

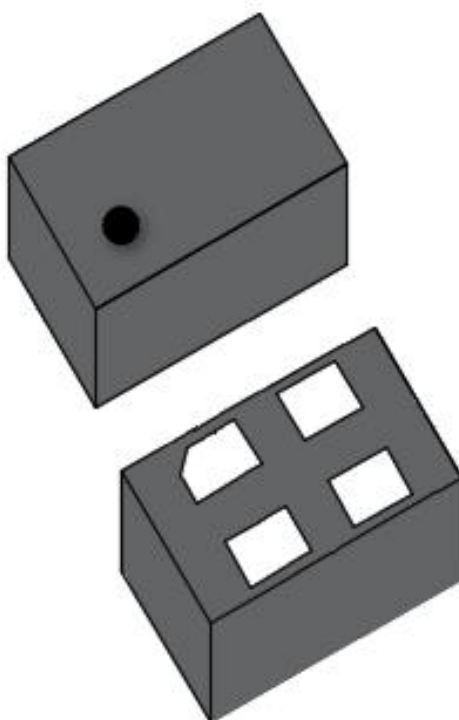
Product Data Sheet

Angle sensor chip

Product Series: BBT-A907D0805 angle sensors

Part Number: BBT-A907D0805

Version: Ver 1.5.1



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1. General Description

BBT-A907D0805 angle sensor is Tunneling Magneto Resistance (TMR) sensor which consists of 1 Wheatstone bridges in a DFN0805-4L package. BBT-A907D0805 is a magnetic angle sensor with TMR to detect magnetic direction change (about in ± 30 degree). The wheatstone bridge has two single ended outputs. Both of outputs are sine analog signal. The phase difference between the two sinusoidal outputs is 180 degrees. The sensor can detect changes in the direction of the magnetic field (approximately ± 30 degrees).

2. Key Features

- Magnetic angle sensor, employing the TMR effect.
- Compatible with a wide range of supply voltages
- Superior temperature stability
- 1 full bridge (+sin/-sin analogue output) in DFN0805-4L package.
- High output signal without amplifier.

3. Typical Application

- Rotary angle detection in mobile / OA equipment.
- Robot arm rotation angle detection.

4. Absolute Maximum Parameters

Parameter	Symbol	Limit value	unit
Supply voltage	Vcc	5.5	V
ESD (Human Body Model).	ESD(HBM)	2	kV
ESD (CDM)	ESD (CDM)	0.5	kV
External magnetic field strength	Hext	200	mT
Storage temperature	Tstg	-40 ~ +125	°C
Operating temperature	Topt	-30 ~ +85	°C
Reflow temperature	T_reflow	260	°C

Remark: When the operating conditions of the product exceed the limit parameters, it may cause irreparable damage to the product. Working at the limit parameters for a long time may lead to a decline in product performance and product reliability.

5. Magnetic Data

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Magnetic field	H _{ext}	20		80	mT	$\sqrt{B_x^2 + B_y^2}$ (Bz: non sensitive)

6. Electrical Characteristics

Conditions (unless otherwise noted): $V_{cc} = 1\text{ V}$; $H_{ext} = 30\text{ mT}$; $T_{opt} = 25^\circ\text{C}$.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	Remarks
Operating voltage	V_{cc}		—	1	5.5	V	
Between V_{cc} and GND resistance	R_s		5	10	15	kOhm	
Output voltage peak to peak amplitude	V_{pp1} / V_{pp2}		250	320	390	mV/V	1)
Mid Point Voltage	Offset1 /Offset2		450	500	550	mV/V	2)
Difference between the mid voltages of two outputs	offset		-15	—	15	mV/V	3)
Resistance Temp.Coefficient	TC_R	$T_L=25^\circ\text{C}$ $T_H=65^\circ\text{C}$	—	-0.05	—	%/K	4)
Amplitude Temp.Coefficient	$TC_{V_{pp1}}$ / $TC_{V_{pp2}}$	$T_L=25^\circ\text{C}$ $T_H=65^\circ\text{C}$	—	-0.09	—	%/K	5)

Remark:

