TMR2102

Large Dynamic Range TMR Linear Sensor

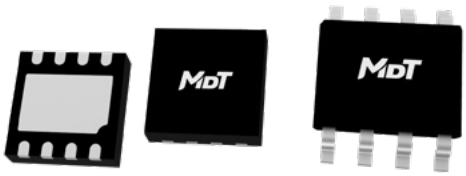
Description

The TMR2102 linear sensor adopts a unique push-pull Wheatstone full-bridge structure utilizing four unshielded, high-sensitivity TMR sensor elements. This Wheatstone full bridge provides differential voltage output with excellent temperature stability when the applied magnetic field changes parallel to the sensor's sensitive direction.

TMR2102 is available in two package options: SOP8 and DFN8L (3 mm × 3 mm × 0.75 mm).

Features and Benefits

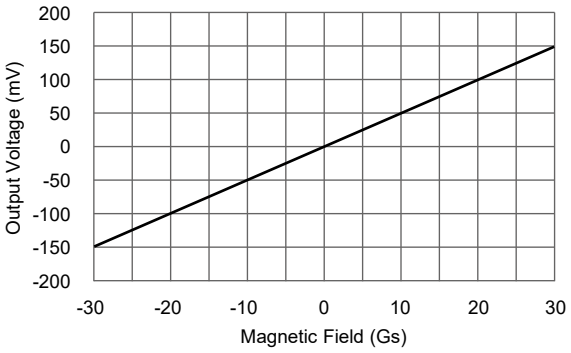
- Tunneling magnetoresistance (TMR) technology
- High sensitivity
- Large dynamic range
- Low power consumption
- Excellent temperature stability
- Very low hysteresis
- Wide operating voltage range
- RoHS & REACH compliant



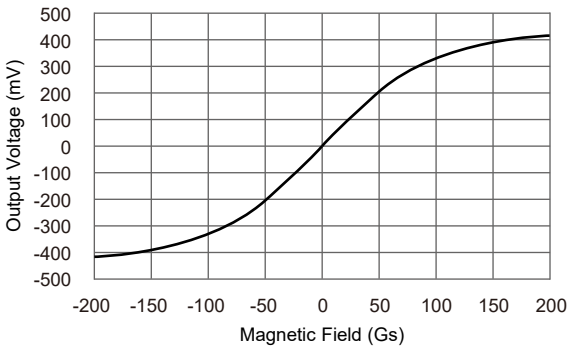
DFN8L SOP8

Applications

- Magnetometer
- Current sensor
- Position sensor
- Angle sensor



TMR2102 ±30 Gs Output Curve



TMR2102 ±200 Gs Output Curve

Selection Guide

Part Number	Supply Voltage	Saturation Magnetic Field	Sensitivity	Package	Packing Form
TMR2102P	1 V	±90 Gs	4.9 mV/V/Gs	SOP8	Tape & Reel
TMR2102D	1 V	±90 Gs	4.9 mV/V/Gs	DFN8L	Tape & Reel

Catalogue

1. Operating Principle

The TMR2102 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.

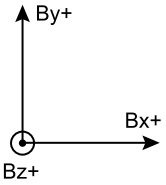


Figure 1-1. Definition of axis

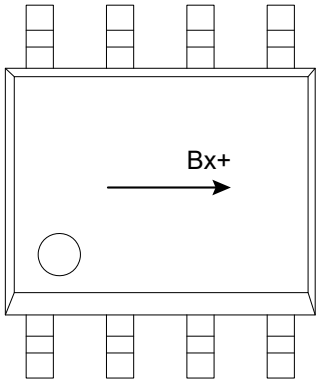


Figure 1-2. Axial diagram (SOP8 top view)

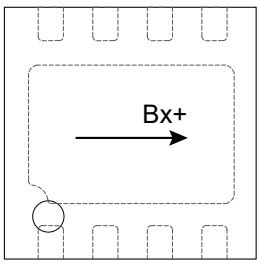


Figure 1-3. Axial diagram (DFN8L top view)

The TMR2102 output voltage varies linearly with the magnetic field along the sensing axis.

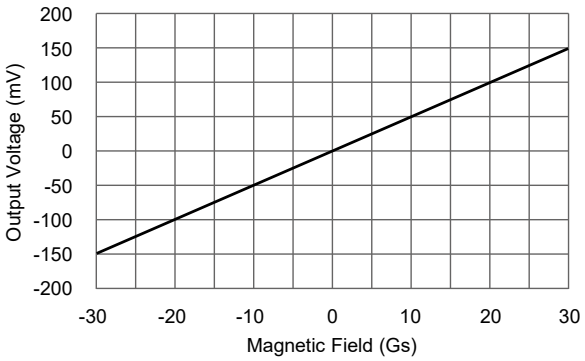


Figure 2. TMR2102 output curve

2. Pin Configuration

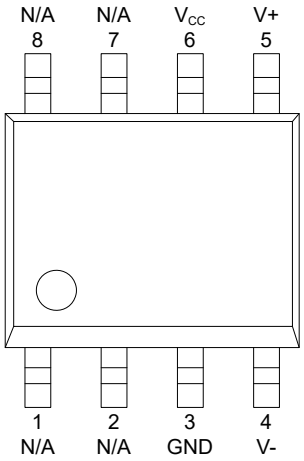


Figure 3-1. Pin configuration (SOP8)

