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BIPOLAR HALL-EFFECT POSITION SENSORS AH41

General Description

The AH41 is an integrated Hall-effect latched sensor designed for electronic commutation of brushless DC motor applications. The device includes an on-chip Hall voltage generator for magnetic sensing, a comparator that amplifiers the Hall voltage, and a Schmitt to provide switching hysteresis for noise rejection and open-collector output. An internal bandgap regulator is used to provide temperature compensated supply voltage for internal circuits and allows a wide operating supply range.

A north pole of sufficient strength will turn the output ON. In the absence of a magnetic field, the output is OFF.

This IC is available in TO-92S-3 package.

Features

- On-chip Hall Sensor
- Wide Operating Voltage Range: 4V to 24V
- Internal Bandgap Regulator for Temperature Compensation
- Maximum Output Sink Current: 50mA
- Low Profile TO-92S-3
- Operating Temperature: -40˚C to 150˚C
- ESD Rating: 2000V (Human Body Model)
  300V (Machine Model)

Application

- Brushless DC Motor

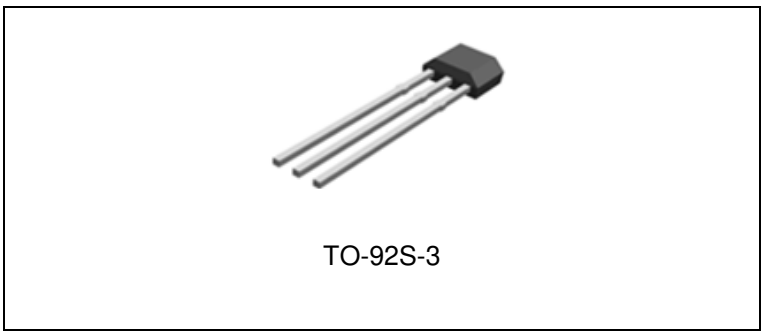


Figure 1. Package Type of AH41

Pin Configuration

Z3 Package
(TO-92S-3)

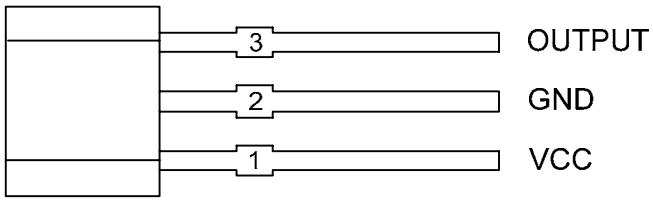


Figure 2. Pin Configuration of AH41 (Front View)

Pin Description

Pin Number	Pin Name	Function
1	VCC	Power supply pin
2	GND	Ground pin
3	OUTPUT	Output pin. It is low during the N magnetic field

Functional Block Diagram

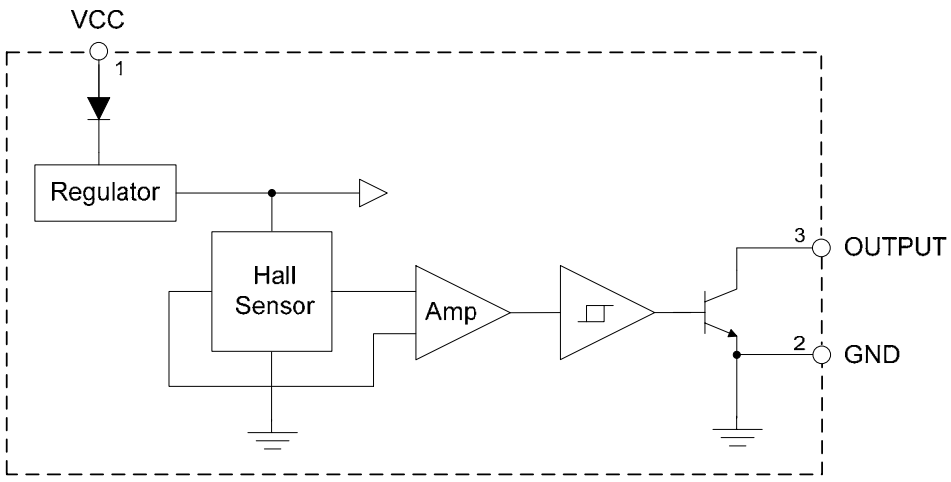
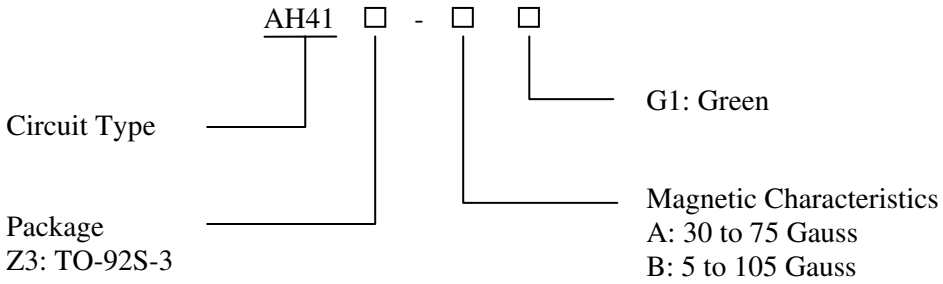


