

**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

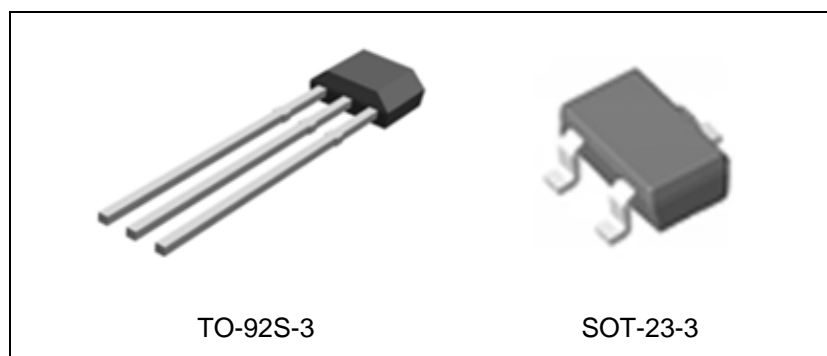


Figure 1. Package Types of AH922

**UNIPOLAR HALL-EFFECT SWITCH**

**AH922**

**Pin Configuration**

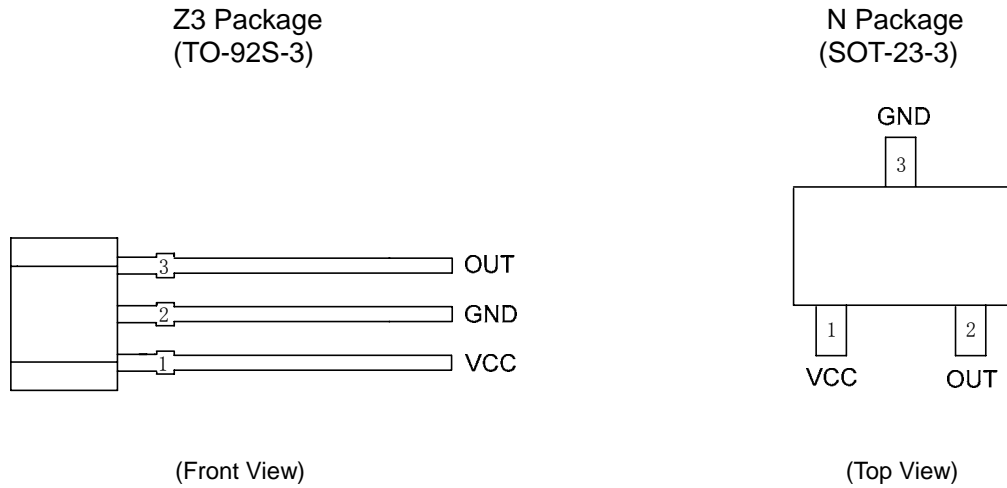


Figure 2. Pin Configuration of AH922

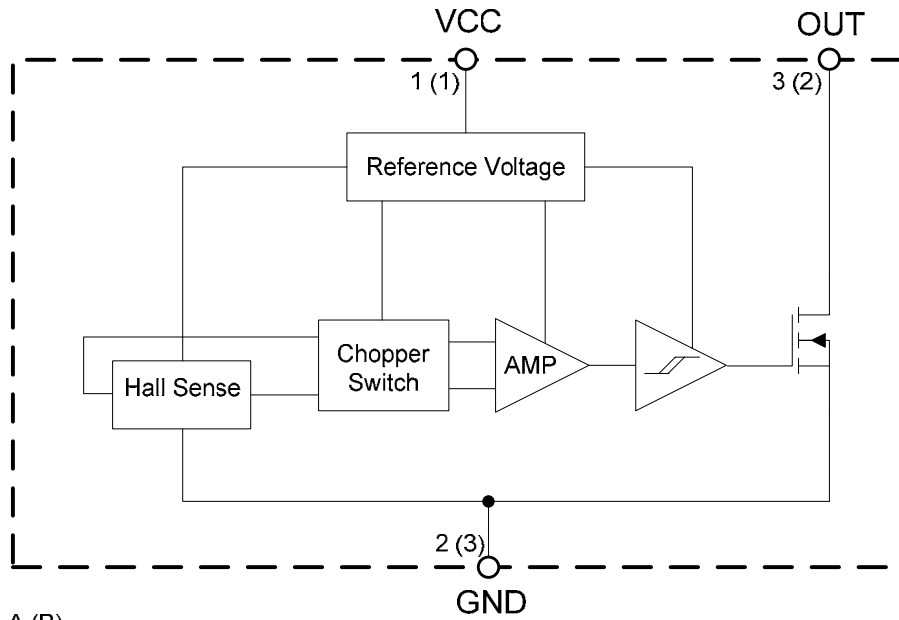
**Pin Description**

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**

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**Functional Block Diagram**