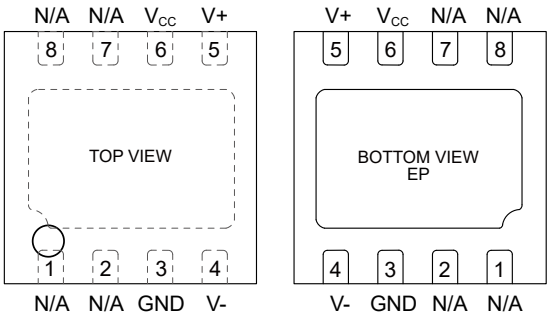


Figure 3-2. Pin configuration (DFN8L)

Pin No.	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

3. 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	-	1000	Gs
ESD Performance (HBM)	V_{ESD}	-	4	kV
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

Parameters	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	V_{CC}	Operating	-	1	7	V
Supply Current [1)]	I_{CC}	Output Open (SOP8)	-	11	-	μA
		Output Open (DFN8L)	-	22	-	μA
Resistance [1, 2)]	R_B	SOP8	-	90	-	kΩ
		DFN8L	-	45	-	kΩ
Sensitivity	SEN	B in ±30 Gs	-	4.9	-	mV/V/Gs
Saturation Magnetic Field	H_{SAT}	-	-	±90	-	Gs
Nonlinearity	NONL	B in ±30 Gs	-	1	-	%FS
Offset	V_{OFFSET}	-	-20	-	20	mV/V
Hysteresis	HYS	B in ±30 Gs	-	0.1	0.2	Gs
Resistance Temperature Coefficient	TCR_B	B = 0 Gs	-	-820	-	PPM/°C
Sensitivity Temperature Coefficient	TCS	-	-	-1160	-	PPM/°C

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.

