

MS4515



- PCB Mounted Pressure Transducers
- Pressure Ranges from 2 to 30inH₂O
- Amplified Ratiometric Analog Output
- Differential & Gauge
- Temperature Compensated
- 3.3V or 5.0 Vdc Supply Voltage



DESCRIPTION

The MS4515 is a small, ceramic based, PCB mounted pressure transducer from Measurement Specialties. The transducer is built using Measurement Specialties' proprietary UltraStable™ process and the latest CMOS sensor conditioning circuitry to create a low cost, high performance transducer designed to meet the strictest requirements from OEM customers.

The MS4515 is fully calibrated and temperature compensated with a total error band (TEB) of less than 1.0% over the compensated range. The sensor operates from single supply of either 3.3 or 5.0Vdc and requires a single external component for proper operation.

The rugged ceramic transducer is available in side port, top port, and manifold mount versions and can measure gauge or differential pressure from 2 to 30 inH₂O. The 1/8" barbed pressure ports mate securely with 3/32" ID tubing.

FEATURES

- inH₂O Pressure Ranges
- PCB Mountable
- High Level Analog Output
- Barbed Pressure Ports

APPLICATIONS

- Blocked Filter Detection
- Altitude and Airspeed Measurements
- Medical Instruments
- Fire Suppression System
- Panel Meter

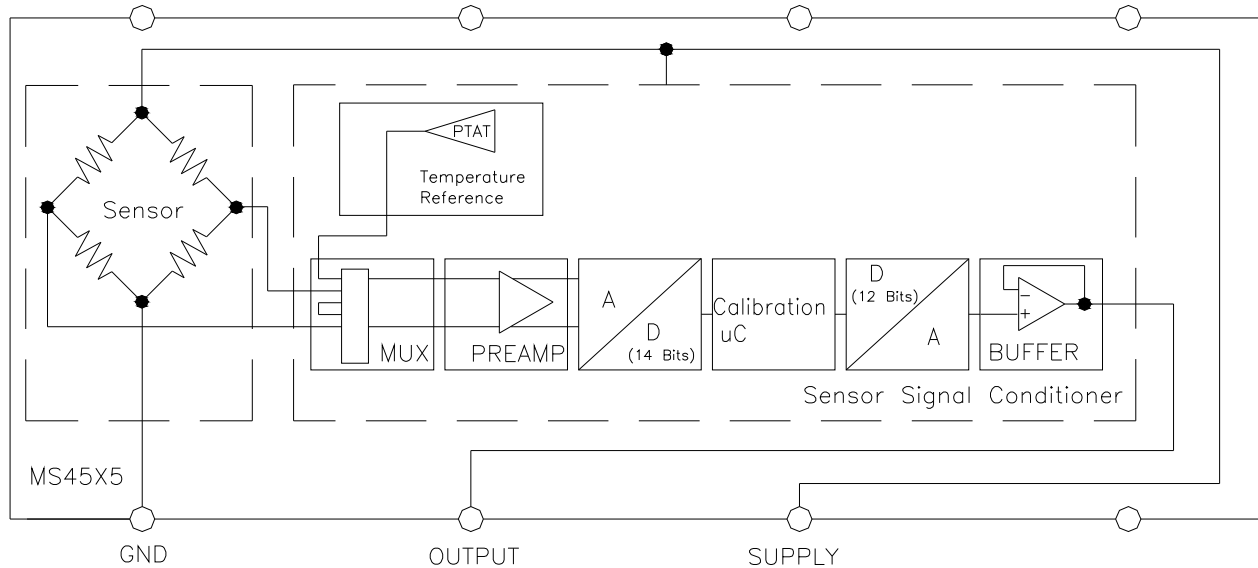
STANDARD RANGES (IN H₂O)

| Range | Gauge | Differential | Option Availability |
|-------|----------------|----------------|---------------------|
| 2 | | DS, SS, TP, MM | |
| 4 | DS, SS, TP, MM | DS, SS, TP, MM | |
| 5 | DS, SS, TP, MM | DS, SS, TP, MM | |
| 10 | DS, SS, TP, MM | DS, SS, TP, MM | -F |
| 20 | DS, SS, TP, MM | DS, SS, TP, MM | -F |
| 30 | DS, SS, TP, MM | DS, SS, TP, MM | -F |

See Package Configurations: DS= Dual Side Port, SS= Single Side Port, TP= Top Port, MM= Manifold Mount
Pin Style "L" is only available SS and MM port types.

