

## AH30 Series Bipolar Latch Hall Effect Sensor

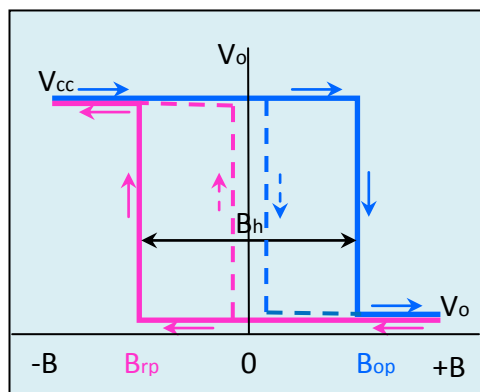
### ◆ Outline

AH30 Series Hall sensor is one of bipolar excitation single-ended digital output Hall IC. The sensor chip has built-in reverse voltage protection, voltage regulators, temperature compensation circuit, Hall-voltage generator, signal amplifier, Schmitt trigger and open collector output drives circuit unit. Excellent voltage regulator and temperature compensation circuit ensure the sensor stable operates over a wide voltage range and temperature range, and the reverse voltage protection circuit avoids the sensor being reverse voltage damage.

### ◆ Magnetic and electric transfer characteristic

#### ◆ Bipolar latch type Hall effect Sensor magnet and electric transfer characteristic:

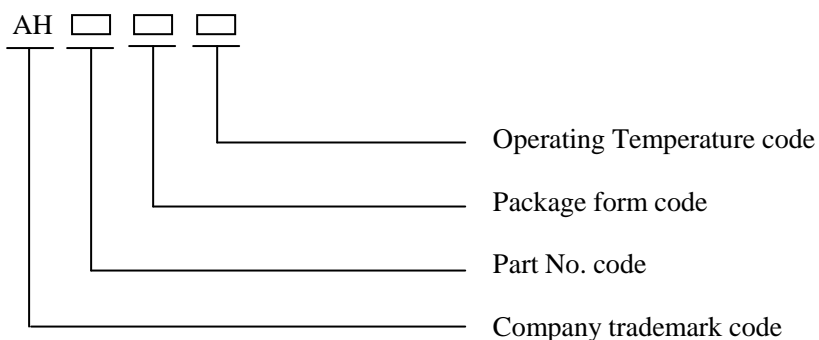
When the S pole of magnet faces the mark surface of the sensor and is closed to sensor ( $B \geq B_{op}$ ), the sensor outputs low level; When the N pole faces the mark surface and is closed to sensor ( $B \leq B_{rp}$ ), the sensor outputs high level. When the magnet is far away with the sensor ( $B=0$ ), the output status of the sensor is latched and remains constant. In order to change the output status, the applied magnetic field must be opposite polarity. The latch function enables the switch state of the sensor to be more stable. The bipolar latch Hall effect sensor's magnet and electric transfer characteristic curve is shown as the figure:





### ◆ Ordering Information

- Parts No. and order mark



- Company trademark code:  
AH ——Nanjing AH Electronic Science & Technology CO.,LTD
  - Parts No. code  
30—— Bipolar single end digital output series  
XX —— Type. No.
  - Package form code  
M——SOT-23-3L (SMD)  
S—— SOT-89 (SMD)  
UA —— TO-92UA/TO-92S (DIP)
- Note: M and S type are in reel,  
M type is 3k pcs/reel, S type is 1kpcs/reel,  
UA type is in bag, 1kpcs/bag or 0.5kpcs/bag.
- Operating Tempt. Code:  
E —— -20°C~+85°C  
L —— -40°C~+150°C



### ◆ Features:

- Rated working voltage 4.5 V ~ 24 V, the limit voltages as low as 3.5 V;
- Operating temperature range: -40°C ~ 150°C;
- Rated output current(sink) : 25 mA, the maximum output current(sink): 50 mA
- Switch response time is about 1μs, the operating frequency DC ~ 100 kHz;
- Small drift between operating point and release point temperature;
- There has variety of magnetic induction sensitivity to choose;
- There has variety of packages and out packing options;
- No mechanical contact, no spark, switch signal stability, no shaking moment, high reliability and safety;
- Latch function enables the sensor immune to interference, switch status is more stable;
- Resistant to mechanical stress and thermal stress capability;
- It can connect directly with digital circuit;
- Products meet the EU RoHS instruction 2011/65 / EU and REACH regulations 1907/2006 / EU requirements

### ◆ Application

#### Industry and consumer products

- Contactless switch
- Brushless DC motor and brushless DC fan
- Position detection and control
- Revolution detection
- Current sensor
- Isolation detection
- Magnetic encoder

#### Automotive Electronic

- Security alarm device
- Automotive ignitor
- Odometer and taximeter;
- Oil level meter;
- Doors, windows, wipers position control;
- Car seat position control
- Vehicle speed control and ABS devices.



