AH3621 CMOS Unipolar Switch Type Hall Effect Sensor

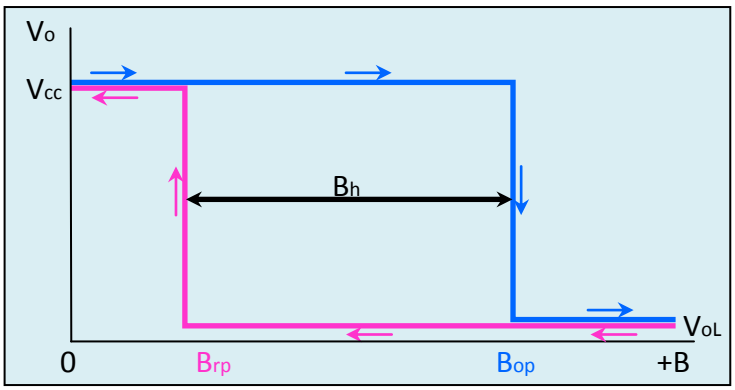
◆ Outline

AH3621 Series Hall effect sensor is one of unipolar excitation single-ended digital output Hall IC based on CMOS technology. The sensor chip is made by CMOS technology, with built-in reverse voltage protection, voltage regulators, temperature compensation circuit, Hall voltage generator, signal amplifier, Schmitt trigger and open collector output driver circuit unit etc. Excellent voltage regulator and temperature compensation circuit ensure the sensor's stable operation over a wide voltage range and temperature range, the reverse voltage protection circuit avoids the sensor being damaged by reverse voltage.

◆ Magnetic and Electric Transfer Characteristic

Unipolar switch type Hall effect Sensor magnetic and electric transfer characteristic:

- When S pole of the magnet faces the mark surface of the sensor and is closed to sensor（$B \geqslant B_{op}$），the sensor outputs low level; When the magnet is far away from sensor （$B \leqslant B_{rp}$），the sensor outputs high level. When the N pole faces the mark surface of the sensor, it is no response. Stable Hysteresis(B_h= Bop-Brp）ensures stable sensor's switch status. The sensor's magnet and electric transfer characteristic curve is shown as the figure:



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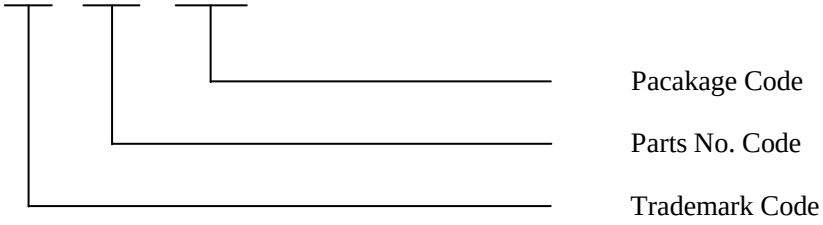
◆ Order Information

- Parts No. and order mark：：
- AH 3621 M/UA



- Package form code：

Package Code	Package Form	Outer Packing
M	SOT-23-3L（SMD）	Reel,3kpcs/reel
UA	TO-92UA/TO-92S（DIP）	Bag, 1kpcs/reel, 0.5kpcs/reel

- Operating Temp. Code：

  E —— -20℃～+85℃

  L —— -30℃～+100℃

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◆ Features:

- Rated working voltage 2.5V ~ 16V, the limit voltages as low as 2.0V;
- Operating temperature range: -30℃ ~ 100℃;
- Rated output current: 20mA;
- Switch response time is about 1μs, the operating frequency DC ~ 100 kHz;
- Small drift between operating point and release point temperature;
- Variety of magnetic induction sensitivity options;
- Variety of packages and outer packing options;
- No mechanical contact, no spark, switch signal stability, no shaking moment, reliability and safety;
- Latch function enables the sensor immune to interference, more stable switch status; Resistant to mechanical stress and thermal stress capability;
- It can connect directly to digital circuit;
- Products meet the EU RoHS instruction 2011/65 / EU and REACH regulations 1907/2006 / EU requirements.