- 1) .The amplitude difference between maximum voltage and minimum voltage (Such as fig1: V_{pp1} or V_{pp2}).
- 2) .Half the difference between the maximum voltage and the minimum voltage (Such as fig1: $\frac{V_{max}+V_{min}}{2}$).
- 3) Offset=Offset1-Offset2
- 4) $TC_R = \frac{[R_{s_{65^\circ\text{C}}} - R_{s_{25^\circ\text{C}}}] }{R_{s_{25^\circ\text{C}}} * [65-25]}$
- 5) $TC_{V_{pp1}} = \frac{[V_{pp1_{65^\circ\text{C}}} - V_{pp1_{25^\circ\text{C}}}] }{V_{pp1_{25^\circ\text{C}}} * [65-25]}$ 、 $TC_{V_{pp2}} = \frac{[V_{pp2_{65^\circ\text{C}}} - V_{pp2_{25^\circ\text{C}}}] }{V_{pp2_{25^\circ\text{C}}} * [65-25]}$

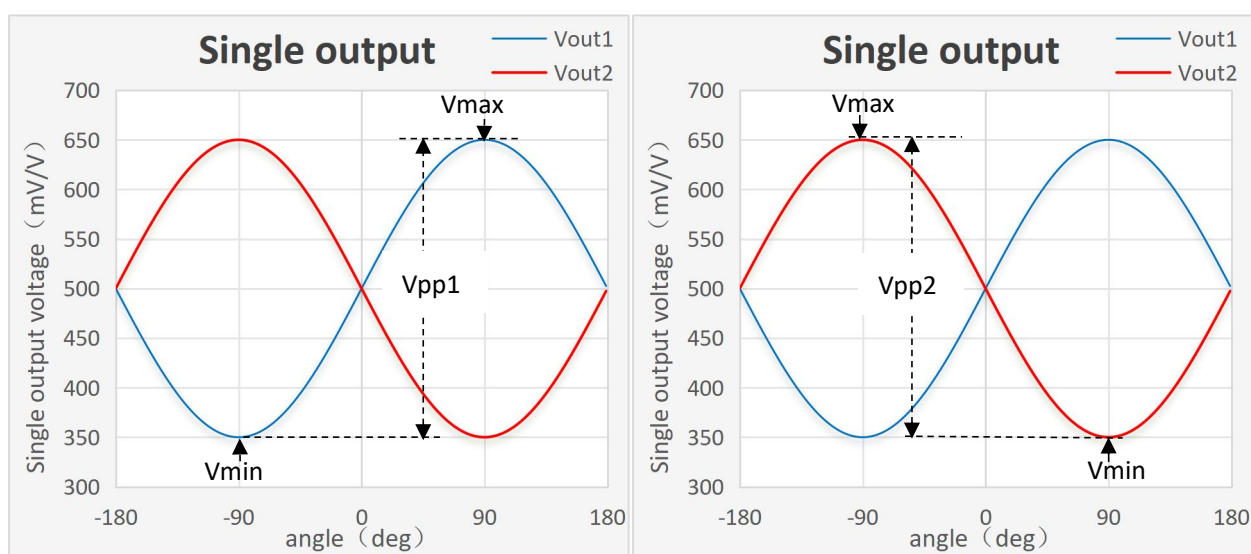


Fig. 1 explanation of amplitude and offset definition. The scale in the figure has been exaggerated to make the signals easier to see.

7. Internal circuit and Pin direction

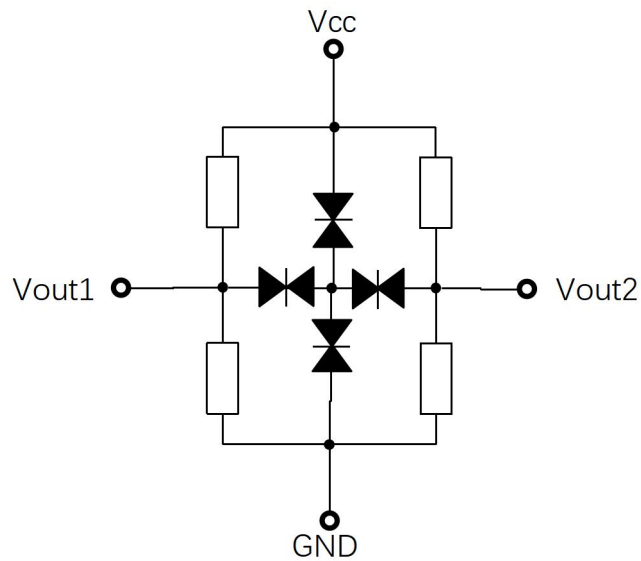


Fig. 2 Schematic diagram of the circuit of the BBT-A907D0805 sensor.

