TMR2103

Large Dynamic Range TMR Linear Sensor

Description

The TMR2103 linear sensor utilizes a unique push-pull Wheatstone bridge composed of four unshielded 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.

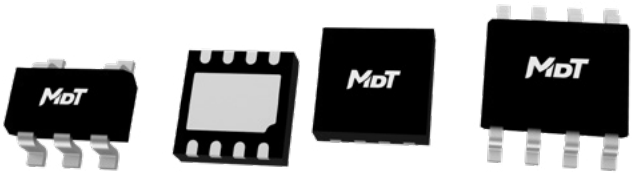
This TMR2103 magnetic linear sensor are available in SOT23-5, SOP8 and DFN8L (3 mm × 3 mm × 0.75 mm) package with compact size and easy to weld.

Features and Benefits

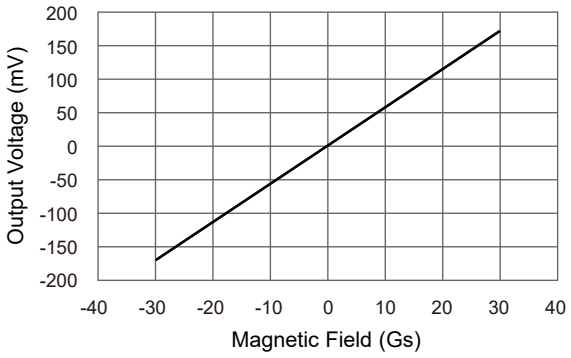
- Tunneling magnetoresistance (TMR) technology
- High sensitivity
- Large dynamic range
- Low power consumption
- Excellent temperature stability
- Very low hysteresis
- Compatible with wide range of supply voltages
- RoHS & REACH compliant

Applications

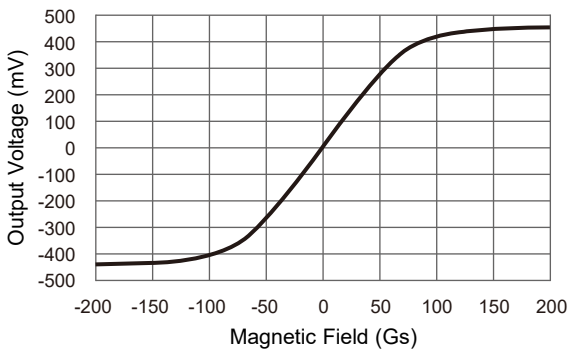
- Magnetometer
- Current sensor
- Position sensor
- Rotation sensor



SOT23-5 DFN8L SOP8



TMR2103 ±30 Gs Output Curve



TMR2103 ±200 Gs Output Curve

Selection Guide

Part Number	Resistance	Linear Range	Sensitivity	Package	Packing Form
TMR2103P	50 kΩ	±30 Gs	-6.0 mV/V/Gs	SOP8	Tape & Reel
TMR2103D	50 kΩ	±30 Gs	6.0 mV/V/Gs	DFN8L	Tape & Reel
TMR2103S	50 kΩ	±30 Gs	6.0 mV/V/Gs	SOT23-5	Tape & Reel

Catalogue

1. Functional Block Diagram

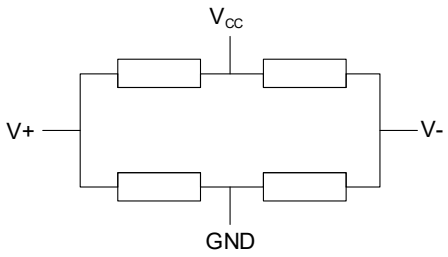


Figure 1. Block Diagram

2. Operating Principle

The TMR2103 sensing axis is parallel 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.

