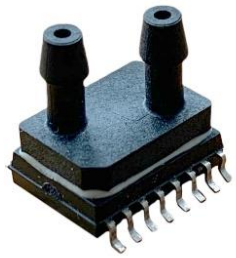
AV Sensors
AdVanced Sensor Design and Manufacture

MCT-SM9333 SERIES



The MCT-SM9333 Series
PA Range, Digital Sensor
JEDEC SOIC16 Standard Package
Dual Ported Barb Ports
Digital Temperature & Pressure Outputs
I^2C & SPI Protocols

DESCRIPTION

Advanced Sensors Multi Chip Technology (MCT) SM9333 Series incorporates the latest mixed signal ASIC (Application Specific Integrated Circuit) with an ultra low pressure, Pascal Ranged, RTV bonded silicon gage to provide a leading *Digital Output* design for medical, life science and building automation industries in a small SOIC-16 package. The MCT-SM9333 Series provides a 14bit digital pressure and 11 bit digital temperature output in SPI and I^2C protocols. The designs superior performance provides 1% Total Error across a wide temperature range of -10 to 60˚C while the ASIC's advanced design sets safety critical operations at the forefront with internal error checking of the sensor's input and output lines. Given these features and an available lower power option; the MCT-SM9333 series is the ideal choice for OEM customers.

APPLICATIONS

- Respirators
- Sleep Apnea
- Airflow Measurements
- Exhaust Hoods
- Building Automation
- HVAC
- VAV
- Clogged Filter Detection

FEATURES

- Digital Temperature & Pressure Output
- 3.3 & 5.0Vdc Supply Voltages
- JEDEC SOIC16 Standard Package
- Ultra Low Pressure, 125Pa or 250Pa Ranges
- I2C & SPI Outputs
- Custom Outputs and Ranges Available

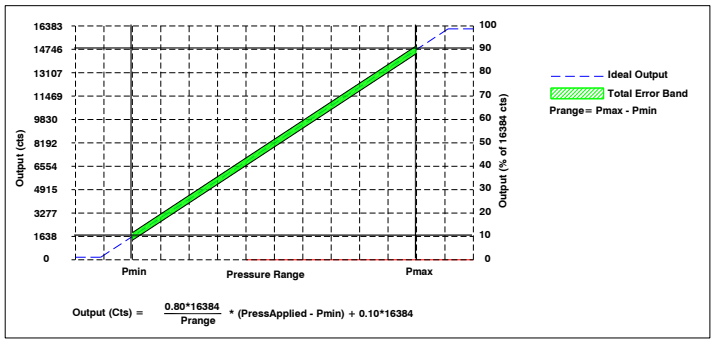
SPECIFICATIONS	Symbol	Min	Typical	Max	Unit	Note
Performance Specifications						
Supply Voltage		2.7V	3.3	5.50	V	
Current Consumption				3	mA	
Standby Current			0.5		µA	-L Option
Pressure Resolution				14	bits	
Temperature Resolution				11	bits	
Output (Type 1) at Pmin			1638		cts	
Output (Type 1) at Pmax			14746		cts	
Output (Type 2) at Pmin			819		cts	
Output (Type 2) at Pmax			15564		cts	
Pressure Accuracy		-0.25		0.25	%FSS	2
Total Error Band	TEB	-3.0		3.0	%FSS	3
Temperature Accuracy			1.5		°C	
Conversion Time			1.0		mS	4
Power On to Valid Data				<10	mS	5
Compensated Temperature		-10 to 60			°C	6
Operating Temperature		-20 to 85			°C	6
Weight		3			grams	3

SPECIFICATIONS	Symbol	Min	Typical	Max	Unit	Note
Absolute Maximum Conditions						10
Supply Voltage		-5.0		6	V	
Storage Temperature		-40		125	˚C	
Package Integrity, Common Mode				50	psi	7
Proof Pressure		75			mBar	8
Burst Pressure		150			mBar	9
Media Compatibility		CDA, Non Ionic, Non Corrosive Gases				
Peak reflow temperature (SMT)		15s max at 250 ˚C				
Moisture Sensitivity Level		MSL 1				
ESD susceptibility (HBM)		±4kV				
Wetted Materials		RTV, Epoxy, Silicon, Gold, Aluminum, LCP				

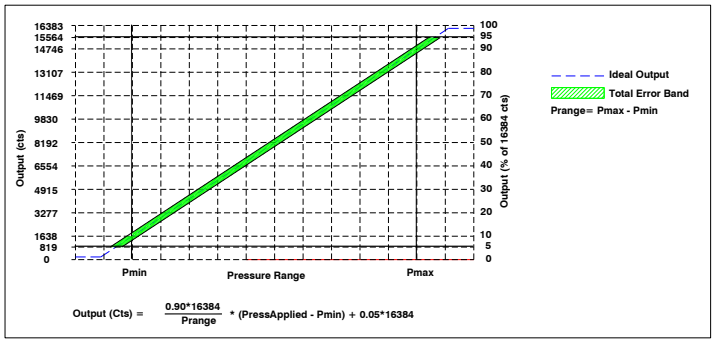
Reference Conditions: Vsupply: 3.30Vdc or 5.00, Ta=25˚C, Positive Pressure Port A