◆ Application

- Contactless switch
- Brushless DC motor
- Position detection and control
- Flow Meter
- Liquid level alarm
- Magnetic encoder
- Flow Sensor
- Wind speed sensor
- Brushless DC fan
- Revolution Detection
- Electronic water meter
- Heat meter
- Current alarm;
- Smart Electronic meter;
- Smart Furniture

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◆ Limit Condition

Parameter	Symbol	Limit Value		Unit
		Min.	Max.	
Storage Tempt.	*Ts*	-50	155	℃
Supply Voltage	V_{CC1}	2.0	18	V
Magnetic Strength	*B*	unlimited	unlimited	mT
Output off-state Voltage	V_O *(off)*	—	18	V
Output(sink)Current	I_O	—	20	mA

◆ Operating Condition

Parameter	Symbol	Value		Unit
		Min.	Max.	
Supply Voltage	V_{CC}	2.5	16	V
Operating Temp.	*Ta*	-30	100	℃
Output Current	I_O	—	15	mA

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Electrical Characteristic

Parameter	Symbol	Test Condition	Value		Unit
			Typ.	Max.	
Output low level voltage	V_{OL}	V_{CC1} = 4.5V， V_{CC2}=16V， I_O=15mA， B>B_{OP}	0.2	0.4	V
Outputleak current	I_{OH}	V_{CC2}=16V， V_{CC1} Open Circuit	0.1	10	μA
Supply Current	I_{CC}	V_{CC1}=16V， V_O Open Circuit	10	20	mA
Output rise time	t_R	V_{CC1}=V_{CC2}=5V， R_L=0.82kΩ， C_L=20pF	0.18	1.5	μs
Output fall time	t_F				

◆ Magnetic Characteristic

Parameter	Symbol		Test Condition	Value		
				Min.	Typ.	Max.
Operate point magnetic strength	S pole faces the product mark	B_{OP}	V_{CC1} = V_{CC2} =16.0V I_O = 10 mA	—	10.0	15.0
Release point magnetic strength	S pole faces the product mark	B_{RP}		2.0	6.0	—
Hysteresis	| B_{OPX} − B_{RPX} |	B_{HX}		—	4.0	6.0

Note1： Unit is mT,1mT (mT）=10（Gs）

Note 2: Pole S is vertical to the mark surface of the product，the field defined into B＞0。

Note3: The operating field of M type (SOT23-3L) is subject to pole “N”.

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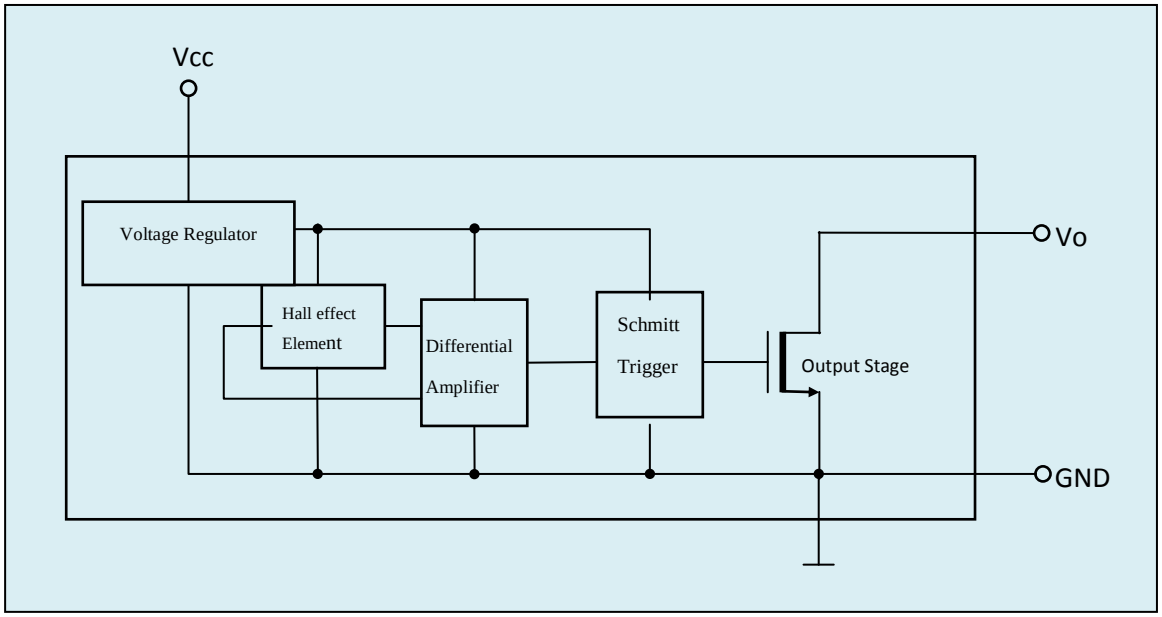
◆ Block Diagram