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BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| Parameter | Conditions | Min | Max | Unit | Notes |
|---------------------------|---|-------------------|------|------------------|----------------|
| Supply Voltage | $T_A = 25\text{ }^\circ\text{C}$ | 2.7 | 5.5 | V | |
| Output Current | $T_A = 25\text{ }^\circ\text{C}$ | | 3 | mA | |
| Load Resistance (R_L) | $T_A = 25\text{ }^\circ\text{C}$ | 10 | | k Ω | |
| Storage Temperature | | -40 | +125 | $^\circ\text{C}$ | |
| Humidity | $T_A = 25\text{ }^\circ\text{C}$ | | 95 | %RH | Non Condensing |
| Overpressure | $T_A = 25\text{ }^\circ\text{C}$, both Ports | Not to Exceed 300 | | psi | |
| Burst Pressure | $T_A = 25\text{ }^\circ\text{C}$, Port 1 | | | psi | See Table 1 |
| ESD | HBM | -4 | +4 | kV | EN 61000-4-2 |
| Solder Temperature | 250 $^\circ\text{C}$, 5 sec max. | | | | |

TABLE 1- BURST PRESSURE BY RANGE AND PACKAGE STYLE

| Range | DS | TP, SS, MM | Unit |
|-------|----|------------|------|
| 002 | 10 | 10 | psi |
| 004 | 10 | 10 | psi |
| 005 | 10 | 10 | psi |
| 010 | 10 | 10 | psi |
| 020 | 20 | 20 | psi |
| 030 | 20 | 20 | psi |

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ENVIRONMENTAL SPECIFICATIONS

| Parameter | Conditions |
|----------------------|--|
| Mechanical Shock | Mil Spec 202F, Method 213B, Condition C, 3 Drops |
| Mechanical Vibration | Mil Spec 202F, Method 214A, Condition 1E, 1Hr Each Axis |
| Thermal Shock | 100 Cycles over Storage Temperature, 30 minute dwell |
| Life | 1 Million FS Cycles |
| MTTF | >10Yrs, 70 °C, 10 Million Pressure Cycles, 120%FS Pressure |

PERFORMANCE SPECIFICATIONS

Supply Voltage¹: 5.0V or 3.3 Vdc

Ambient Temperature: 25°C (unless otherwise specified)

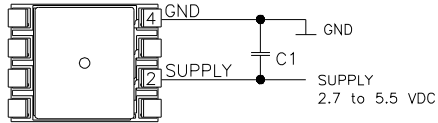
| PARAMETERS | MIN | TYP | MAX | UNITS | NOTES |
|--|---|-----|------|-------|-------|
| Accuracy | -0.25 | | 0.25 | %Span | 2 |
| Total Error Band (TEB) | -1.0 | | 1.0 | %Span | 3,5 |
| Total Error Band (TEB) 4inH2O and Below | -2.0 | | 2.0 | %Span | 3,5 |
| Supply Current | | 3 | | mA | 5 |
| Compensated Temperature | 0 | | +60 | °C | 4 |
| Operating Temperature | -10 | | +85 | °C | |
| Response Time | | 1 | | mS | 5 |
| Weight | | 3 | | grams | |
| Media | Non-Corrosive Dry Gases Compatible with Ceramic, Silicon, Pyrex, PPS, RTV, Gold, Aluminum and Epoxy. See "Wetted Material by Port Designation" chart below. | | | | |

