

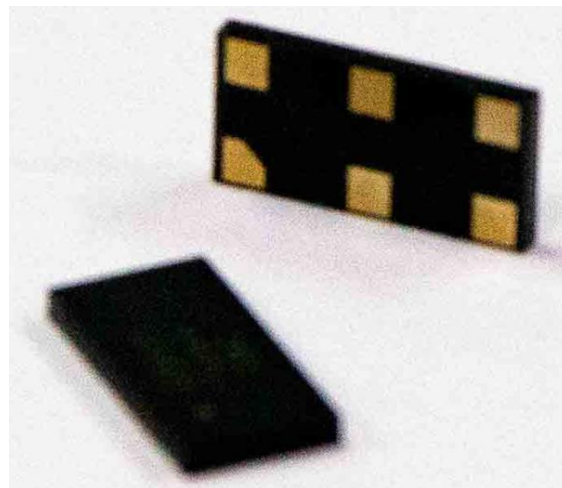
Product Data Sheet

AMR magnetic sensor chip

Product Series: BBA-A745C1A36 Angle Sensor

Part Number: BBA-A745C1A36-XXXXX

Version: Ver 1.1



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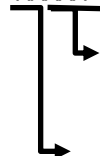
1. General Description

The BBA-A745C1A36-XXXXX is an angular sensor based on the Anisotropic MagnetoResistive(AMR) effect. The sensor contains two Wheatstone bridges with common ground and supply pin VDD. They are shifted at a relative angle of 45° to one another.

A rotating magnetic field in the sensor plane delivers two sinusoidal output signals with the double frequency of the angle α between sensor and magnetic field direction shown in Fig. 1. The function of these signals is $\sin(2\alpha)$ and $\cos(2\alpha)$.

The output represents sine and cosine functions by applied magnetic field in x-y plane and its sensor can detect $180^\circ / 1$ rotation. Sine and cosine single ended signals are layout 90° to one another.

BBA-A745C1A36-XXXXX



Vpp: $xx.x\% \cdot V_{CC}$ 如:

① BBA-A745C1A36-xx505 表示 $V_{pp}=50.5\% \cdot V_{CC}$

② BBA-A745C1A36-xx800 表示 $V_{pp}=80.0\% \cdot V_{CC}$

Vcc: 3.3V、5.0V 如:

① BBA-A745C1A36-33xxx 表示 $V_{CC}=3.3$, $V_{off}=1/2V_{CC}$

② BBA-A745C1A36-50xxx 表示 $V_{CC}=5.0$, $V_{off}=1/2V_{CC}$

2. Key Features

- Magnetic angle sensor, employing the AMR effect.
- Insensitive to interference field Minimal offset voltage
- Negligible hysteresis
- Superior temperature stability
- Saturation field distance $< 300 \mu m$
- Sine and Cosine Outputs
- Differential output also available with improved accuracy

3. Typical Application

- Incremental or absolute position measurement (linear and rotary motion)
- Motor commutation
- Brush-less dc motor control and positioning
- Actuator control and positioning
- Contactless angular measurement and detection
- Magnetic angular position sensing

4. Absolute Maximum Parameters

Parameter	Symbol	Limit value	unit
Supply voltage	V _{cc}	+5	V
ESD (Human Body Model).	ESD(HBM)	4	kV
ESD (Machine Model).	ESD(MM)	0.4	kV
ESD (CDM)	ESD (CDM)	0.5	kV
External magnetic field strength	H _{ext}	315	Gs
Storage temperature	T _{stg}	-55 ~ +150	°C
Operating temperature	T _{opt}	-40 ~ +150	°C
Reflow temperature	T _{reflow}	260	°C

5. Magnetic Data

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Magnetic field	H _{ext}		-	315	-	gs
Reference Position Error	d		-	±50	-	um
Angle Error (after Compensation)	Angle Error		-	±0.5	-	Deg
Angle Measurement Range	Angle		0		180	Deg

6. Electrical Characteristics

Conditions (unless otherwise noted): $V_{cc} = 5.0 \text{ V}$; $H_{ext} = 300 \text{ Gs}$; $T_{opt} = 25^\circ\text{C}$.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	Remarks
Supply voltage	V_{cc}		3	5	5.5	V	
operating current	I_{cc}			4		mA	
Output voltage range	V_{out1} V_{out2}	$V_{cc}=5\text{V}$ $H_{ext}=300\text{Gs}$	700		4650	mV	Customized range
The output voltage peak to peak	V_{pp1} V_{pp2}	$V_{cc}=5\text{V}$ $H_{ext}=300\text{Gs}$	can be customized.			mV	1)
			2050		2650	mV	example 1
			2500		3600	mV	example 2
Output Referred Offset Voltage	V_{off1} V_{off2}	$V_{cc}=5\text{V}$	can be customized.			mV	2)
			2450	—	2550	mV/V	example 1
Amplitude synchronization	k		-1		1	%	3)
Phase difference between sine and cosine	Orthogonal ity			0.8		deg.	