Figure 3. Functional Block Diagram of AH41

Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing Type
TO-92S-3	-40 to 150°C	AH41Z3-AG1	AH41	Bulk
		AH41Z3-BG1	AH41	Bulk

BCD Semiconductor's Pb-free products, as designated with "G1" suffix in the part number, are RoHS compliant and green.

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	-24 to 28	V
Output OFF Voltage	V_{CE}	30	V
Output Sink Current (Continuous Current)	I_{OUT}	50	mA
Power Dissipation (T_A=25°C)	P_D	400	mW
Storage Temperature	T_{STG}	-65 to 150	°C
Junction Temperature	T_J	150	°C
ESD (Machine Model)		300	V
ESD (Human Body Model)		2000	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operating Conditions (T_A=25°C)

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	4	24	V
Operating Temperature	T_{OP}	-40	150	°C

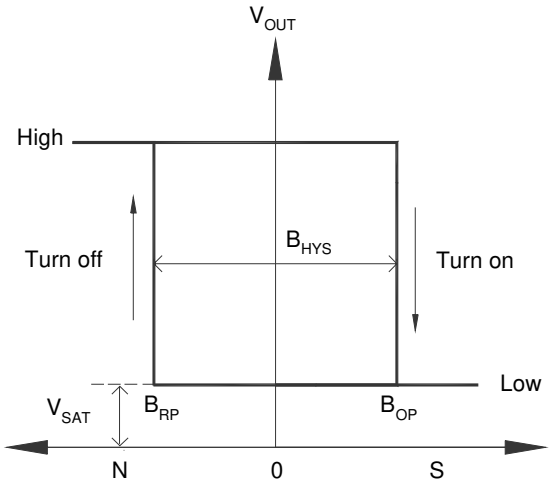
Electrical Characteristics

V_{CC} =12V, T_A =25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}		4		24	V
Supply Current	I_{CC}	V_{CC}=4V to 24V		6	9	mA
Output Leakage Current	I_{OL}	V_{CE}=14V		0.1	10	μA
Output Saturation Voltage	V_{SAT}	I_{OUT} =20mA		110	300	mV
Rise Time	tr	R_L=820Ω C_L=20pF		200		ns
Fall Time	tf	R_L=820Ω C_L=20pF		100		ns

Magnetic Characteristics (T_A=25°C)

Parameter	Symbol	Grade	Min	Typ	Max	Unit
Operating Point	B_{OP}	A	30		75	Gauss
		B	5		105	
Releasing Point	B_{RP}	A	-75		-30	Gauss
		B	-105		-5	
Hysteresis	B_{HYS}		80	110	140	Gauss