8. Typical output curve

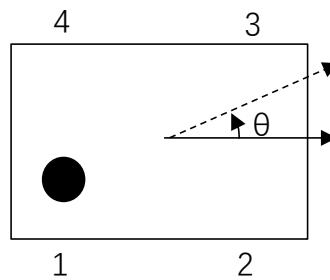


Fig. 3 Angle and magnetic field detection direction

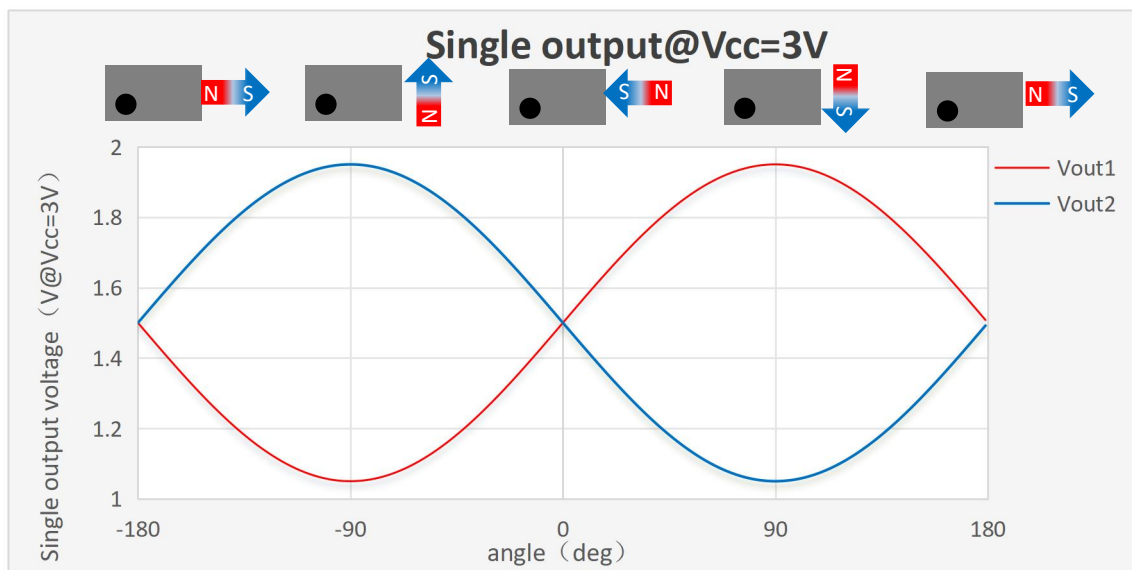
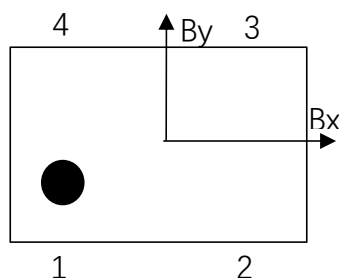


Fig. 4 Output signals of Vout1 and Vout2.

9. Package information

9.1 Pin configuration & Pin description



Pin	Symbol	Function
1	Vout1	Analog sine output
2	Vcc	Supply voltage of sine and cosine bridge
3	Vout2	Analog sinusoidal output, 180 degrees of phase Different from Vout1
4	GND	Ground of sine and cosine bridge