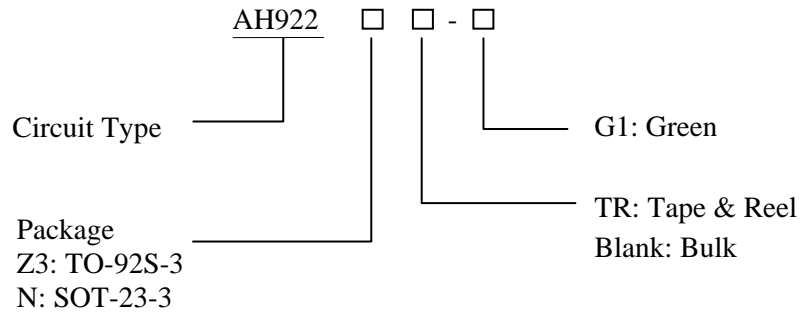
A (B)  
A for TO-92S-3  
B for SOT-23-3

Figure 3. Functional Block Diagram of AH922

**UNIPOLAR HALL-EFFECT SWITCH**

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**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

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**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	$\mu A$
Output Rising Time	$t_{RISING}$	$R_L=1k\Omega$ , $C_L=20pF$		0.4	2	$\mu s$
Output Falling Time	$t_{FALLING}$	$R_L=1k\Omega$ , $C_L=20pF$		0.4	2	$\mu s$

**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

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**Magnetic Characteristics (Continued)**