Test Circuit

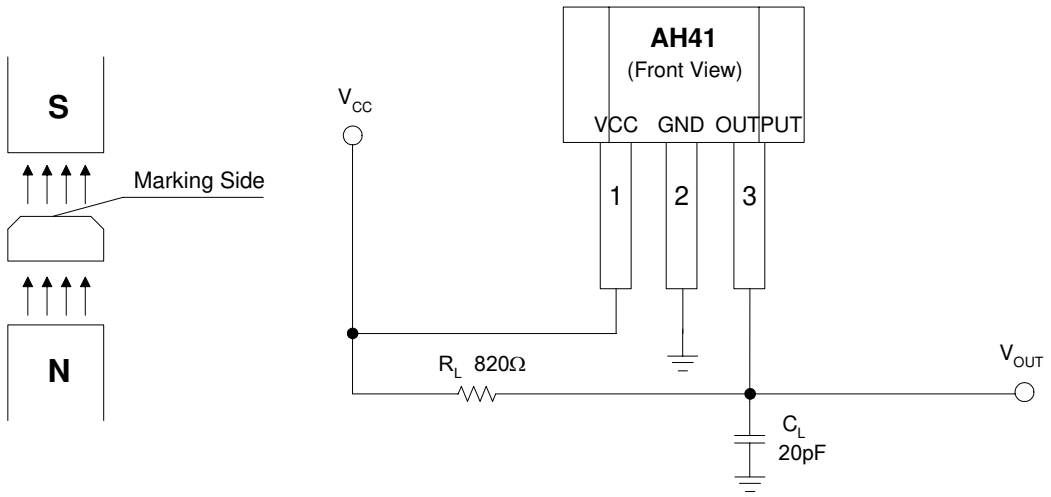


Figure 4. Basic Test Circuit of AH41

Typical Performance Characteristics

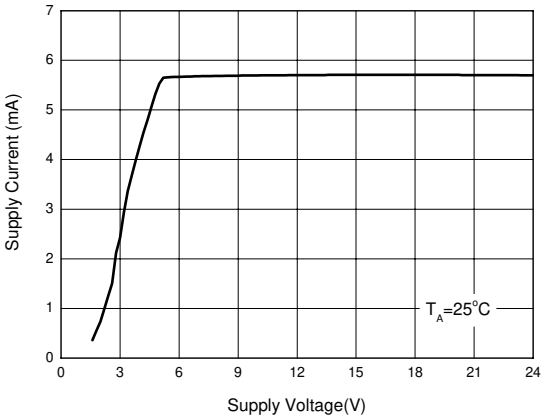


Figure 5. Supply Current vs. Supply Voltage

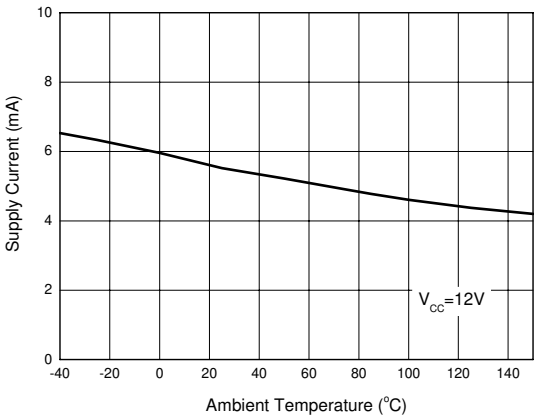


Figure 6. Supply Current vs. Ambient Temperature

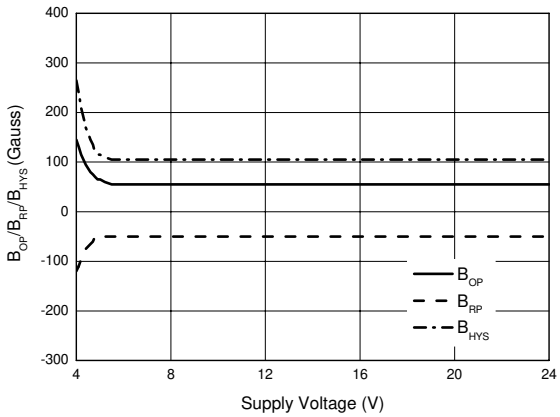


Figure 7. $B_{OP}/B_{RP}/B_{HYS}$ vs. Supply Voltage

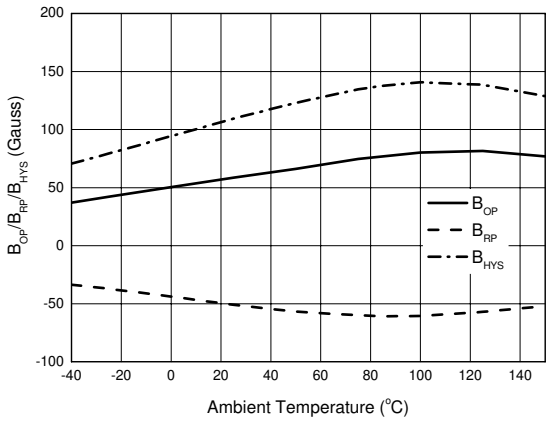


Figure 8. $B_{OP}/B_{RP}/B_{HYS}$ vs. Ambient Temperature

Typical Performance Characteristics (Continued)