Notes

1. Proper operation requires an external capacitor placed as shown in Connection Diagram. Output is ratiometric to supply voltage variations of less than 10%.
2. Accuracy: The maximum deviation from a best fit straight line (BFSL) fitted to the output measured over the pressure range at 25C. Includes all errors due to pressure non linearity, hysteresis, and non repeatability.
3. Total error band includes all accuracy errors, thermal errors over the compensated temperature range, and span and offset calibration tolerances. For ideal sensor output with respect to input pressure, reference Pressure Transfer Function charts below. TEB values are valid only at the calibrated supply voltage.
4. For errors beyond the compensated temperature range, see Extended Temperature Multiplier chart below.
5. This product can be configured for custom OEM requirements, contact factory for lower power consumption or higher accuracy.

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CONNECTION DIAGRAM

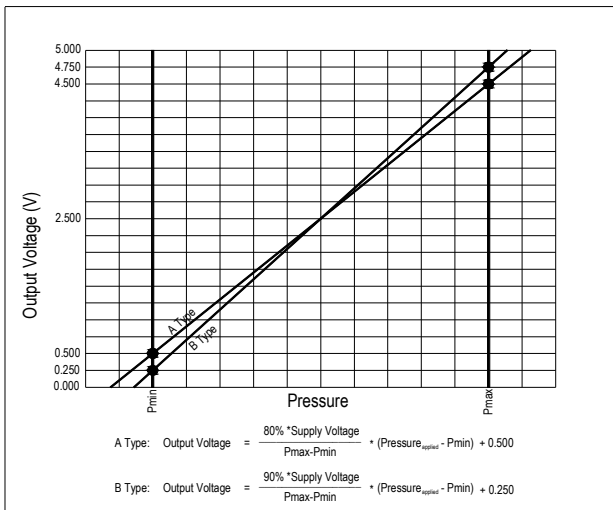


Notes

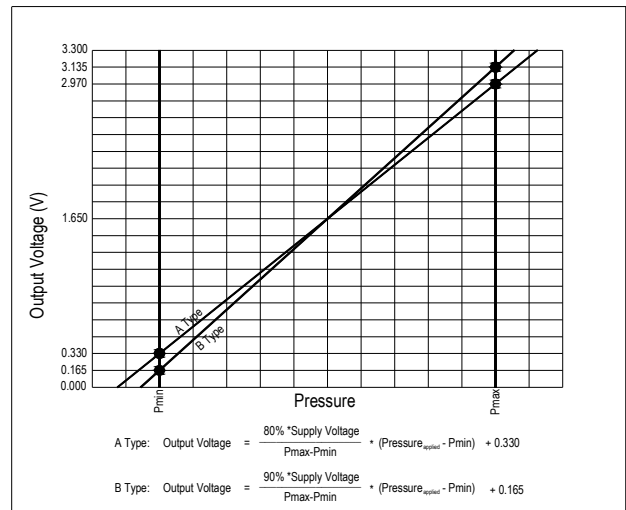
1. Place 100nF capacitor between Supply and GND to within 2 cm of sensor.

