

## General Description

The 3-Axis TMR2309 linear sensor utilizes three unique push-pull Wheatstone bridges. The 3-Axis TMR2309 is available in a 9.5 mm X 9.5 mm X 6.0 mm<sup>3</sup> package.

## Features and Benefits

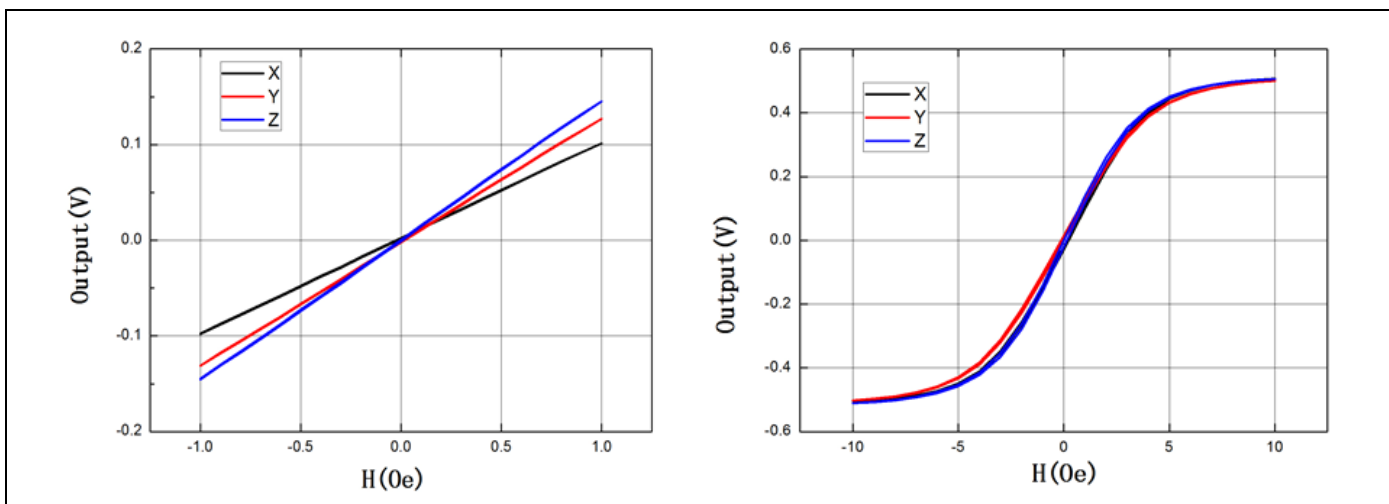
- Tunneling Magneto resistance (TMR) Technology
- Ultra High Sensitivity (~100 mV/V/Oe)
- Ultra Low Noise Spectral Density (150 pT/√Hz@1Hz)
- Very Low Power Consumption
- Excellent Thermal Stability
- Low Hysteresis
- Compatible with wide Range of Supply Voltages
- No need for set/reset calibration

## Applications

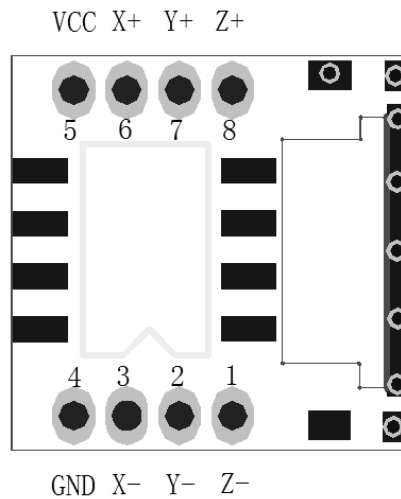
- Weak Magnetic Field Sensing
- Current Sensors
- Position and Displacement Sensing
- Bio-medical Sensing
- Magnetic Communication

## Transfer Curve

The following figure shows the response of the 3-axis TMR2309 to an applied magnetic field in the range of ±10Oe and ±100Oe when the TMR2309 is biased at 1V.