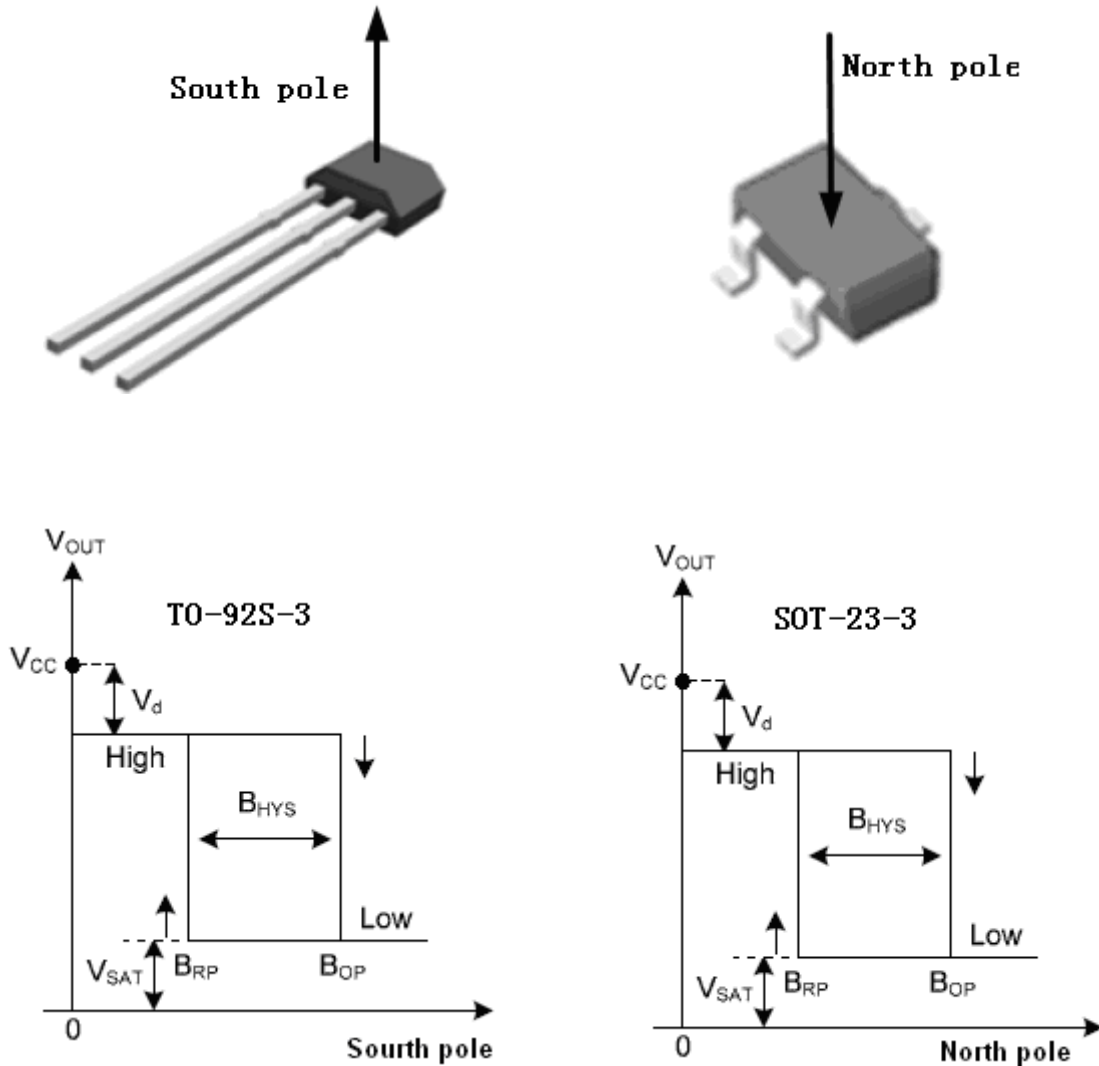


Figure 4. Magnetic Flux Density of AH922

**Test Circuit and Test Conditions**

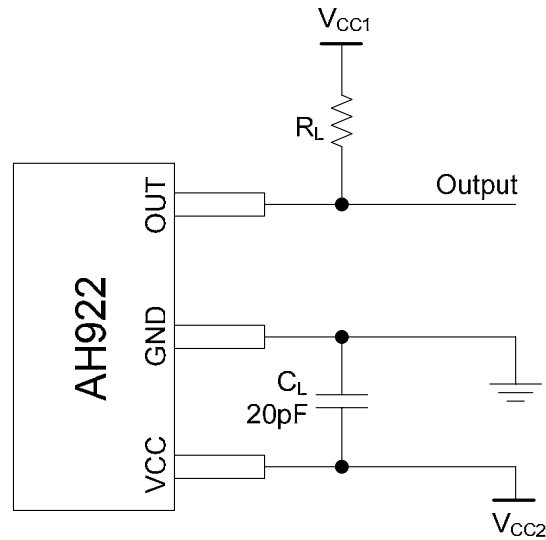


Figure 5. Test Circuit of AH922

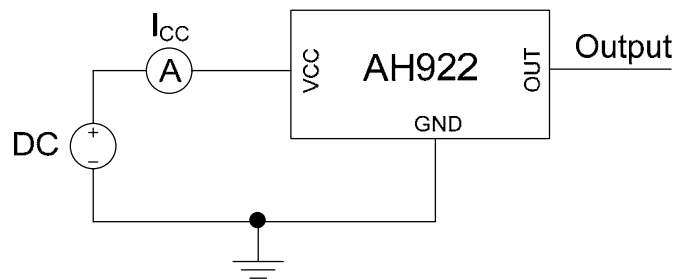


Figure 6. Test Condition of AH922 (Supply Current)

Note 2: The output is open during measurement.

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



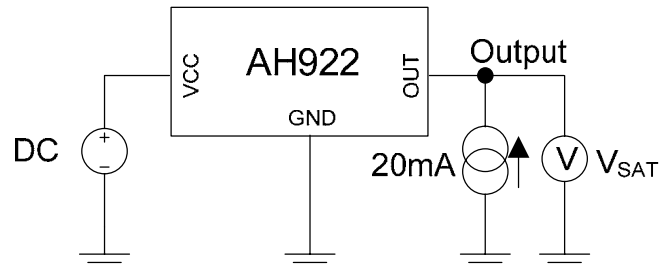
**UNIPOLAR HALL-EFFECT SWITCH**
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**Test Circuit and Test Conditions (Continued)**


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

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

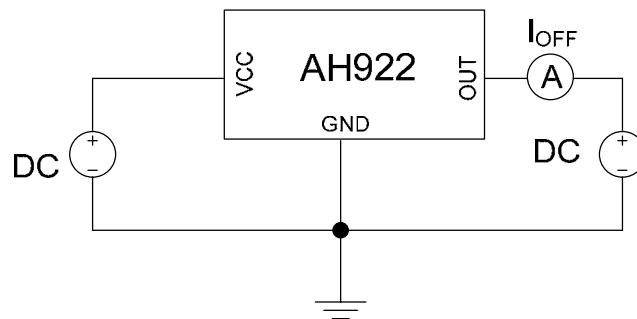
 Note 5: The device is put under the magnetic field:  $B > B_{OP}$ .