◆ Pin Function

Pin No.	Pin Symbol	Pin Name	Function	
			When $B \geq B_{OP}$	*When* $B \leq B_{RP}$
1	*Vcc*	Power Supply	Power Supply（+）	
2	GND	Ground	Power Supply（-）	
3	*Vo*	Output	Low Level	High Level

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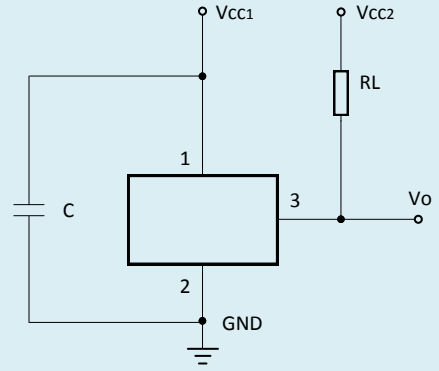
◆ Typical Application Circuit



Note:

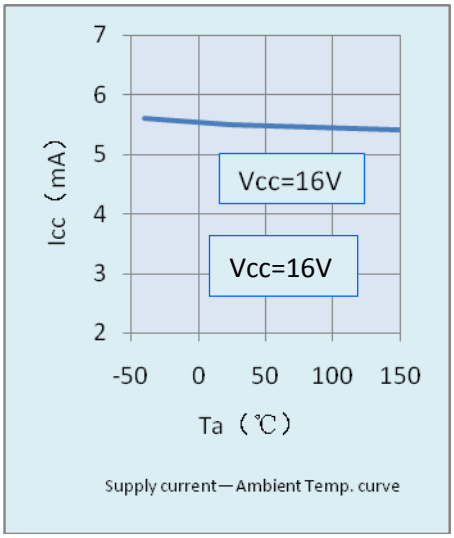
a a) C is filter capaciter，C=0.1μF；

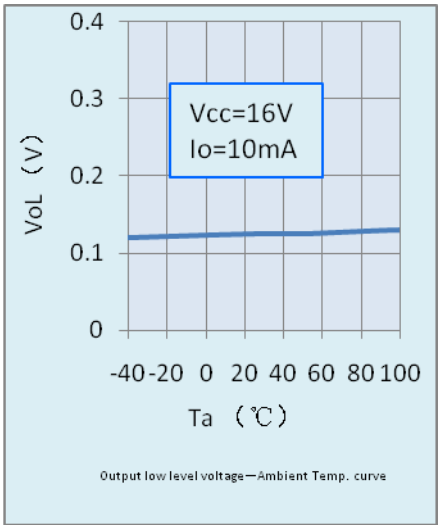
b) RL is pull-up resistor，RL=1kΩ～50kΩ。

c) Vcc2 work with Vcc1short circuit.

