

# 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.

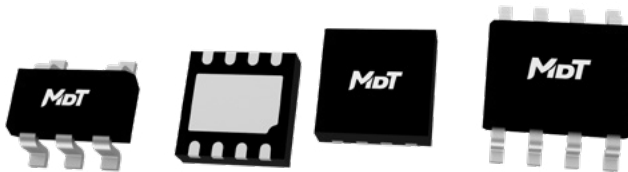
This TMR2103 magnetic linear sensor are available in SOT23-5, SOP8 and DFN8L (3 mm × 3 mm × 0.75 mm) package with compact size and easy to weld.

### 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

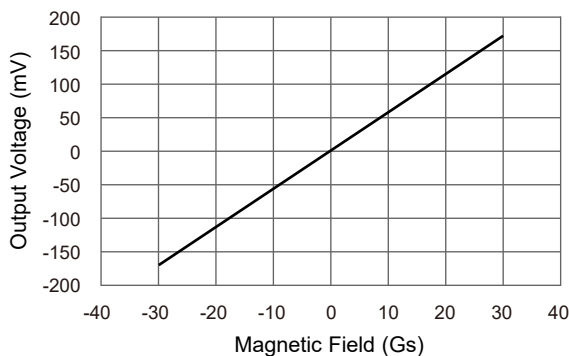
- Magnetometer
- Current sensor
- Position sensor
- Rotation sensor



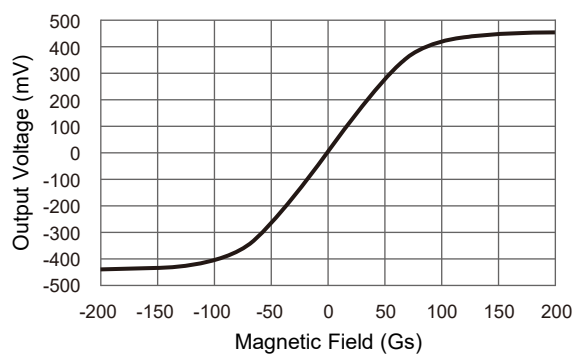
SOT23-5

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

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### 1. Functional Block Diagram

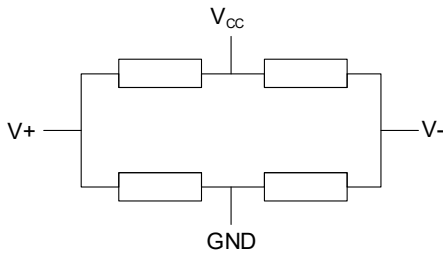


Figure 1. Block Diagram

### 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.

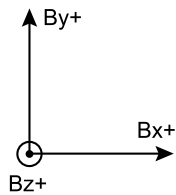


Figure 2-1. Definition of axis

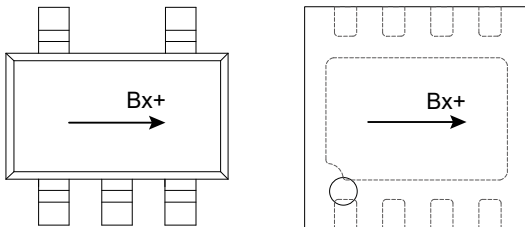


Figure 2-2. Axial diagram (SOT23-5) and (DFN8L) top view

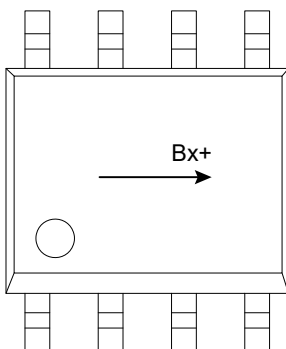


Figure 2-3. Axial diagram (SOP8 top view)

### 3. Pin Configuration

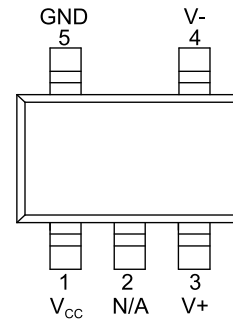


Figure 3-1. Pin Configuration (SOT23-5)

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

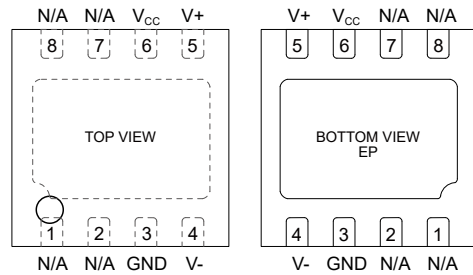


Figure 3-2. Pin Configuration (DFN8L)