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**

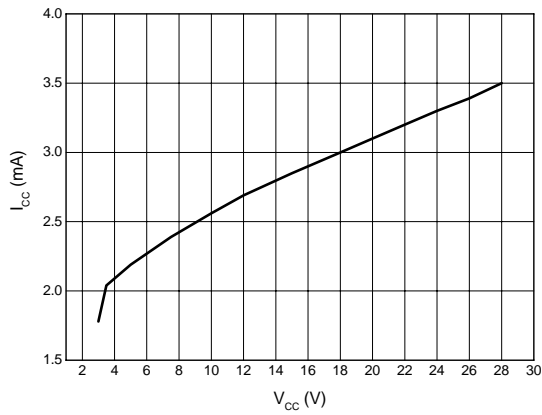


Figure 9.  $I_{CC}$  vs.  $V_{CC}$

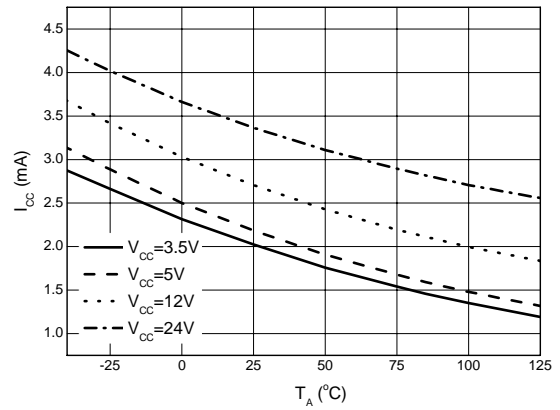


Figure 10.  $I_{CC}$  vs.  $T_A$

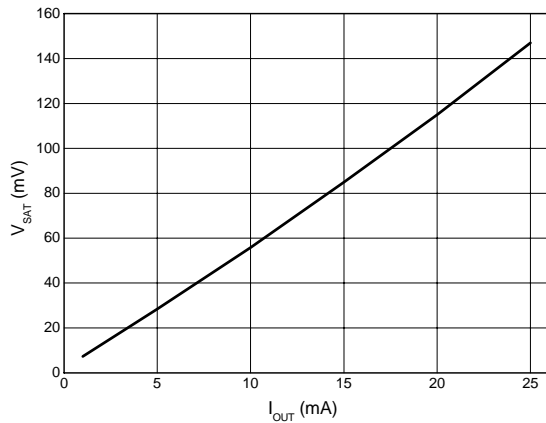


Figure 11.  $V_{SAT}$  vs.  $I_{OUT}$

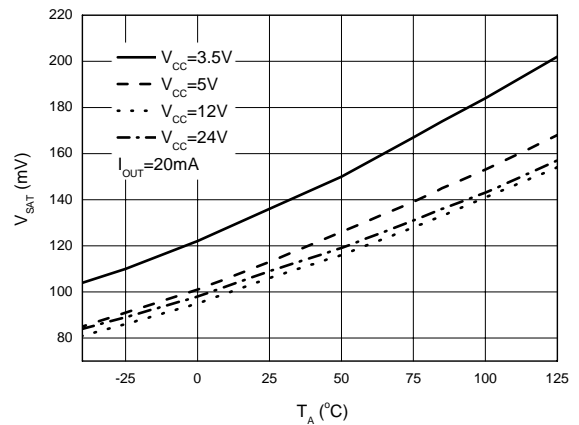


Figure 12.  $V_{SAT}$  vs.  $T_A$

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**Typical Performance Characteristics (Continued)**

