MS4525

SPECIFICATIONS

- **PCB Mounted Pressure Transducers**
- **Amplified Ratiometric Analog Output**
- **Differential, Gage, Absolute, Compound, & Vacuum**
- **Temperature Compensated**
- **3.3 or 5.0 V_{DC} Supply Voltage**

The MS4525 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 MS4525 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 5.0V_{DC} and requires a single external component for proper operation.

The rugged ceramic transducer is available in side port, top port, and manifold mount and can measure absolute, gage, differential, or compound pressure from 1 to 150psi. The 1/8" barbed pressure ports mate securely with 3/32" ID tubing.

FEATURES

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

APPLICATIONS

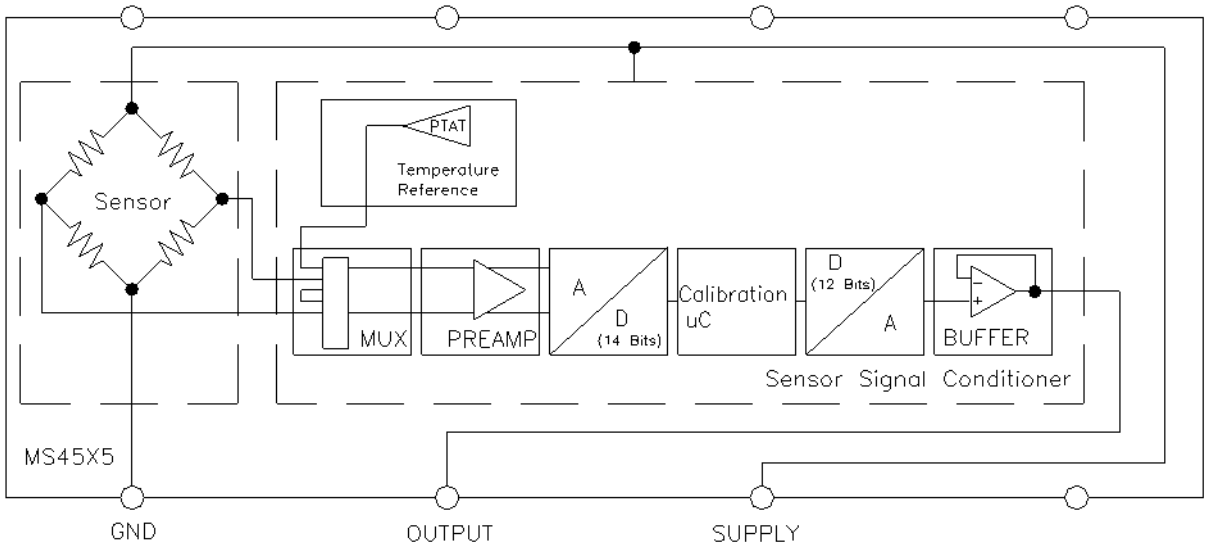
- Blocked Filter Detection
- Altitude and Airspeed Measurements
- Medical Instruments
- Fire Suppression System
- Panel Meter
- Air Movement/Environmental Controls
- Pneumatic Controls

STANDARD RANGES (PSI)

Pressure	Absolute	Gage	Differential	Compound	Vacuum	Option Availability
1		DS, SS, TP, MM	DS, SS, TP			-F
2		DS, SS, TP, MM	DS, SS, TP			-F
5		DS, SS, TP, MM	DS, SS, TP			-F
15	SS, TP	DS, SS, TP, MM	DS, MM	SS, TP	SS, TP, DS	-F
30	SS, TP	DS, SS, TP, MM	DS, MM	SS, TP		-F
50	SS, TP	DS, SS, TP, MM	DS, MM	SS, TP		-F
100	SS, TP	DS, SS, TP, MM	DS, MM	SS, TP		-F
150	SS, TP	DS, SS, TP, MM	DS, MM	SS, TP		-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.
Pin Style “C” is only available SS, TP and MM port types.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

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

TABLE 1- BURST PRESSURE BY RANGE AND PACKAGE STYLE

Range	DS	TP, SS, MM	Unit
001	20	20	**psi**
002	20	20	**psi**
005	15	20	**psi**
015	45	90	**psi**
030	90	200	**psi**
050	150	300	**psi**
100	300	300	**psi**
150	**300**	**300**	**psi**

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 ºC, 1.188 Million Pressure Cycles, 120%FS Pressure

PERFORMANCE SPECIFICATIONS

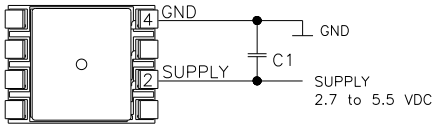
Supply Voltage[1]: 5.0V or 3.3 V_{DC}
Ambient Temperature: 25°C (unless otherwise specified)

PARAMETERS	MIN	TYP	MAX	UNITS	NOTES
Output	0.500		4.500	V	1,2,3
	0.250		4.750		
Accuracy	-0.25		0.25	%Span	2
Total Error Band (TEB)	-1.0		1.0	%Span	3,5
Supply Current		3		mA	5
Long Term Stability (Offset & Span)		±0.5		%Span	
Compensated Temperature	-10		+85	ºC	4
Operating Temperature	-25		+105	ºC	
Response Time		1		mS	5
Weight		3		grams	
Start time to data ready			5	ms	
Media	Non-Corrosive Dry Gases Compatible with Ceramic, Silicon, Borosilicate Glass, 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. The maximum deviation from a best fit straight line (BFSL) fitted to the output measured over the pressure range at 25°C. 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.
6. Long term stability over a year period with constant voltage and temperature
7. Pressure connection: barbed ports are designed for use with tubing 3/32” ID, 60-70A durometer (PVC).
8. For details on environmental conditions and pressure type descriptions, reference to relative tables.