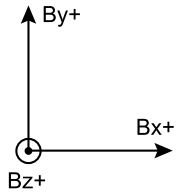


Figure 2-1. Definition of axis

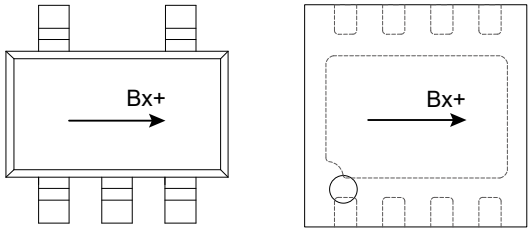


Figure 2-2. Axial diagram (SOT23-5) and (DFN8L) top view

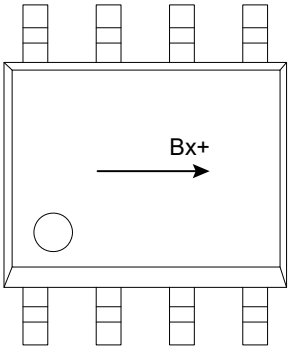


Figure 2-3. Axial diagram (SOP8 top view)

3. Pin Configuration

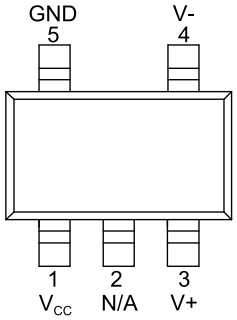


Figure 3-1. Pin Configuration (SOT23-5)

Pin Number	Name	Function
1	V_{CC}	Power supply
2	N/A	Not connected
3	V+	Analog differential output 1
4	V-	Analog differential output 2
5	GND	Ground

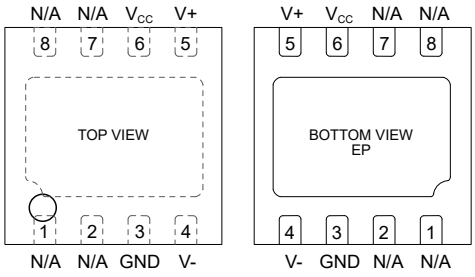


Figure 3-2. Pin Configuration (DFN8L)

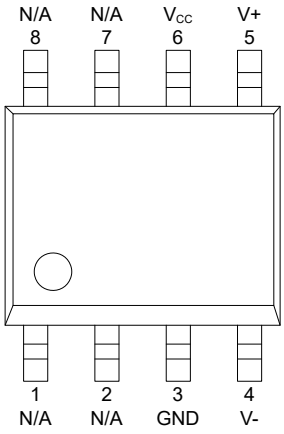


Figure 3-3. Pin Configuration (SOP8)

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

4. Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit
Supply Voltage	V_{CC}	-	7	V
Reverse Supply Voltage	V_{RCC}	-	7	V
External Magnetic Field	B	-	4000	Gs
ESD Performance (HBM)	V_{ESD}	-	4	kV
Operating Ambient Temperature	T_A	-40	125	°C
Storage Ambient Temperature	T_{STG}	-50	150	°C

5. Electrical Specifications

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

Parameters	Symbol	Condition	Min.	Typ.	Max.	Unit	Applicable Part Number
Supply Voltage	V_{CC}	Operating	-	1	7	V	All parts
Supply Current [1)]	I_{CC}	Output Open	-	60	-	μA	All parts
Resistance [1, 2)]	R_B	-	-	50	-	kΩ	All parts
Sensitivity	SEN	B in ±30 Gs	-	6.0	-	mV/V/Gs	TMR2103D TMR2103S
			-	-6.0	-	mV/V/Gs	TMR2103P
Saturation Magnetic Field	H_{SAT}	-	-	±75	-	Gs	All parts
Nonlinearity	NONL	B in ±30 Gs	-	0.5	-	%FS	All parts
Offset	V_{OFFSET}	-	-15	-	15	mV/V	All parts
Hysteresis	HYS	B in ±30 Gs	-	0.3	-	Gs	All parts
Resistance Temperature Coefficient	TCR	B = 0 Gs	-	-640	-	PPM/°C	All parts
Sensitivity Temperature Coefficient	TCS	-	-	-13	-	PPM/°C	All parts

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

2) Bridge resistance is customizable. Contact MultiDimension Technology for details.

