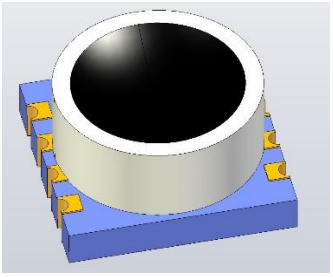
AV Sensors
AdVanced Sensor Design and Manufacture

MCT-583DHRD SERIES

The MCT-583DHRD Series
Leadless Chip Carrier Pin Styles
Digital Pressure & Temperature Outputs
Liquid Level Measurements



DESCRIPTION

Advanced Sensors Multi Chip Technology (MCT) 5803DHRD Series incorporates a bonded silicon gage to the latest mixed signal ASIC (Application Specific Integrated Circuit) with a leading *24Bit* High Resolution ADC (∑ Δ) specifically designed for optimized for depth measurement systems with a water depth resolution of 1cm and below. The MCT 5803DHRD Series provides a 24bit digital pressure and temperature output in SPI and I^2C protocols. The advanced design requires *no* external calculation since a fully integrated digital signal processor (DSP) performs an error correction algorithm. The designs superior performance provides 1% Total Error across a wide temperature range of -10 to 60˚ Given these features and an advanced low power design; the MCT-583DHRD series is the ideal choice for OEM customers.

APPLICATIONS

- Mobile Water Depth Measurements
- Diving Computers
- Adventure, Fitness, and Performance Watches

FEATURES

- Internal Error Correction
- Low Power Sleep Stage
- High Accuracy
- Leadless Chip Carrier
- High Resolution Digital Output (24bit ADC Pressure & Temperature)
- I2C & SPI Outputs
- Custom Outputs and Ranges Available

SPECIFICATIONS	Symbol	Min	Typical	Max	Unit	Note
Performance Specifications						
Supply Voltage		3.0	3.3	3.60	V	
Current Consumption				3	mA	
Standby Current			0.2		µA	
Output Resolution		12		24	bits	
Pressure Accuracy		-0.25		0.25	%FSS	2
Temperature Accuracy			±4		°C	3
Total Error Band	TEB	-1.0		1.0	%FSS	4
Long Term Stability			±0.25		%FSS	
Conversion Time		2	7	10	mS	5
Power On to Valid Data				3	mS	6
Weight				3	grams	
Compensated Temperature		-10 to 60			°C	7
Operating Temperature		-40 to 85			°C	

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SPECIFICATIONS	Symbol	Min	Typical	Max	Unit	Note
Absolute Maximum Conditions						10
Supply Voltage		-0.3		3.6	V	
Voltage on Any Pin		-0.3		Vsupply +0.3	V	
Digital Interface	I2C	100		400	kHz	
Clock Frequency	SPI	50		800	kHz	
Pull Up Resistor, Data Lines		1			kΩ	
Storage Temperature		-40		85	˚C	
ESD Susceptibility (HBM)		2				kV
Peak Reflow Temperature		15s max at 250˚C [450˚F]				
Proof Pressure		3x Range				8
Burst Pressure		5x Range				9
Media Compatibility		Compatible with Wetted Materials				

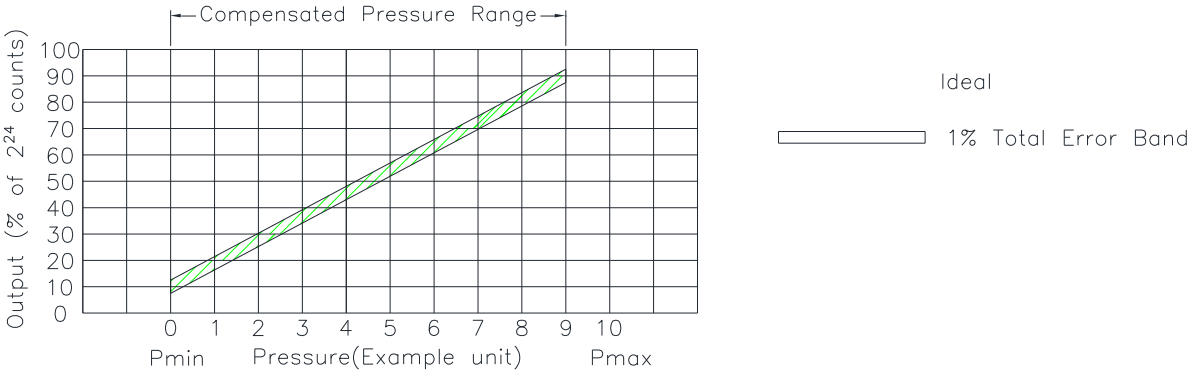
WETTED MATERIALS	
Ports	316L-
Substrate	Alumina ($AL_2 03$)
Adhesives	Silicone
Gel Potting	Dimethyl Silicone Elastomer

Reference Conditions: Vsupply: 3.30Vdc Ta=25˚C

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. Typical temperature output error over the compensated temperature range.
4. 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. See Pressure Range Specifications below.
5. The time for the output DAC to be updated with new data.
6. The time for the output DAC to have valid data after a power on reset.
7. The temperature range over which the sensor will produce an output proportional to pressure within the specified performance limits.
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