9.2 Package Outline

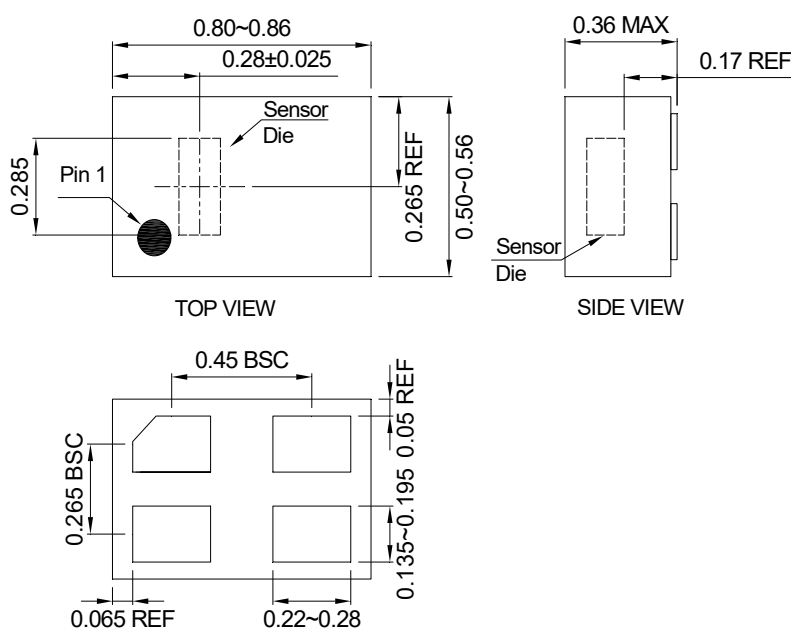


Fig.5 Outline package diagram of BBT-A907D0805 series sensor (unit: mm).

Note: The pin plating is electroless tin-plated-3μm.

9.3 Footprint on PCB

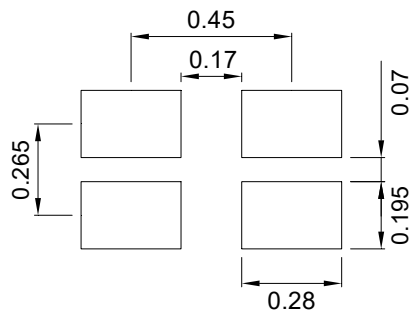


Fig.6 footprint of the sensor chips with package.

10. Product packaging

Item	Request	Remark
Reels	7 inch	See Figure 6
Carrier tape	8mm wide	See Figure 6
Empty front length	400 mm	Refer to EIA-481 requirements
Trail length	160 mm	Refer to EIA-481 requirements
Number of standard packages	13000 / 7" Reel	Planning criteria for volume products
MSL Level	MSL 3	J-STD-020E