6. Dimensions

SOT23-5 Package

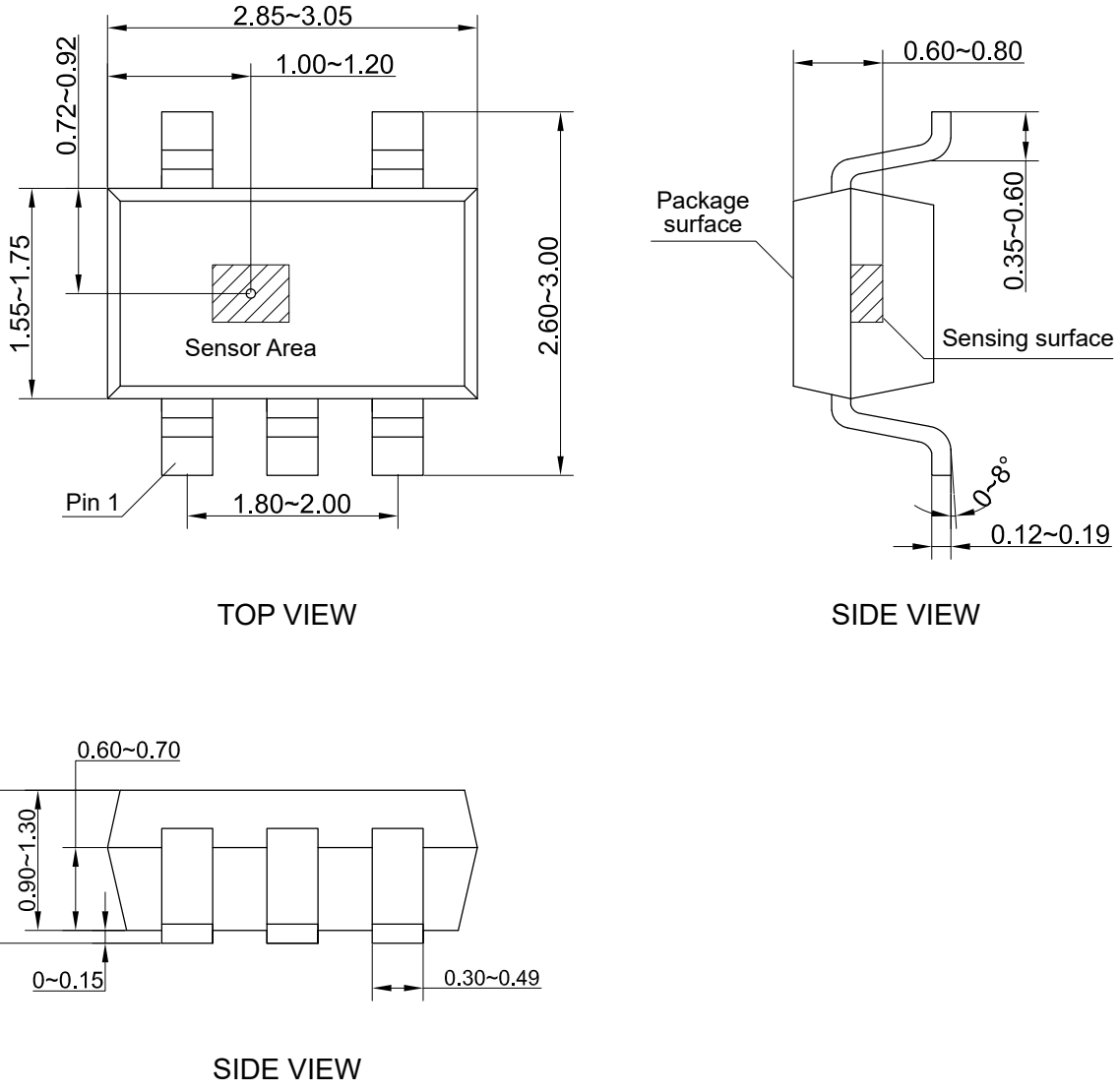


Figure 4. Package outline of SOT23-5 (unit: mm)

