

UNIPOLAR HALL-EFFECT SWITCH

AH922

General Description

The AH922 is a unipolar Hall-effect one-chip switch with digital output, solution for sense magnetic field. It is designed in mixed signal CMOS and chopper technology. This IC is quite suitable for use in automotive, industrial and consumer applications. The two sensors are suited for operation over extended temperature ranges.

The AH922 Hall-effect switch is combined with a voltage regulator, Hall-voltage generator, chopper small-signal amplifier, Schmitt trigger and open-drain output.

The AH922 is available in TO-92S-3 and SOT-23-3 packages.

Features

- Wide Operating Voltage Range
- Chopper Stabilization
- Extremely Low Switch Point Drift
- Superior Temperature Stability
- High Sensitivity Integrated Hall Sensor
- Solid State Reliability
- Robust EMC Capability

Applications

- 5V/12V DC Brushless Motor/Fan
- Solid State Switch
- Speed Detection
- Revolution Counting

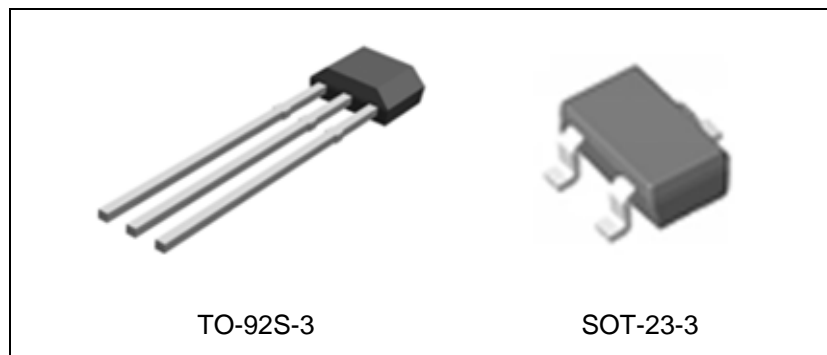


Figure 1. Package Types of AH922

UNIPOLAR HALL-EFFECT SWITCH

AH922

Pin Configuration

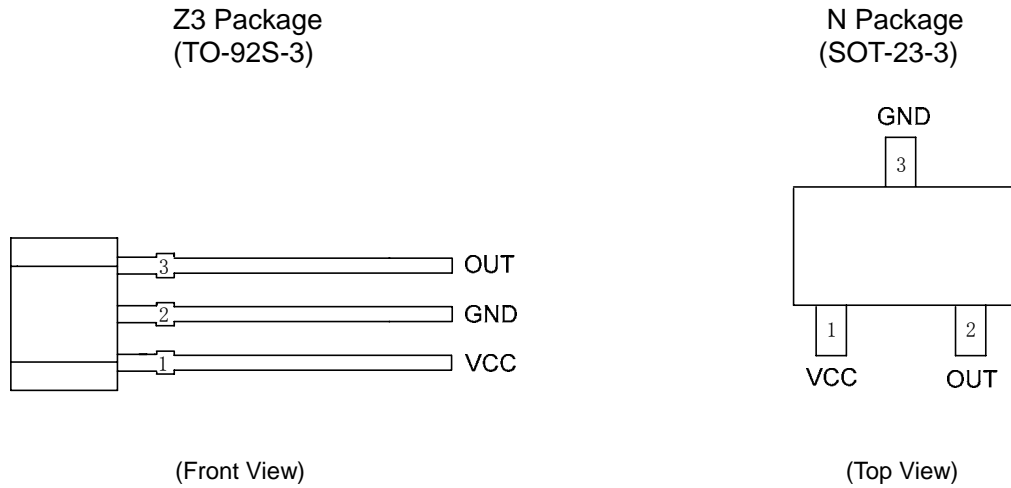
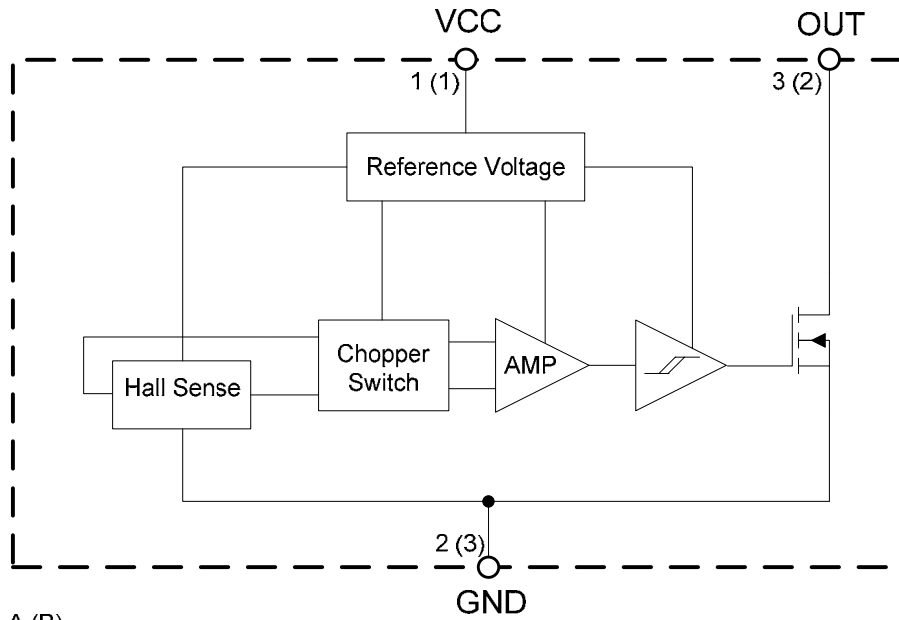