PRESSURE AND TEMPERATURE TRANSFER FUNCTION

Pressure Transfer Functions, Supply=5V

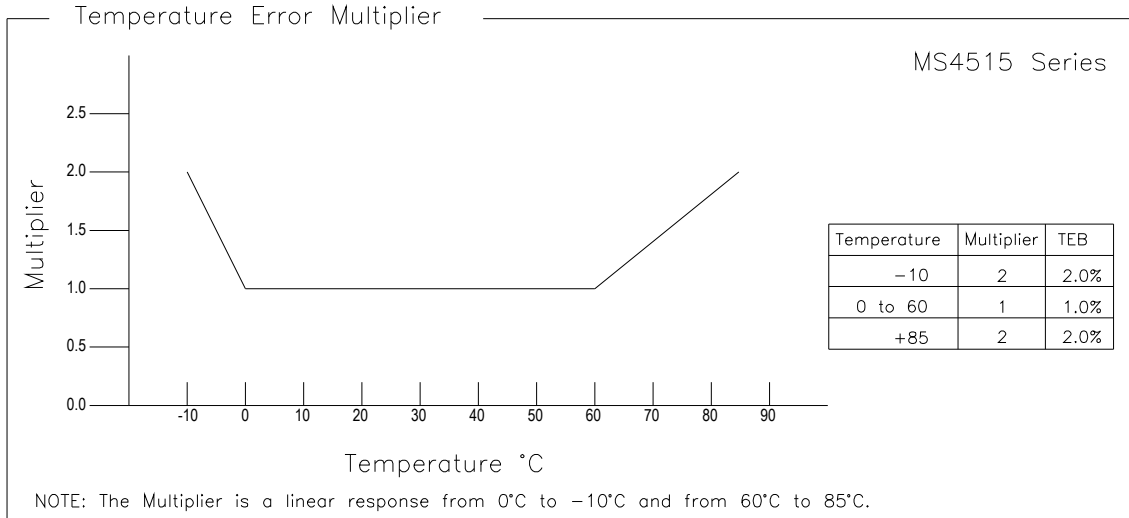


Pressure Transfer Functions, Supply=3.3V

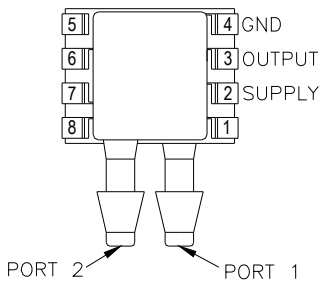


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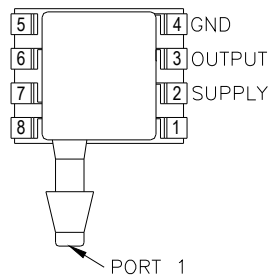
EXTENDED TEMPERATURE MULTIPLIER CHART



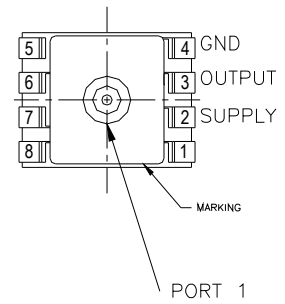
PACKAGE, PINOUT & PRESSURE TYPE CONFIGURATION



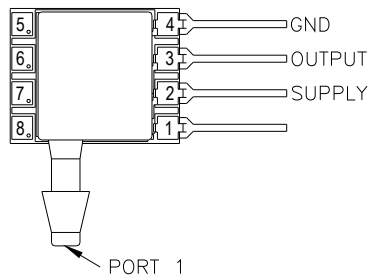
MS4515-DSv0xxxP



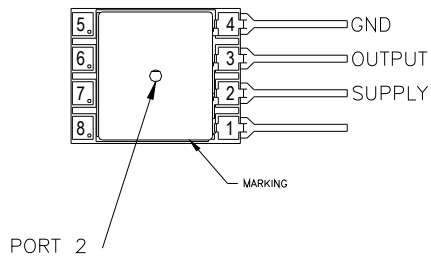
MS4515-SSv0xxxP



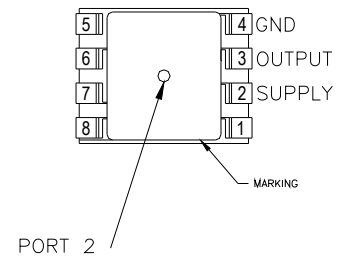
MS4515-TPv0xxxP



MS4515-SSv0xxxL



MS4515-MMv0xxxL



MS4515-MMv0xxxP

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| Pin Name | Pin | Function |
|----------|--------|-------------------------|
| SUPPLY | 2 | Positive Supply Voltage |
| OUTPUT | 3 | Analog Output |
| GND | 4 | Ground |
| | 1, 5-8 | No Connection |

| Pressure Type | Pmin | Pmax | Description |
|--------------------------------|---------|---------|---|
| Differential/ Bidirectional | -Prange | +Prange | Output is proportional to the difference between Port 1 and Port 2. Output swings positive when Port 1 > Port 2. Output is 50% of supply voltage when Port 1=Port 2 |
| Gauge | 0psiG | +Prange | Output is proportional to the difference between 0psiG (Pmin) and Port 1. Output swings positive when Port 1 > Port 2. |

Prange is equal to the maximum full scale pressure specified in the ordering information.