◆ Limit condition

Parameter	Symbol	Limit Value		Unit
		Min.	Max	
Storage Tempt.	$T_s$	-55	175	°C
Supply Voltage	$V_{CC1}$	3.5	28	V
Magnetic Strength	$B$	unlimited	unlimited	mT
Output off-state Voltage	$V_o(off)$	—	25	V
Output(sink)Current	$I_o$	—	50 (Note)	mA

Note: The output current limit value of AH3012 (AH512) is 20mA.

◆ Operating Condition

Parameter	Symbol	Value		Unit
		Min.	Max.	
Supply Voltage	VCC	4.5	24	V
Operating Temp.	Ta	-40	150	°C
Output Current	IO	—	50 (注)	mA

Note: The output current max. value of AH3012 (AH512) is 20mA.



### ◆ Electrical Characteristic

Parameter	Symbol	Test Condition	Value		Unit
			Typ.	Max.	
Output low level voltage	VOL	VCC1 = 4.5V, VCC2=24V, IO=25mA, B≥BOP	0.2	0.4	V
Outputleak current	IOH	VCC2=24 V, VCC1 Open circuit	0.1	10	μA
Supply Current	ICC	VCC1=24V, VO Open circuit	6	12	mA
Output rise time	tR	VCC1=VCC2=12V, RL=1.2kΩ, CL=20pF	0.3	1.5	μs
Output fall time	tF				

### ◆ Magnetic Characteristic

Excitation and Switch mode	Type	Package	B <sub>OP</sub>	B <sub>RP</sub>	B <sub>H</sub>	
			Max	Min.	Min.	Max.
Bipolar latch type	AH3031	UA, M	4	-4	3	10
	AH3041		6	-6		
	AH3051		8	-8		
	AH3013 (AH413)	UA, M	7	-7	4	14
	AH3013 (AH513)					
	AH3012 (AH512)	UA	6	-6	2	12
	AH3075	UA, M	10	-10	12	26
AH3076	15		-15			

Note 1: Unit: mT, 1mT=10Gs.

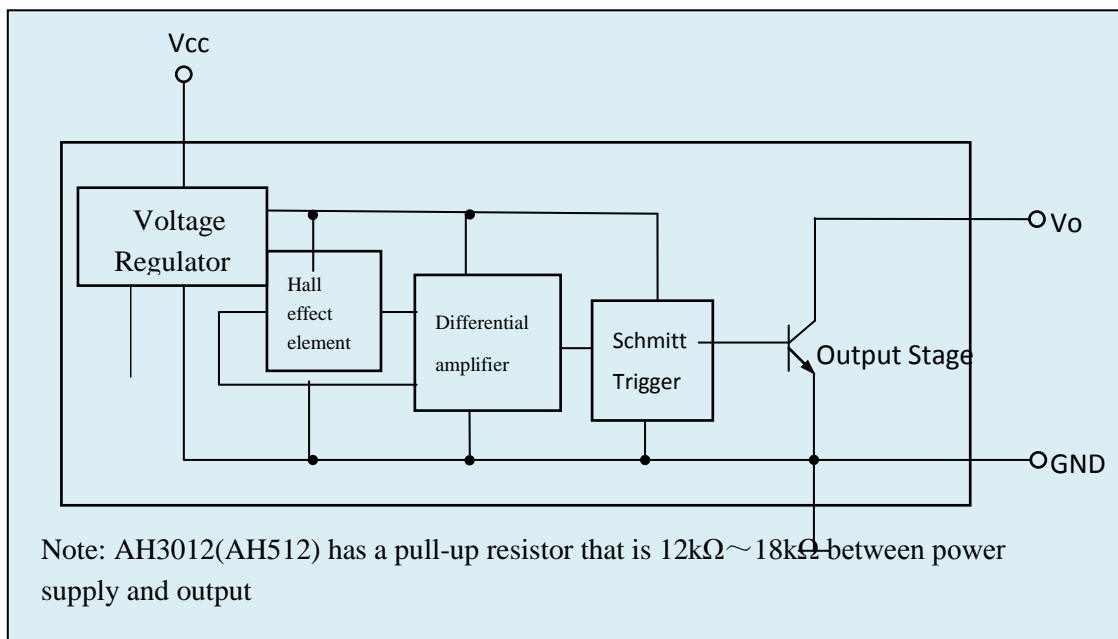
Note2: Pole S is vertical to the mark surface of the product, the field defined into  $B > 0$ .

