MULTI DIMENSION Sensing the Future

AEC A Willow Technologies Company

# TMR2905

Ultra High Sensitivity TMR linear sensor

## General Description

The TMR2905 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 parallel to the surface of the sensor package, and it provides superior temperature compensation of the output. The TMR2905 is available a 6mm X 5mm X 1.5mm SOP8 package.

## Features and Benefits

- Tunneling Magneto resistance (TMR) Technology
- Ultra High Sensitivity (50~60mV/V/Oe)
- Large Dynamic Range
- Very Low Power Consumption
- Excellent Thermal Stability
- Very Low Hysteresis
- Compatible with wide Range of Supply Voltages
- Ultra Low Noise Spectral Density(＜2nT/sqrt(Hz)@1Hz)

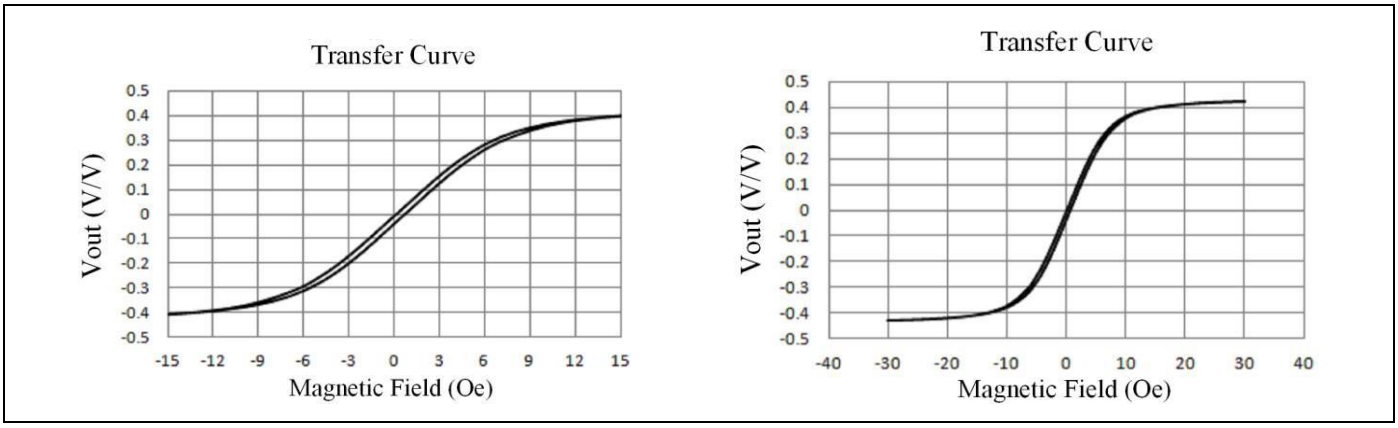
TMR2905

## Applications

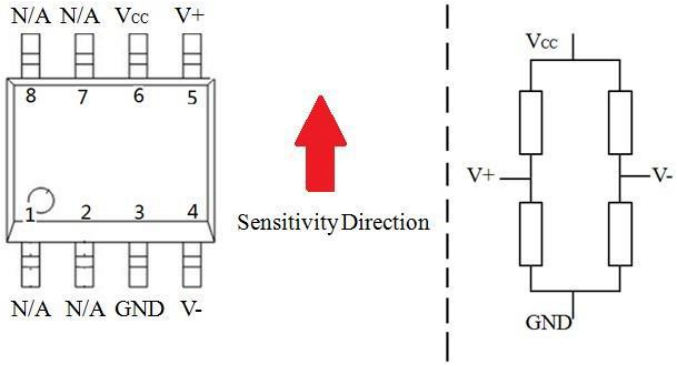
- Weak Magnetic Field Sensing
- Current Sensors
- Position and Displacement Sensing

## Transfer Curve

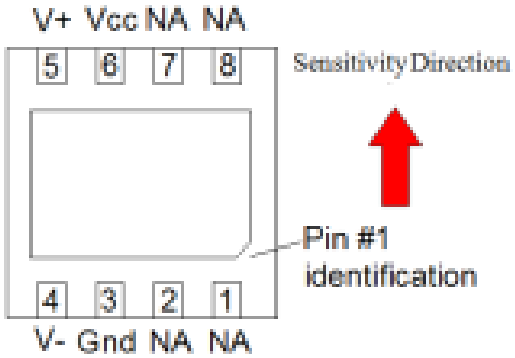
The following figure shows the response of the TMR2905 to an applied magnetic field in the range of ±15 Oe and ±30 Oe when the TMR2905 is biased at 1V.



## Pin Configuration




SOP8 Top View




DFN8 Bottom View

| Pin No. | Pin Name | Pin 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 | Vcc | Supply Voltage |

## Absolute Maximum Ratings

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ | 7 | V |
| Reverse Supply Voltage | $V_{RCC}$ | 7 | V |
| Max Exposed Field | $H_E$ | 4000 | Oe(1) |
| ESD Voltage | $V_{ESD}$ | 4000 | V |
| Operating Temperature | $T_A$ | -40~125 | °C |
| Storage Temperature | $T_{stg}$ | -50 ~150 | °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 | | 0.2 | | mA |
| Resistance | R | | 2 | 45，5(2) | 8 | KOhm |
| Sensitivity | SEN | Fit @±5 Oe | 50 | | 60 | mV/V/Oe |
| Saturation Field | $H_{sat}$ | | | ±10 | | Oe |
| Non-Linearity | NONL | Fit @±5 Oe | | 2 | | %FS |
| Offset Voltage | $V_{offset}$ | | -30 | | 30 | mV/V |
| Hysteresis | Hys | Fit @±30 Oe | | | 1 | Oe |
| Temperature Coefficient of Resistance | TCR | H = 0 Oe | | -500 | | PPM/°C |
| Temperature Coefficient of Sensitivity | TCS | | | -1100 | | PPM/°C |