Concentrate:

- 1) V_{out} output voltage amplitude (schematic diagram below).
- 2) Voffset bias voltage (schematic below).
- 3) $k = 100 - \frac{V_{pp_cos}}{V_{pp_sin}} * 100$

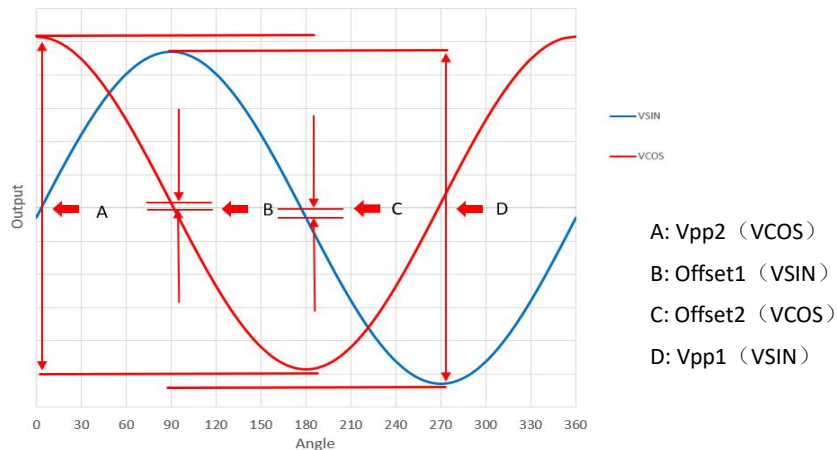


Fig1: explanation of amplitude and offset definition

7. Typical output curve

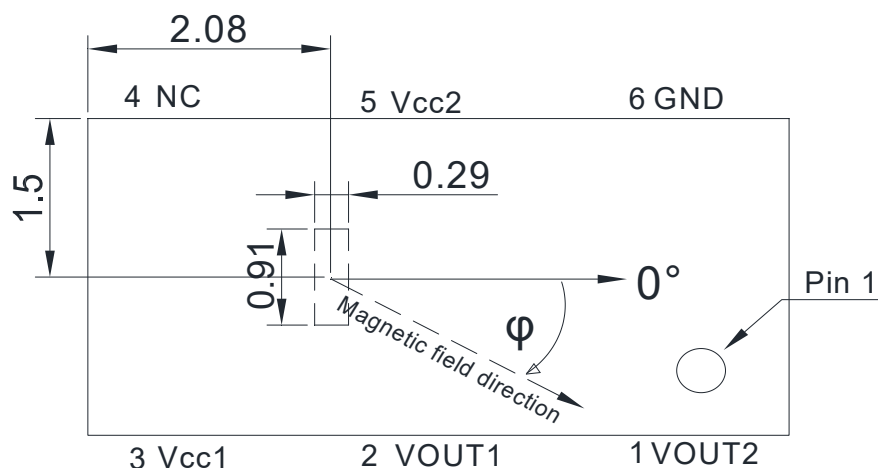


Fig. 2 Angle and magnetic field detection direction

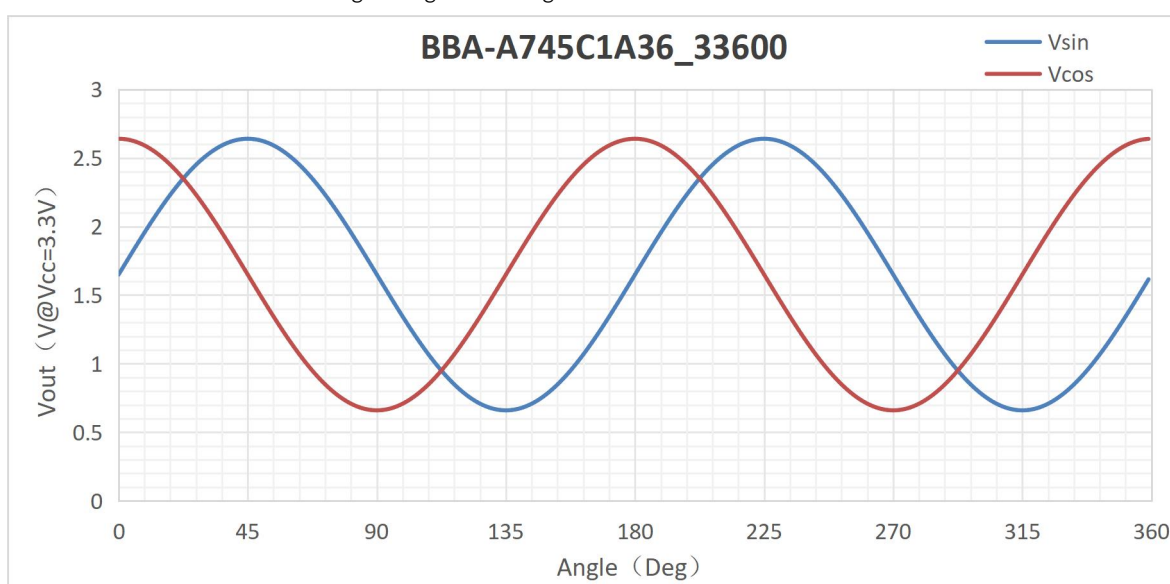
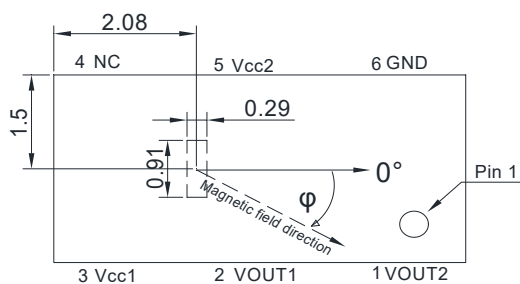


Fig. 3 Typical sensor output signal by applied voltage $V_{cc}=5V$.

8. Package information

8.1 Pin configuration & Pin description



Pin NO.	Symbol	Function
1	VOUT2	Analog positive cosine output
2	VOUT1	Analog positive sine output
3	Vcc1	Supply voltage of the sine output
4	NC	No connected
5	Vcc2	Supply voltage of the cosine output
6	GND	Ground of sine and cosine

