

General Description

The TMR9003 linear sensor utilizes a unique push-pull Wheatstone bridge composed of four TMR sensor elements. The unique bridge design provides a high sensitivity differential output that is linearly proportional to a magnetic field applied parallel to the surface of the sensor package, and it provides superior temperature compensation of the output. The TMR9003 is assembled in a 6mm×5mm×1.5mm SOP8 package.

Features and Benefits

- Tunneling Magnetoresistance (TMR) Technology
- High Sensitivity (~30mV/V/Oe)
- Ultra-low Noise Spectral Density (750pT/√Hz@1Hz)
- Very-low Power Consumption
- Excellent Thermal Stability
- Low Hysteresis
- Compatible with Wide Range of Supply Voltages
- No need for set/reset calibration

Applications

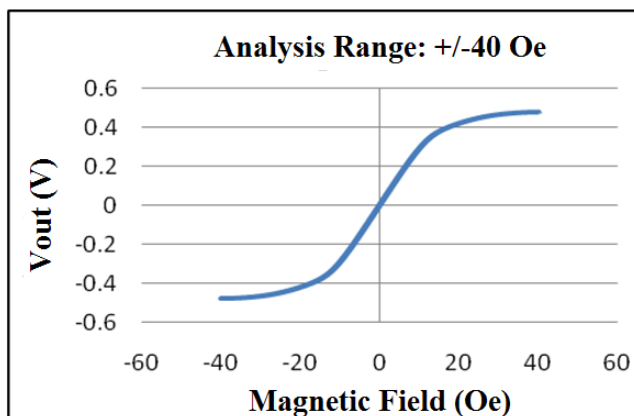
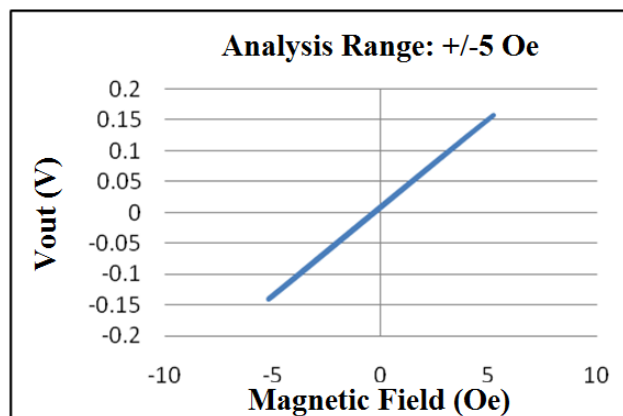
- Weak Magnetic Field Sensing
- Current Sensors
- Position and Displacement Sensing
- Biomedical Sensing
- Magnetic Communication