Figure 2. Pin Configuration of AH922

Pin Description

Pin Number		Pin Name	Function
TO-92S-3	SOT-23-3		
1	1	VCC	Supply voltage
2	3	GND	Ground pin
3	2	OUT	Output pin

UNIPOLAR HALL-EFFECT SWITCH**AH922****Functional Block Diagram**

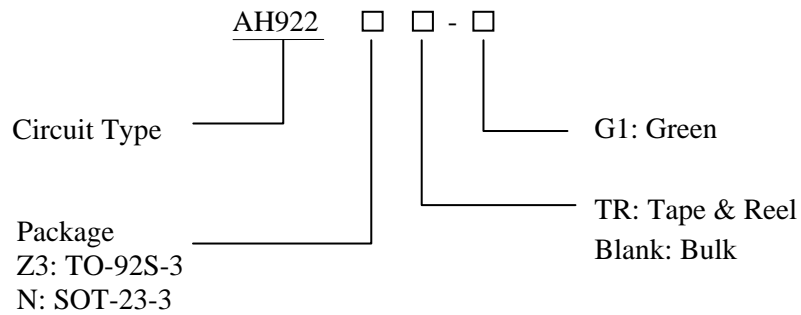
A (B)
A for TO-92S-3
B for SOT-23-3

Figure 3. Functional Block Diagram of AH922

UNIPOLAR HALL-EFFECT SWITCH

AH922

Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing Type
TO-92S-3	-40 to 125°C	AH922Z3-G1	922	Bulk
SOT-23-3		AH922NTR-G1	GT4	Tape & Reel

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

**UNIPOLAR HALL-EFFECT SWITCH****AH922****Absolute Maximum Ratings (Note 1)**

Parameter	Symbol	Value		Unit
Supply Voltage	V_{CC}	24		V
Output Current (Continuous)	I_{OUT}	25		mA
Power Dissipation	P_D	TO-92S-3	400	mW
		SOT-23-3	230	
Operation Temperature	T_A	-50 to 150		°C
Storage Temperature	T_{STG}	-65 to 150		°C
Maximum Junction Temperature	T_J (Max)	165		°C
ESD (Human Body Model)	ESD	4000		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

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	3.5	22	V
Operating Ambient Temperature	T_A	-40	125	°C

**UNIPOLAR HALL-EFFECT SWITCH****AH922****Electrical Characteristics** $V_{CC}=12V$, $T_A=25^{\circ}C$, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	Operating	3.5	12	22	V
Supply Current	I_{CC}	$V_{CC}=12V$, $B < B_{RP}$		3	5	mA
		$V_{CC}=12V$, $B > B_{OP}$		3	5	mA
Saturation Voltage	V_{SAT}	$I_{OUT}=20mA$, $B > B_{OP}$		185	500	mV
Output Leakage Current	$I_{LEAKAGE}$	$V_{OUT}=20V$, $B < B_{RP}$		0.1	5	μA
Output Rising Time	t_{RISING}	$R_L=1k\Omega$, $C_L=20pF$		0.4	2	μs
Output Falling Time	$t_{FALLING}$	$R_L=1k\Omega$, $C_L=20pF$		0.4	2	μs

Magnetic Characteristics $V_{CC}=12V$, $T_A=25^{\circ}C$, unless otherwise specified.