CONNECTION DIAGRAM

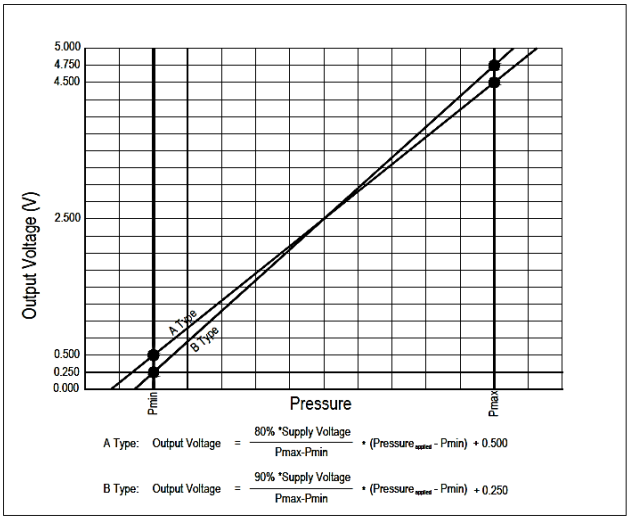


Notes:

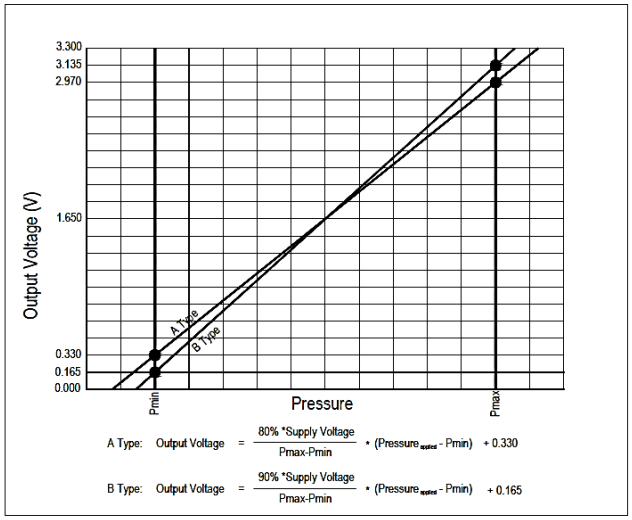
1. Place 100nF capacitor between Supply and GND to within 2 cm of sensor.

PRESSURE AND TEMPERATURE TRANSFER FUNCTION

Pressure Transfer Functions, Supply=5V



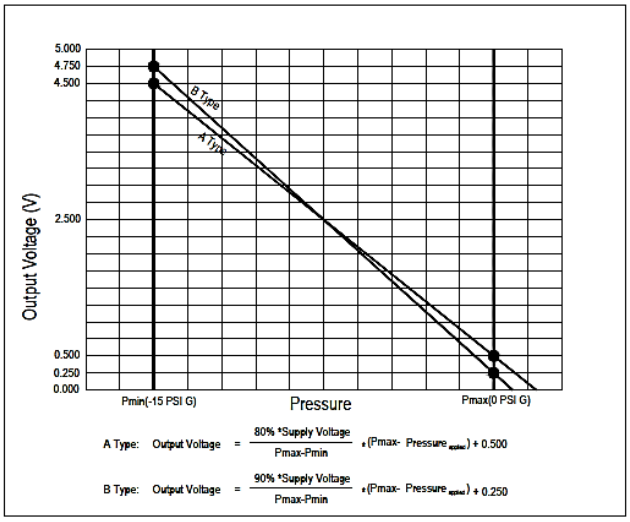
Pressure Transfer Functions, Supply=3.3V



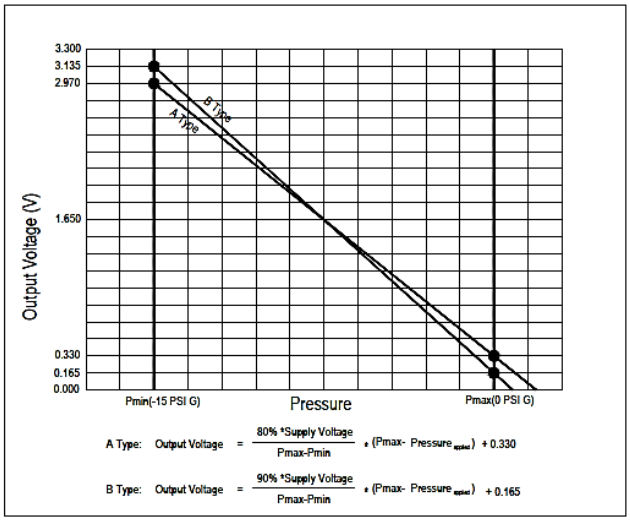
Sensor Output at Significant Percentages, Supply 5V			
% Output	Output Type A (psi)	Output Type B (psi)	Voltage (V)
0	$P_{min}-(P_{max}-P_{min})*10/80$	$P_{min}-(P_{max}-P_{min})*5/90$	0.000
5		P_{min}	0.250
10	P_{min}		0.500
50			2.500
90	P_{max}		4.500
95		P_{max}	4.750
100	$P_{max}+(P_{max}-P_{min})*10/80$	$P_{max}-(P_{max}-P_{min})*10/80$	5.000

Sensor Output at Significant Percentages, Supply 3.3V			
% Output P	Output A (psi)	Output B (psi)	Voltage (V)
0	$P_{min}-(P_{max}-P_{min})*10/80$	$P_{min}-(P_{max}-P_{min})*5/90$	0.000
5		P_{min}	0.165
10	P_{min}		0.330
50			1.650
90	P_{max}		2.970
95		P_{max}	3.315
100	$P_{max}+(P_{max}-P_{min})*10/80$	$P_{max}+(P_{max}-P_{min})*5/90$	3.300

