

General Description

The TMR2505 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 TMR2505 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

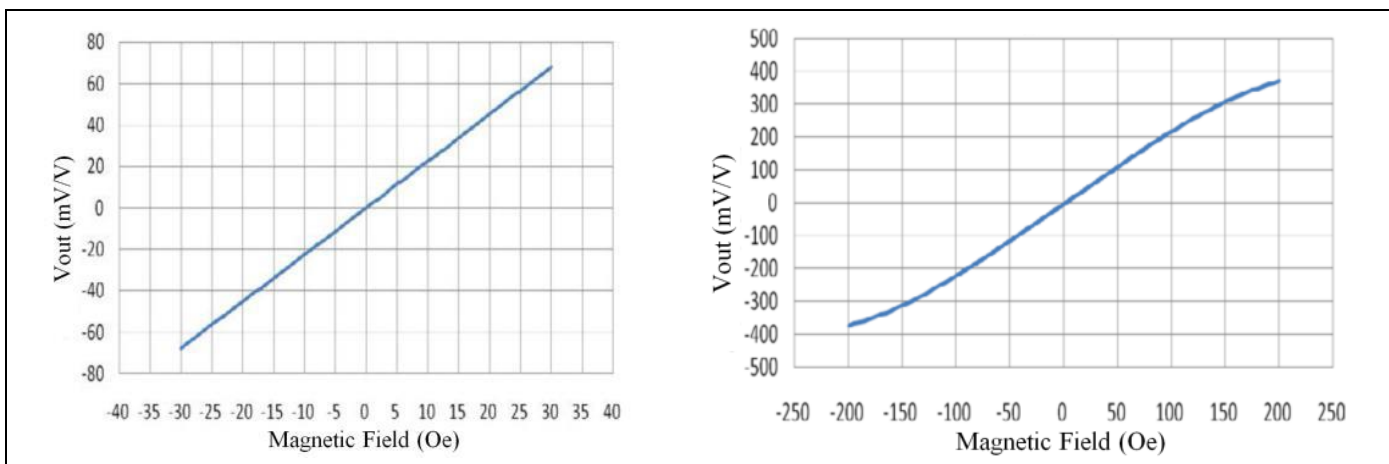
- Magnetic Field Sensing
- Current Sensors
- Position and Displacement Sensors



TMR2505

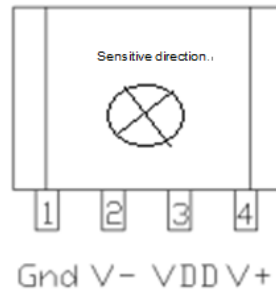
Transfer Curve

The following figure shows the response of the TMR2505 to an applied magnetic field in the range of ± 30 Oe (left) and ± 200 Oe (right) when the TMR2505 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 _{DD}	Operating		1	7	V
Supply Current	I _{CC}	Output Open		0.625 ⁽²⁾		uA
Resistance(SOP8)	R			1.6 ^(2,3)		Mohm
Sensitivity	SEN	Fit @ ±30 Oe		2.2		mV/V/Oe
Saturation Field	H _{sat}			±100		Oe
Non-Linearity	NONL	Fit @ ±30 Oe		1		%FS
Offset Voltage	V _{offset}		-10		10	mV/V
Hysteresis	Hys	Fit @ ±30 Oe			1	Oe
Temperature Coefficient of Resistance	TCR	H = 0 Oe		-1000		PPM/°C
Temperature Coefficient of Offset	TCO	-55°C~150°C		-0.02		mV/V/°C
Temperature Coefficient of Sensitivity	TCS	-55°C~150°C		245		PPM/°C

Notes:

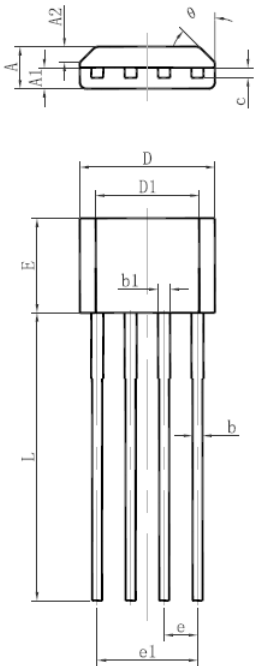
(1) 1 Oe (Oersted) = 1 Gauss in air = 0.1 millitesla = 79.8 A/m.

(2) I_{CC} = V_{CC} / R.

(3) Custom resistance may be available upon request.

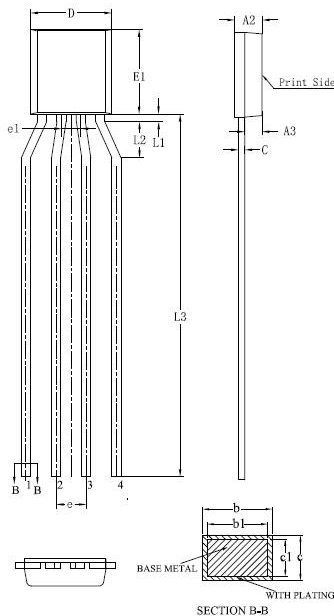
Package Information

TO94 package drawing:



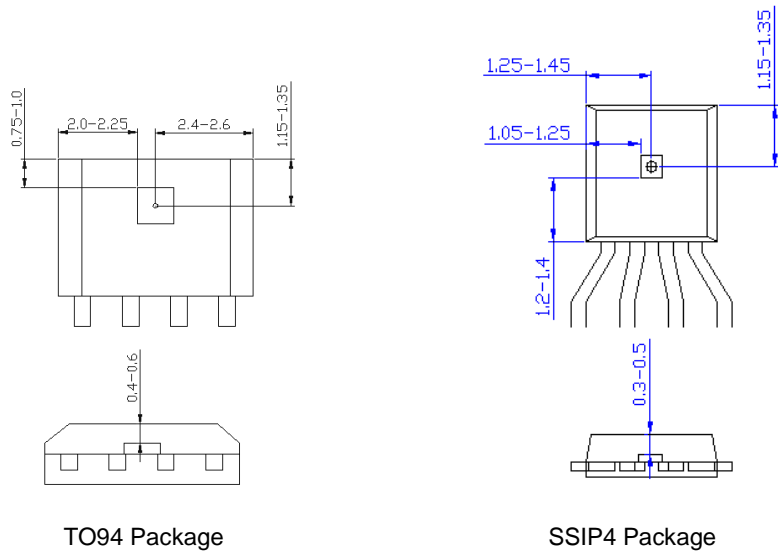
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.800	0.055	0.071
A1	0.700	0.900	0.028	0.035
A2	0.500	0.700	0.020	0.028
b	0.360	0.500	0.014	0.020
b1	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.980	5.280	0.196	0.208
D1	3.780	4.080	0.149	0.161
E	3.450	3.750	0.136	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
e1	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



Top view and side view (unit:mm)



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