Parameter	Symbol	Min	Typ	Max	Unit
Operating point	B_{OP}	80	110	140	Gauss
Releasing point	B_{RP}	35	65	95	Gauss
Hysteresis	B_{HYS}	20	45	70	Gauss

UNIPOLAR HALL-EFFECT SWITCH

AH922

Magnetic Characteristics (Continued)

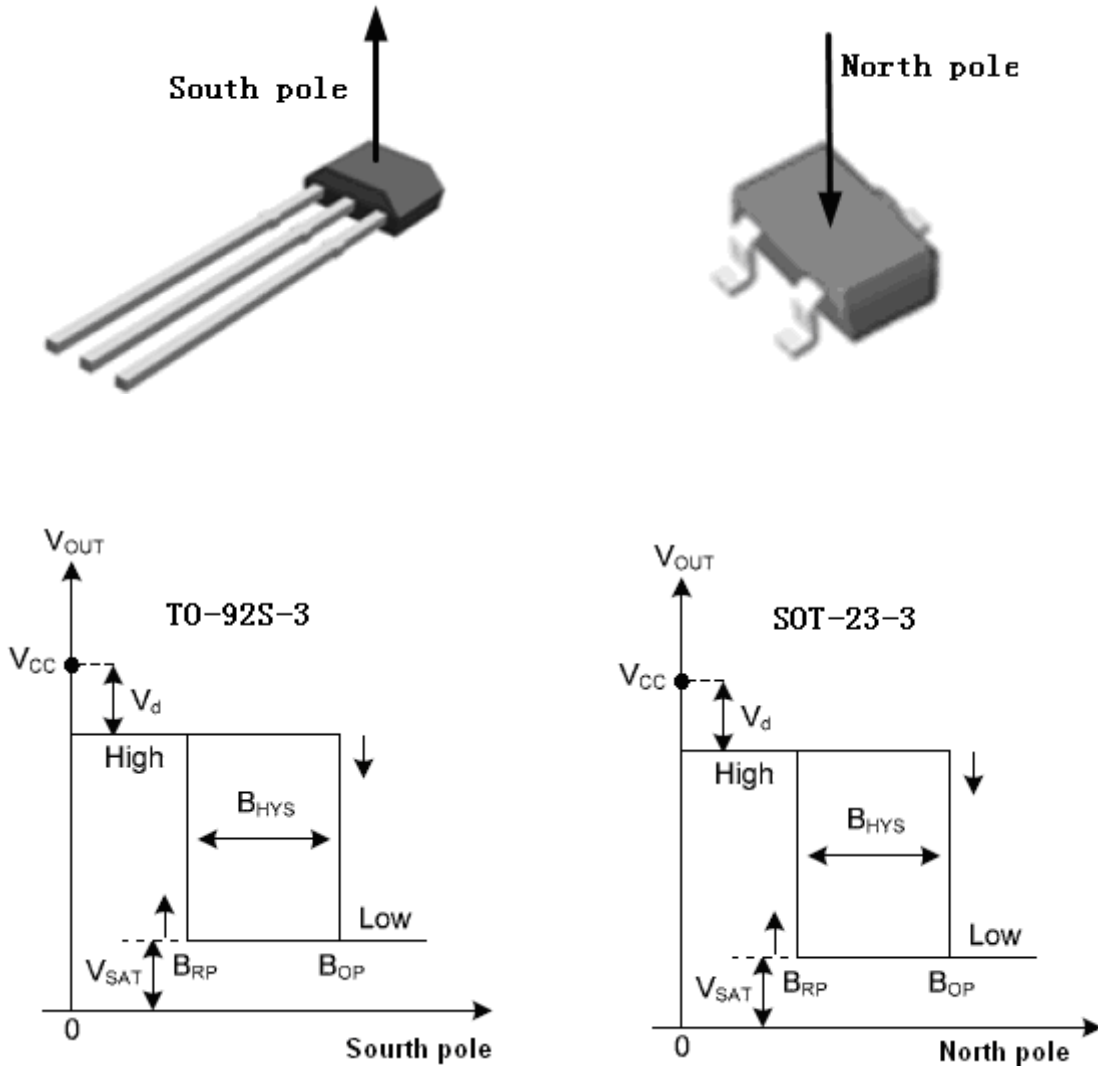


Figure 4. Magnetic Flux Density of AH922

Test Circuit and Test Conditions

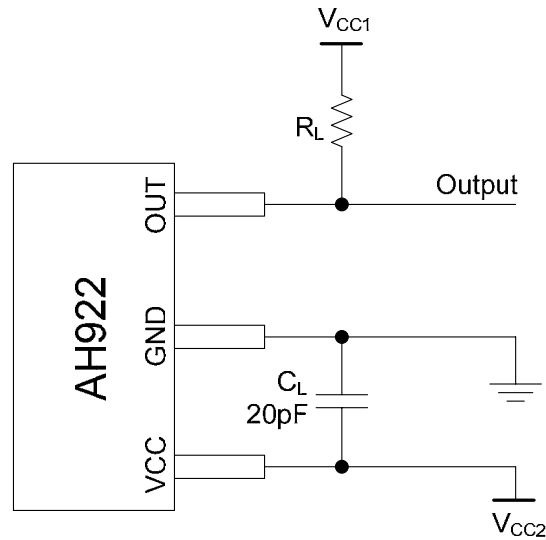


Figure 5. Test Circuit of AH922

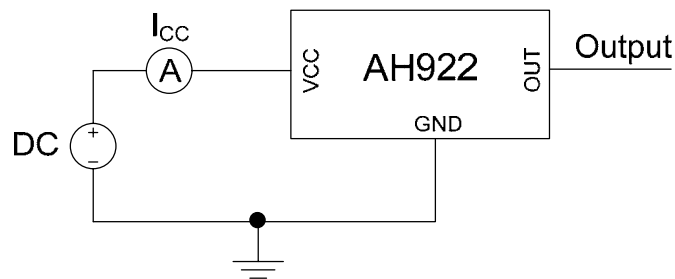


Figure 6. Test Condition of AH922 (Supply Current)

Note 2: The output is open during measurement.