## Pin Configuration



Pin No.	Pin Name	Pin Function
1	VZ-	Analog Z-axis Output-
2	VY-	Analog Y-axis Output-
3	VX-	Analog Y-axis Output-
4	GND	Ground
5	Vcc	Supply Voltage
6	VX+	Analog X-axis Output+
7	VY+	Analog Y-axis Output+
8	VZ+	Analog Z-axis Output+

## 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 <sup>(1)</sup>
ESD Voltage	$V_{ESD}$	4000	V
Operating Temperature	$T_A$	-40~125	°C
Storage Temperature	$T_{stg}$	-50 ~150	°C

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	$V_{CC}$	Operating		1	7	V
Supply Current	$I_{CC}$	Output Open		0.07 <sup>(2)</sup>		mA
Resistance	R			15		KOhm
Sensitivity	SEN	X-axis Fit @ $\pm 1$ Oe		100		mV/V/Oe
		Y-axis Fit @ $\pm 1$ Oe		100		mV/V/Oe
		Z-axis Fit @ $\pm 1$ Oe		100		mV/V/Oe
Saturation Field	$H_{sat}$	X-axis		$\pm 8$		Oe
		Y-axis		$\pm 8$		Oe
		Z-axis		$\pm 8$		Oe
Non-Linearity	NONL	X-axis Fit @ $\pm 1$ Oe		0.5		%FS
		Y-axis Fit @ $\pm 1$ Oe		0.5		%FS
		Y-axis Fit @ $\pm 1$ Oe		0.5		%FS
Offset Voltage	$V_{offset}$	X-axis	-15		15	mV/V
		Y-axis	-15		15	mV/V
		Z-axis	-15		15	mV/V
Hysteresis	Hys	X-axis Fit @ $\pm 1$ Oe			0.02	Oe
		Y-axis Fit @ $\pm 1$ Oe			0.02	Oe
		Z-axis Fit @ $\pm 1$ Oe			0.02	Oe
Temperature Coefficient of Resistance	TCR	H = 0 Oe		-600		PPM/ $^{\circ}C$
Temperature Coefficient of Sensitive	TCS			-300		PPM/ $^{\circ}C$
Self Noise	Ni	X-axis @ 1Hz		150		pT/ $\sqrt{Hz}$
		Y-axis @ 1Hz		150		pT/ $\sqrt{Hz}$
		Z-axis @ 1Hz		150		pT/ $\sqrt{Hz}$

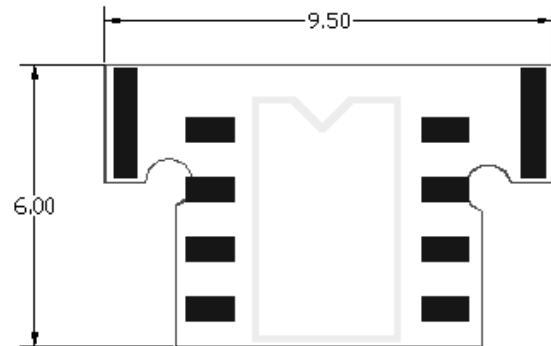
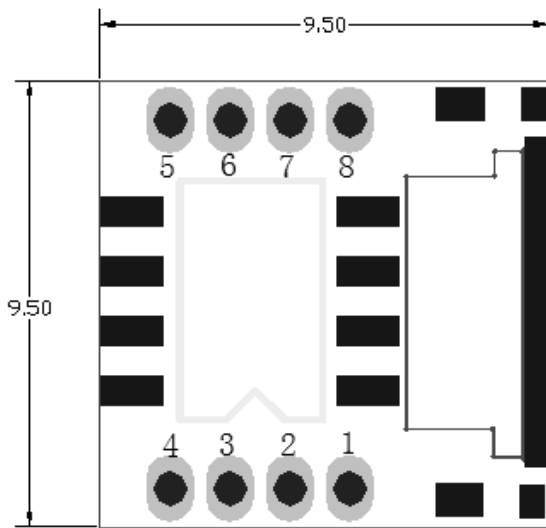
Notes:

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

(2) Custom resistance may be available upon request.

## Package Information

Size: Length x Width x Height = 9.5x9.5x6.0 mm<sup>3</sup>





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