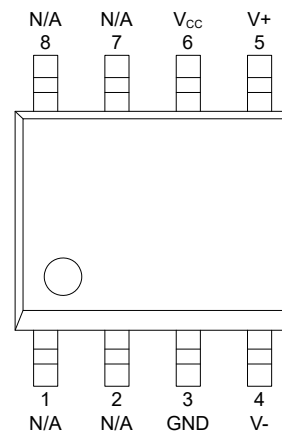


Figure 3-3. Pin Configuration (SOP8)

Pin Number	Name	Function
3	GND	Ground
4	V-	Analog differential output 2
5	V+	Analog differential output 1
6	V <sub>CC</sub>	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

$V_{CC} = 1.0\text{ V}$ ,  $T_A = 25\text{ °C}$ , 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 <sup>1)</sup>	$I_{CC}$	Output Open	-	60	-	μA	All parts
Resistance <sup>1, 2)</sup>	$R_B$	-	-	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

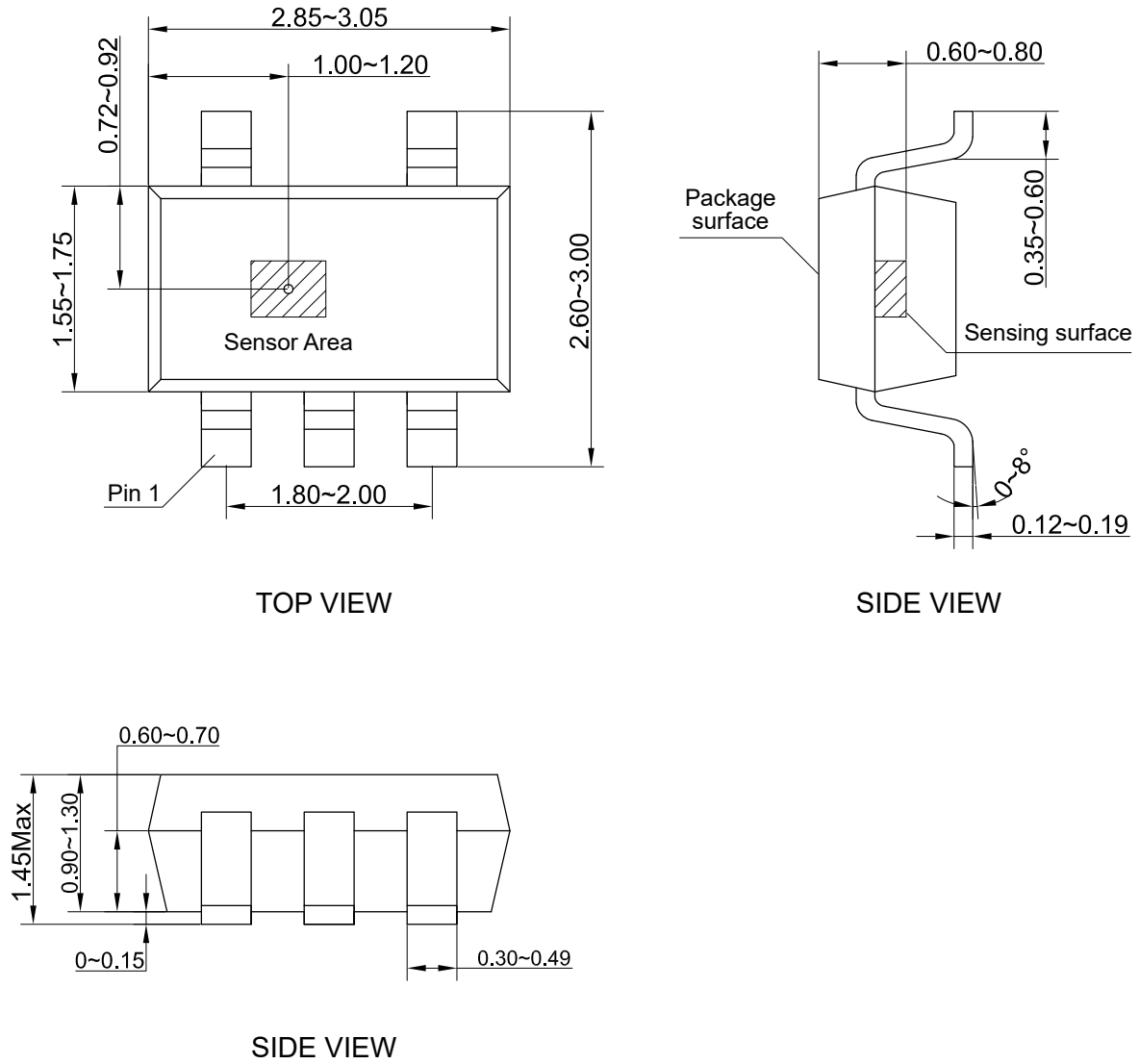


Figure 4. Package outline of SOT23-5 (unit: mm)

DNF8L Package

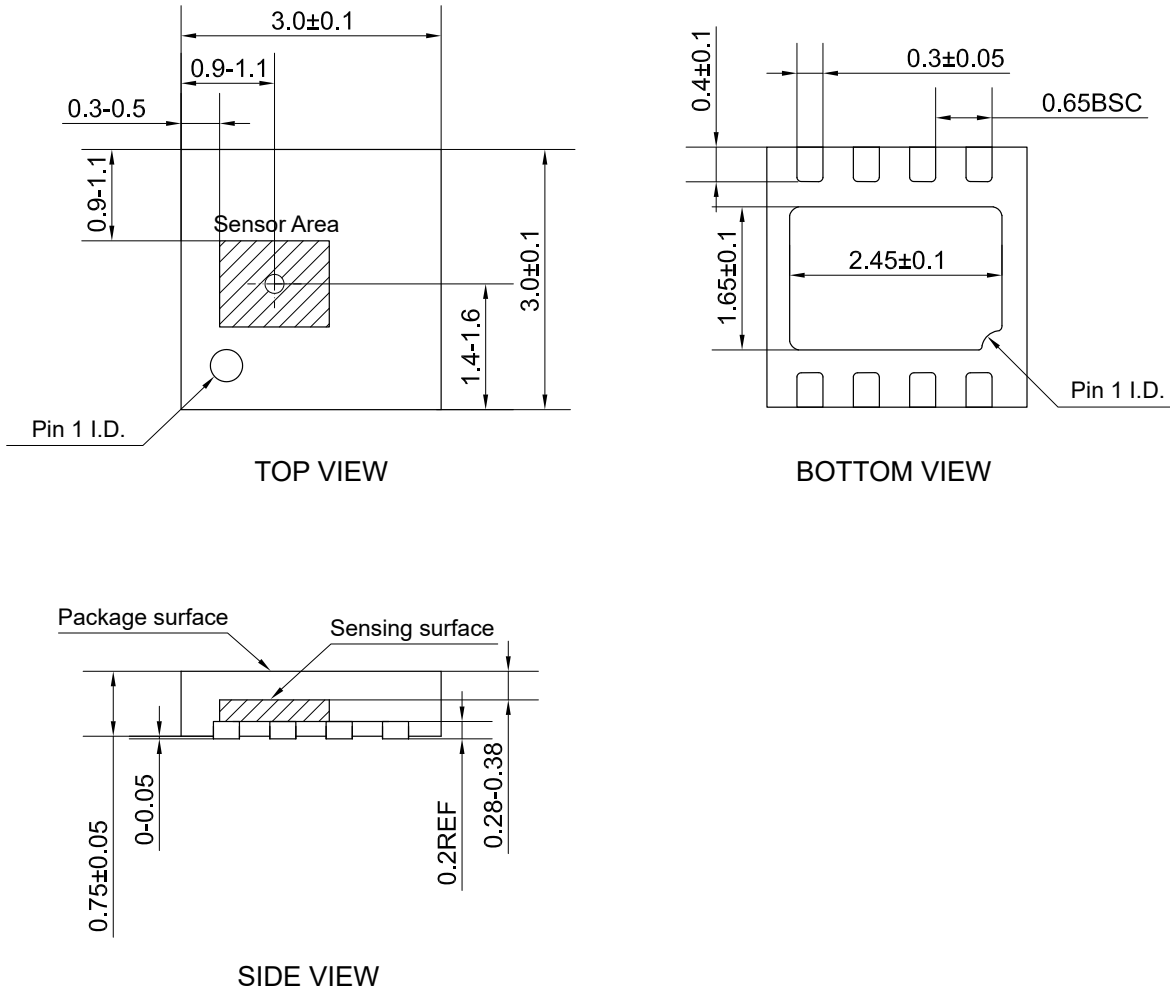


Figure 5. Package outline of DNF8L (unit: mm)

