AMR3001 AMR Angle Sensor

Features and Benefits

- Anisotropy of magnetoresistance (AMR) Technology
- Compatible with Wide Range of Supply Voltages
- Wide Airgap Tolerance
- Excellent Thermal Stability
- Very Low Hysteresis
- Ultrasmall Package



Applications

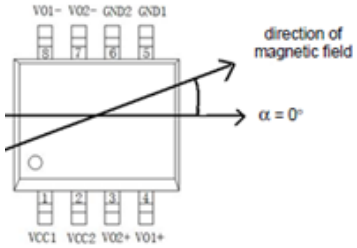
- Rotary Position Sensors
- Rotary Encoders
- Contactless Potentiometers
- Valve Position Sensors
- Knob Position Sensors

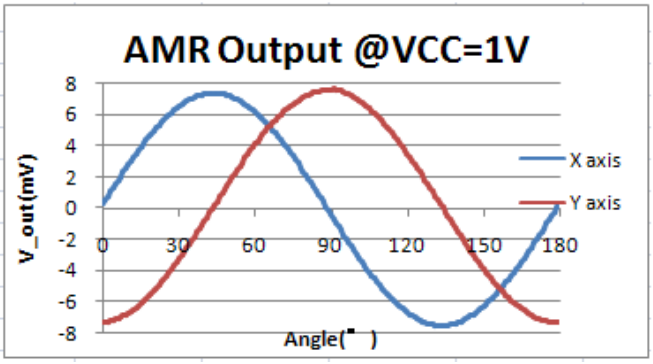
General Description

The output voltage of the AMR3001 TMR angle sensor is proportional to the sine or cosine of the angle of a magnetic field applied parallel to the surface of the sensor, which can be provided by a small magnet positioned above the device. The AMR3001 includes two Wheatstone bridges, which can be configured to output sine and cosine functions respectively. Each bridge includes four TMR sensor elements in a push-pull arrangement to produce a best-in-class peak-to-peak signal as large as 0.75% of the supply voltage. Additionally, the unique TMR Wheatstone bridge technology accurately compensates the output against changes in ambient temperature. This sensor is assembled in an ultra small SOP8 package

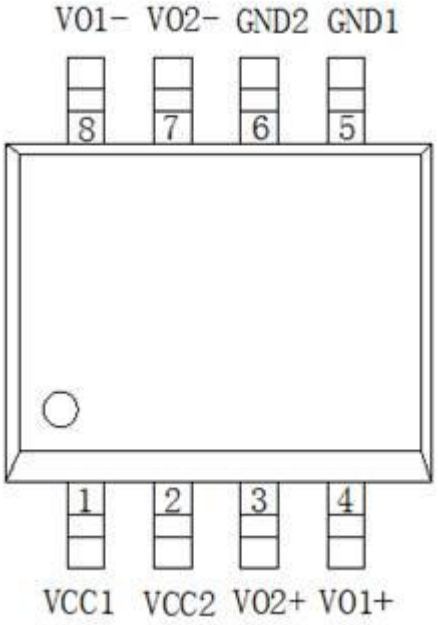
Operation

A small magnet, placed above the AMR3001, can be used to provide a magnetic field in any desired orientation parallel to the plane of the AMR3001 package. The following chart show a typical sensor output as a function of the angle of the applied magnetic field using a 6 mm diameter, 2.5 mm thick magnet and at 1 V supply.





Pin Out



Pin No.	Pin Name	Pin Function
1	VccX	Supply Voltage（direction X）
2	VccY	Supply Voltage（direction Y）
3	Y+	Analog Differential Output1（direction Y）
4	X+	Analog Differential Output1（direction X）
5	GNDX	Ground（direction X）
6	GNDY	Ground（direction Y）
7	Y-	Analog Differential Output2（direction Y）
8	X-	Analog Differential Output2（direction X）

Absolute Maximum Ratings

Characteristic	Symbol	Notes	Limit	Unit
Supply Voltage	VCC	TJ=25℃	18	V
External magnetic field strength	Hext	TJ=25℃	4000	Oe
ESD Voltage	VESD		8	kV
Storage Temperature	Tstg		-40~150	ºC

Specification (Differential Output)