8.2 Package Outline

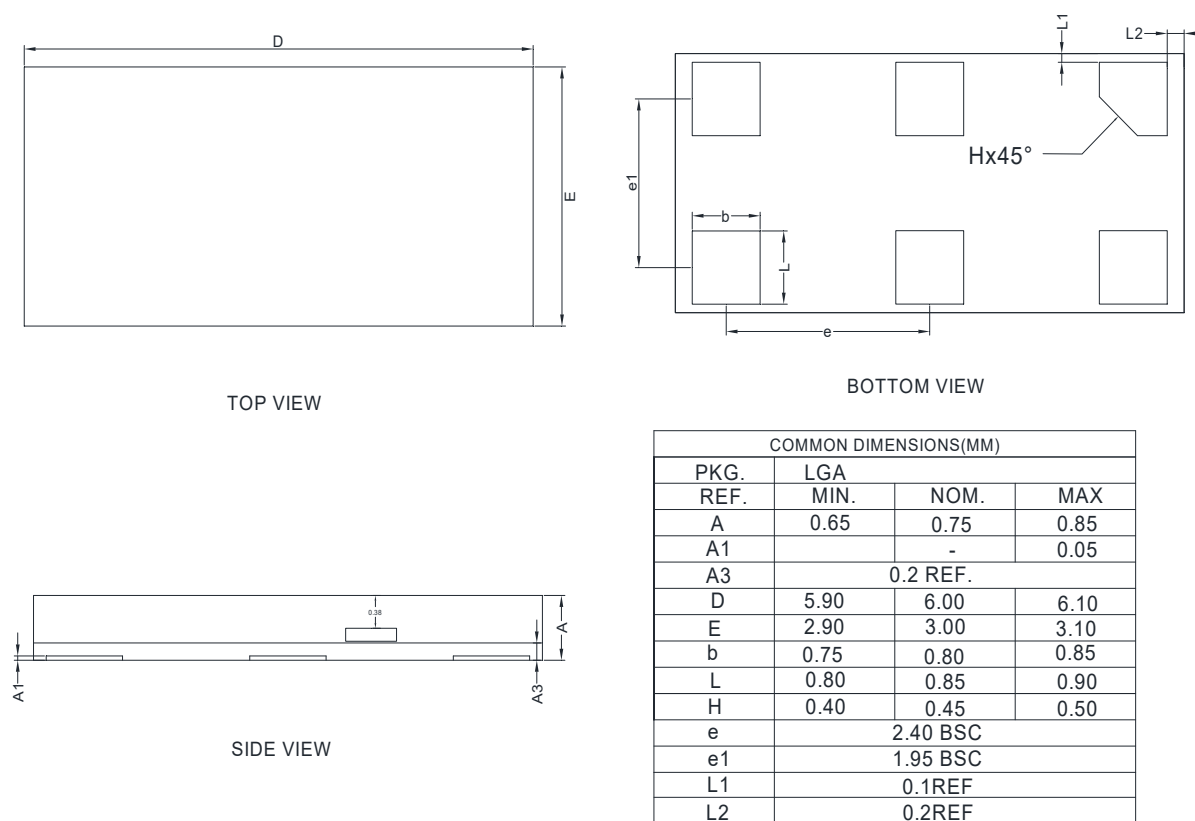


Fig.4 Outline package diagram of BBA-A745C1A36 series sensor (unit: mm).

8.3 Footprint

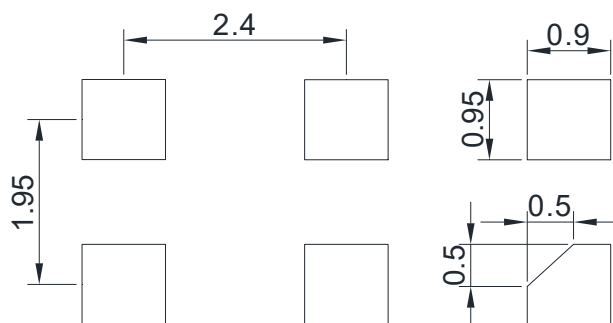


Fig.5 footprint of the sensor chips with LGA-3x6-6L package(unit: mm)

9. Product packaging

Item	Request	Remark
Reels	13 inch	See Figure 7
Carrier tape	12mm wide	See Figure 7
Empty front length	400 mm	Refer to EIA-481 requirements
Trail length	160 mm	Refer to EIA-481 requirements
Number of standard packages	1500 / 7" Reel; 6000 / 13" Reel	Planning criteria for volume products
MSL Level	MSL 3	J-STD-020E

