

## General Description

The TMR2503 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 TMR2503 is available in the TO94, SSIP4, or SOT23-5 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

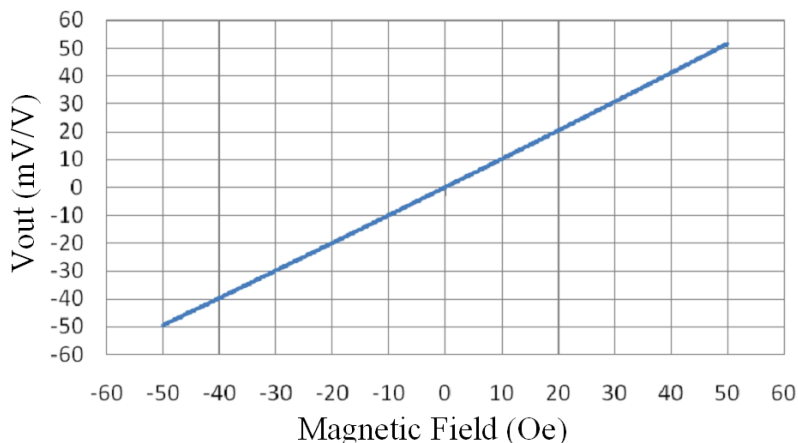
- Magnetic Field Sensing
- Current Sensors
- Motor and Fan Drivers
- Position and Displacement Sensors



TMR2503

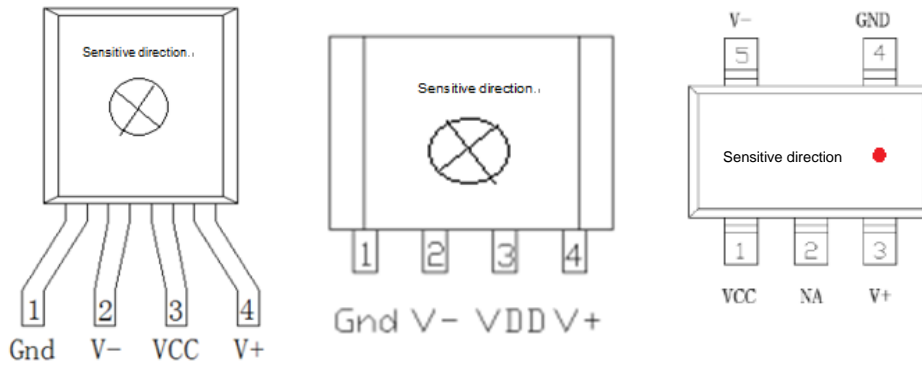
## Transfer Curve

The following figure shows the response of the TMR2503 to an applied magnetic field in the range of  $\pm 50$  Oe when the TMR2503 is biased at 1V.



## Pin Configuration

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



Pin No.(TO94/SSIP4)	Pin No.(SOT23-5)	Pin Name	Pin Function
1	4	GND	Ground
2	5	Vout-	Analog Differential Output 1
3	1	V <sub>DD</sub>	Supply Voltage
4	3	Vout+	Analog Differential Output 2
-	2	NC	NC

## Absolute Maximum Ratings

Parameter	Symbol	Limit	Unit
Supply Voltage	V <sub>DD</sub>	7	V
Reverse Supply Voltage	V <sub>RDD</sub>	-7	V
Max Exposed Field	H <sub>E</sub>	4000	Oe <sup>(1)</sup>
ESD Voltage	V <sub>ESD</sub>	4000	V
Operating Temperature	T <sub>A</sub>	-55~150	°C
Storage Temperature	T <sub>stg</sub>	-70 ~165	°C

## Specification (V<sub>CC</sub>=1.0V, T<sub>A</sub>=25°C, Differential Output)

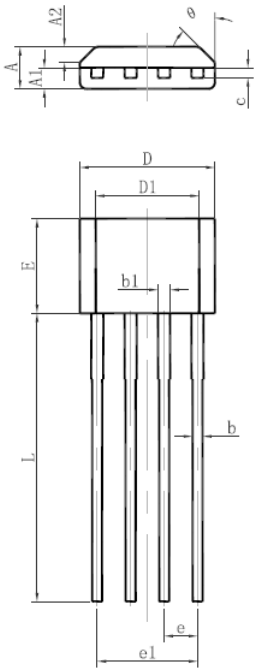
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V <sub>DD</sub>	Operating		1	7	V
Supply Current	I <sub>CC</sub>	Output Open		1.1 <sup>(2)</sup>		mA
Resistance	R			0.9 <sup>(2,3)</sup>		KOhm
Sensitivity	SEN	Fit @ ±50 Oe		1.0		mV/V/Oe
Saturation Field	H <sub>sat</sub>		-700		+700	Oe
Non-Linearity	NONL	Fit @ ±50 Oe		0.5		%FS
Offset Voltage	V <sub>offset</sub>		-20		20	mV/V
Hysteresis	Hys	Fit @ ±50 Oe			1	Oe
Temperature Coefficient of Resistance	TCR	H = 0 Oe		-300		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		300		PPM/°C

Notes:

- (1) 1 Oe (Oersted) = 1 Gauss in air = 0.1 millitesla = 79.8 A/m.
- (2)  $I_{cc} = V_{cc} / R$ .
- (3) Custom resistance may be available upon request.

