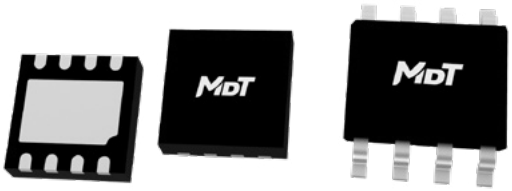
TMR2901

High sensitivity, Low Noise TMR Magnetic Linear Sensor

Description

The TMR2901 linear sensor utilizes a unique push-pull Wheatstone bridge composed of four TMR sensor elements. The TMR2901 is available in SOP8 package and DFN8L (3 mm × 3 mm × 0.75 mm) package.



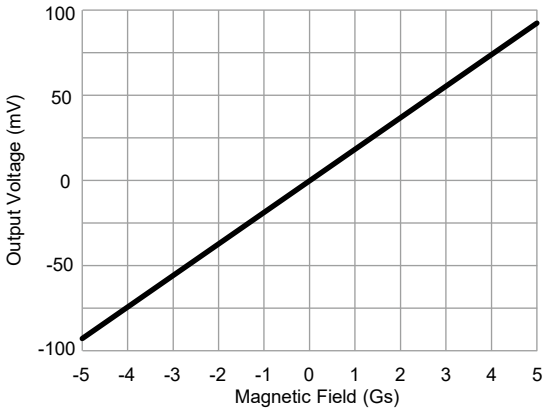
DFN8L SOP8

Features and Benefits

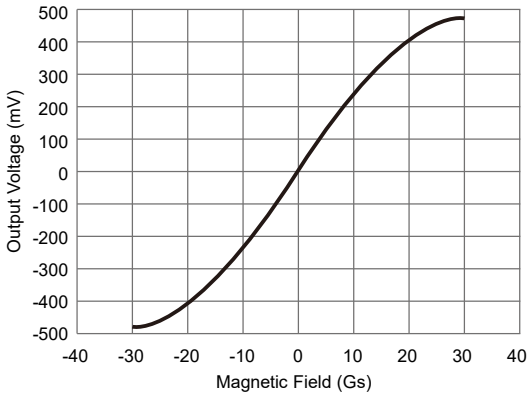
- Tunneling magnetoresistance (TMR) technology
- High sensitivity (25 mV/V/Gs)
- Very low noise spectral density: 2 nT/rt(Hz)@1Hz
- Low power consumption
- Excellent thermal stability
- Very low hysteresis
- Compatible with wide range of supply voltages
- No need for set/reset calibration
- RoHS & REACH compliant

Applications

- Weak magnetic field sensing
- Current sensors
- Position and displacement sensing



TMR2901 ±5Gs Output Curve



TMR2901 ±30Gs Output Curve

Selection Guide

Part Number	Linear Range	Sensitivity	Package	Packing Form
TMR2901P	±10 Gs	25 mV/V/Gs	SOP8	Tape & Reel
TMR2901D	±10 Gs	25 mV/V/Gs	DFN8L	Tape & Reel

Catalogue

1. Operating Principle

The TMR2901 sensing axis is as indicated by the arrow, being parallel to the printed surface and perpendicular to the horizontal Bx direction; the sensing direction is defined from the N pole toward the S pole, as indicated by the arrow in the figure below.

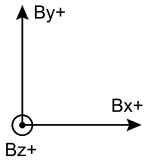


Figure 1-1. Definition of axis

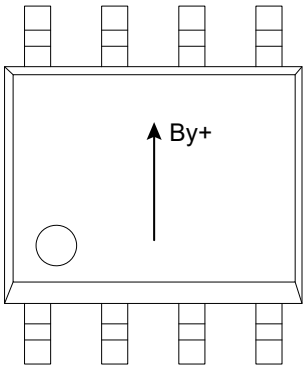


Figure 1-2. Axial diagram (SOP8 top view)

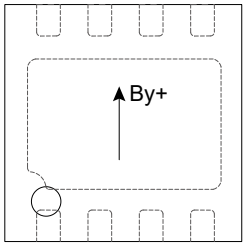


Figure 1-3. Axial diagram (DFN8L top view)

The TMR2901 output voltage varies linearly with the magnetic field along the sensing axis.

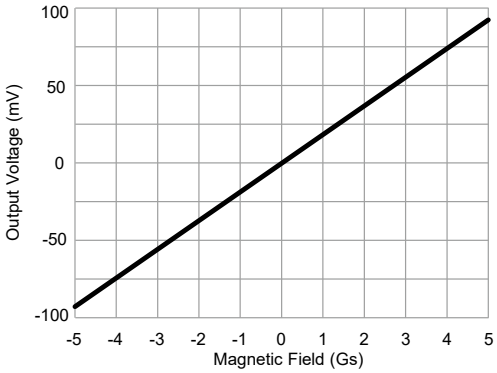


Figure 2. TMR2901 output curve

2. Pin Configuration

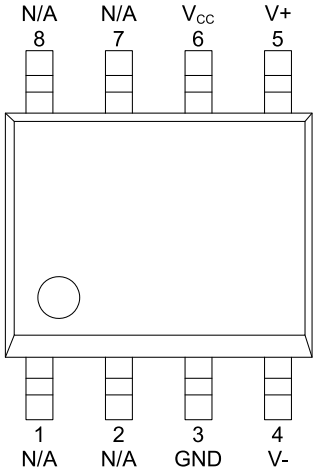


Figure 3-1. Pin configuration (SOP8)