Note3: Re AH3012 (AH512), there is a pull resistor which is 12kΩ~18kΩ between power supply and output.

Note 4: More information please visit our website:www.ahest.net or call us.

Note 5: The operating field of M type (SOT23-3L) is subject to pole N.

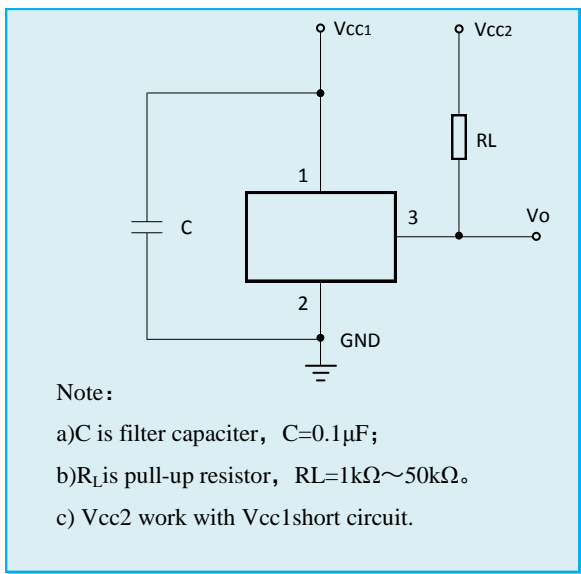
## ◆ Block Diagram



## ● Pin Function

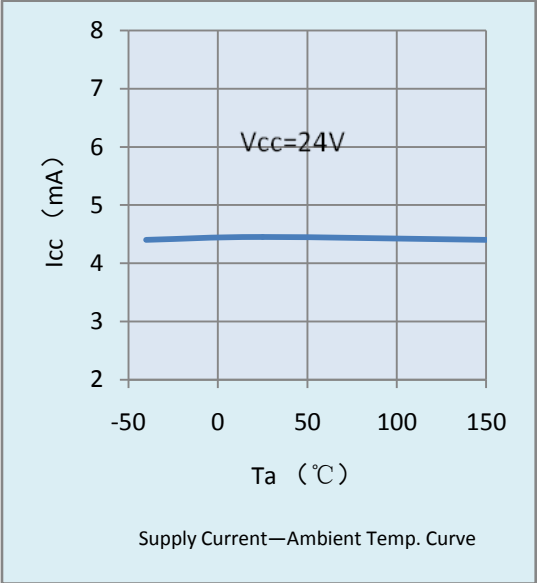
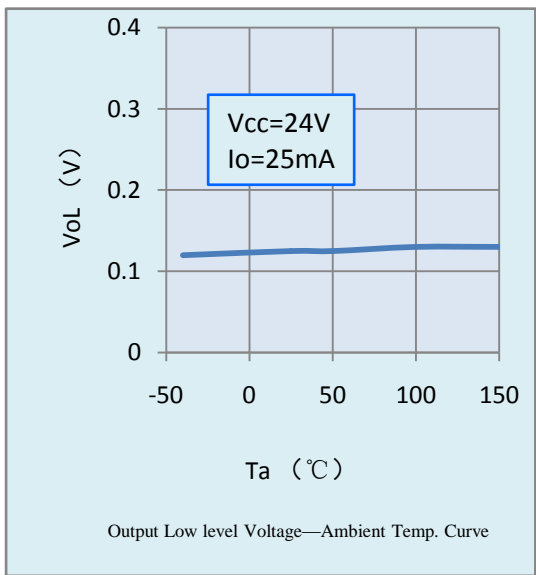
Pin No.	Pin Symbol	Pin Name	Function	
			When $B \geq B_{OP}$	When $B \leq B_{RP}$
1	Vcc	Supply Voltage	Power Supply (+)	
2	GND	Ground	Power Supply (-)	
3	Vo	Output	Low Level	High Level