WETTED MATERIAL BY PORT DESIGNATION

| Style | Port | Material | | | | | | | |
|--------|--------|----------|---------|---------|-------|-----|------|----------|-------|
| | | PPS | Ceramic | Silicon | Pyrex | RTV | Gold | Aluminum | Epoxy |
| DS, MM | Port 1 | X | X | X | X | X | | | X |
| | Port 2 | X | X | X | X | X | X | X | X |
| SS, TP | Port 1 | X | X | X | X | X | X | X | X |

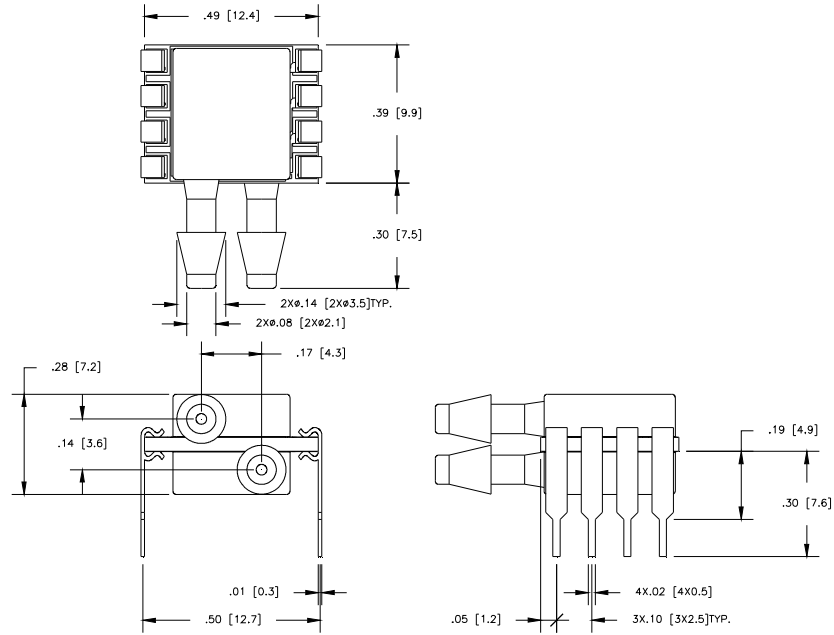
"X" Indicates Wetted Material

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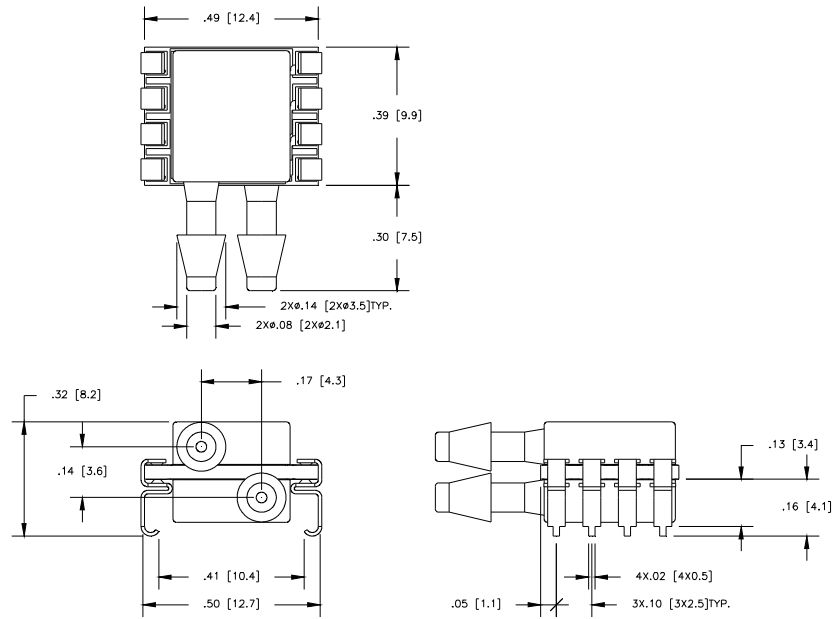
DIMENSIONS