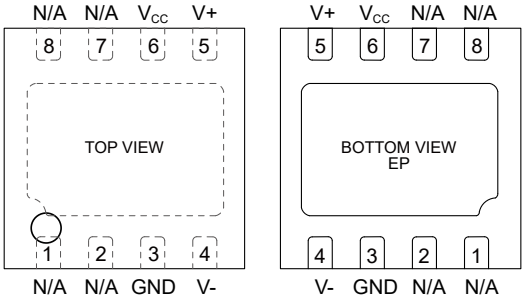


Figure 3-2. Pin configuration (DFN8L)

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

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	-	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	7	V
Supply Current [1)]	I_{CC}	Open output	-	0.1	-	μA
Resistance [2)]	R_B	-	7	45, 9	10	kΩ
Sensitivity	SEN	Fit in ±1 Gs	20	25	27	mV/V/Gs
Saturation Magnetic Field	B_{SAT}	-	-	±20	-	Gs
Nonlinearity	NONL	Fit in ±1 Gs	-	0.3	-	%FS
Offset Voltage	V_{OFFSET}	-	-10	-	10	mV/V
Hysteresis	HYS	Fit in ±1 Gs	-	-	0.2	Gs
Temperature Coefficient of Resistance	TCR_B	B = 0 Gs	-	-500	-	PPM/°C
Temperature Coefficient of Sensitivity	TCS	-	-	-1100	-	PPM/°C
Noise spectral density	N_i	@1Hz	-	2	-	nT/rt(Hz)

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

2) Custom resistance may be available upon request.