SOP8 Package

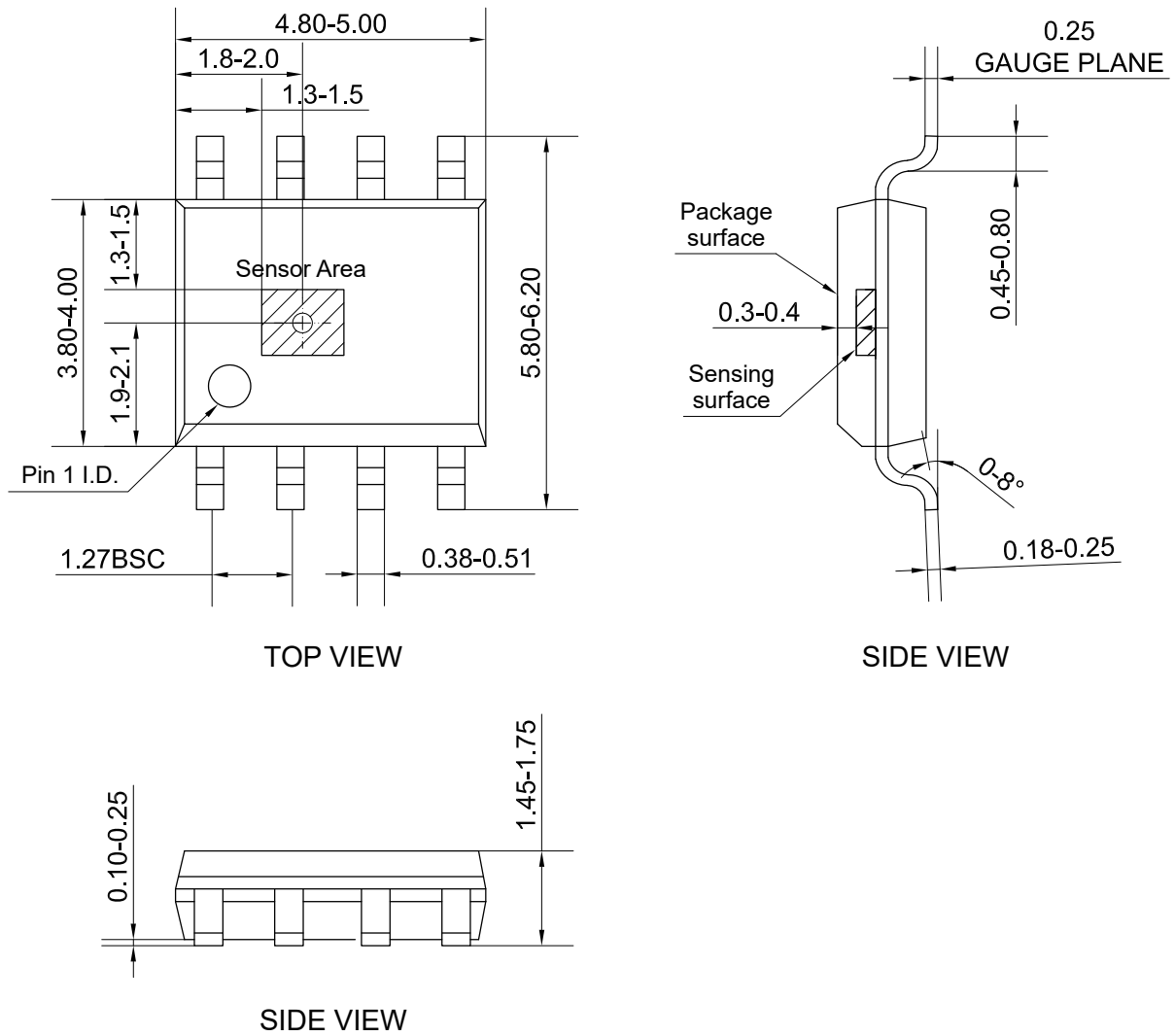


Figure 6. Package outline of SOP8 (unit: mm)

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