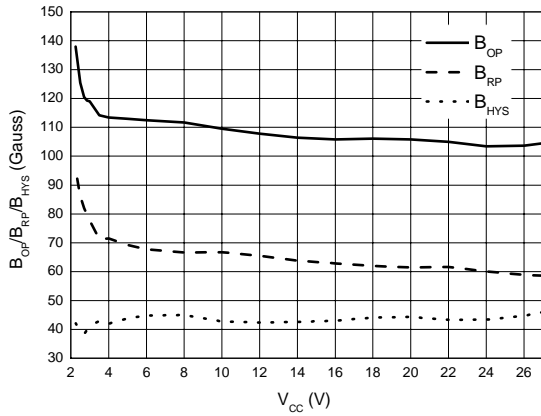


Figure 13. B<sub>OP</sub>/ B<sub>RP</sub>/ B<sub>HYS</sub> vs. V<sub>CC</sub>

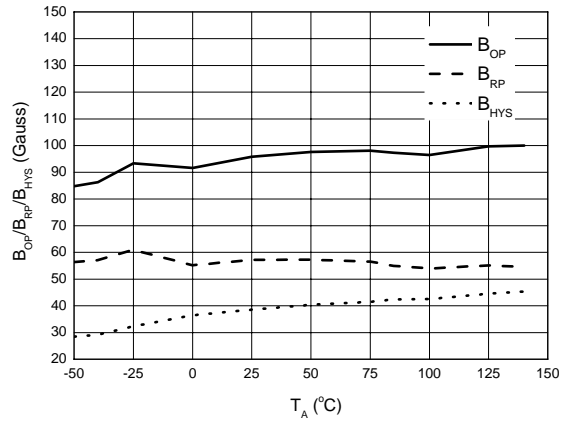


Figure 14. B<sub>OP</sub>/ B<sub>RP</sub>/ B<sub>HYS</sub> vs. T<sub>A</sub>

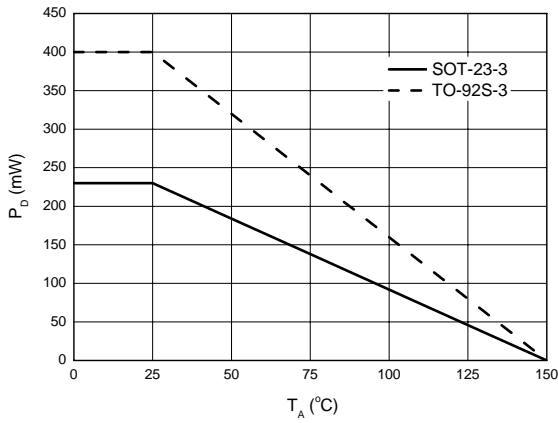