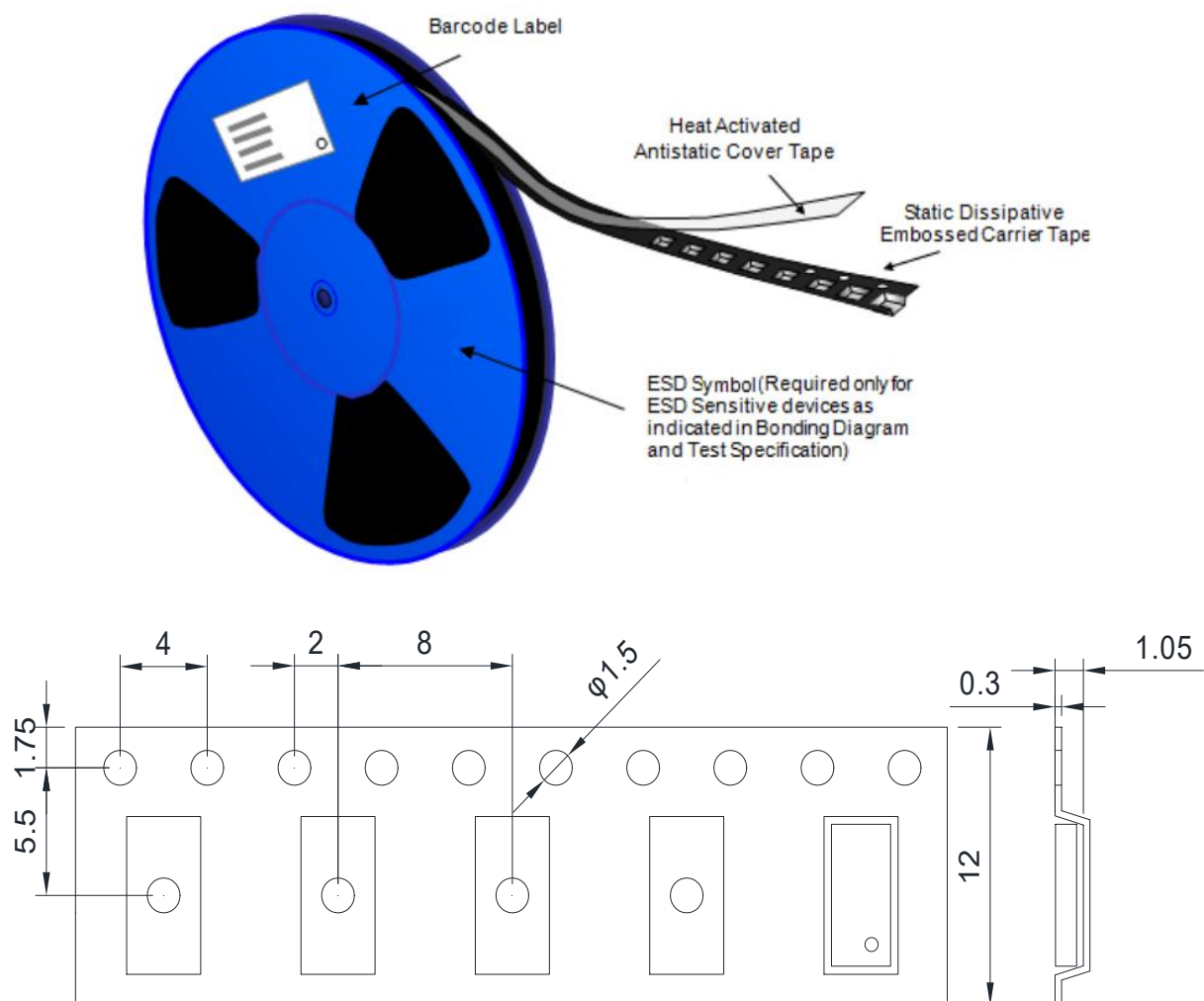
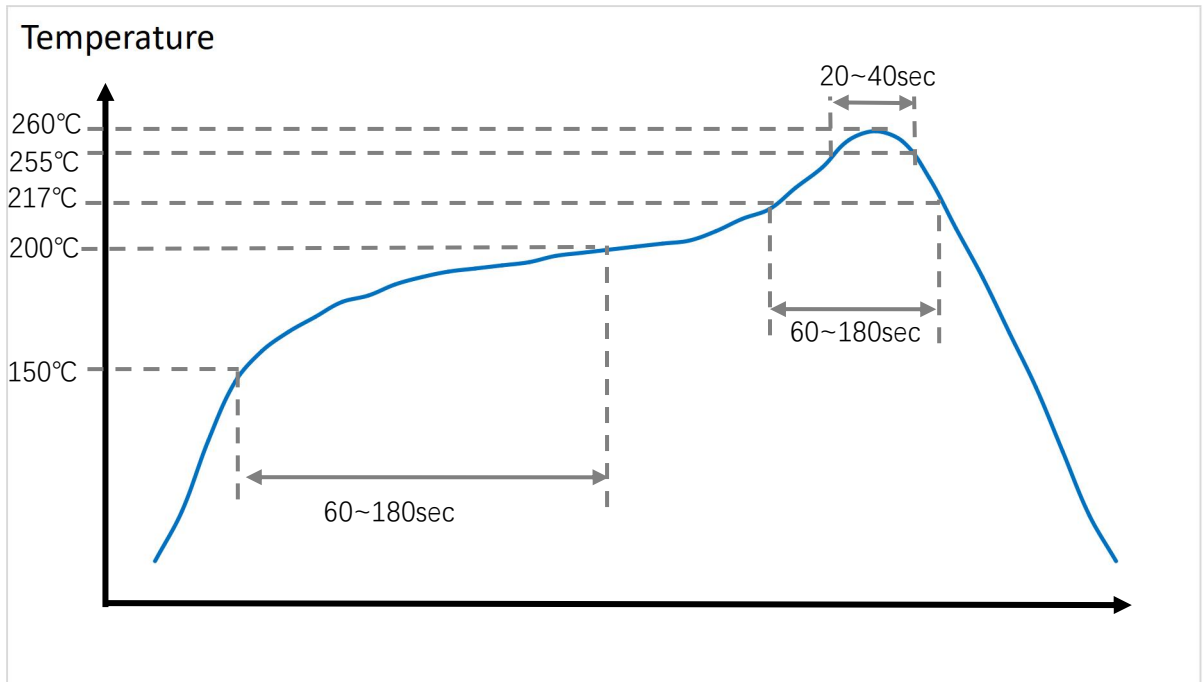


Fig.7 Reels and Carrier tape

10. Reflow Profile (Reference)

Peak Temperature should not exceed 260 degC.

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



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