Vacuum Series Transfer Functions, Supply=5V



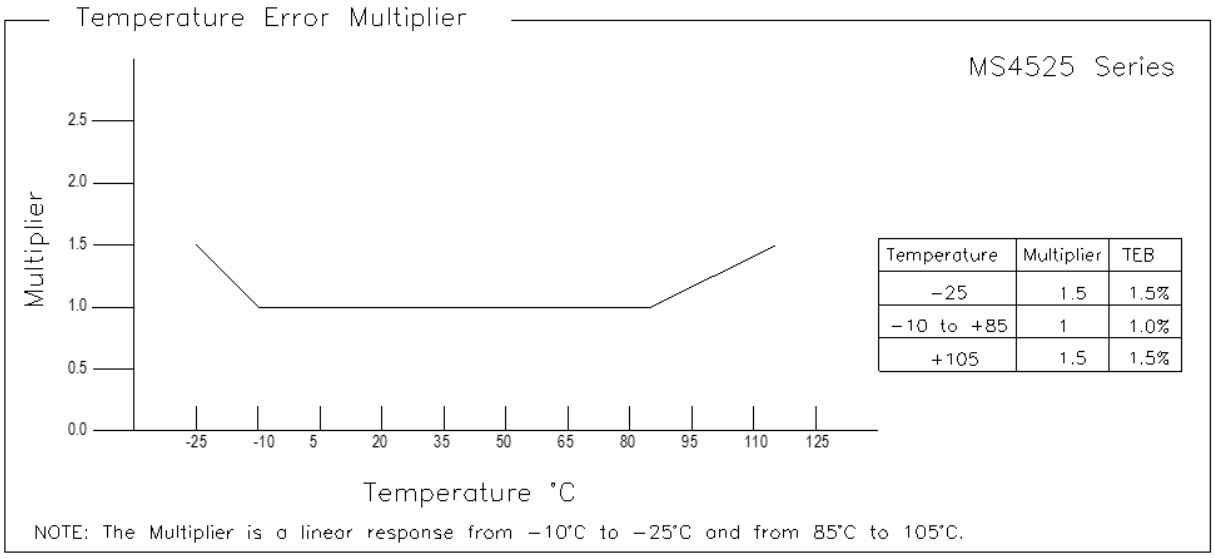
Vacuum Series Transfer Functions, Supply=3.3V



Sensor Output at Significant Percentages, Supply 5V			
% Output	Output Type A [psiG]	Output Type B [psiG]	Voltage [V]
0	1.6875	0.833	0.000
5		0	0.250
10	0		0.500
50			2.500
90	-15		4.500
95		-15	4.750
100			5.000

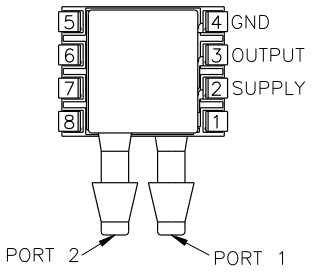
Sensor Output at Significant Percentages, Supply 3.3V			
% Output	Output Type A [psiG]	Output Type B [psiG)]	Voltage [V]
0	1.6875	0.833	0.000
5		0	0.165
10	0		0.330
50			1.650
90	-15		2.970
95		-15	3.315
100			3.300

EXTENDED TEMPERATURE MULTIPLIER CHART

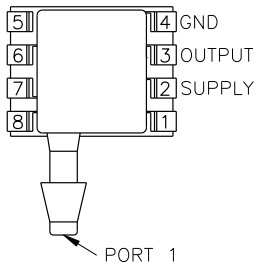


Temperature	Multiplier	TEB
−25	1.5	1.5%
−10 to +85	1	1.0%
+105	1.5	1.5%

PACKAGE, PINOUT & PRESSURE TYPE CONFIGURATION



MS4525−DSvoxxxyp



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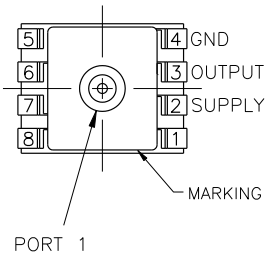

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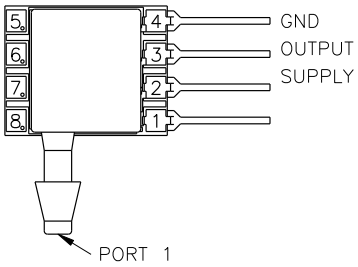
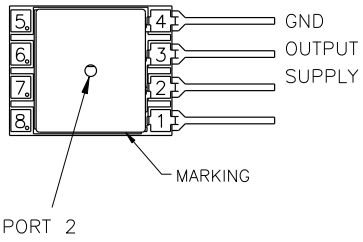
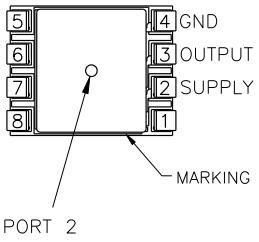


MS4525−SSvoxxxyL



MS4525−MMvoxxxyL



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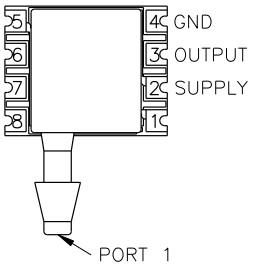

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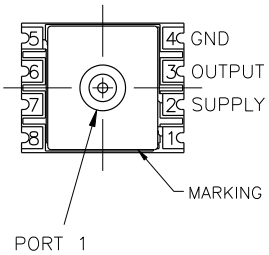
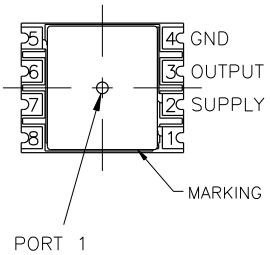


MS4525−TPvoxxxyC



MS4525−MMvoxxxyC

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

Pressure Type	P_{min}	P_{max}	Description
Absolute	0psiA	$+P_{range}$	Output is proportional to the difference between 0psiA (P_{min}) and pressure applied to Port 1.
Differential/ Bidirectional	$-P_{range}$	$+P_{range}$	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.
Gage	0psiG	$+P_{range}$	Output is proportional to the difference between 0psiG (P_{min}) and Port 1. Output swings positive when Port 1> Port 2.
Compound	-15psiG	$+P_{range}$	Output is proportional to the difference between -15psiG pressure (P_{min}) and pressure applied to Port 1.

P_{range} is equal to the maximum full scale pressure specified in the ordering information.

