

## 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.

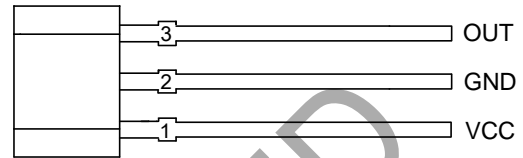
The AH922 is available in TO-92S-3 and SOT-23-3 packages.

## 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
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

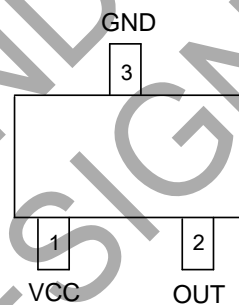
## Pin Assignments

(Front View)



TO-92S-3

(Top View)



SOT-23-3

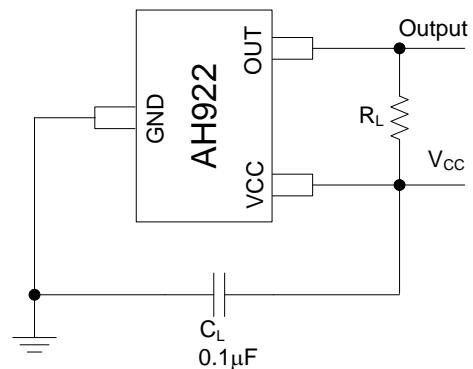
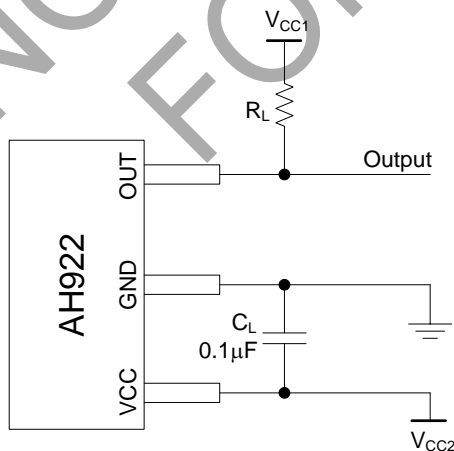
## Applications

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

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

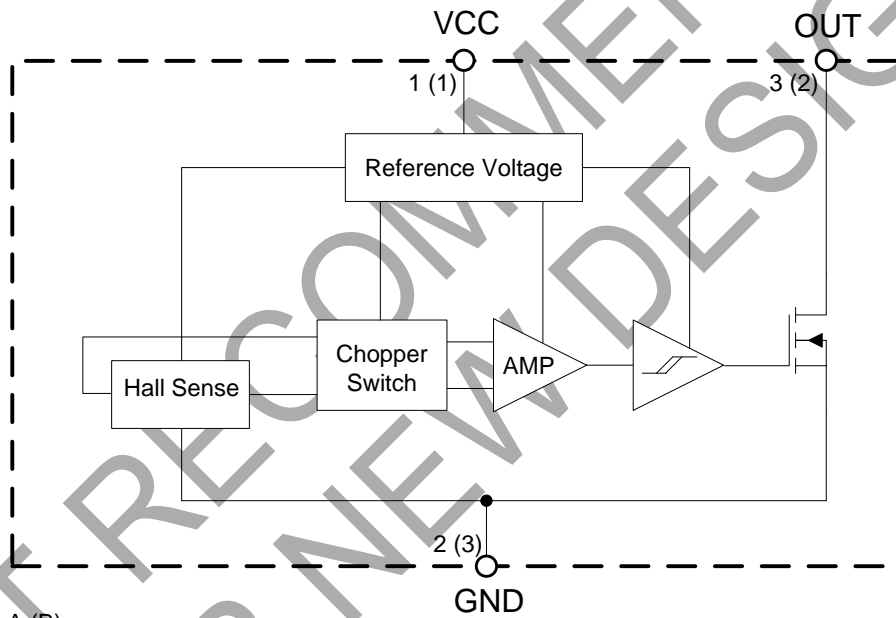
## Typical Applications Circuit



**Pin Descriptions**

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

**Functional Block Diagram**



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

### Absolute Maximum Ratings (Note 4)

Symbol	Parameter	Rating	Unit
V <sub>CC</sub>	Supply Voltage	24	V
I <sub>OUT</sub>	Output Current (Continuous)	25	mA
P <sub>D</sub>	Power Dissipation	TO-92S-3	400
		SOT-23-3	230
T <sub>A</sub>	Operation Temperature	-50 to +150	°C
T <sub>STG</sub>	Storage Temperature	-65 to +150	°C
T <sub>J</sub> (Max)	Maximum Junction Temperature	+165	°C
ESD	ESD (Human Body Model)	4000	V