Note 3: The device is put under the magnetic field: $B < B_{RP}$.

Test Circuit and Test Conditions (Continued)

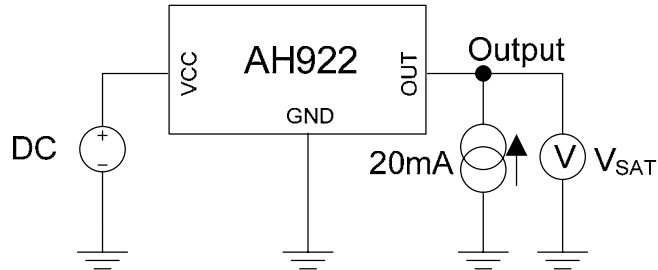


Figure 7. Test Condition of AH922 (Output Saturation Voltage)

Note 4: The output saturation voltage V_{SAT} is measured at $V_{CC}=12V$.

Note 5: The device is put under the magnetic field: $B > B_{OP}$.

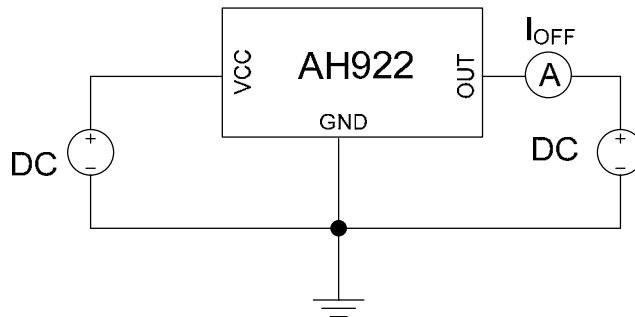


Figure 8. Test Condition of AH922 (Output Leakage Current)

Note 6: The device is put under the magnetic field: $B < B_{RP}$.

Note 7: $V_{DC}=12V$.