Range	Absolute	Gauge	Differential	Compound	Vacuum
001		DS,SS,TP,MM	DS,SS,TP		
002		DS,SS,TP,MM	DS,SS,TP		
005		DS,SS,TP,MM	DS,SS,TP		
015	SS,TP	DS,SS,TP,MM	DS,MM	SS,TP	SS,TP,DS
030	SS,TP	DS,SS,TP,MM	DS,MM	SS,TP	
050	SS,TP	DS,SS,TP,MM	DS,MM	SS,TP	
100	SS,TP	DS,SS,TP,MM	DS,MM	SS,TP	
150	SS,TP	DS,SS,TP,MM	DS,MM	SS,TP	

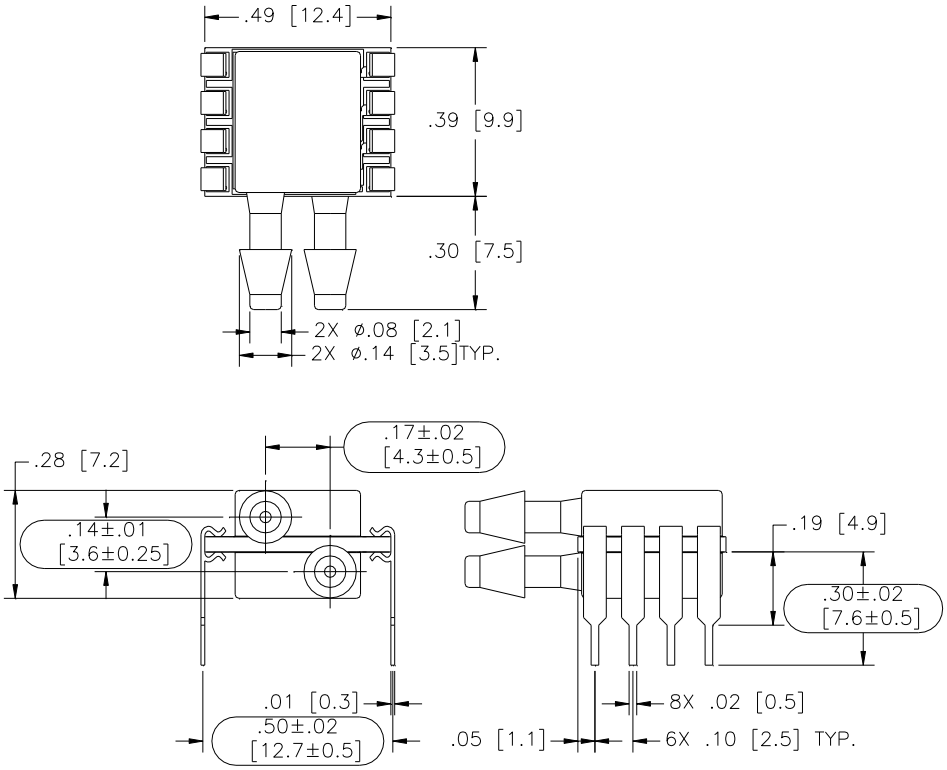
WETTED MATERIAL BY PORT DESIGNATION

		Material						
Style	Port	Ceramic	Silicon	Borosilicate Glass	RTV	Gold	Aluminum	Epoxy
DS, MM	Port 1	X	X	X	X			X
	Port 2	X	X	X	X	X	X	X
SS, TP, SM	Port 1	X	X	X	X	X	X	X

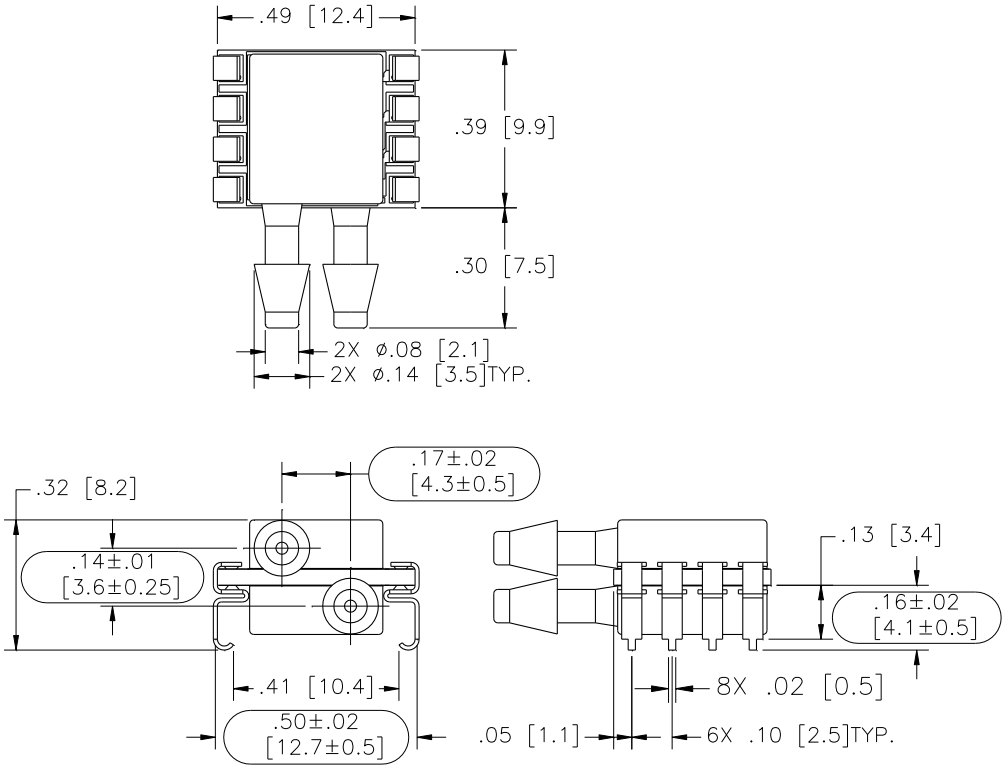
"X" Indicates Wetted Material

DIMENSIONS (are in INCHES [mm])