Notes:

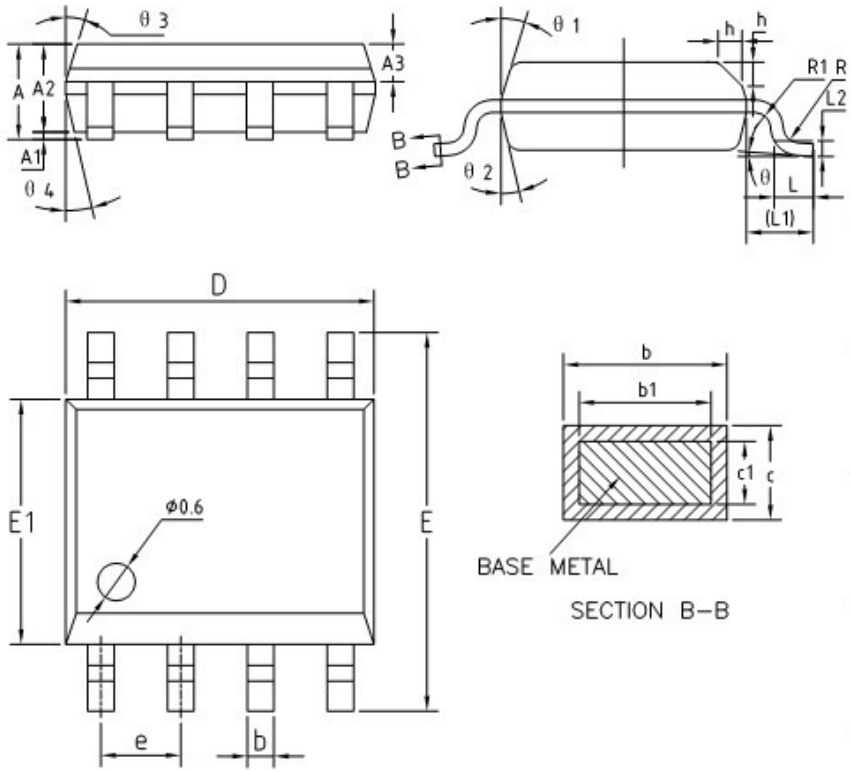
(1) 1 Oe (Oersted) = 1 Gauss in air = 0.1 millitesla = 79.8 A/m.

(2) Custom resistance may be available upon request.

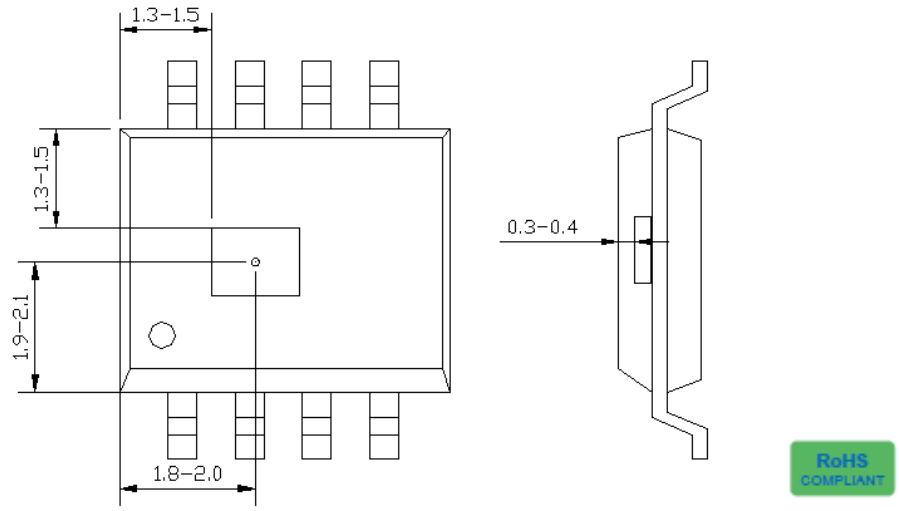
## Package Information

COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|---|---|---|---|
| A | 1.35 | 1.55 | 1.75 |
| A1 | 0.10 | 0.15 | 0.25 |
| A2 | 1.25 | 1.40 | 1.65 |
| A3 | 0.50 | 0.60 | 0.70 |
| b | 0.38 | – | 0.51 |
| b1 | 0.37 | 0.42 | 0.47 |
| c | 0.18 | – | 0.25 |
| c1 | 0.17 | 0.20 | 0.23 |
| D | 4.80 | 4.90 | 5.00 |
| E | 5.80 | 6.00 | 6.20 |
| E1 | 3.80 | 3.90 | 4.00 |
| e | 1.17 | 1.27 | 1.37 |
| L | 0.45 | 0.60 | 0.80 |
| L1 | 1.04REF | | |
| L2 | 0.25BSC | | |
| R | 0.07 | – | – |
| R1 | 0.07 | – | – |
| h | 0.30 | 0.40 | 0.50 |
| θ | 0° | – | 8° |
| θ1 | 15° | 17° | 19° |
| θ2 | 11° | 13° | 15° |
| θ3 | 15° | 17° | 19° |
| θ4 | 11° | 13° | 15° |




## TMR Sensor Position




Top view and side view (unit:mm)

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