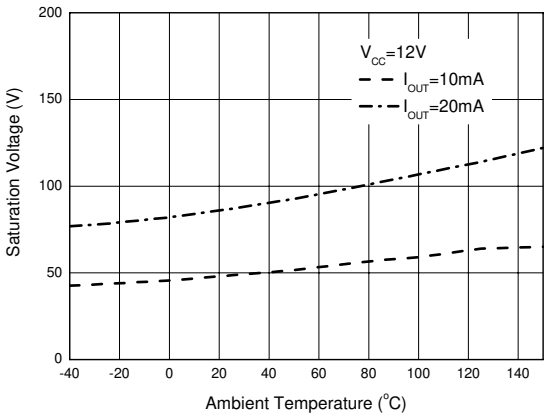
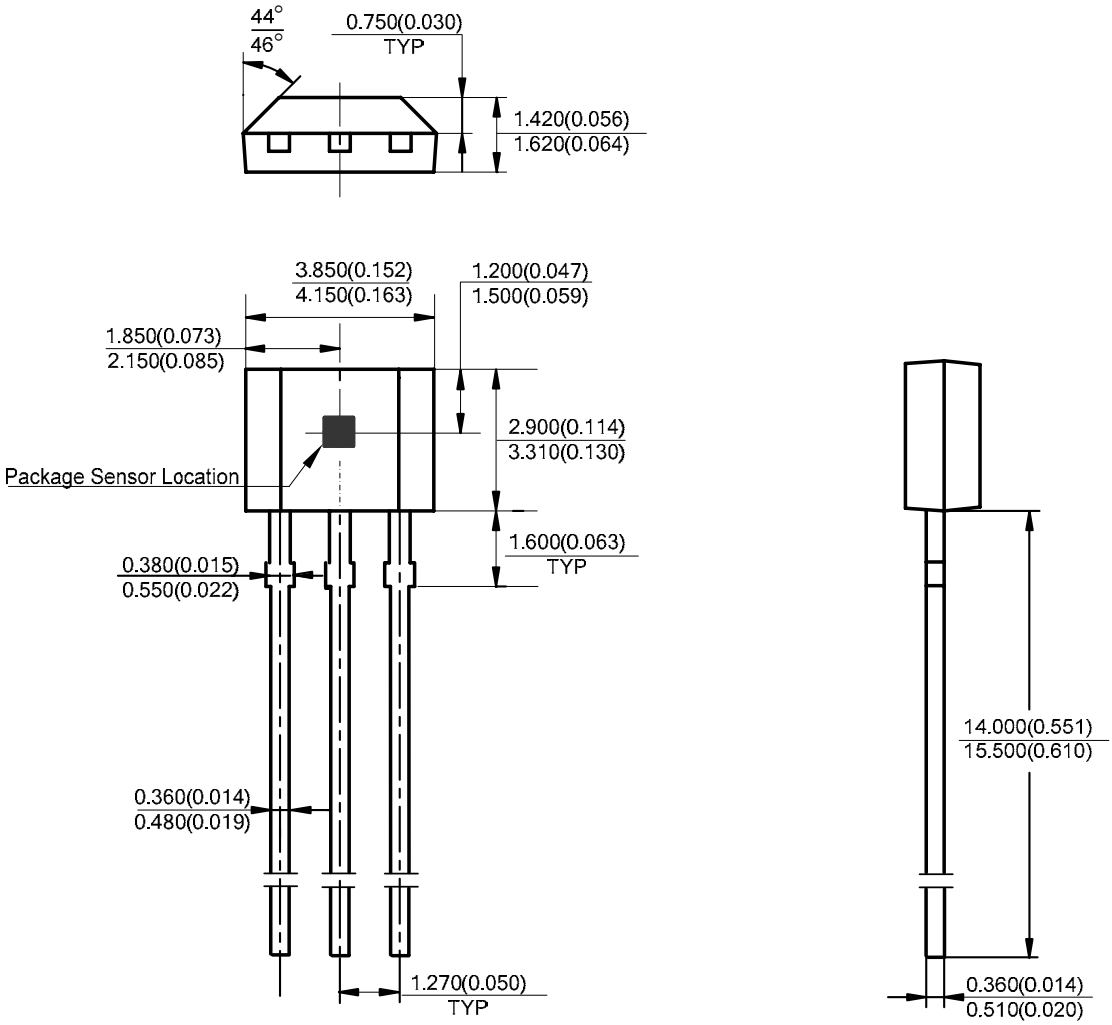


Figure 9. Saturation Voltage vs. Ambient Temperature

Mechanical Dimensions

TO-92S-3 **Unit: mm(inch)**



BCD Semiconductor Manufacturing Limited

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