◆ Typical Characteristic Curve

- Electrical Characteristic





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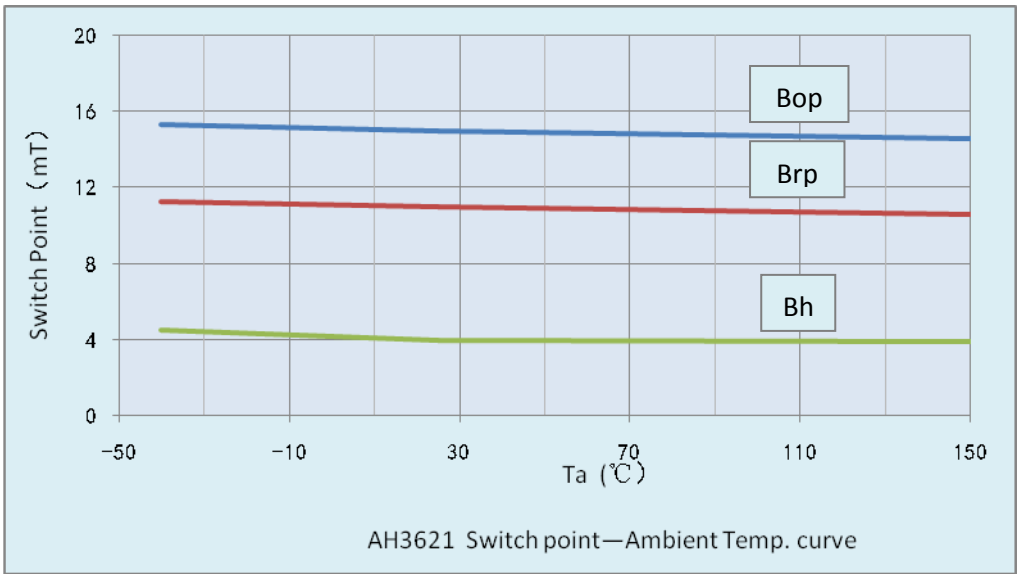
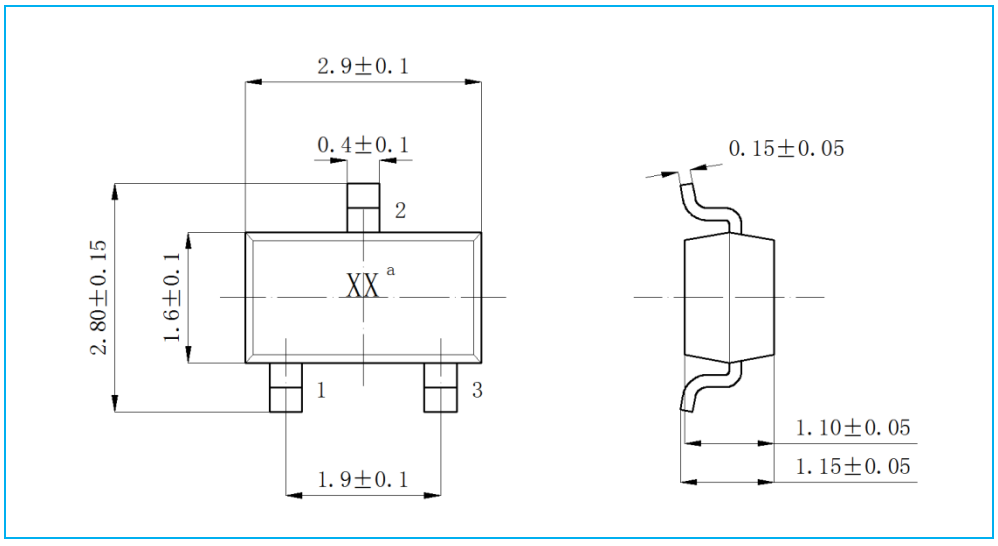
- Magnetic Characteristic



◆ Package Outline and Pin Identify

- SOT-23-3L（M Type）Package Figure（Unit:mm）



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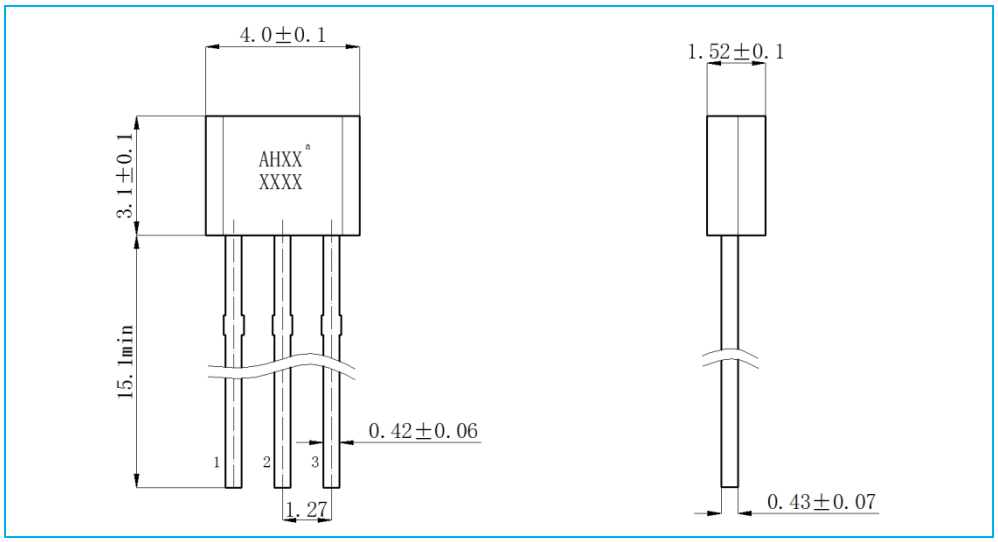
- TO-92UA/TO-92S（UA type）Package Figure（Unit:mm）



Note: In the package outline figure, Pin 1 is Vcc, Pin 2 is GND, Pin 3 is output

- Mark

  Mark XX or AHXX means abbreviated parts No., the second line XXXX means product lot No.

- Pin configuration

  a) M Type: It faces product mark, and two pins are downward, towards the left, clockwise, the pin No. is 1、2、3 in turn.

  b) **UA Type:** It faces product mark, and the pins are downward, from left to right, the pin No. is 1、2、3 in turn.

Important Declaration

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