DNF8L Package

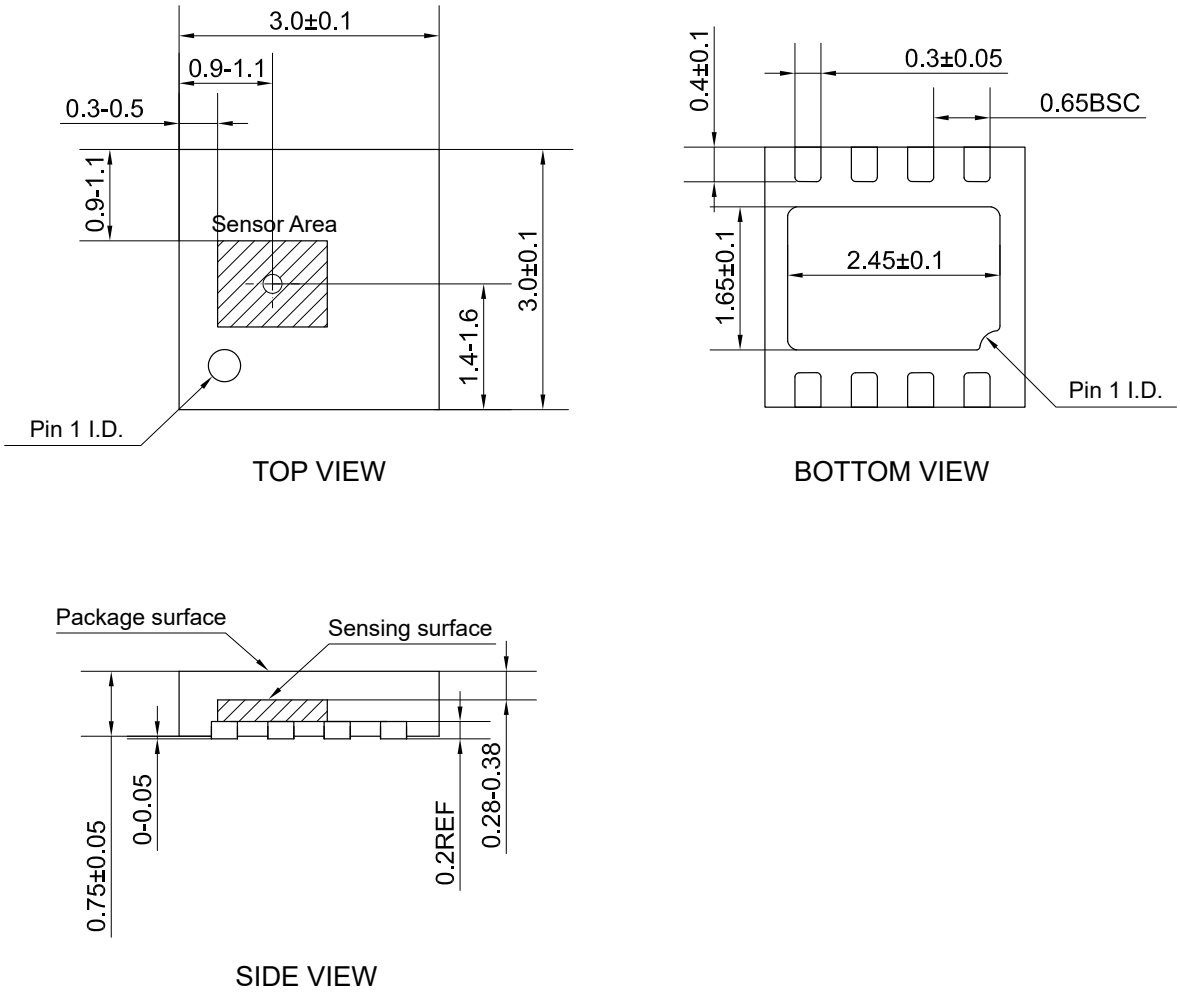


Figure 5. Package outline of DNF8L (unit: mm)