5. Dimensions

SOP8 Package

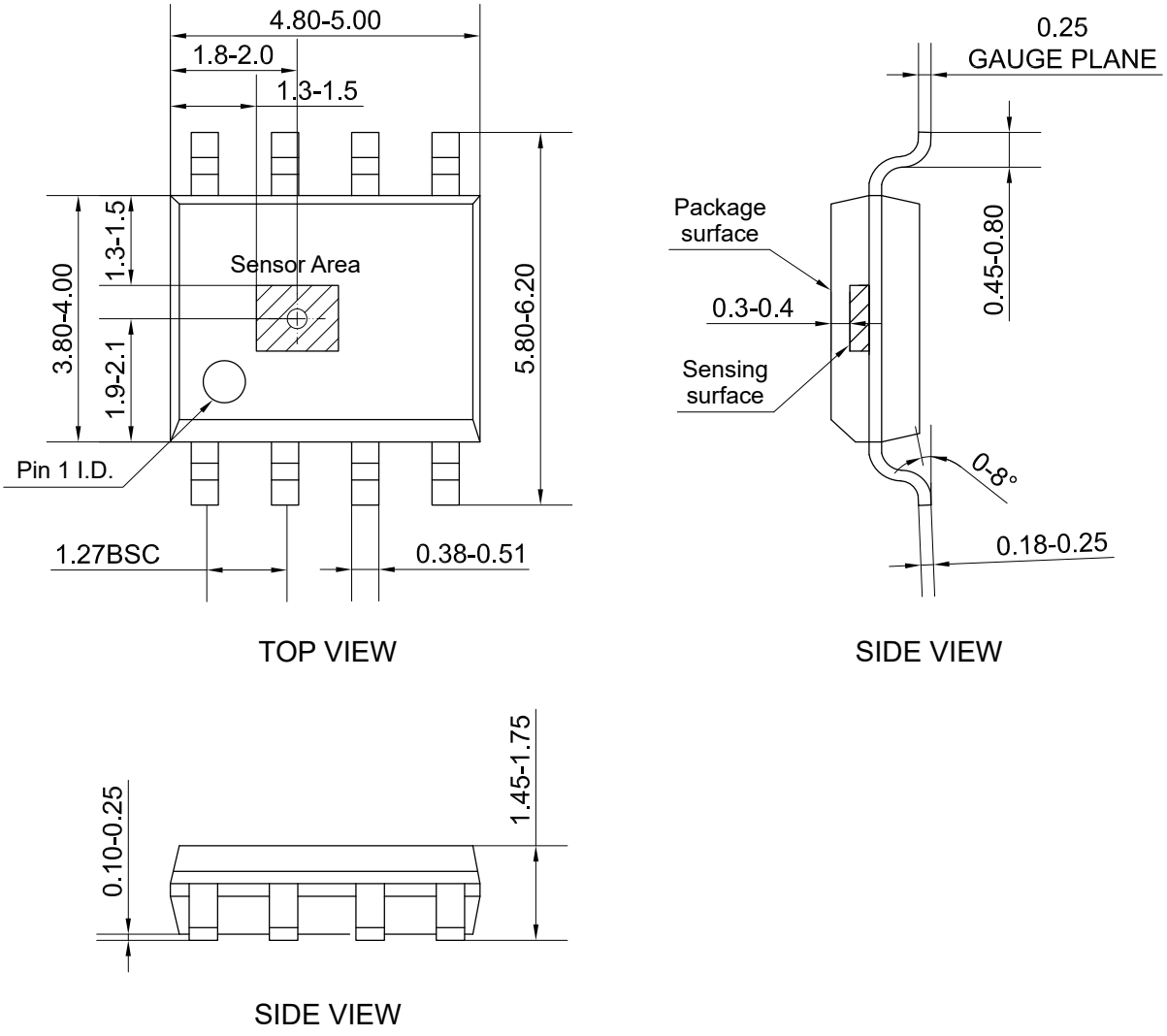


Figure 4. Package outline of SOP8 (unit: mm)

DFN8L Package

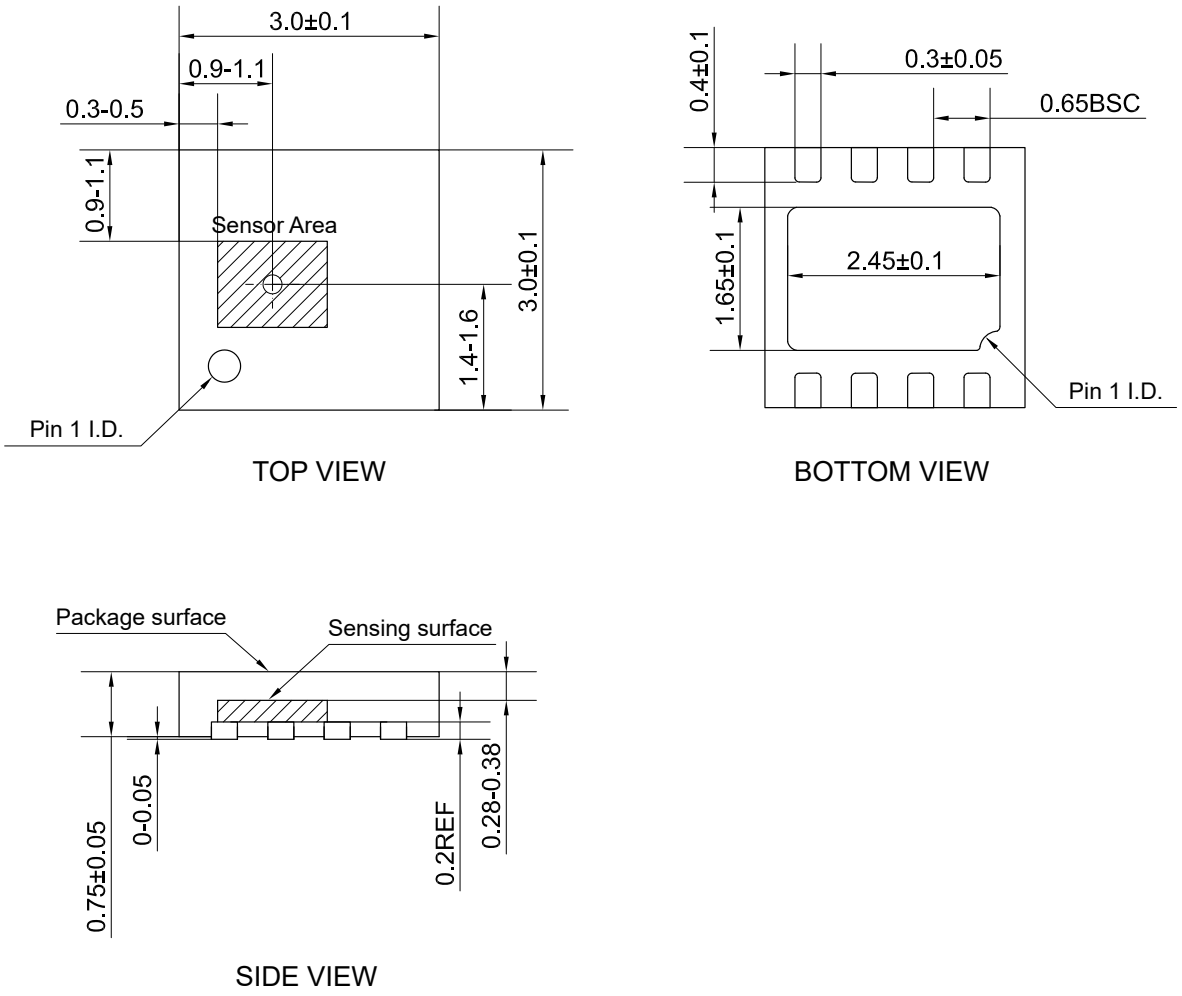


Figure 5. Package outline of DFN8L (unit: mm)

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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