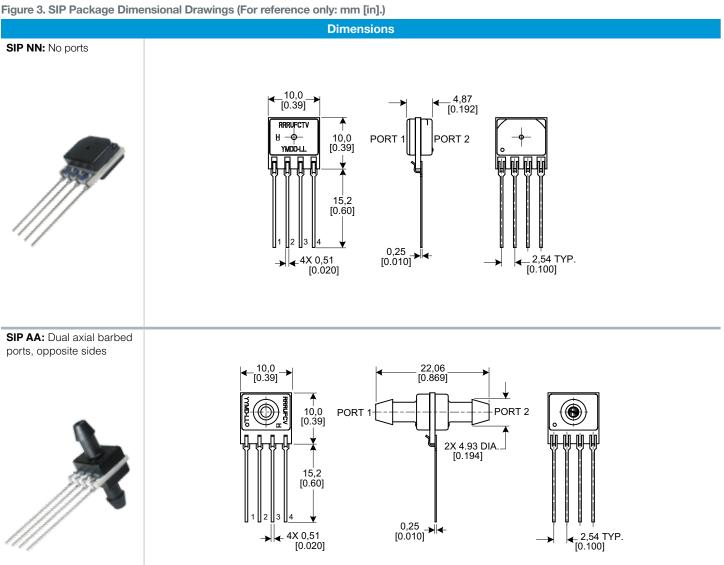
Figure 2. SMT Package Dimensional Drawings (continued)



5,38 [0.212]

Figure 2. SMT Package Dimensional Drawings (continued)





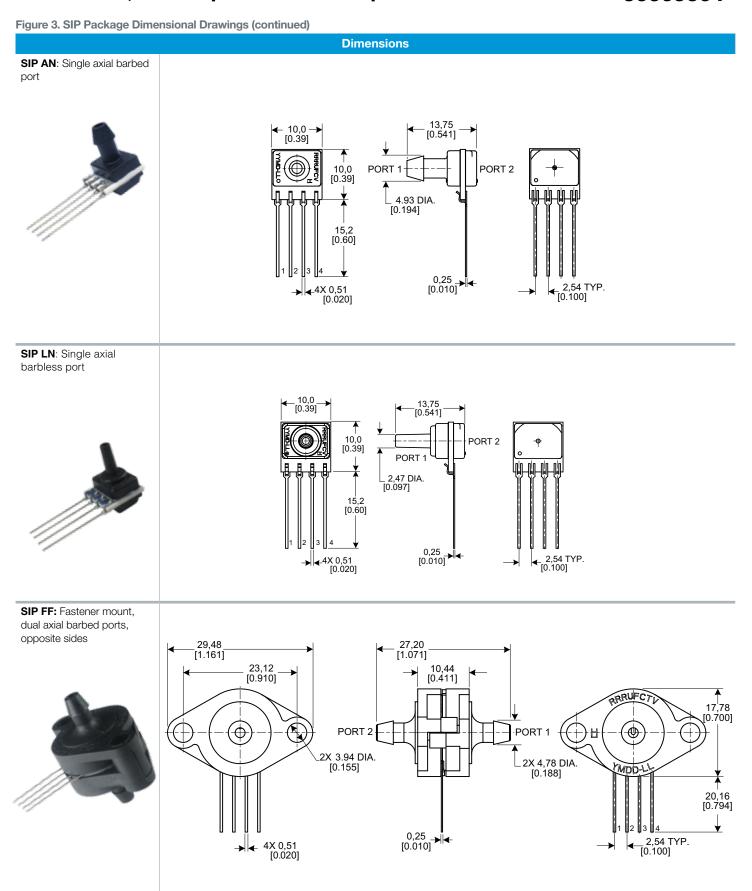
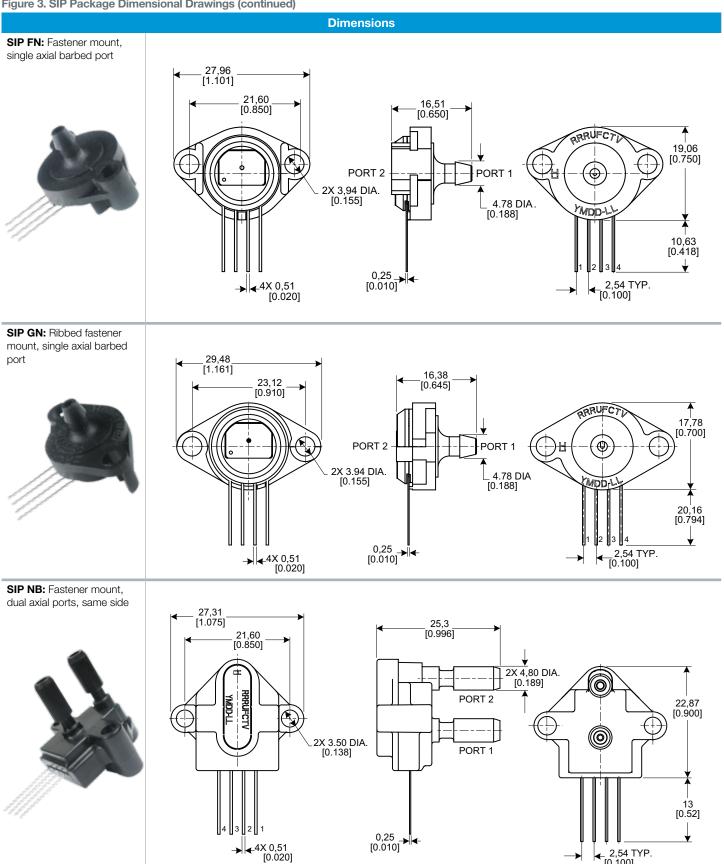