● **Typical Application Circuit**

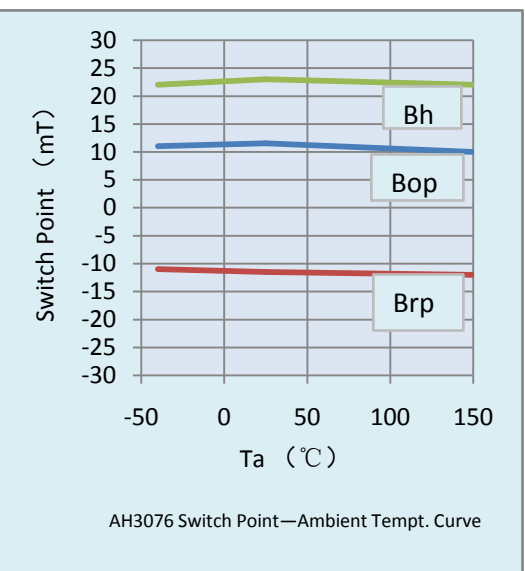
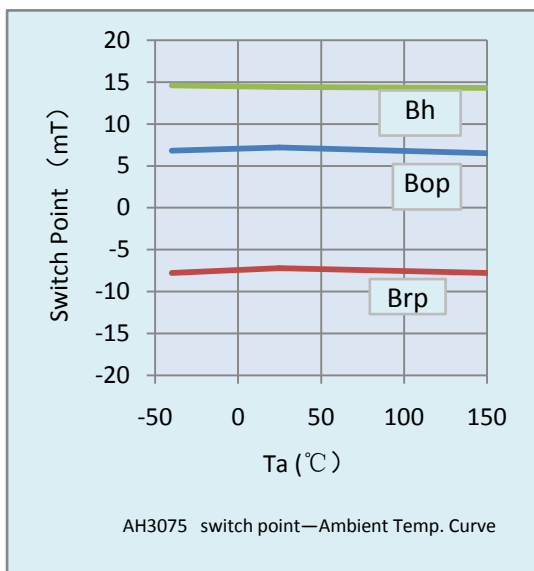
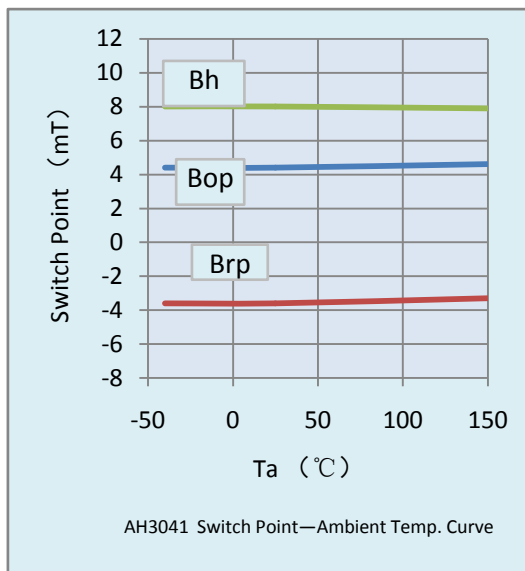
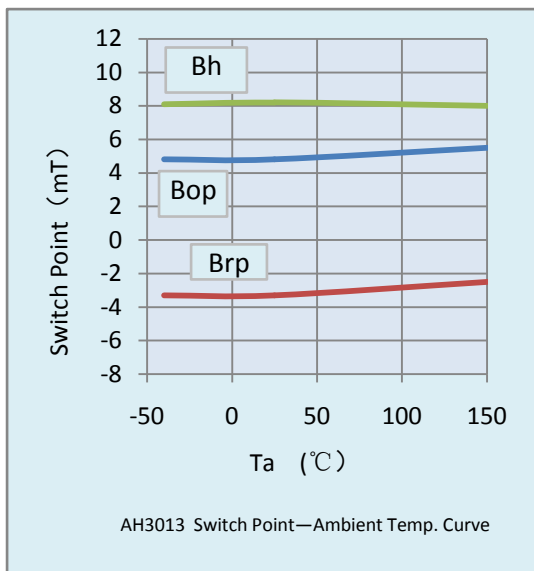


