TMR9082

High sensitivity, Low Noise TMR Magnetic Linear Sensor

Description

The TMR9082 linear sensor utilizes a unique push-pull Wheatstone bridges composed of four highly sensitive TMR sensor elements. With low noise, high sensitivity, and a compact package, the TMR9082 is designed for detecting weak magnetic fields such as geomagnetic or magnetic flux leakage. TMR9082 is available in SOP8 package.

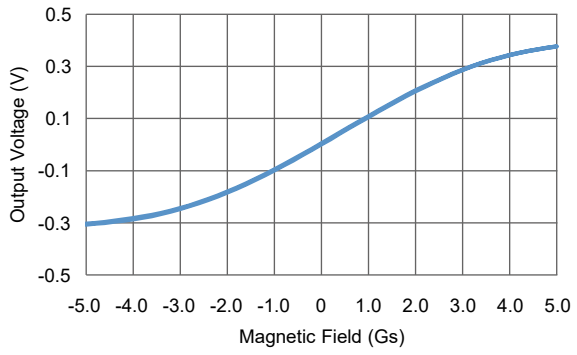
Features and Benefits

- Tunneling magnetoresistance (TMR) technology
- High sensitivity (~100 mV/V/Gs)
- Low noise spectral density: 250 pT/rt(Hz)@1Hz
- Low power consumption
- Excellent thermal stability
- Low hysteresis
- Wide range supply voltages range
- No need for set/reset pulse circuit
- RoHS & REACH compliant

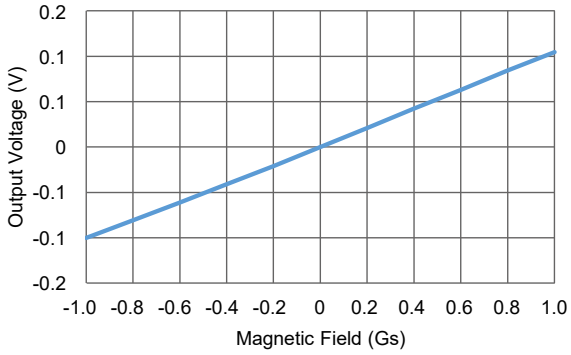
SOP8

Applications

- Weak magnetic field sensing
- Current sensor
- Position and displacement sensor
- Biomedical sensor
- Magnetic communication



TMR9082 ±5Gs Output Curve



TMR9082 ±1Gs Output Curve

Selection Guide

Part Number	Supply Voltage	Saturation Field	Sensitivity	Noise	Package	Packing Form
TMR9082P	1 V	±4 Gs	100 mV/V/Gs	250 pT/rt(Hz)@1Hz	SOP8	Tape & Reel

Catalogue

1. Operating Principle

The TMR9082 sensing axis is perpendicular to the package top-marking surface; the sensing axis is defined from the N pole toward the S pole, as indicated by the arrow in the figure below.

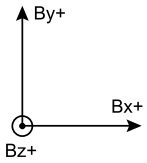


Figure 1-1. Definition of axis

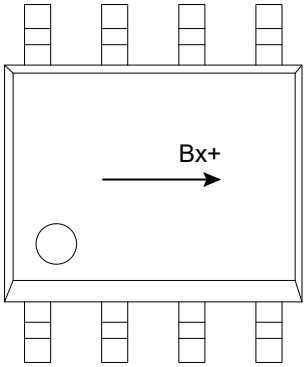


Figure 1-2. Axial diagram (SOP8 top view)

The TMR9082 output voltage varies linearly with the magnetic field along the sensing axis.

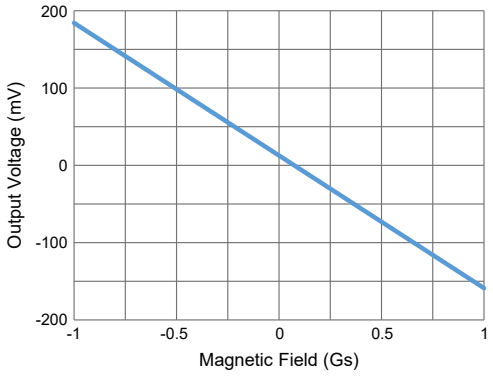


Figure 2. TMR9082 output curve

2. Pin Configuration

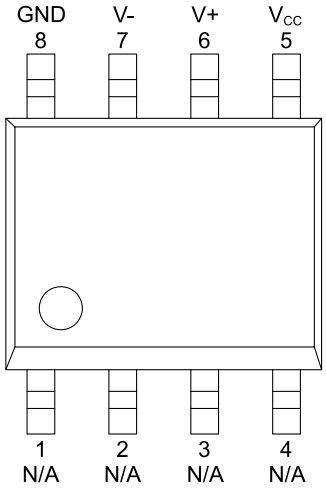


Figure 3. Pin Configuration

Pin Number	Name	Function
1, 2, 3, 4	N/A	Not connected
5	V_{CC}	Supply voltage
6	V+	Analog differential output 1
7	V-	Analog differential output 2
8	GND	Ground

3. Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit
Supply voltage	V_{CC}	-	3	V
Reverse supply voltage	V_{RCC}	-	3	V
External magnetic field	B	-	4000	Gs
ESD performance (HBM)	V_{ESD}	-	4000	V
Operating ambient temperature	T_A	-40	125	°C
Storage ambient temperature	T_{STG}	-50	150	°C

4. Electrical Specifications

V_{CC} = 1.0 V, T_A = 25 °C, differential output unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	V_{CC}	Operating	-	1	3	V
Supply Current [1)]	I_{CC}	Open output	-	33	-	μA
Resistance [1)]	R_B	-	-	30	-	kΩ
Sensitivity	SEN	Fit in ±1 Gs	-	100	-	mV/V/Gs
Saturation Magnetic Field	B_{SAT}	-	-	±4	-	Gs
Nonlinearity	NONL	Fit in ±1 Gs	-	0.4	-	%FS
Offset Voltage	V_{OFFSET}	-	-20	-	20	mV/V
Hysteresis	HYS	Fit in ±0.5 Gs	-	0.03	-	Gs
Temperature Coefficient of Resistance	TCR_B	-40 °C to 125 °C	-	-900	-	PPM/°C
Temperature Coefficient of Sensitivity	TCS	-40 °C to 125 °C	-	-100	-	PPM/°C
Noise spectral density	N_i	@1Hz	-	250	-	pT/rt(Hz)

1) $I_{CC} = V_{CC} / R_B$, and supply current changes linearly with supply voltage.

5. Characteristic Curves

5.1 Temperature Characteristics of Sensitivity

The following figure illustrates the TMR9082's sensitivity over the operating temperature range (-40 °C to 125 °C).

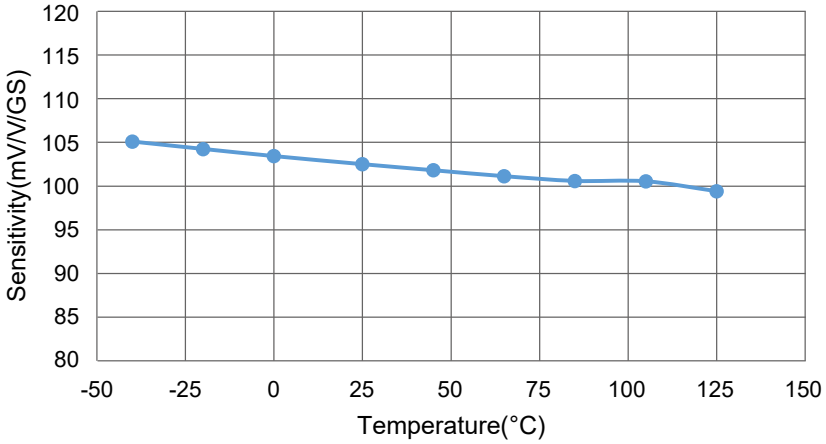


Figure 4. TMR9082 temperature characteristics of sensitivity

5.2 Sensor Noise

The following figure illustrates the power spectral density (PSD) of the TMR9082 background noise (NI). The 1/f noise is approximately 250 pT/rt(Hz)@1Hz and the white noise is approximately 4.5 pT/rt(Hz)@10kHz.