5. Dimensions

SOP8 Package

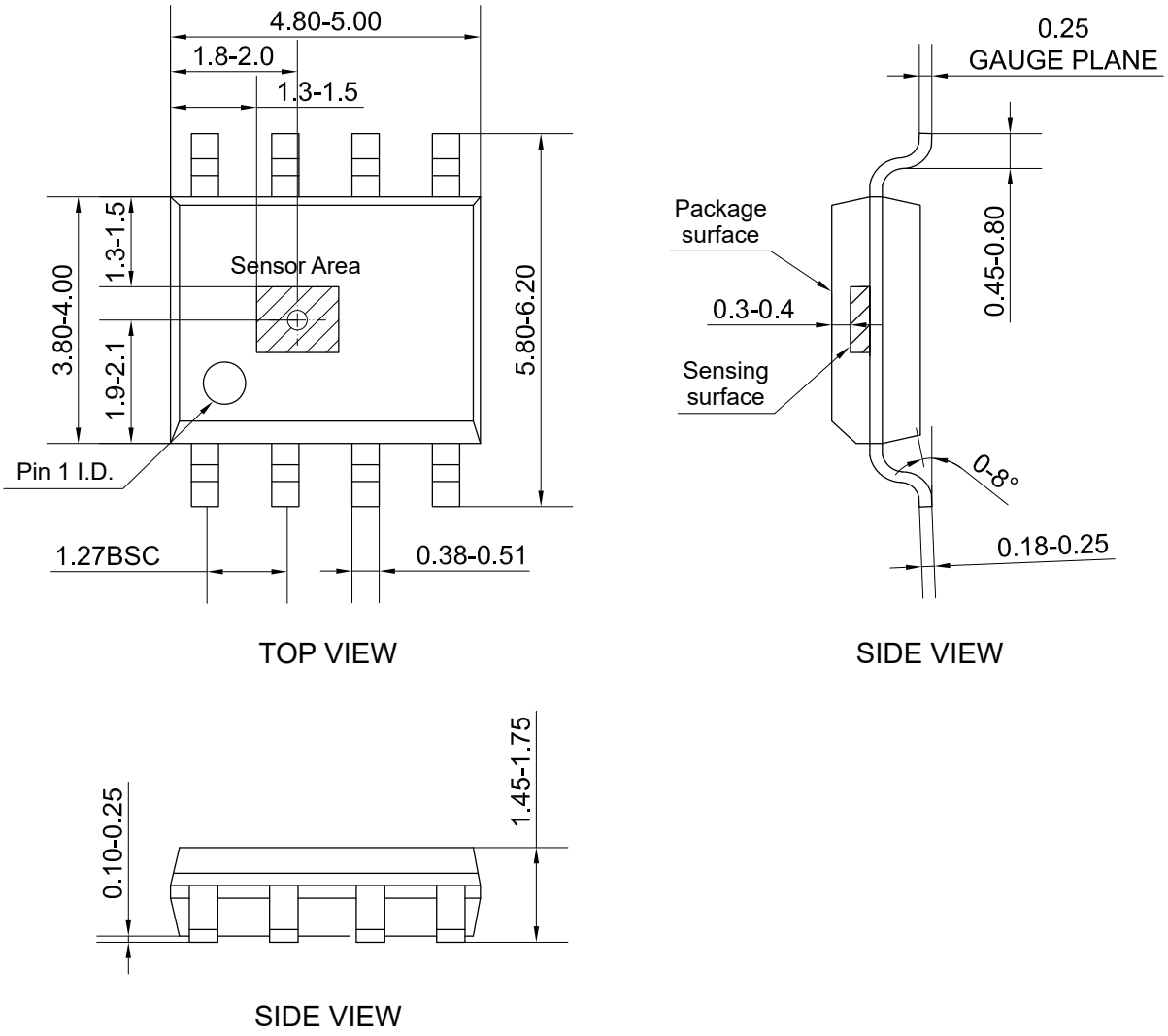


Figure 4. Package outline of SOP8 (unit: mm)

DNF8L Package

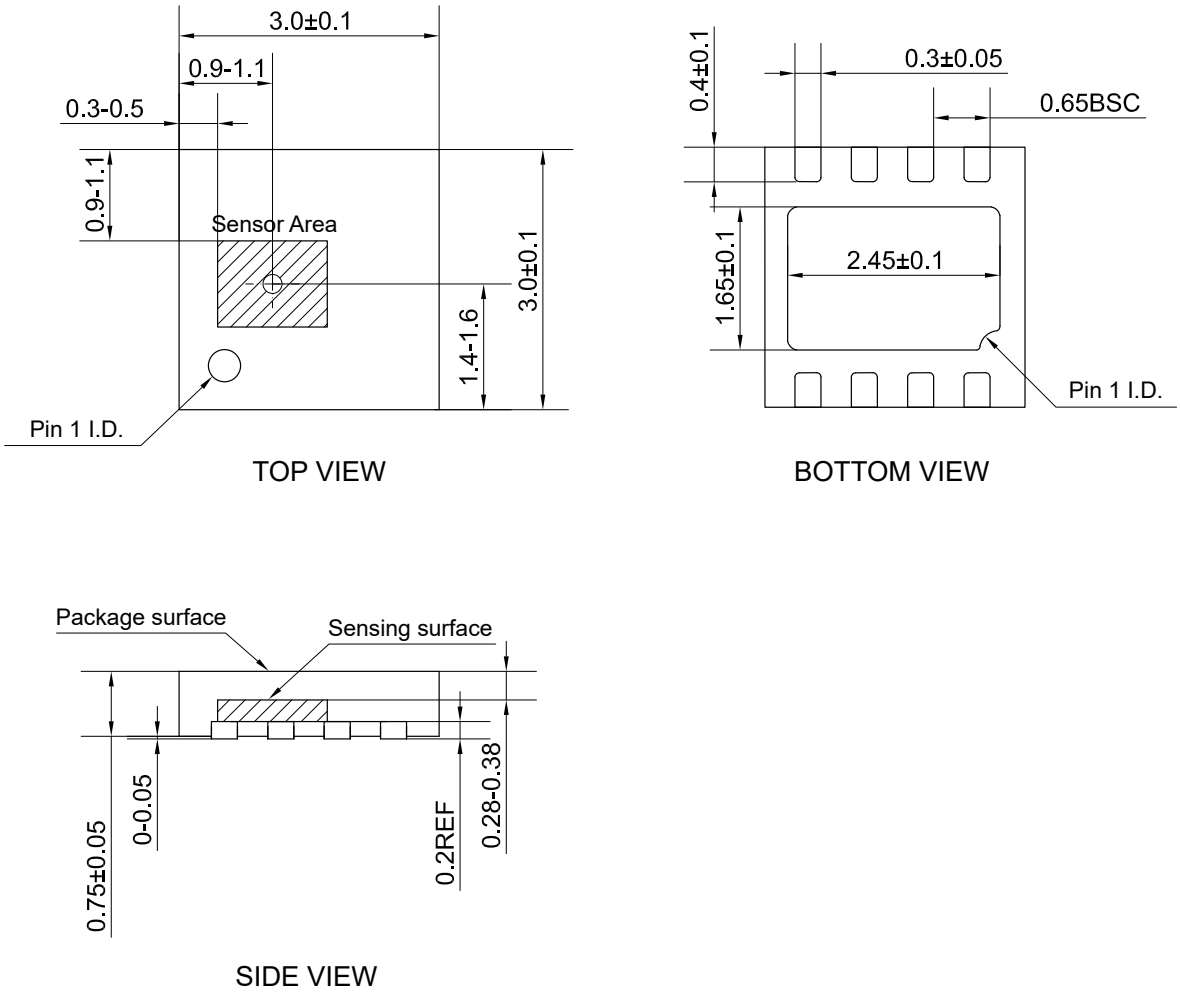


Figure 5. Package outline of DNF8L (unit: mm)

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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