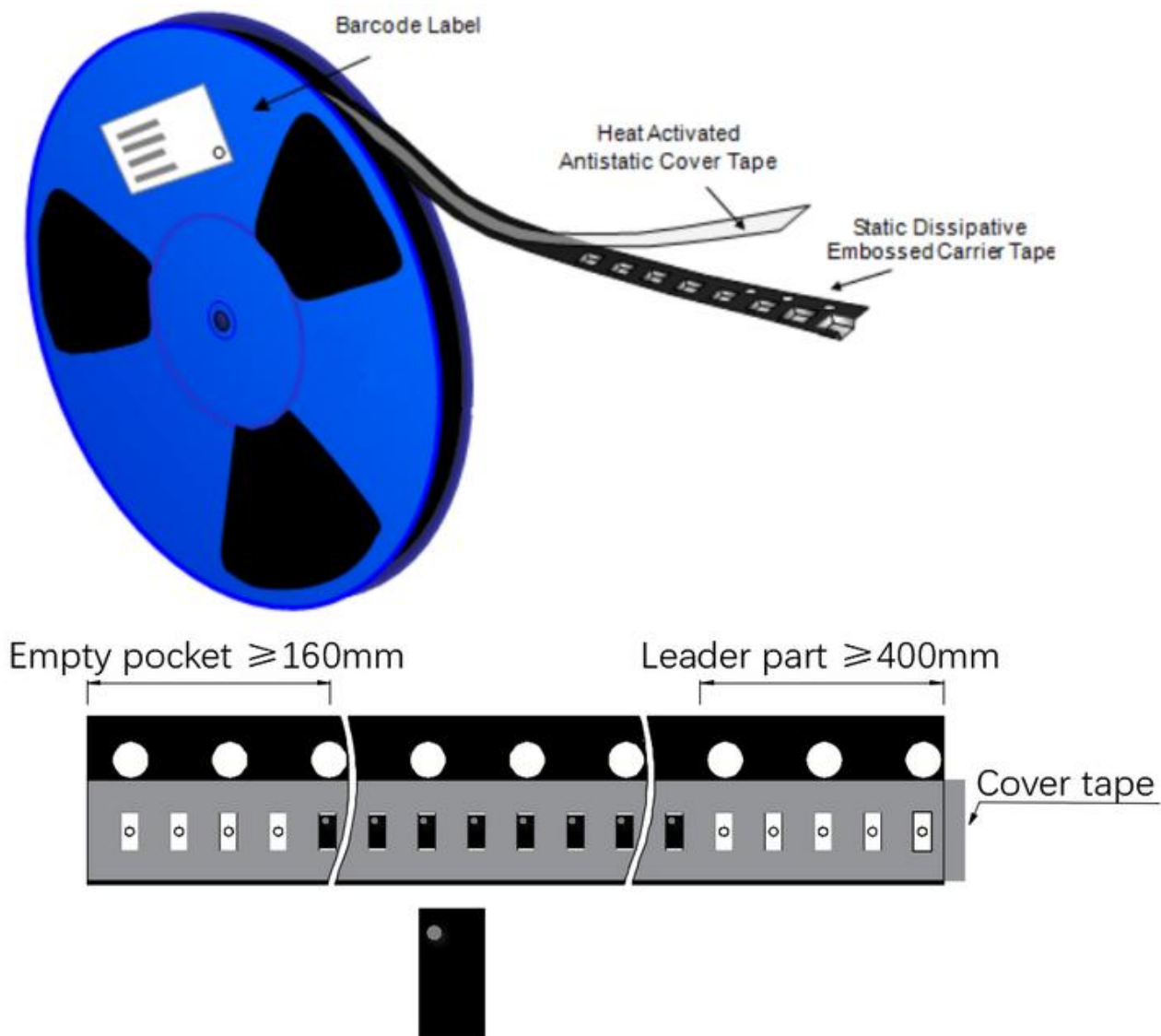
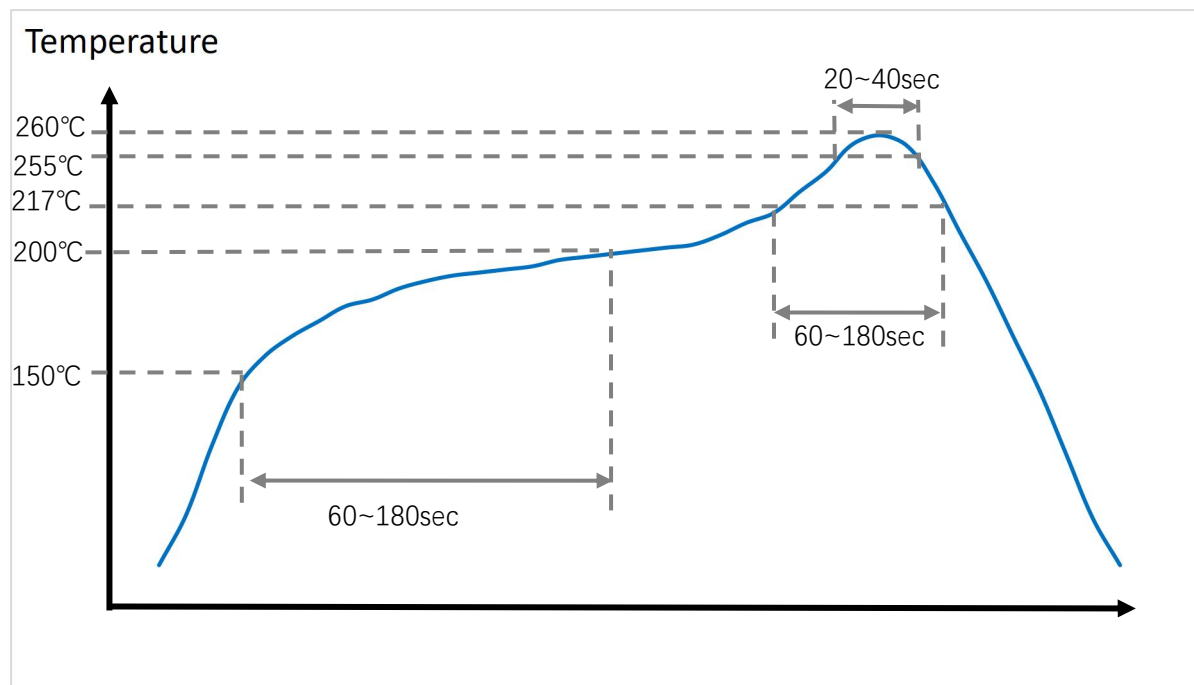


Figure.7 Reels and Carrier tape

11. Reflow Profile (Reference)

Peak Temperature should not exceed 260 degC.

Below Profile is Reference. Please confirm productivity in assembly process.



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