TMR2501

General Description

The TMR2501 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 perpendicular to the surface of the sensor package, and it provides superior temperature compensation of the output. The TMR2501 is available in the TO94 and SSIP4 packages.

Features and Benefits

- Tunneling Magneto resistance (TMR) Technology
- High Sensitivity
- Large Dynamic Range
- Low Power Consumption
- Excellent Thermal Stability
- Very Low Hysteresis
- Compatible with wide Range of Supply Voltages
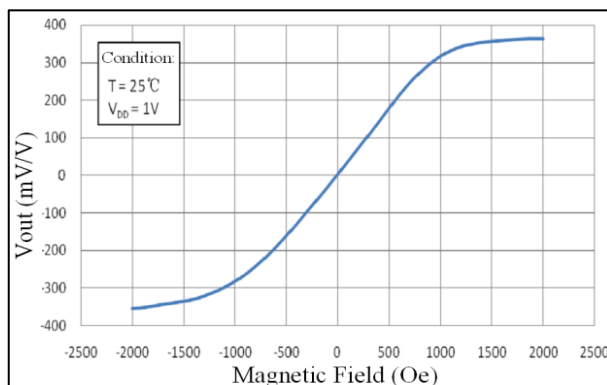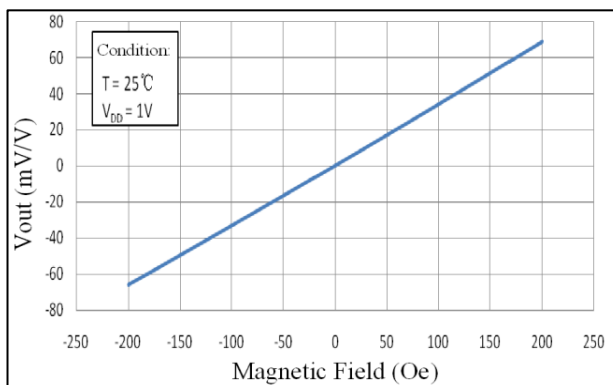
Applications

- Magnetic Field Sensing
- Current Sensors
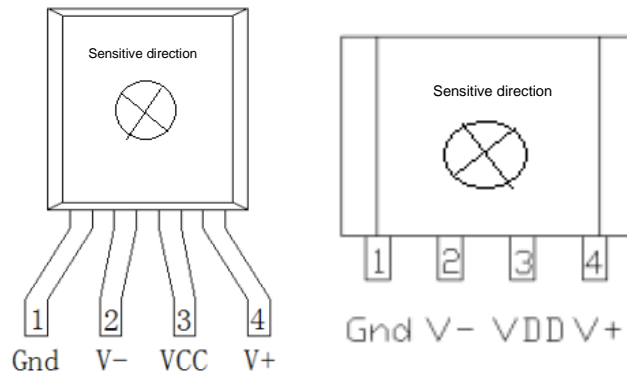- Position and Displacement Sensing

TMR2501

Transfer Curve

The following figure shows the response of the TMR2501 to an applied magnetic field in the range of ±200 Oe(left) and ±1000 Oe (right) when the TMR2501 is biased at 1V.

Pin Configuration

(Arrow indicates direction of applied field that generates a positive output voltage.)

Pin No.	Pin Name	Pin Function
1	GND	Ground
2	Vout-	Analog Differential Output 1
3	V_{DD}	Supply Voltage
4	Vout+	Analog Differential Output 2

Absolute Maximum Ratings

Parameter	Symbol	Limit	Unit
Supply Voltage	V_{DD}	7	V
Reverse Supply Voltage	V_{RDD}	-7	V
Max Exposed Field	H_E	4000	Oe[1]
ESD Voltage	V_{ESD}	4000	V
Operating Temperature	T_A	-55~150	°C
Storage Temperature	T_{stg}	-70 ~165	°C

Specification (V_{CC}=1.0V, T_A=25°C, Differential Output)

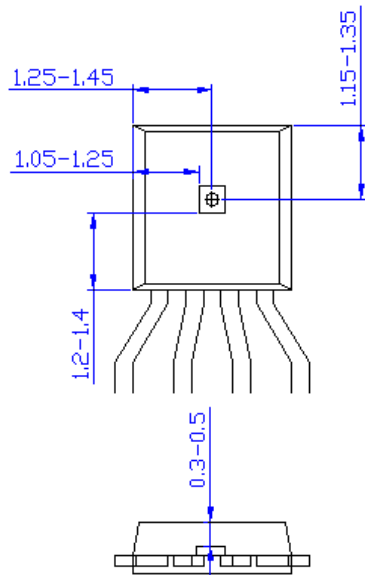| Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	Operating		1	7	V
Supply Current	I_{CC}	Output Open			1.5[2]	mA
Resistance(SOP8)	R				7[2,3]	KOhm
Sensitivity	SEN	Fit @±200 Oe	0.2		0.5	mV/V/Oe
Saturation Field	H_{sat}			±1000		Oe
Non-Linearity	NONL	Fit @±100 Oe		0.5		%FS
		Fit @±500 Oe		1.5		%FS
Offset Voltage	V_{offset}		-10		10	mV/V
Hysteresis	Hys	Fit @±100 Oe			1	Oe
Temperature Coefficient of Resistance	TCR	H = 0 Oe		-365		PPM/°C
Temperature Coefficient of Offset	TCO	-55°C~150°C		-0.015		mV/V/°C
Temperature Coefficient of Sensitivity	TCS	-55°C~150°C		345		PPM/°C

Notes:

(1) 1 Oe (Oersted) = 1 Gauss in air = 0.1 millitesla = 79.8 A/m.

(2) Icc= Vcc/ R.   (3) Custom resistance may be available upon request.

Package Information

TO94 package drawing:

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.800	0.055	0.071
A1	0.700	0.900	0.028	0.035
A2	0.500	0.700	0.020	0.028
b	0.360	0.500	0.014	0.020
b1	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.980	5.280	0.196	0.208
D1	3.780	4.080	0.149	0.161
E	3.450	3.750	0.136	0.148
e	1.270 TYP		0.050 TYP	
e1	3.710	3.910	0.146	0.154
L	14.900	15.300	0.587	0.602
θ	45° TYP		45° TYP	

SSIP4 package drawing:

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A2	0.80	0.90	1.00
A3	0.55	0.60	0.65
b	0.28	—	0.38
b1	0.27	0.30	0.33
c	0.20	—	0.26
c1	0.19	0.20	0.21
D	2.85	2.90	2.95
E1	2.70	2.80	2.90
L1	0.20	0.25	0.30
L2	1.10	1.20	1.30
L3	11.80	12.00	12.20
e	1.00BSC		
e1	0.64BSC		

TMR Sensor Position

TO94 Package

SSIP4 Package

RoHS
COMPLIANT

Top view and side view (unit:mm)

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