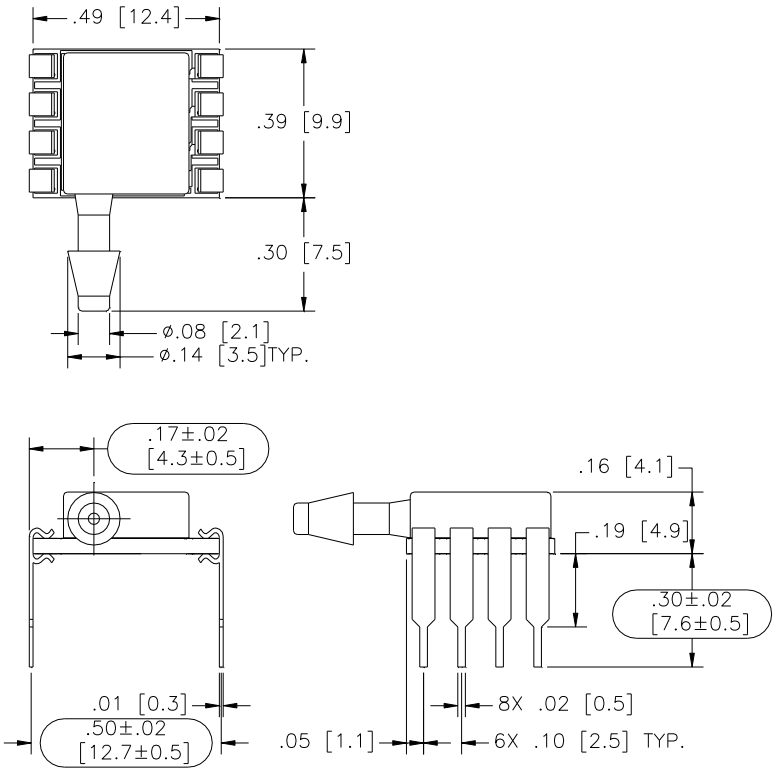
Model: MS4525-DSvoxxxyP



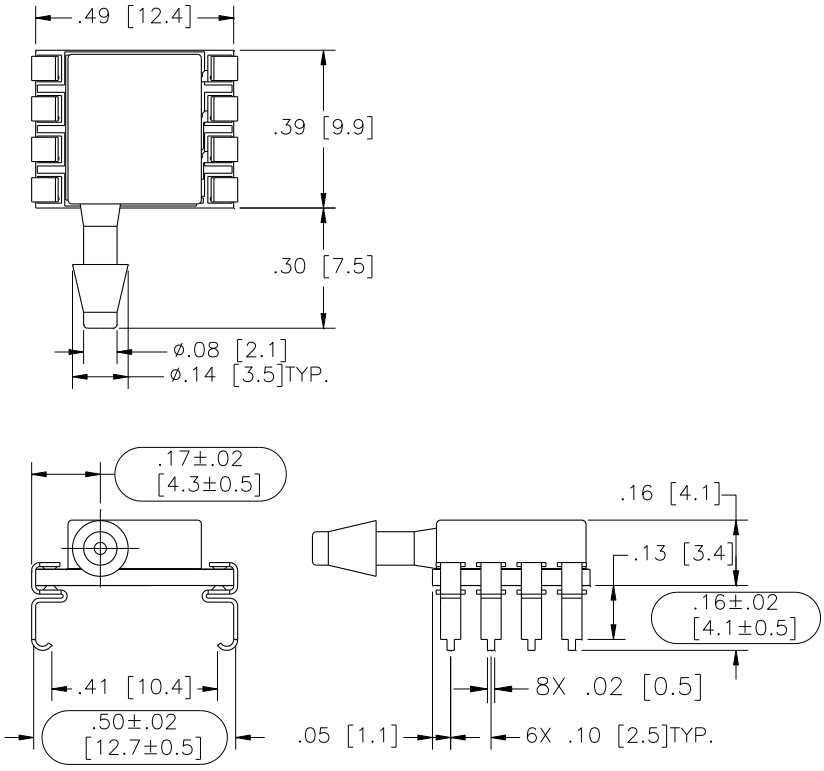
Model: MS4525-DSvoxxxyS



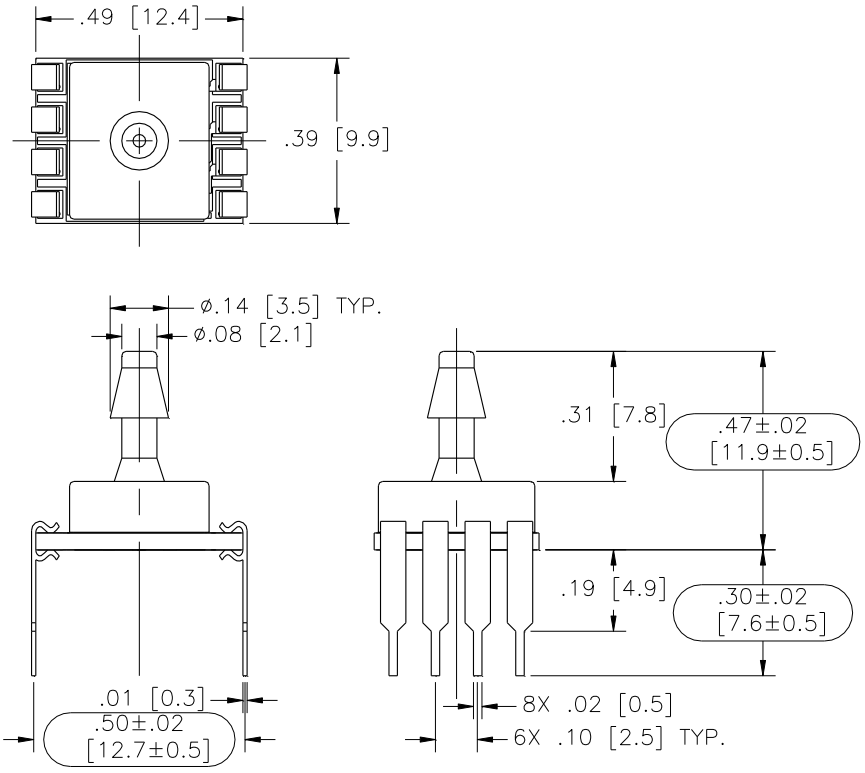
Model: MS4525-SSvoxxxyP



Model: MS4525-SSvoxxxyS