PRESSURE OUTPUT CHART EXAMPLE
TYPE 1 (10–90%) EXAMPLE



PRESSURE TRANSFER FUNCTION

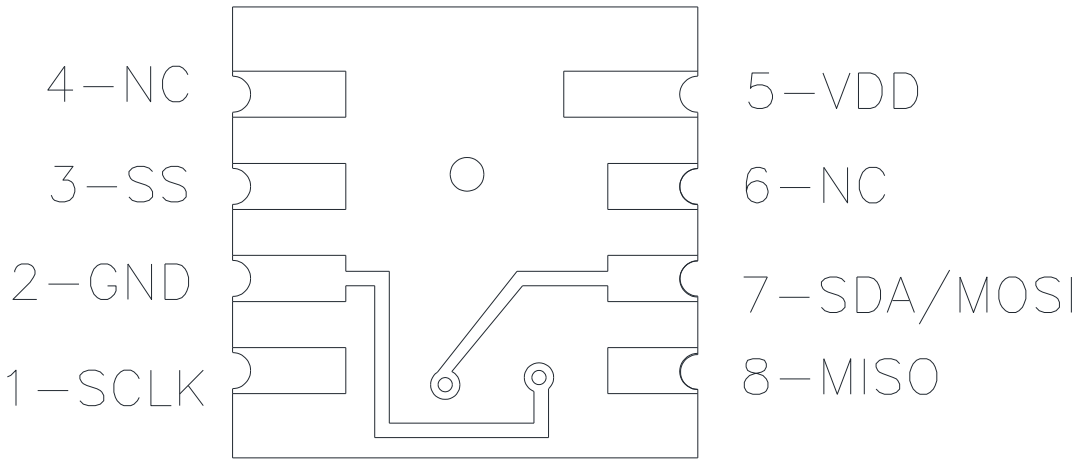
$$\text{Output (\% of } 2^{24} \text{ counts)} = \frac{M*16777215}{Pmax-Pmin} * (Papplied-Pmin)+N*16777215$$

TEMPERATURE TRANSFER FUNCTION

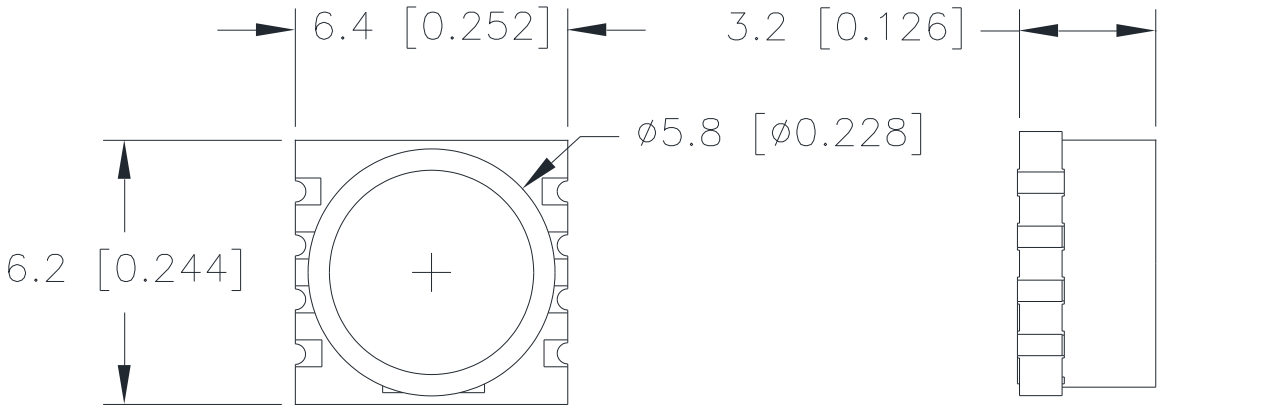
$$\text{Temperature Output (Decimal Counts)} = \frac{(\text{Output } ^\circ C - (-40^\circ C)_{Tmin}) * 16777215}{(85^\circ C_{Tmax} - (-40^\circ C)_{Tmin})}$$

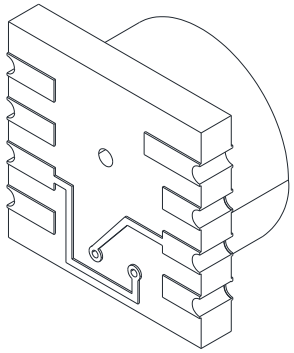
TRANSFER FUNCTION				
Variable	OUTPUT TYPE			
	1	2	3	4
M	0.8	0.9	0.8	0.9
N	0.1	0.05	0.05	0.04

CONNECTION DIAGRAM



MECHANICAL DIMENSIONS





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PART NUMBERING FOR ORDERS

Series	Port Type	Package Style	Pressure Range	Pressure Units	Pressure Type	Calibrated Voltage	Output Type	Digital Protocol	Media
MCT-583DHRD	GR=Gel Ring	C=LLC	001 002 005 007 014	B= Bar	G= Gage A=Absolute	3=3.3Vdc	Type1= 10 -90% of Cts (24 Bits) Type2= 5 -95% of Cts (24 Bits)	I0=I2C, 0x08H I1=I2C, 0x18H I2=I2C, 0x28H I3=I2C, 0x38H I4=I2C, 0x48H I5=I2C, 0x58H I6=I2C, 0x68H I7=I2C, 0x78H [All Packages] S1=SPI	T= Liquid Media, Silicone Gel V=Liquid Media, Parylene Coating
			120 200	K=Kpa					

Part Number Example: MCT-583DHRD GRC 005BGB31S1T **Dual Side Port Barbed , Leadless Chip Carrier, 0 to +5 Bar Range, 3.3Vdc Supply, SPI Protocol, Pmin= 10 to 90%, Liquid Media**

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 buyers 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.