Figure 3. SIP Package Dimensional Drawings (continued)



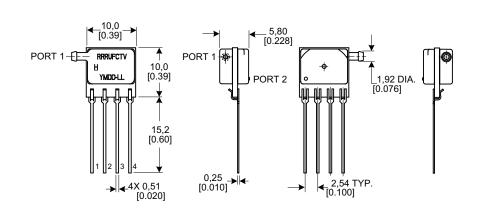
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Figure 3. SIP Package Dimensional Drawings (continued)

Dimensions

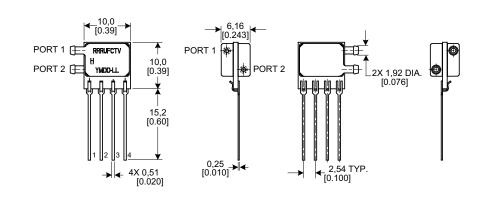
SIP RN: Single radial barbed port





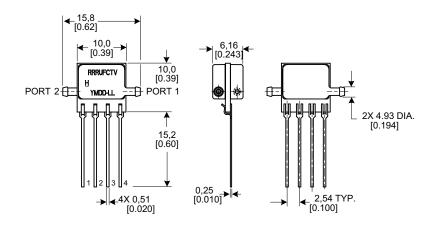
SIP RR: Dual radial barbed ports, opposite sides