Model: MS4525-TPvoxxxyP



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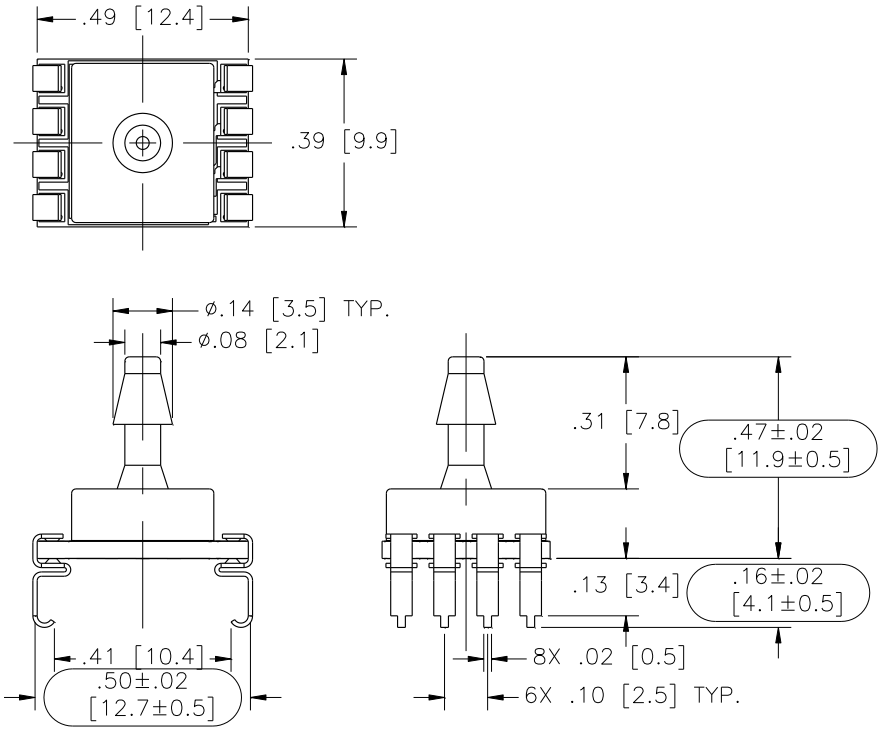
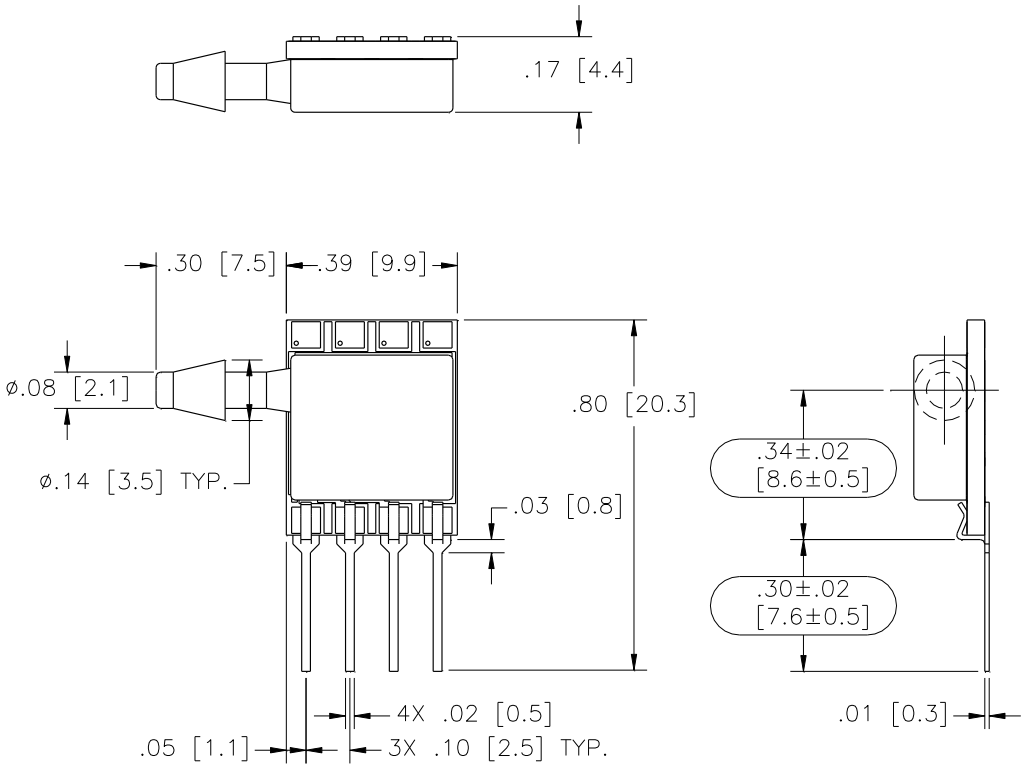
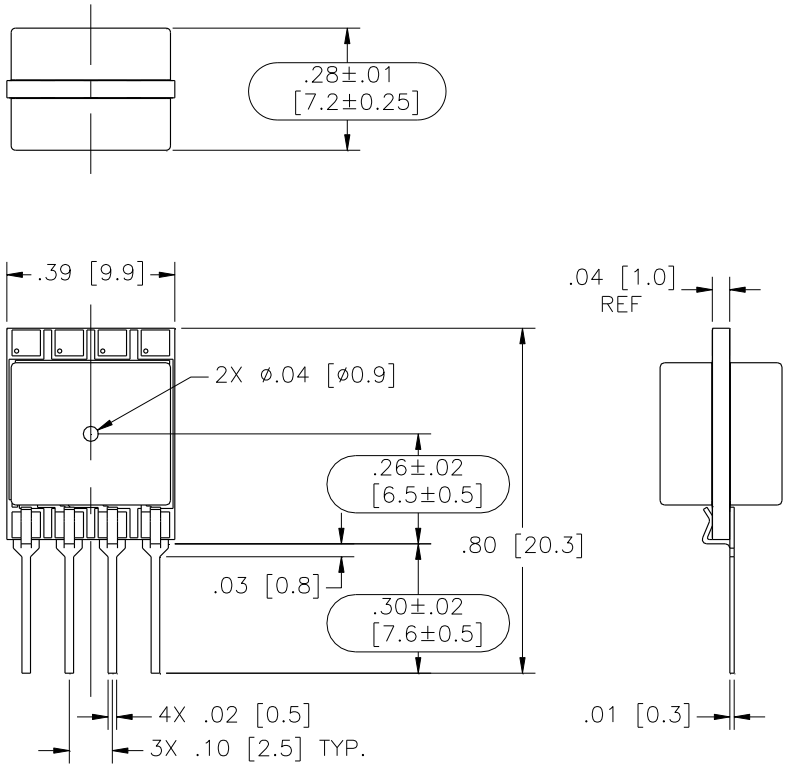