Electrical Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Supply Voltage	VCC	Operating		5	18	V
Applied Magnetic Field	B	Operating	100		400	Oe
Resistance one bridge	Rbridge	TJ=25℃,B=0 GS		1600		ohm
Temperature coefficient of Resistance	TCR	TJ=-40℃~125℃		1500		PPM/º c
Offset Voltage	Voffset	TJ=25℃	-1		1	mV/V
Temperature coefficient of offset voltage	TCO	In range:40℃~125℃		0.04		mV/V
Peak voltage	Vpeak	TJ=25℃		7.5		mV/V
Temperature coefficient of Peak voltage	TCVpeak	TJ=-40℃~125℃		-4000		PPM/º c
Angular inaccuracy	Δ α	0~180°,TJ=25℃		+/-0.4		º

Preliminary

		B=200GS				
Operating Temperature	TA	Operating	-40		125	°C
hysteresis output voltage	Vo(hys)	TJ=25℃			1	%FS
amplitude synchronism	k	0~180° ,TJ=25℃ B=200GS		99.8		%
Temperature coefficient of amplitude synchronism	TCk	TJ=-40℃~125℃ B=200GS		0.05		%K

Notes:

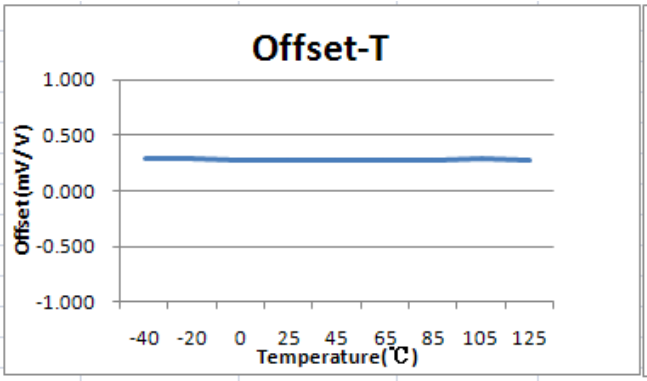
(1) 1 Oe (Oersted) = 1 Gauss in air = 0.1 millitesla = 79.8 A/m.

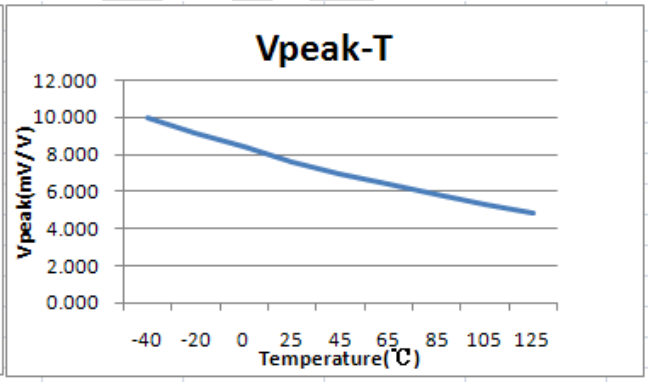
(2) Custom sensor resistance may be available upon request. Please contact Multi-Dimension Technology for more details.