Note 4: 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

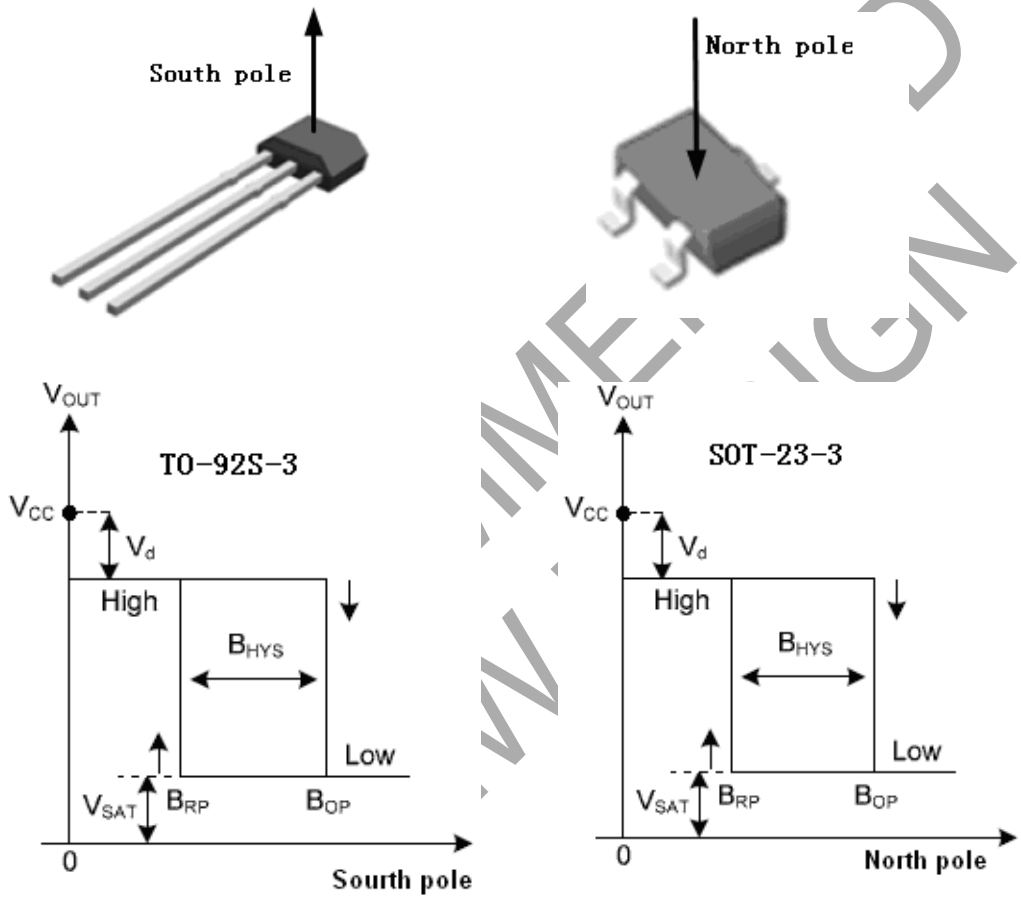
Symbol	Parameter	Min	Max	Unit
V <sub>CC</sub>	Supply Voltage	3.5	22	V
T <sub>A</sub>	Operating Ambient Temperature	-40	+125	°C

### Electrical Characteristics (V<sub>CC</sub>=12V, T<sub>A</sub>=+25°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CC</sub>	Supply Voltage	Operating	3.5	12	22	V
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> =12V, B<B <sub>RP</sub>	—	3	5	mA
		V <sub>CC</sub> =12V, B>B <sub>OP</sub>	—	3	5	mA
V <sub>SAT</sub>	Saturation Voltage	I <sub>OUT</sub> =20mA, B>B <sub>OP</sub>	—	185	500	mV
I <sub>LEAKAGE</sub>	Output Leakage Current	V <sub>OUT</sub> =20V, B<B <sub>RP</sub>	—	0.1	5	µA
t <sub>RISE</sub>	Output Rising Time	R <sub>L</sub> =1kΩ, C <sub>L</sub> =20pF	—	0.4	2	µs
t <sub>FALL</sub>	Output Falling Time	R <sub>L</sub> =1kΩ, C <sub>L</sub> =20pF	—	0.4	2	µs

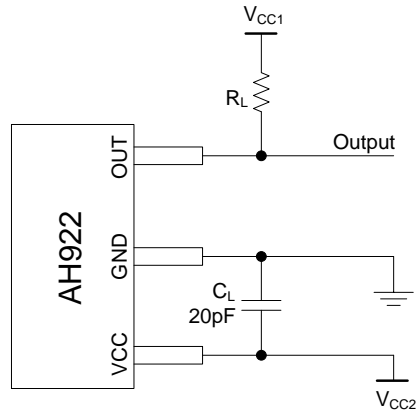
**Magnetic Characteristics** ( $V_{CC}=12V$ ,  $T_A=+25^{\circ}C$ , unless otherwise specified.)