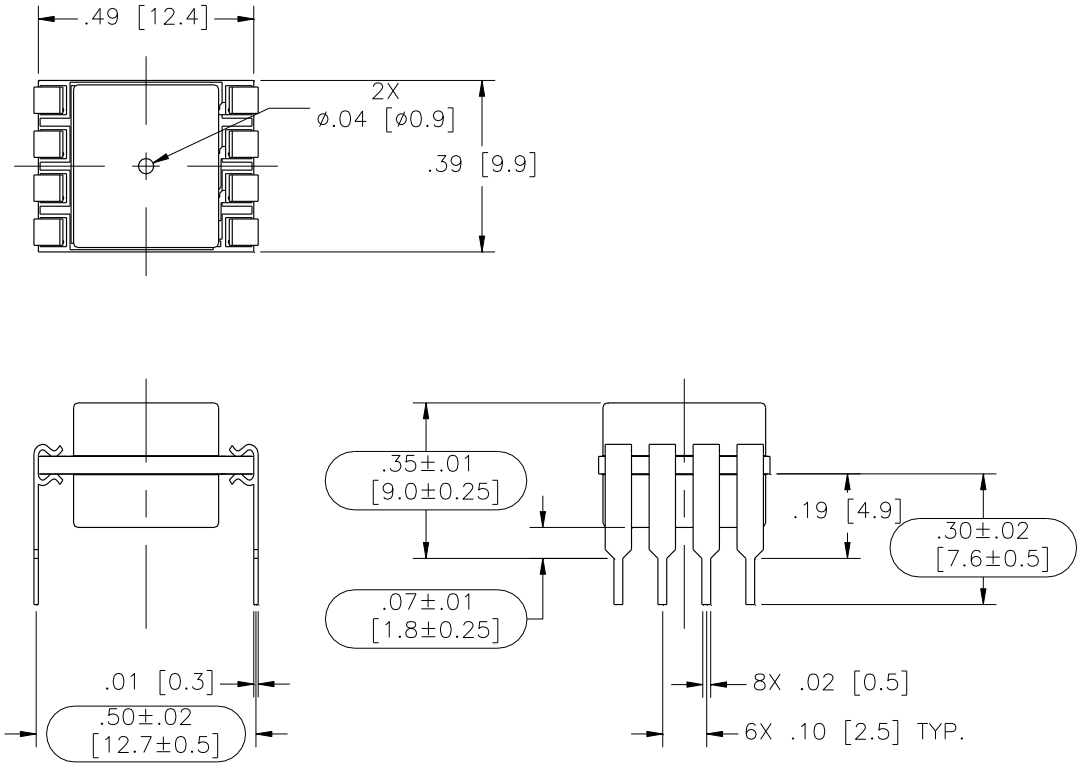
Model: MS4525-SSvoxxxyL



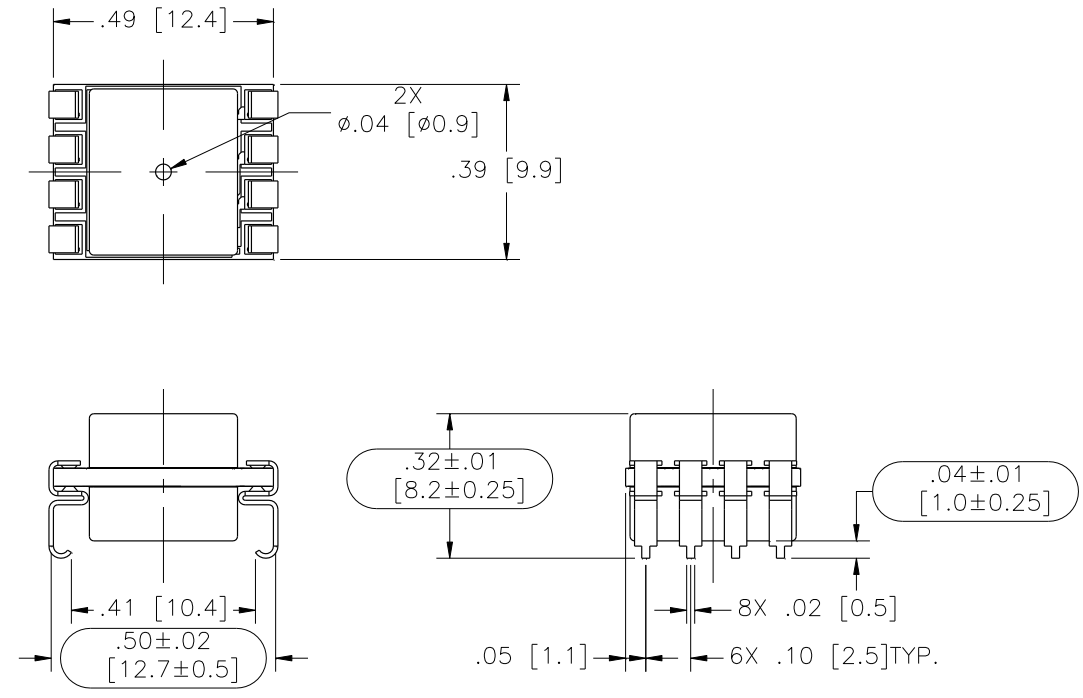
Model: MS4525-MMvoxxxyL



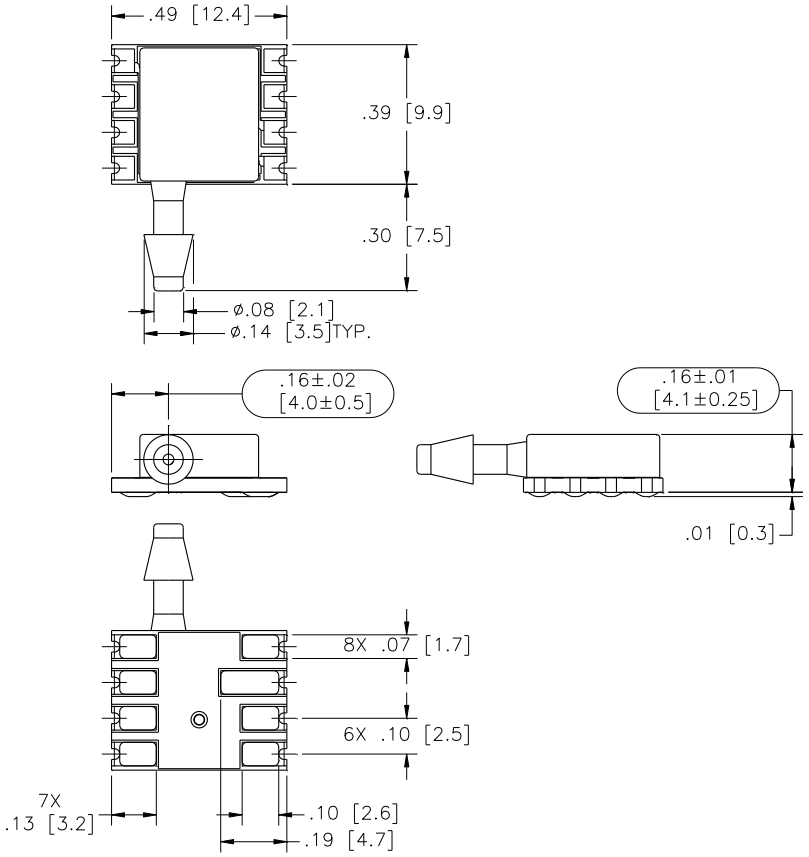
Model: MS4525-MMvoxxxyP



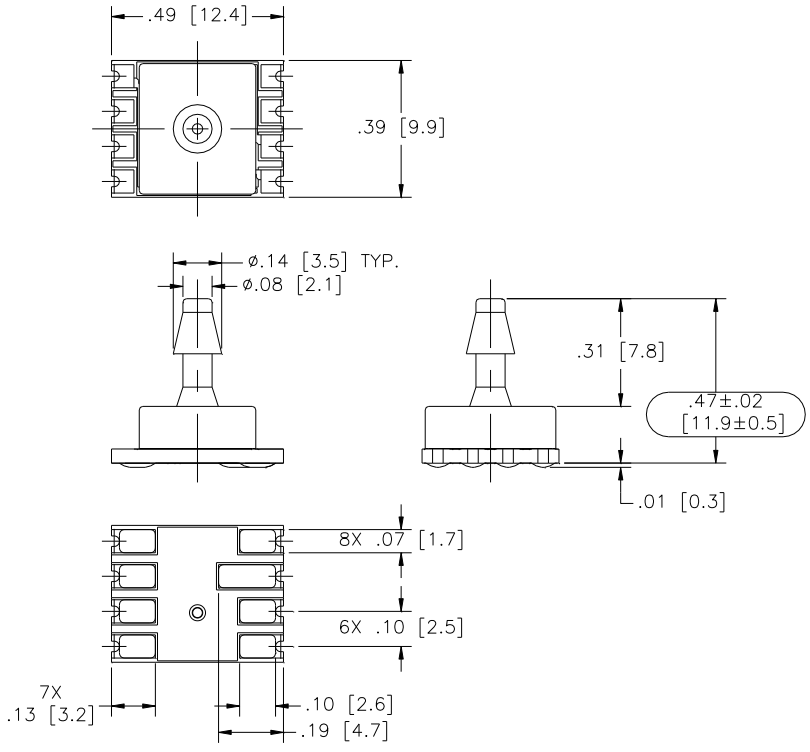