1. All specification at reference conditions unless otherwise noted.
2. Maximum deviation from a Best Fit Straight Line through Pmin and Pmax measured at 25˚C. Errors included Pressure Non Linearity, Pressure Hysteresis and Repeatability.
3. Maximum deviation from the Ideal Transfer Function expressed as a percentage of the %FSS over the compensated temperature range. Includes calibration errors (Offset & Span), temperature errors (Offset & Span), pressure non-linearity, pressure and thermal hysteresis. Based on system level autozero at 25˚C after board mount or solder reflow.
4. The time for the output DAC to be updated with new data.
5. The time for the output DAC to have valid data after a power on reset.
6. Compensated and operating temperature for mBar ranges are 0˚C to 60˚C and -20˚C – to 105˚C, respectively.
7. Maximum pressure the sensor package can withstand without rupture.
8. Maximum pressure without degrading sensor's performance specifications.
9. Maximum pressure the silicon diaphragm can withstand without rupture.
10. Exceeding Absolute Maximum Specification may damage the device. Extended exposure beyond the operating conditions may affect device reliability.

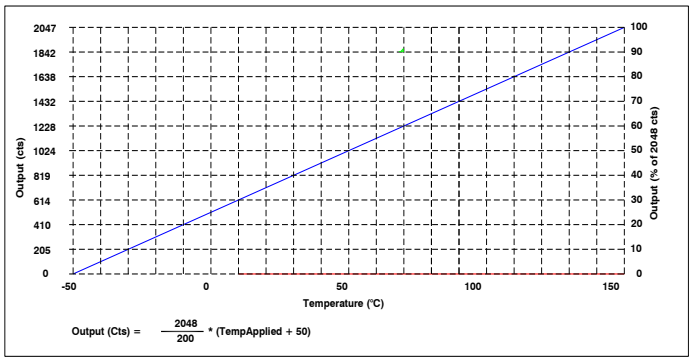
PRESSURE AND TEMPERATURE TRANSFER FUNCTIONS



Type 1, 10-90%, Pressure Transfer Function

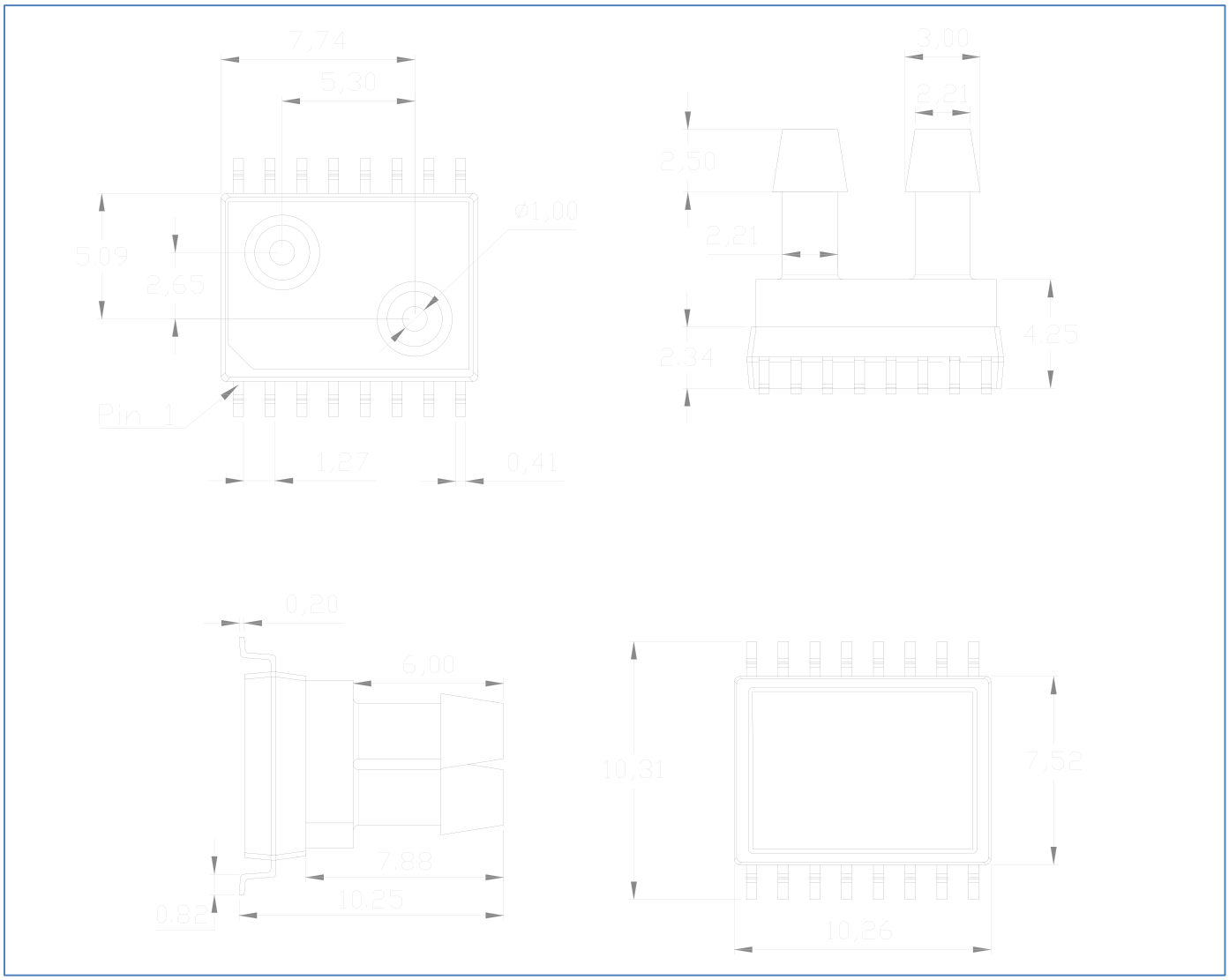


Type 2, 5-95%, Pressure Transfer Function

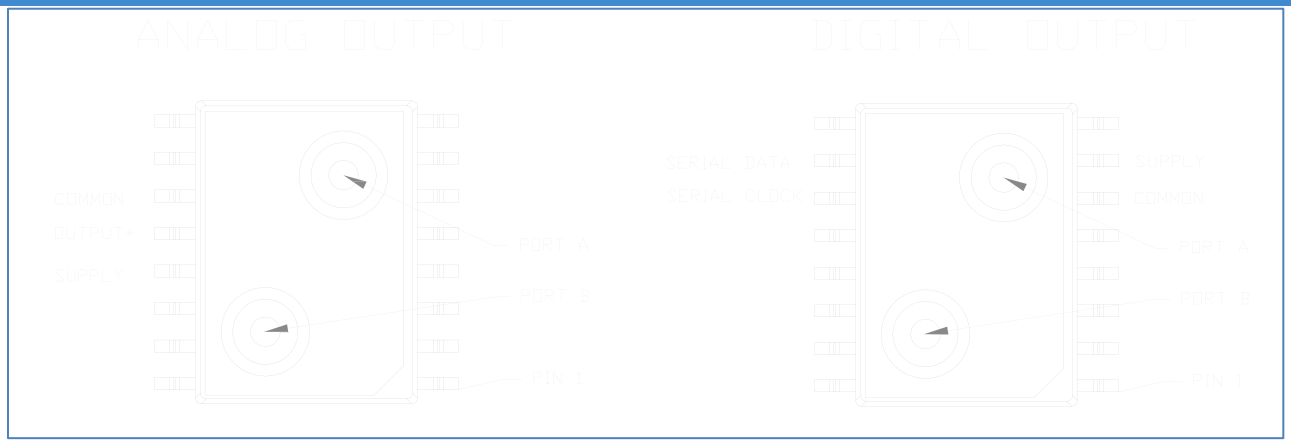