Figure 15. P<sub>D</sub> vs. T<sub>A</sub>

**UNIPOLAR HALL-EFFECT SWITCH**

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**Typical Application**

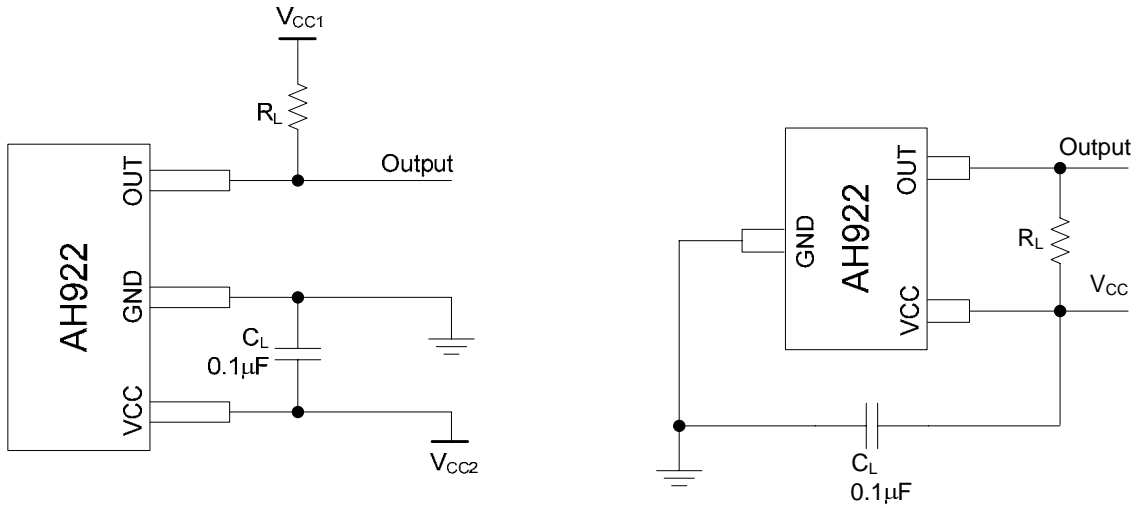


Figure 16. Typical Application Circuit of AH922

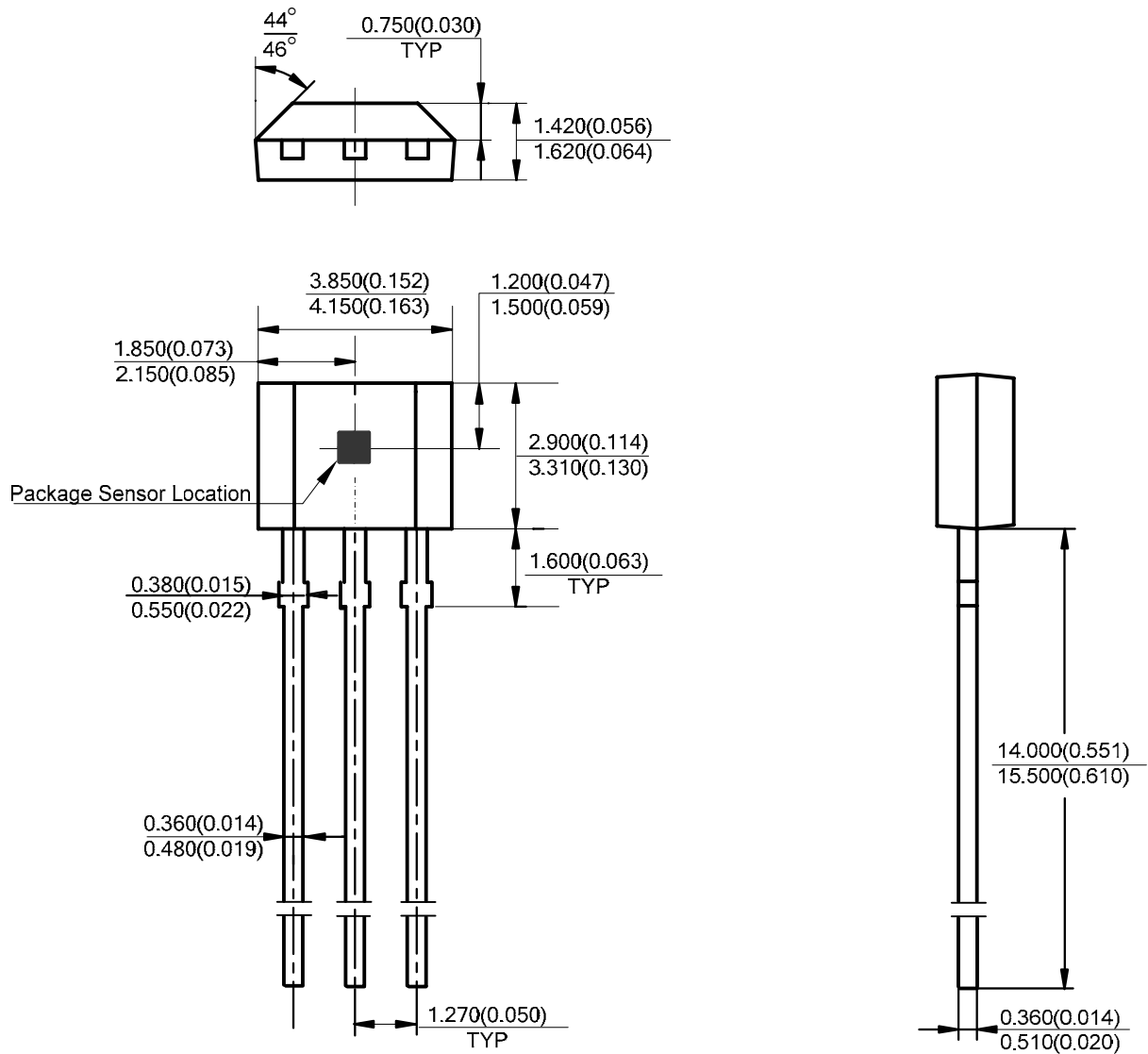