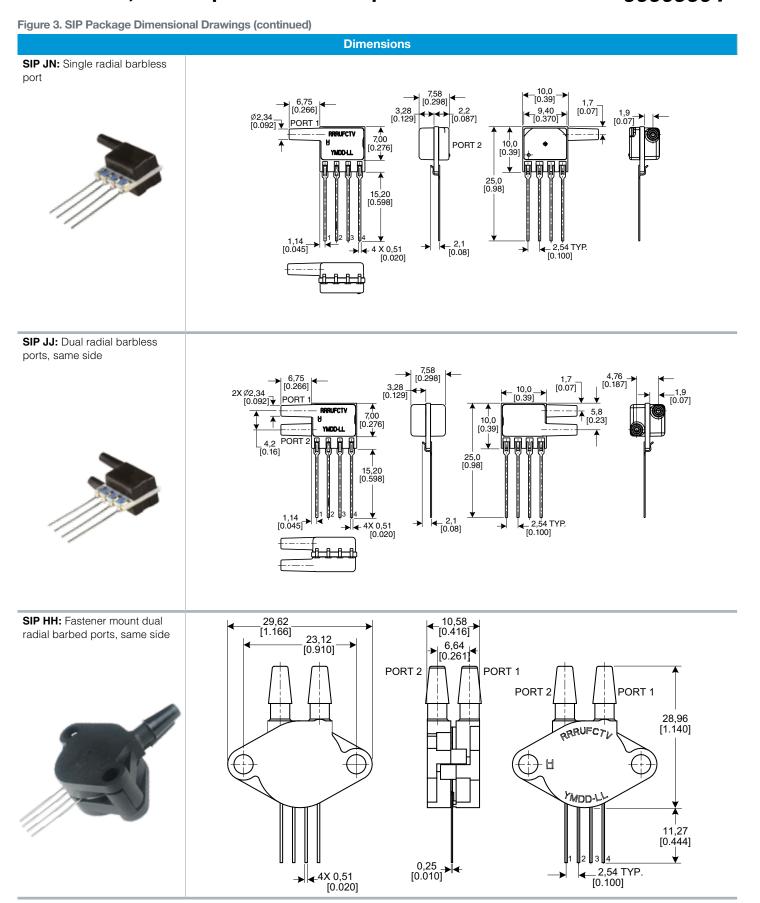




SIP DR: Dual radial barbed ports, opposite sides

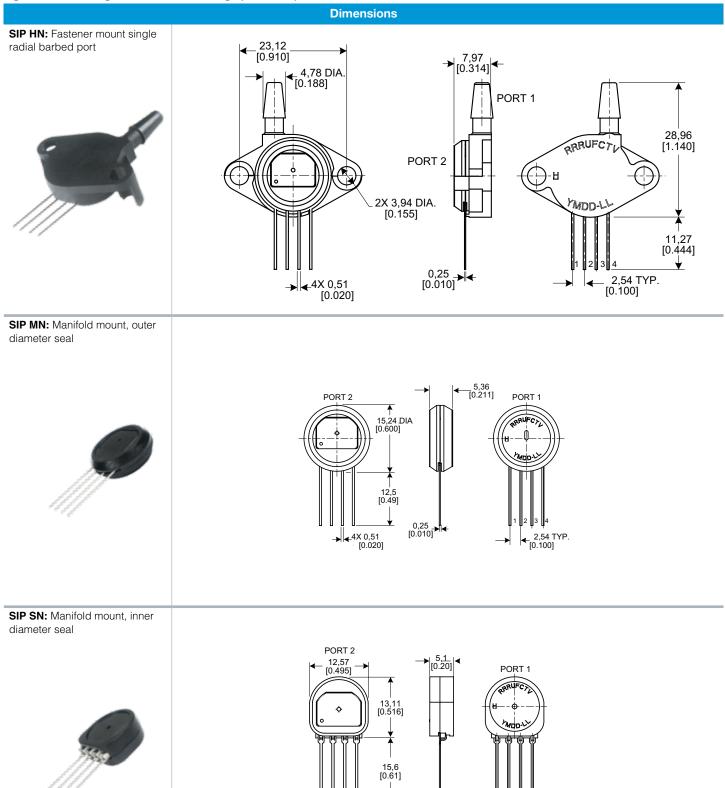






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Figure 3. SIP Package Dimensional Drawings (continued)



→ 4X 0,51 [0.020]

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Table 5. Pinout for DIP and SMT Packages

Output Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
analog	GND	Vout+	V _{supply}	Vout-	NC	NC	NC	NC

Table 6. Pinout for SIP Packages

Output Type	Pin 1	Pin 2	Pin 3	Pin 4
analog	GND	Vout+	V_{supply}	Vout-

Figure 4. Recommended PCB Pad Layouts

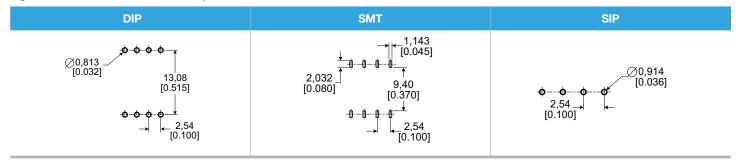
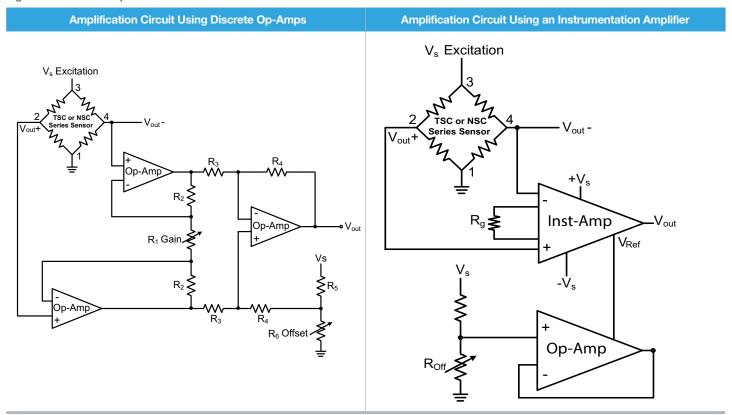