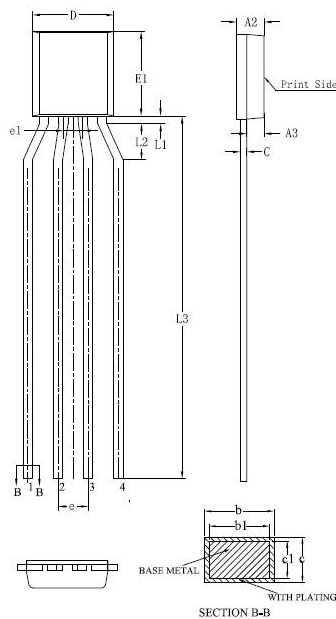
**Package Information**

TO94 package drawing:



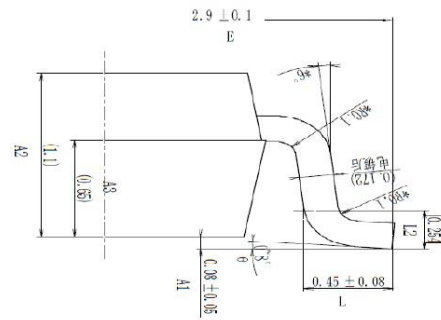
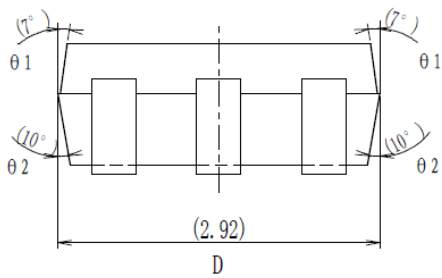
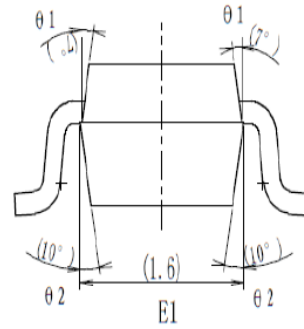
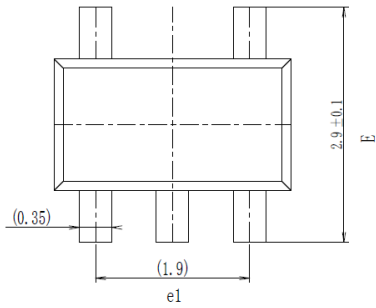
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.800	0.055	0.071
A1	0.700	0.900	0.028	0.035
A2	0.500	0.700	0.020	0.028
b	0.360	0.500	0.014	0.020
b1	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.980	5.280	0.196	0.208
D1	3.780	4.080	0.149	0.161
E	3.450	3.750	0.136	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:

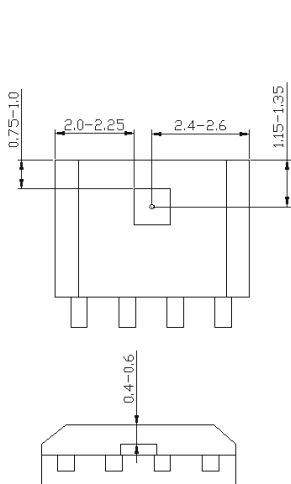


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A2	0.80	0.90	1.00
A3	0.55	0.60	0.65
b	0.28	—	0.38
b1	0.27	0.30	0.33
c	0.20	—	0.26
c1	0.19	0.20	0.21
D	2.85	2.90	2.95
E1	2.70	2.80	2.90
L1	0.20	0.25	0.30
L2	1.10	1.20	1.30
L3	11.80	12.00	12.20
e	1.00BSC		
e1	0.64BSC		

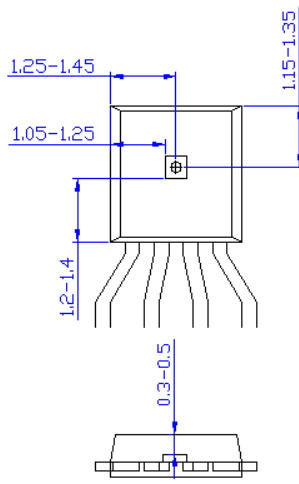
SOT23-5 package drawing:



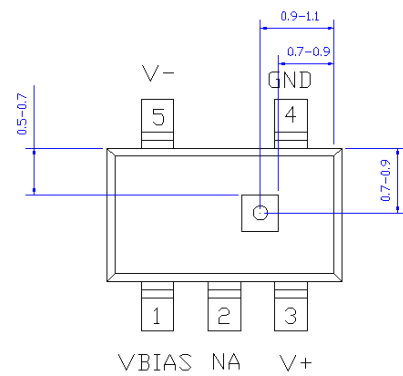
### TMR Sensor Position



TO94 Package



SSIP4 Package



SOT23-5 Package

RoHS  
COMPLIANT

Top view and side view (unit:mm)

**MULTI**  
**DiMENSION**  
*Sensing the Future***多维科技**  
感知未来**American Electronic Components Inc.**

1101 Lafayette Street, Elkhart, Indiana 46516, United States of America.

Web: [www.aecensors.com](http://www.aecensors.com) Email: [sales@aecensors.com](mailto:sales@aecensors.com)

Toll: 888 847 6552, Tel: +1 574 293 8013

The information provided herein by MultiDimension Technology Co., Ltd. (hereinafter MultiDimension) is believed to be accurate and reliable. Publication neither conveys nor implies any license under patent or other industrial or intellectual property rights. MultiDimension reserves the right to make changes to product specifications for the purpose of improving product quality, reliability, and functionality. MultiDimension does not assume any liability arising out of the application and use of its products. MultiDimension's customers using or selling this product for use in appliances, devices, or systems where malfunction can reasonably be expected to result in personal injury do so at their own risk and agree to fully indemnify MultiDimension for any damages resulting from such applications.