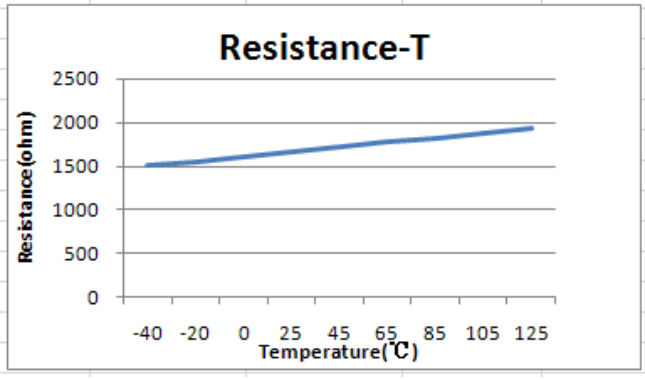
(3) Offset voltage=(Vo(max)-Vo(min))/2

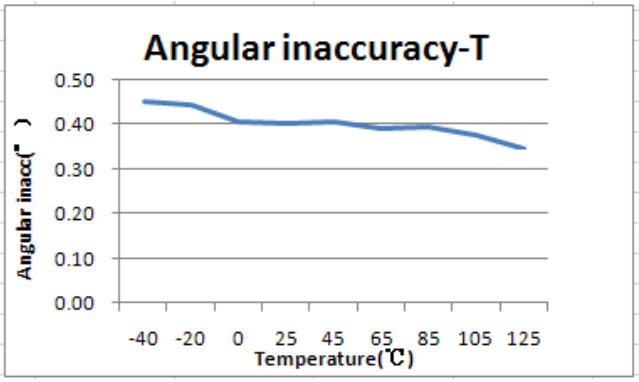
(4) Peak voltage=|Vo(max)-offset|, Periodicity of Vpeask: sin(2α) and cos(2α), respectively.

Characteristic Curves





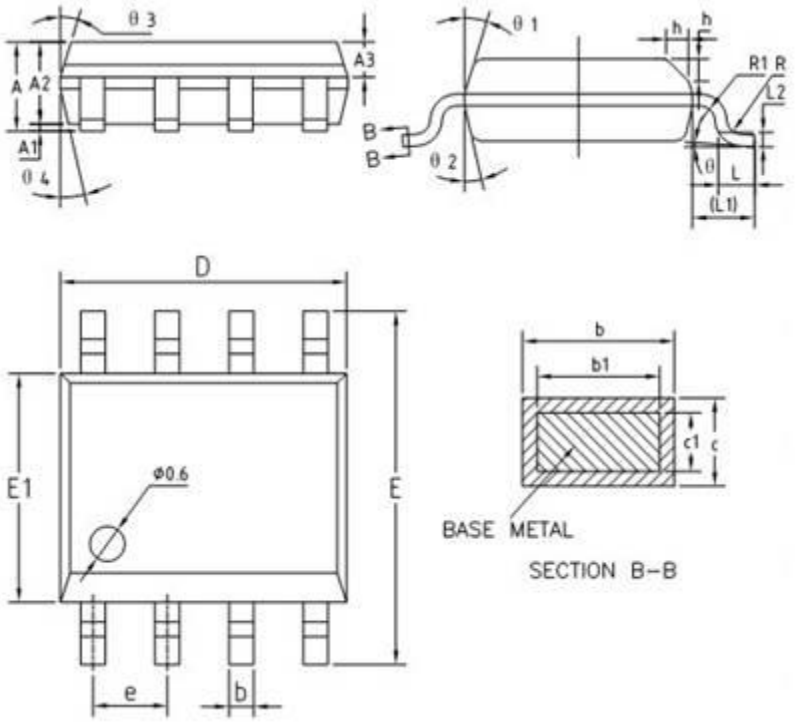




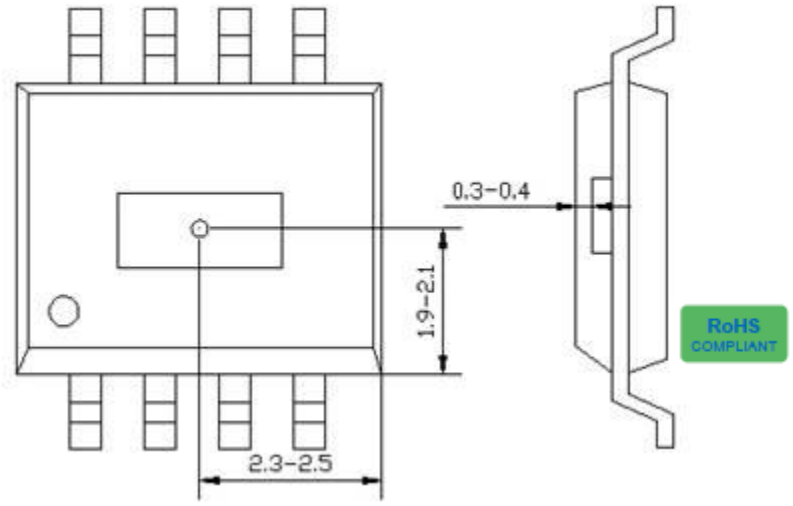
Package Information

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°



AMR Sensor Position



Unit: mm

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