DIMENSIONS ARE IN INCHES [mm]

Model MS4515-DSvxxxxyP



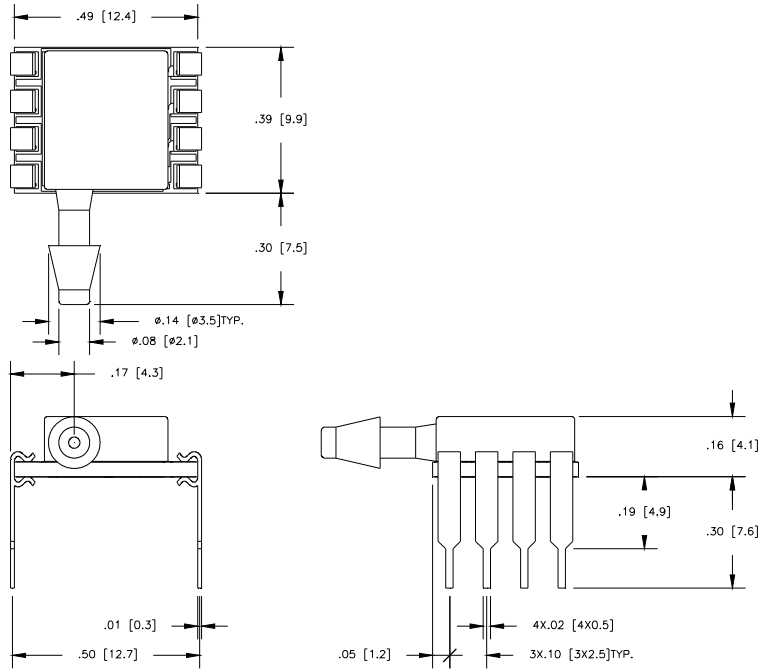
Model MS4515-DSvxxxxyS



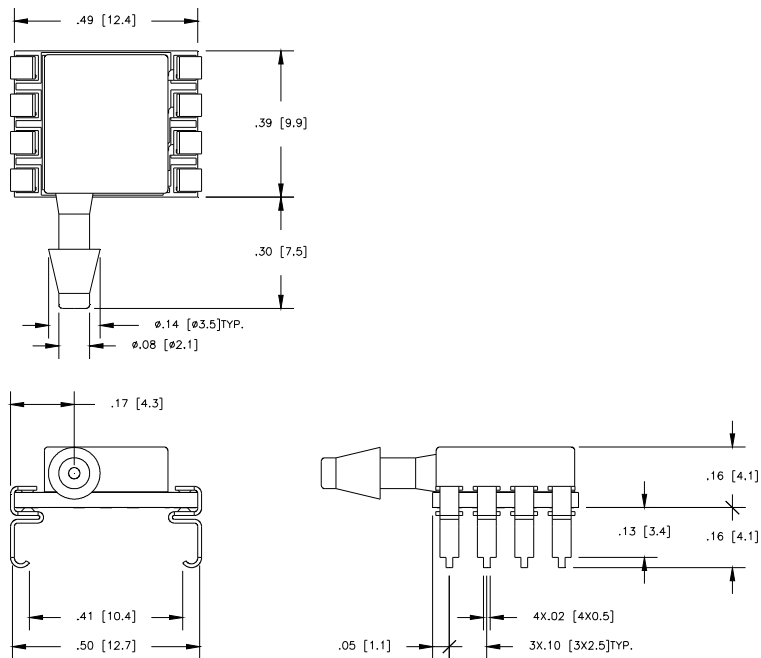
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DIMENSIONS ARE IN INCHES [mm]