TMR9003

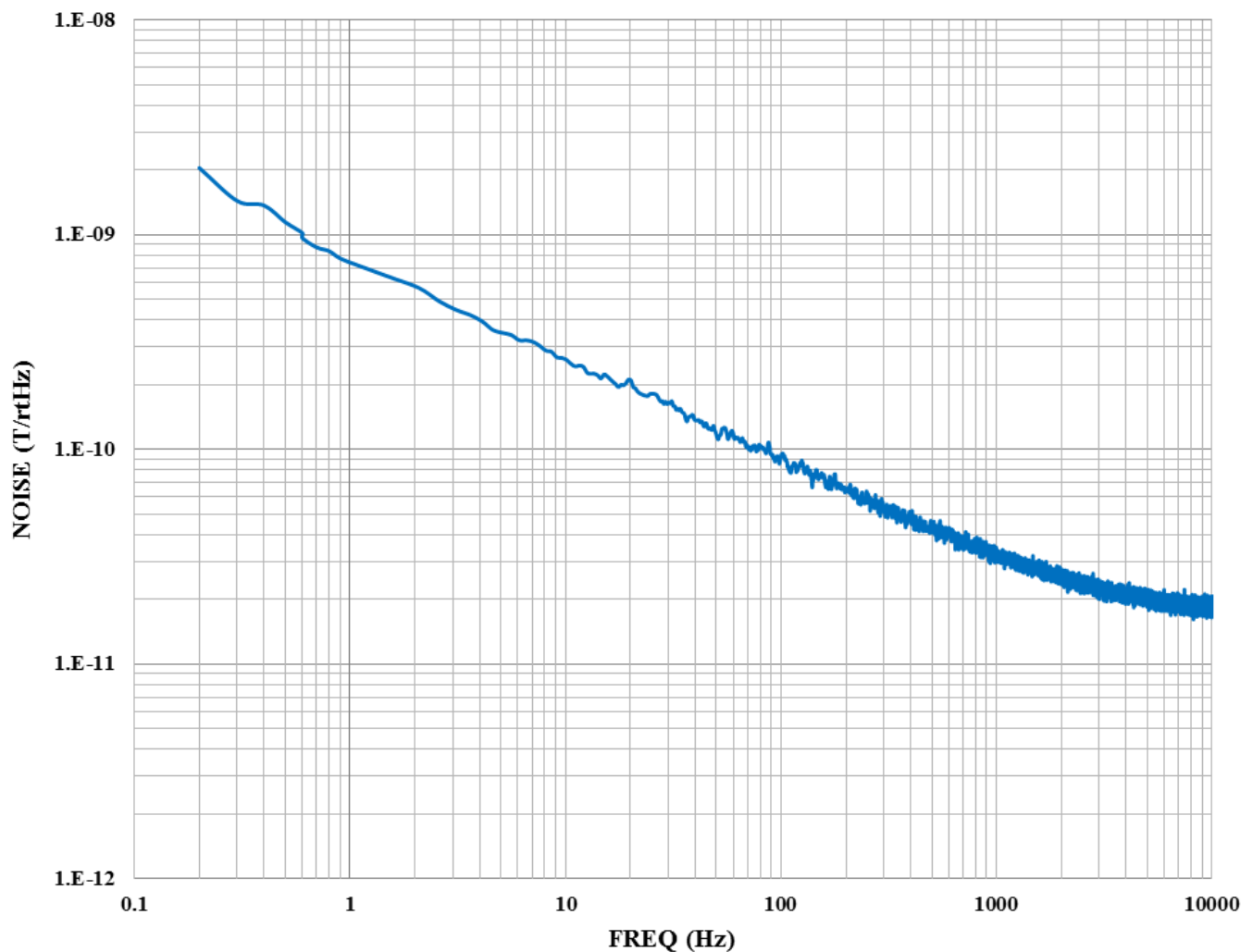
Transfer Curve

The following figure shows the response of the TMR9003 to an applied magnetic field in the range of ± 5 Oe and ± 40 Oe when the TMR9003 is biased at 1 V. The following specifications are calculated over an analysis range of ± 5 Oe.



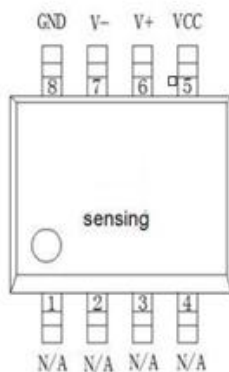
Sensor Noise

The following figure illustrates the Power SpectralDensity (PSD) of the TMR9003 self noise (N_i). The $1/f$ noise is approximately $750 \text{ pT}/\sqrt{\text{Hz}}$ @ 1Hz , and the white noise is approximately $20\text{pT}/\sqrt{\text{Hz}}$ @ 10kHz .



Pin Configuration

(Arrow indicates direction of applied field that generates a positive output voltage after a SET pulse.)



(Top View)

Pin No.	Pin Name	Pin Function
5	V _{CC}	Supply voltage
6	V+	Analog Differential Output 1
7	V-	Analog Differential Output 2
8	GND	Ground
1、2、3、4	N/A	Not connected

Absolute Maximum Ratings

Parameter	Symbol	Limit	Unit
Supply Voltage	V_{CC}	7	V
Reverse Supply Voltage	V_{RCC}	7	V
Max Exposed Field	H_E	4000	Oe ⁽¹⁾
ESD Voltage	V_{ESD}	4000	V
Operating Temperature	T_A	-40~125	°C
Storage Temperature	T_{stg}	-50 ~150	°C

Specification ($V_{CC}=1.0V$, $T_A=25^{\circ}C$)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	Normal Operating		1	7	V
Supply Current	I_{CC}	Output Open		20 ⁽²⁾		μA
Resistance	R			50		kOhm
Sensitivity	SEN	Fit ±5Oe		30		mV/V/Oe
Saturation Field	H_{sat}			±15		Oe
Non -Linearity	NONL	Fit ±5Oe		0.5		%FS
Offset Voltage	V_{offset}			10		mV/V
Hysteresis	Hys	Fit ±5Oe		0.1		Oe
Self Noise	N_i	@1Hz		750		pT/√Hz