Typical Performance Characteristics

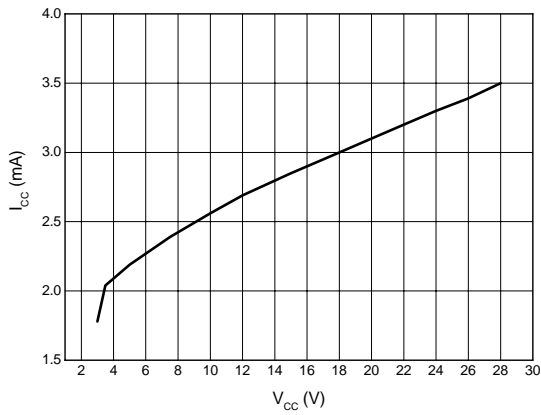


Figure 9. I_{CC} vs. V_{CC}

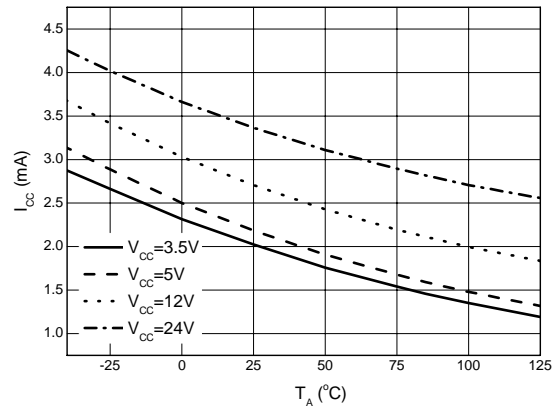


Figure 10. I_{CC} vs. T_A

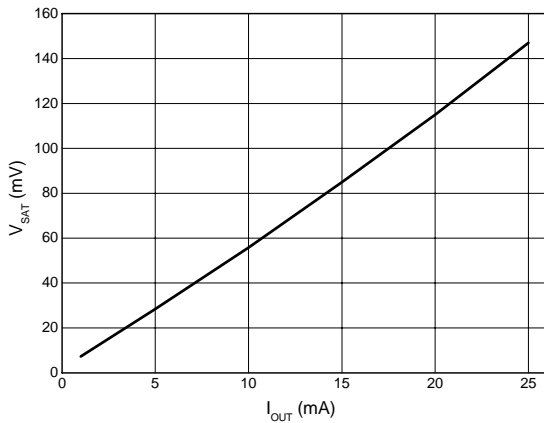


Figure 11. V_{SAT} vs. I_{OUT}

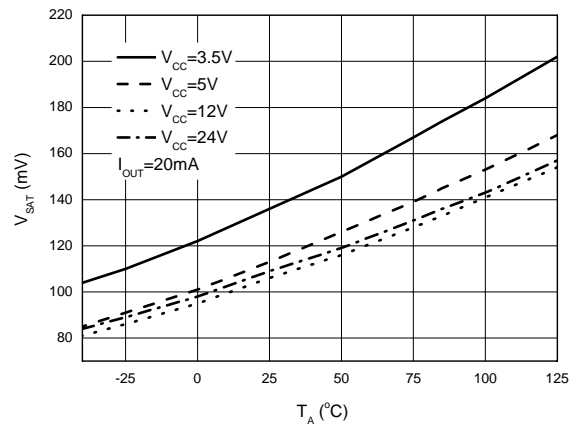


Figure 12. V_{SAT} vs. T_A

UNIPOLAR HALL-EFFECT SWITCH

AH922

Typical Performance Characteristics (Continued)