SOP8 Package

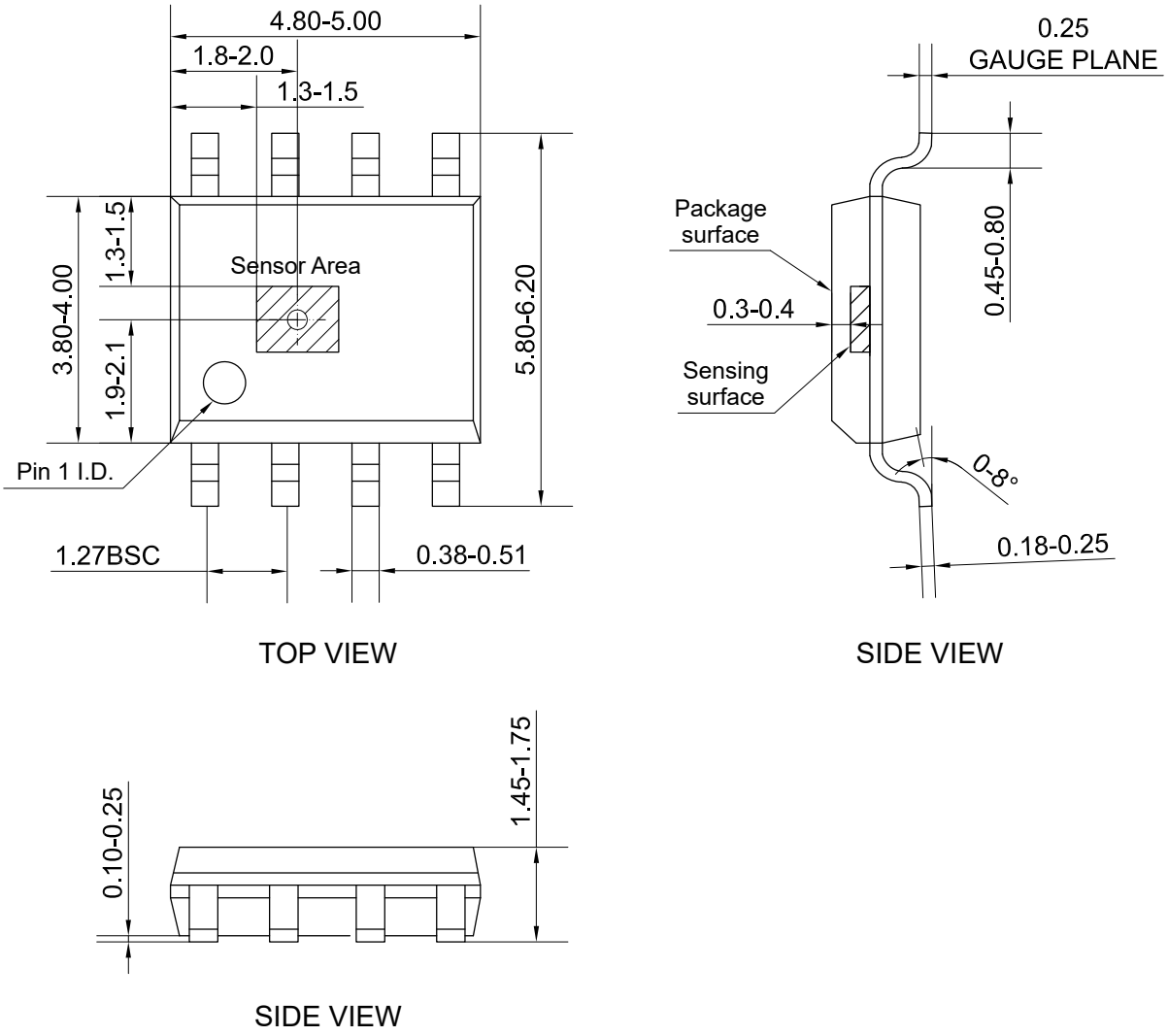


Figure 6. Package outline of SOP8 (unit: mm)

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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