Temperature Transfer Function

MECHANICAL DIMENSIONS in [mm]



PORT DESIGNATION



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PART NUMBERING FOR ORDERS

Series	Port Type	Package Style	Pressure Range	Pressure Units	Pressure Type (Range Availability) [Package Availability]	Calibrated Voltage	Output Type	Digital Protocol	Options
MCT-SM9333	VBD= Vertical Barb, Dual	J= J lead SMT	125 250	PA=Paschal	B=Bidirectional (All Ranges) [All Port Types]	3=3.3Vdc 5-5.0Vdc	Type1= 10 -90% of Supply Voltage	I1=I2C, 0x28H I2=I2C, 0x38H I3=I2C, 0x48H [All Packages] S1=SPI [All Packages]	-L Low Power

Part Number Example: MCT-SM9333 VBDJ 125PAB 31I1

Vertical Barbed Dual Port, J Leaded SMT Package, -125 To +125 Pa Range, 3.3Vdc Supply, I2C Protocol 0x28H, Pmin= -125, Pmax=+ 125 Pa, 10% to 90% cts.

WARRANTY

Pressure sensors have a limited one-year warranty to the original purchaser. AVSensors will repair or replace, at its option, without charge those items it finds defective. This is the 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. In no event shall AVSensors be liable for consequential, special, or indirect damages. This warranty does not apply to units that have been modified, misused, neglected or installed where the application exceeds published ratings. Specifications may change without notice. The information supplied is believed to be accurate and reliable as of this printing, however, we assume no responsibility for its use.