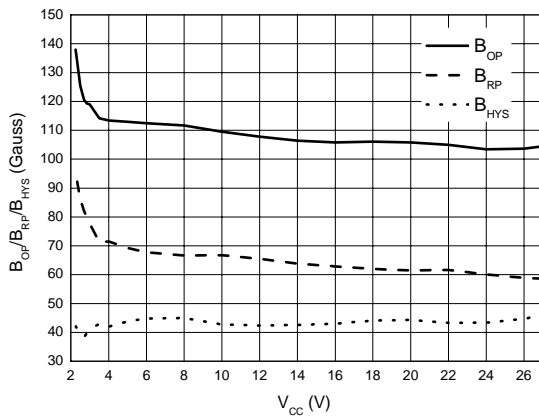


Figure 13. $B_{OP}/B_{RP}/B_{HYS}$ vs. V_{CC}

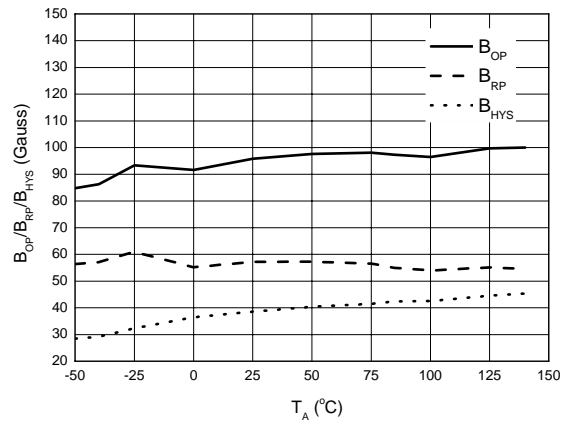


Figure 14. $B_{OP}/B_{RP}/B_{HYS}$ vs. T_A

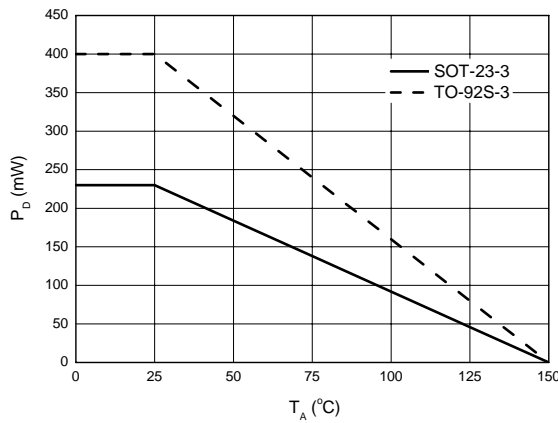


Figure 15. P_D vs. T_A