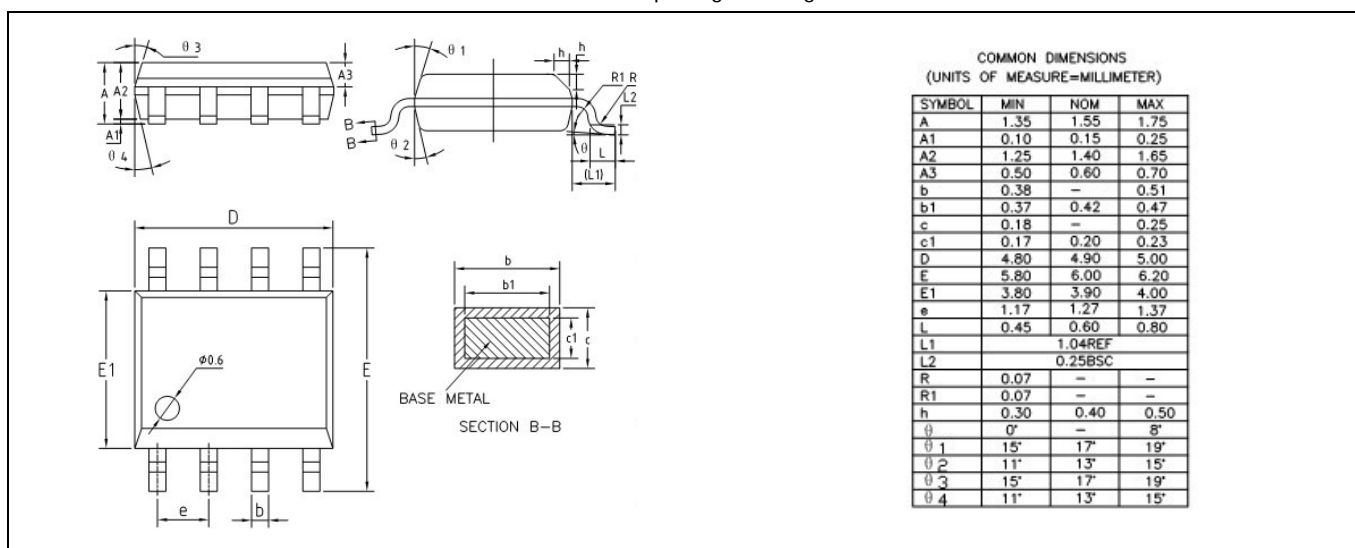
Note:

(1) 1 Oe (Oersted) = 1 Gauss in air = 0.1 millitesla = 79.8 A/m.

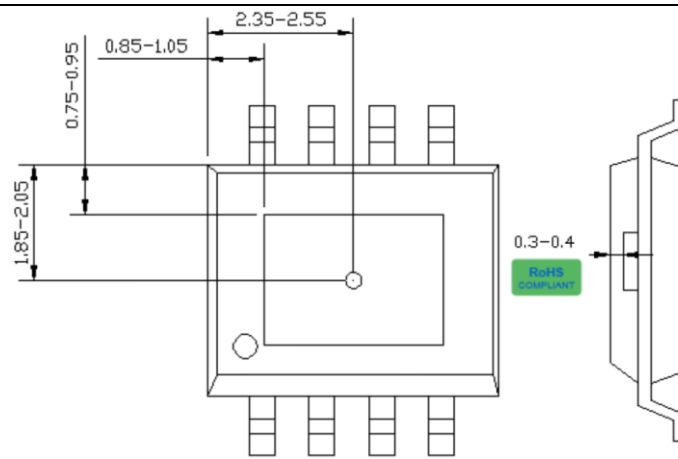
(2) $I_{CC} = V_{CC}/R$, I_{CC} will vary under different R in practice and it can be customized accordingly.

Package Information

SOP8 package drawing



TMR Sensor Position



Top view and side view(unit: mm)



MultiDimension Technology Co., Ltd.

Address: No. 7 Guangdong Road, Zhangjiagang Free Trade Zone, Jiangsu, 215634, China

Web: www.dowaytech.com/en

Email: info@dowaytech.com

The information provided herein by MultiDimension Technology Co., Ltd. (hereinafter MultiDimension) is believed to be accurate and reliable. Publication neither conveys nor implies any license under patent or other industrial or intellectual property rights. MultiDimension reserves the right to make changes to product specifications for the purpose of improving product quality, reliability, and functionality. MultiDimension does not assume any liability arising out of the application and use of its products. MultiDimension's customers using or selling this product for use in appliances, devices, or systems where malfunction can reasonably be expected to result in personal injury do so at their own risk and agree to fully indemnify MultiDimension for any damages resulting from such applications.