**UNIPOLAR HALL-EFFECT SWITCH**

**AH922**

**Mechanical Dimensions**

**TO-92S-3**

**Unit: mm(inch)**



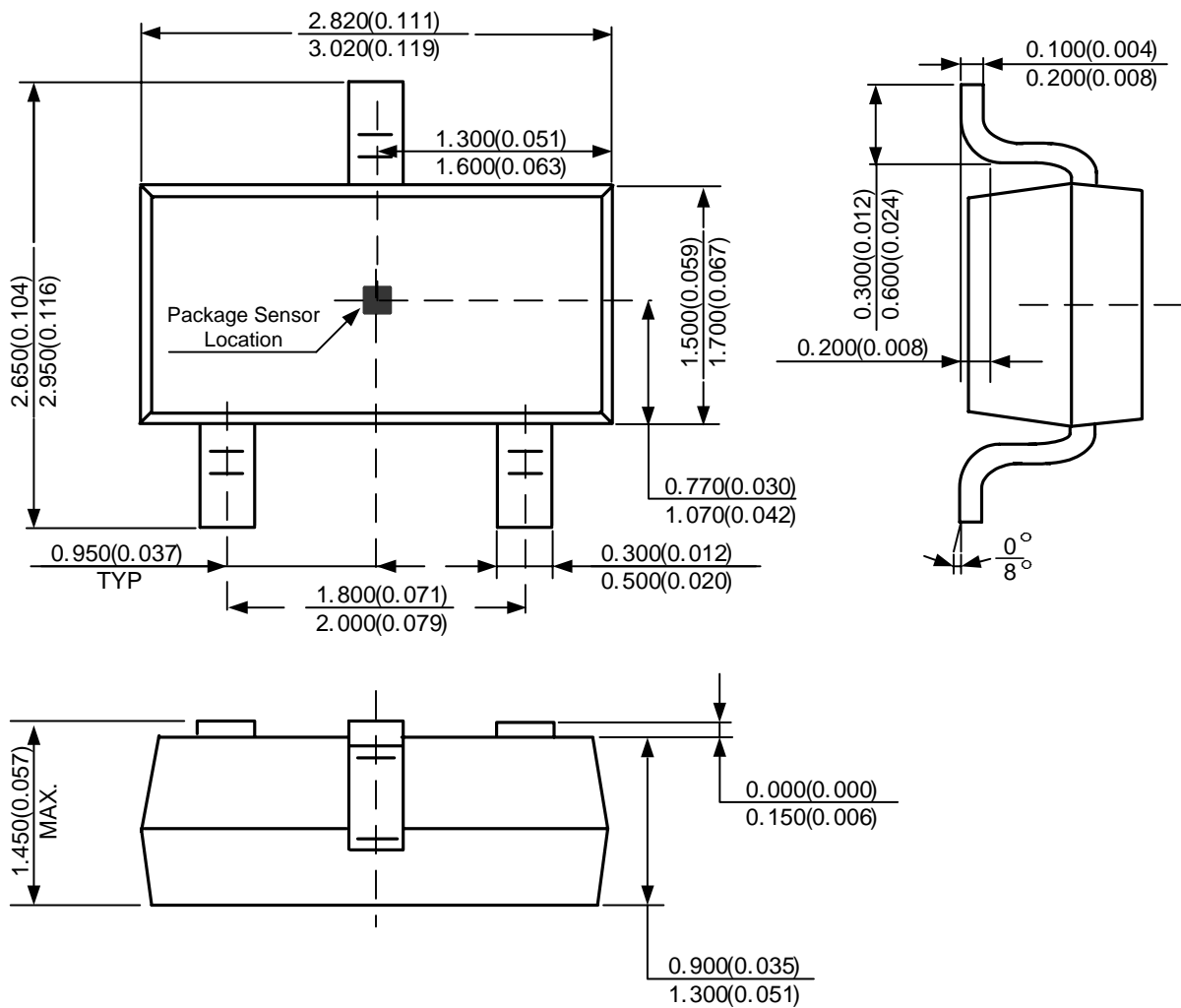
**UNIPOLAR HALL-EFFECT SWITCH**

**AH922**

**Mechanical Dimensions (Continued)**

**SOT-23-3**

**Unit: mm(inch)**





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