Typical Application

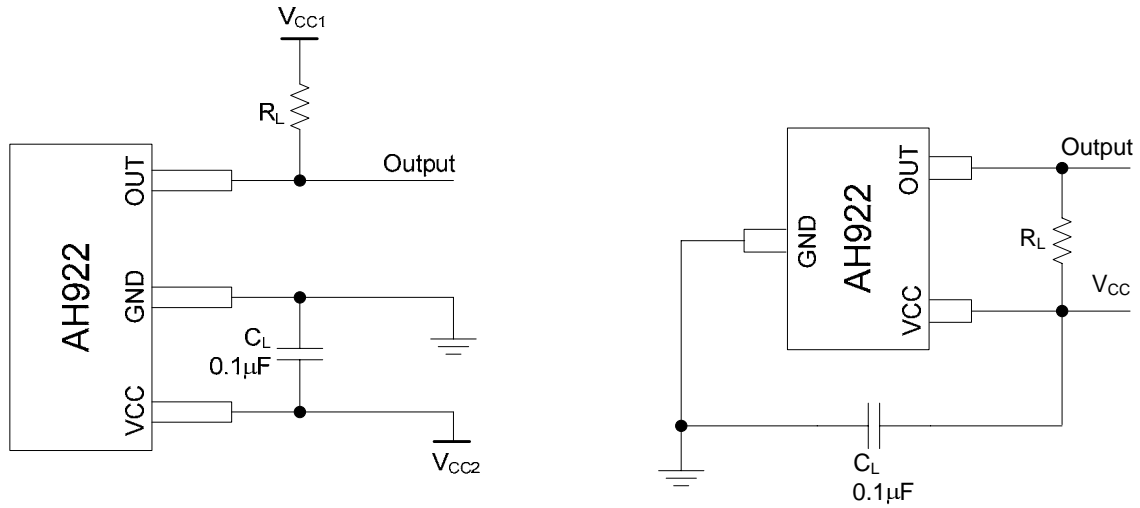


Figure 16. Typical Application Circuit of AH922

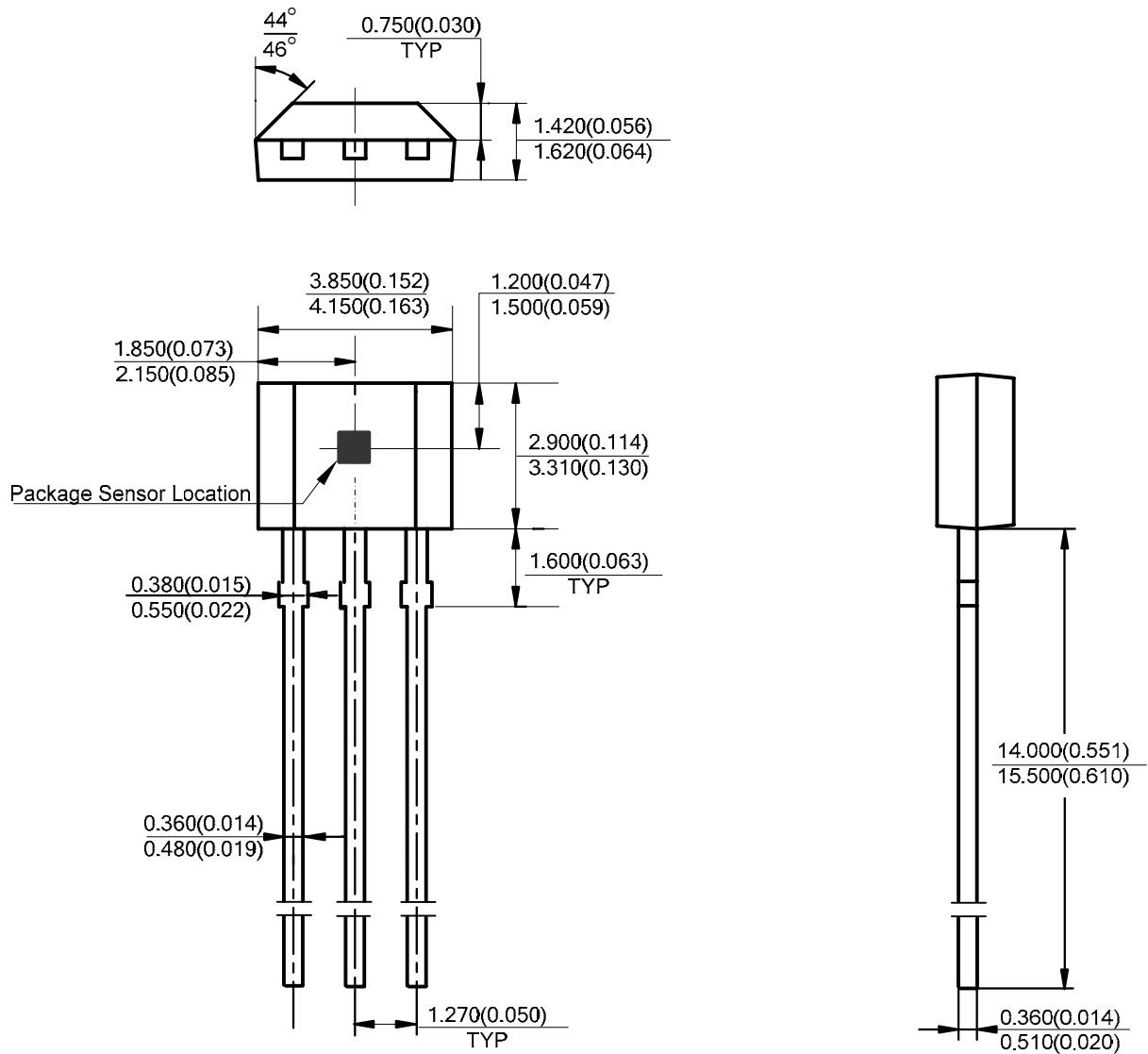
UNIPOLAR HALL-EFFECT SWITCH

AH922

Mechanical Dimensions

TO-92S-3

Unit: mm(inch)