● **Typical Characteristic Curve**

● **Electrical Characteristic**



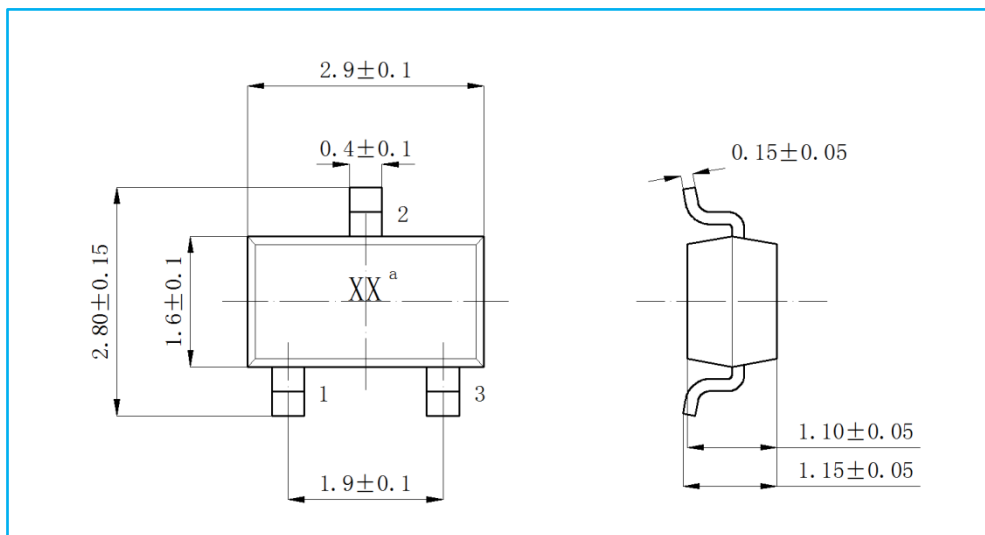
● Magnetic Characteristic



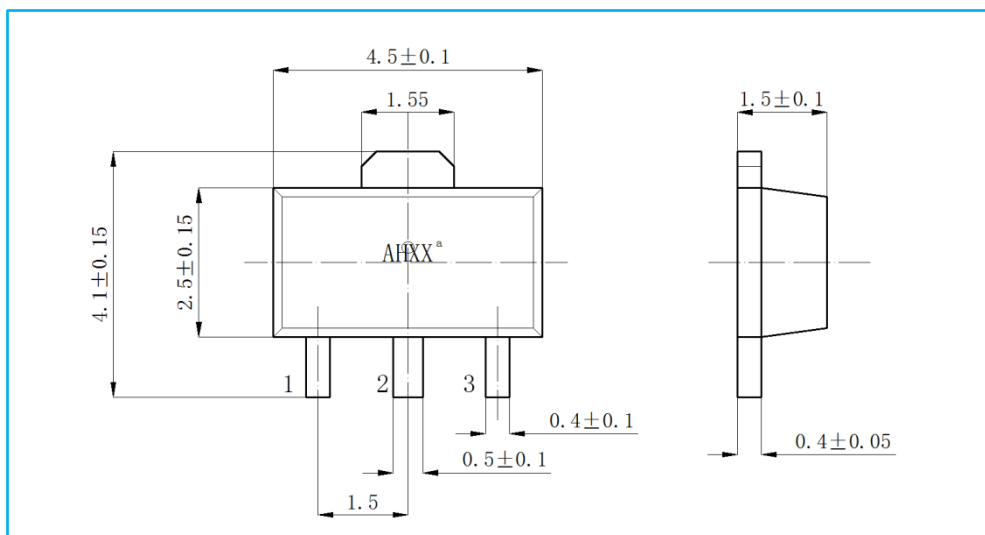


◆ Package Outline and Pin Identify

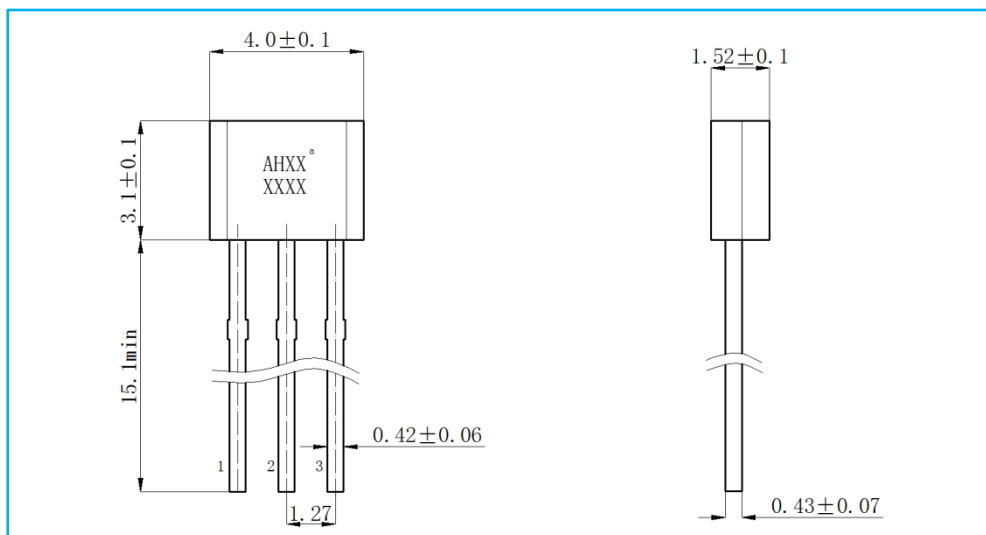
- SOT-23-3L (M Type) Package Figure (Unit:mm)



- SOT-89 (S type) Package Figure (Unit:mm)



- 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) **S Type and 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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