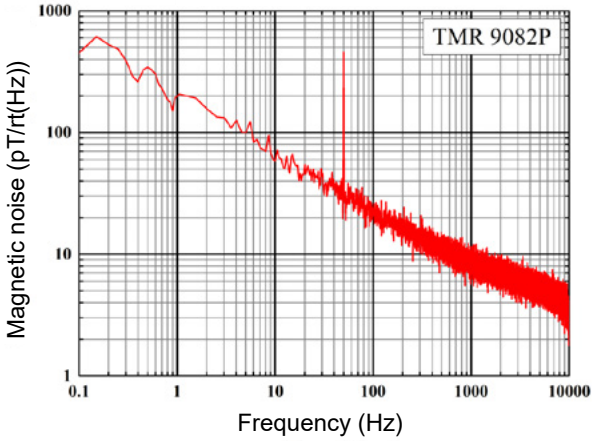


Figure 5. Magnetic noise density of TMR9082

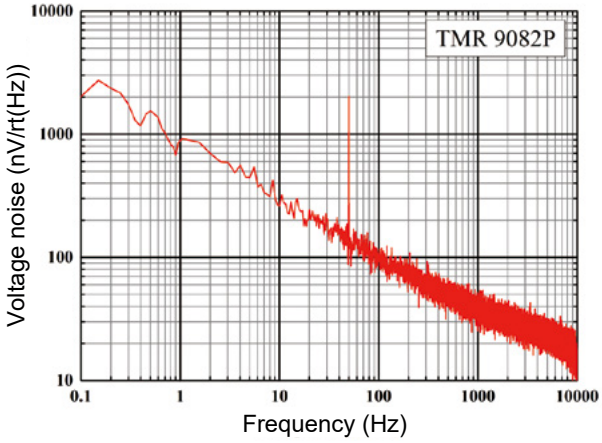


Figure 6. Voltage noise density of TMR9082

6. Dimensions

SOP8 Package

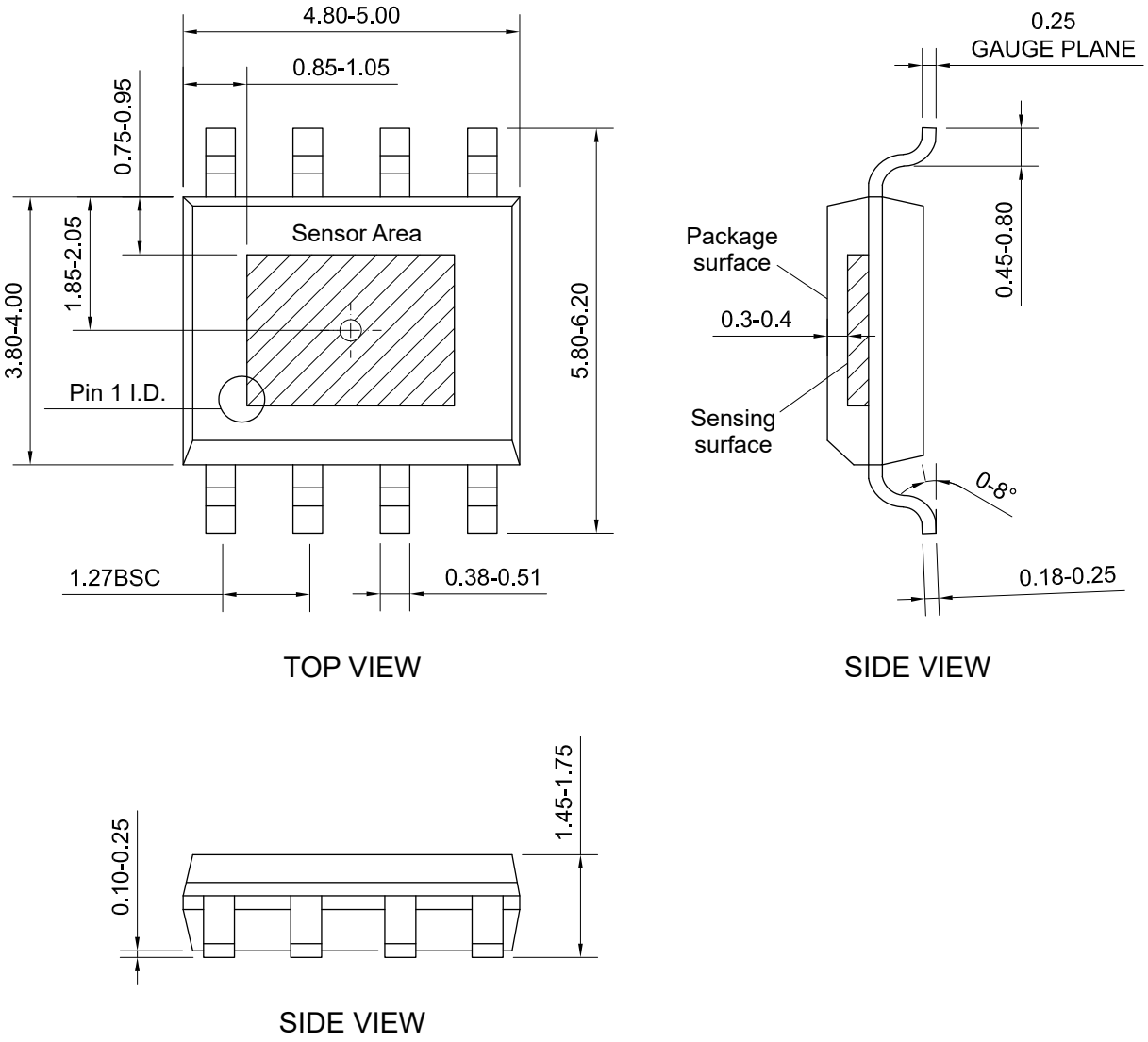


Figure 7. Package outline of SOP8 (unit: mm)

Recycling

The product(s) in this document should be disposed of at the end of the product(s) life using a qualified waste management company for recycling in accordance with local regulations.

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