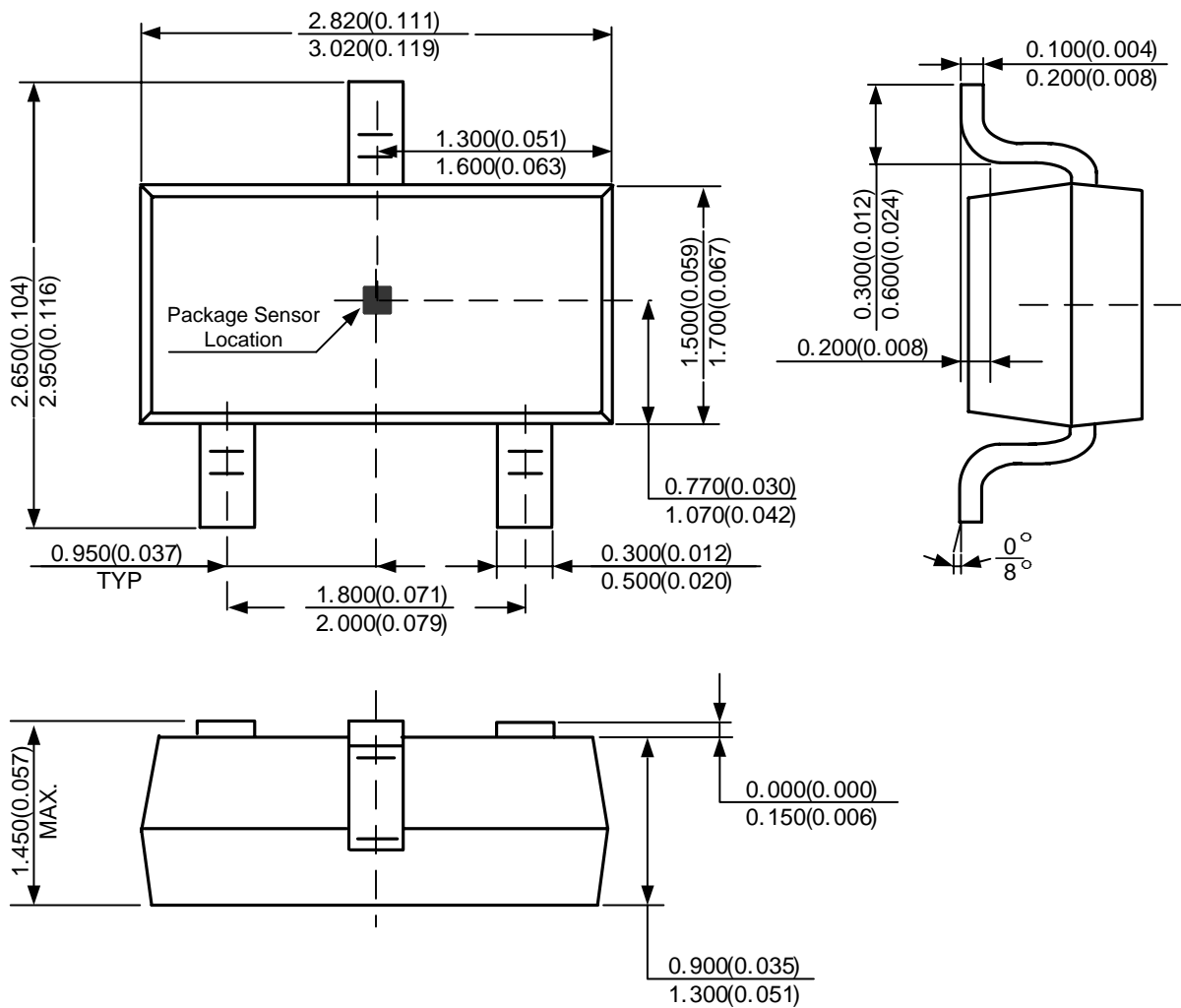
UNIPOLAR HALL-EFFECT SWITCH

AH922

Mechanical Dimensions (Continued)

SOT-23-3

Unit: mm(inch)





BCD Semiconductor Manufacturing Limited

<http://www.bcdsemi.com>

IMPORTANT NOTICE

BCD Semiconductor Manufacturing Limited reserves the right to make changes without further notice to any products or specifications herein. BCD Semiconductor Manufacturing Limited does not assume any responsibility for use of any its products for any particular purpose, nor does BCD Semiconductor Manufacturing Limited assume any liability arising out of the application or use of any its products or circuits. BCD Semiconductor Manufacturing Limited does not convey any license under its patent rights or other rights nor the rights of others.

MAIN SITE

- Headquarters

BCD Semiconductor Manufacturing Limited

No. 1600, Zi Xing Road, Shanghai Zizhu Science-based Industrial Park, 200241, China
Tel: +86-21-24162266, Fax: +86-21-24162277

- Wafer Fab

Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd.

800 Yi Shan Road, Shanghai 200233, China
Tel: +86-21-6485 1491, Fax: +86-21-5450 0008

REGIONAL SALES OFFICE

Shenzhen Office

Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd., Shenzhen Office

Unit A Room 1203, Skyworth Bldg., Gaoxin Ave. 1.S., Nanshan District, Shenzhen, China
Tel: +86-755-8826 7951
Fax: +86-755-8826 7865

Taiwan Office

BCD Semiconductor (Taiwan) Company Limited

4F, 298-1, Rui Guang Road, Nei-Hu District, Taipei, Taiwan
Tel: +886-2-2656 2808
Fax: +886-2-2656 2806

USA Office

BCD Semiconductor Corp.

30920 Huntwood Ave. Hayward, CA 94544, USA
Tel : +1-510-324-2988
Fax: +1-510-324-2788