Model: MS4525-MMvoxxxyS



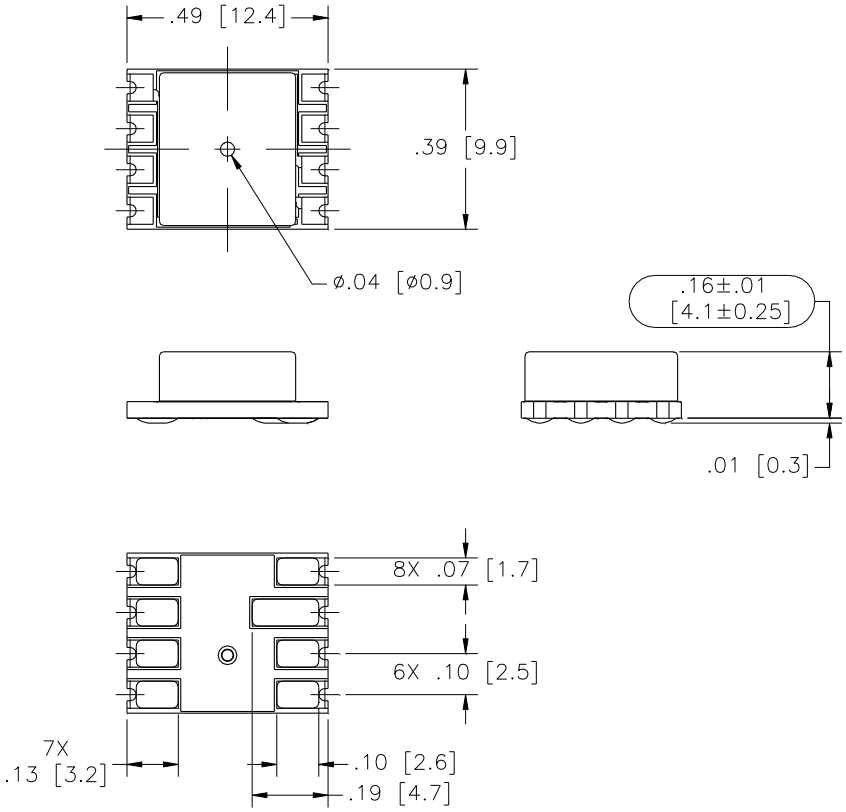
Model: MS4525-SSvoxxxyC



Model: MS4525-TPvoxxxyC



Model: MS4525-MMvoxxxyC



AVAILABLE OPTIONS

Gel Coat (-F Option)

The MS4525 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.