Model MS4515-SSvoxxxP



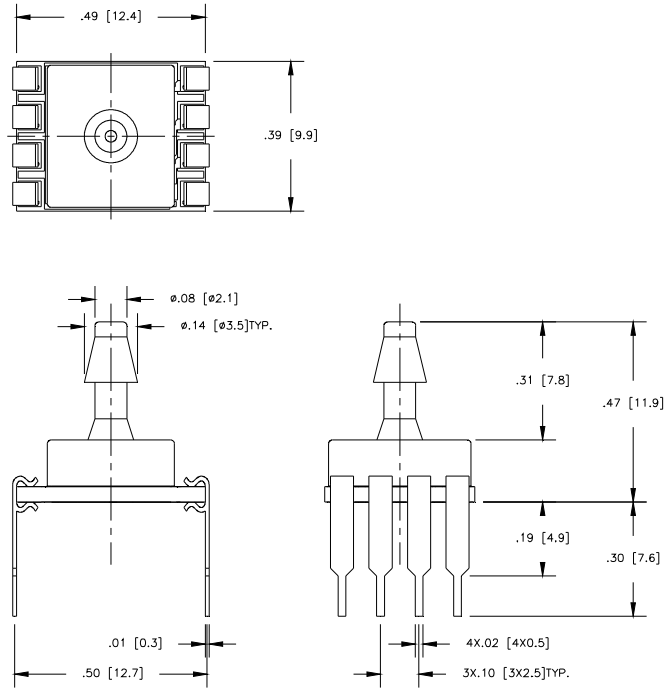
Model MS4515-SSvoxxxS



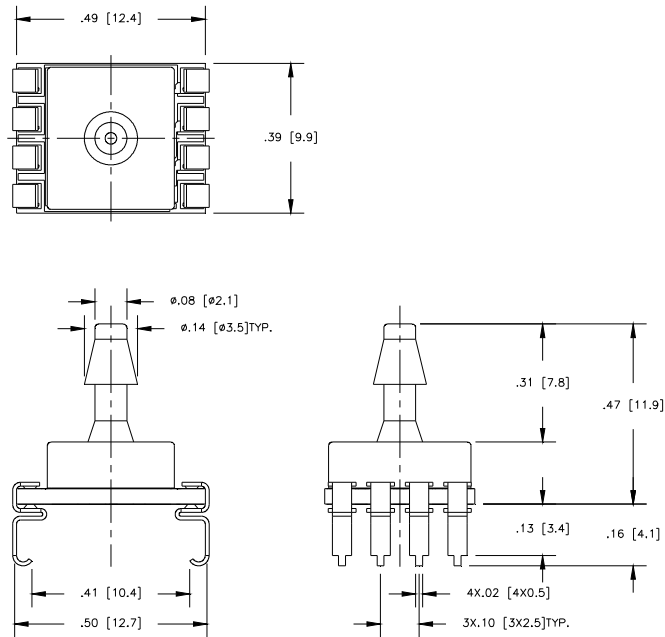
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DIMENSIONS ARE IN INCHES [mm]