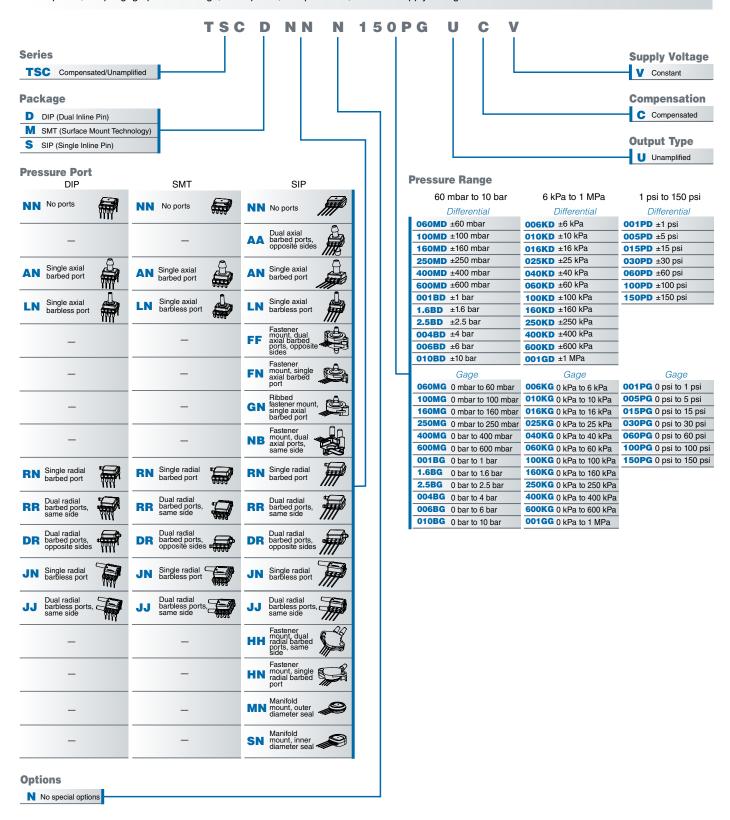
Figure 5. Circuit Examples



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Figure 6. TSC Series Nomenclature and Order Guide¹

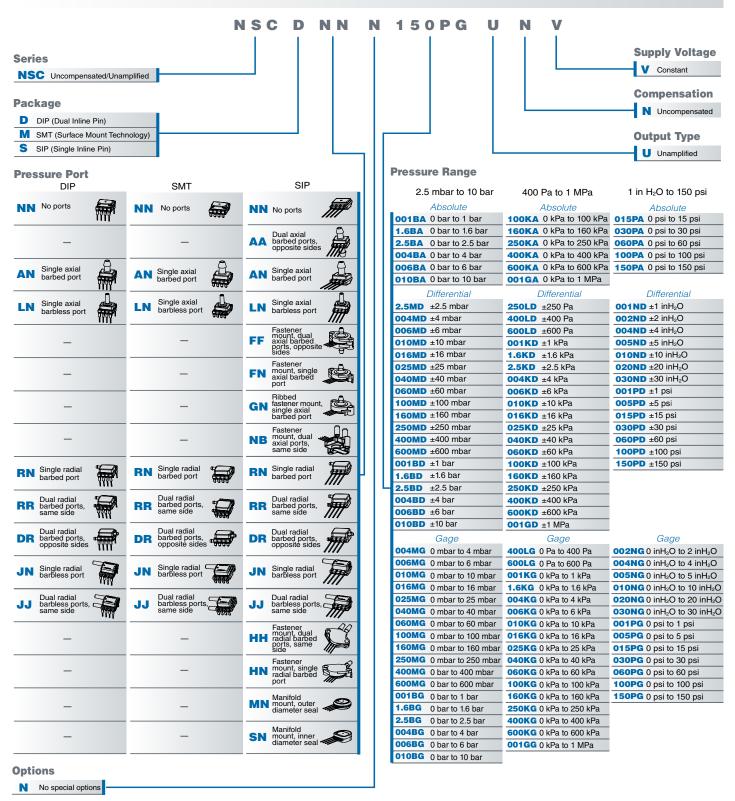
For example, **TSCDNNN150PGUCV** defines a TSC Series TruStability® Pressure Sensor, DIP package, NN pressure port, no special options,150 psi gage pressure range, unamplified, compensated, constant supply voltage.



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Figure 7, NSC Series Nomenclature and Order Guide¹

For example, **NSCDNNN150PGUNV** defines an NSC Series TruStability® Pressure Sensor, DIP package, NN pressure port, no special options, 150 psi gage pressure range, unamplified, uncompensated, constant supply voltage.



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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.

WARRANTY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. The foregoing is buyer's sole remedy and is in lieu of all warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.

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