Model MS4515-TPvxxxxyP



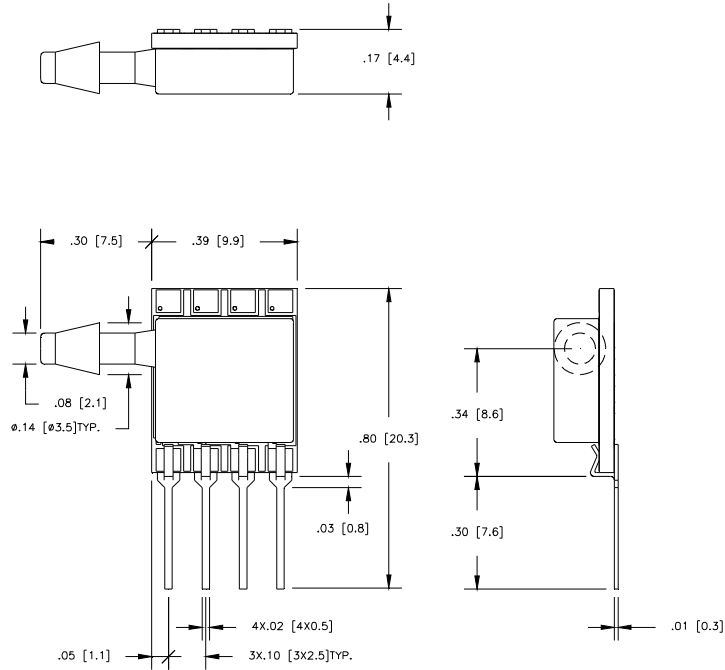
Model MS4515-TPvxxxxyS



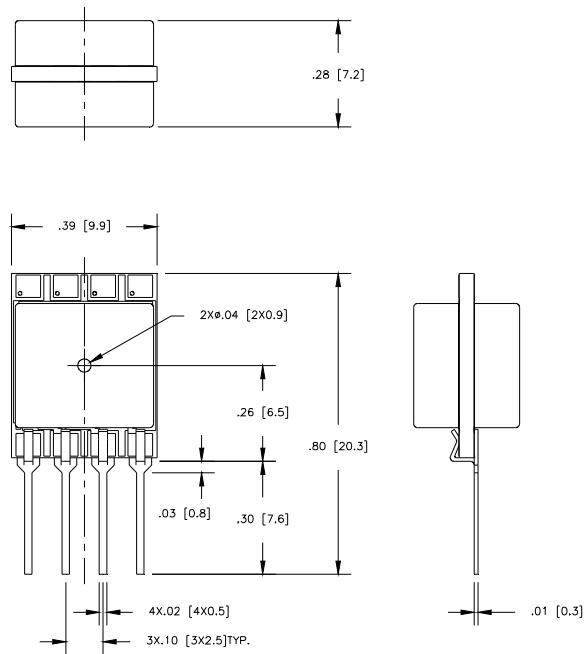
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DIMENSIONS ARE IN INCHES [mm]

Model MS4515-SSvxxxxyL



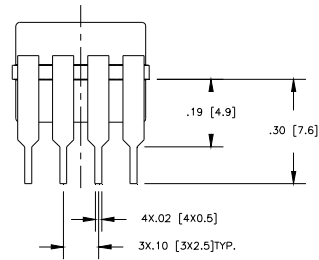
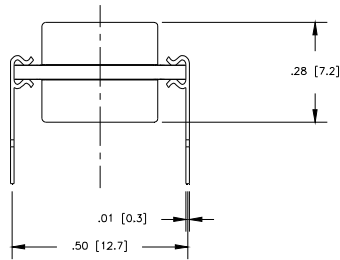
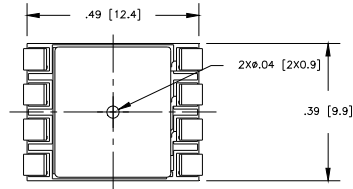
Model MS4515-MMvxxxxyL



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DIMENSIONS ARE IN INCHES [mm]

Model MS4515-MMvoxxxyP



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AVAILABLE OPTIONS

Gel Coat (-F Option)

The 45x5 is designed for non ionic and clean dry air applications. Select this option for added protection in high humidity or slightly corrosive environments with the application of a silicone gel elastomer to sensor and ASIC. For questions concerning media compatibility, contact the factory.

ORDERING INFORMATION