Symbol	Parameter	Min	Typ	Max	Unit
B <sub>OP</sub>	Operating Point	80	110	140	Gauss
B <sub>RP</sub>	Releasing Point	35	65	95	Gauss
B <sub>HYS</sub>	Hysteresis	20	45	70	Gauss

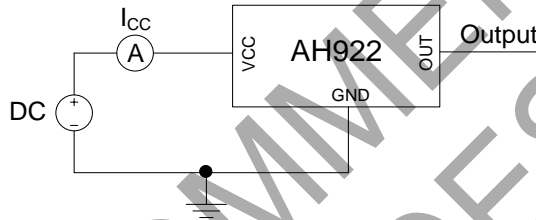


Magnetic Flux Density of AH922

**Test Circuit and Test Conditions**

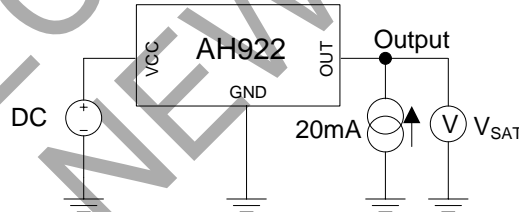


**Test Circuit of AH922**



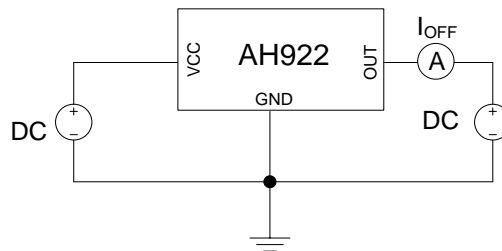
**Test Conditions of AH922 (Supply Current)**

- Notes:
- 5. The output is open during measurement.
  - 6. The device is put under the magnetic field:  $B < B_{RP}$ .



**Test Conditions of AH922 (Output Saturation Voltage)**

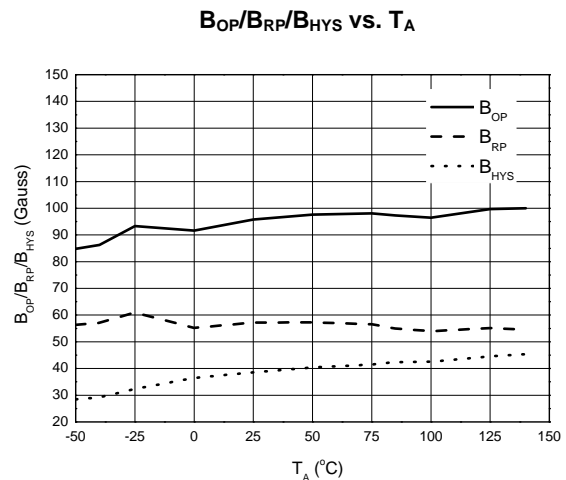
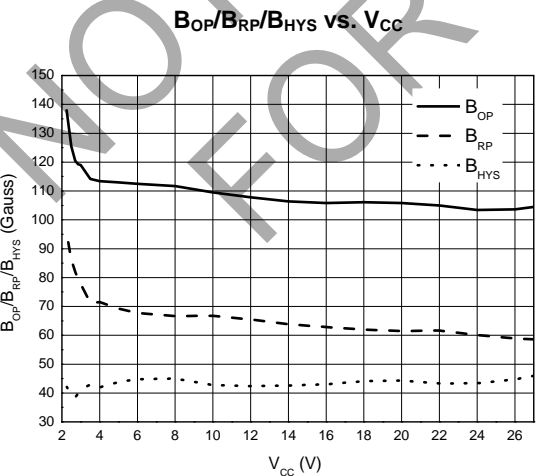
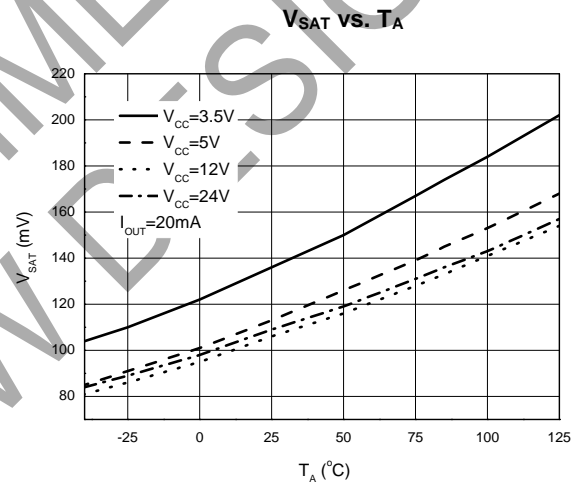
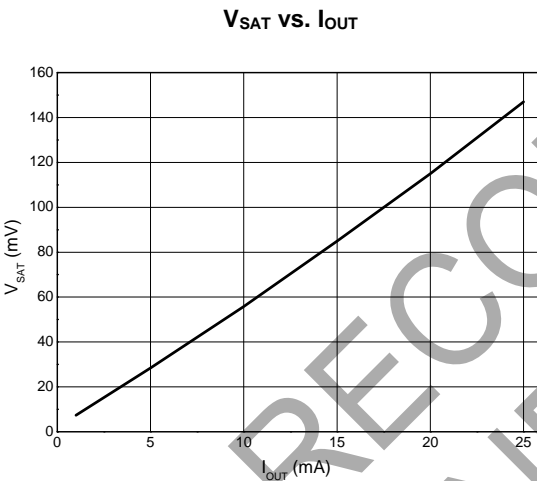
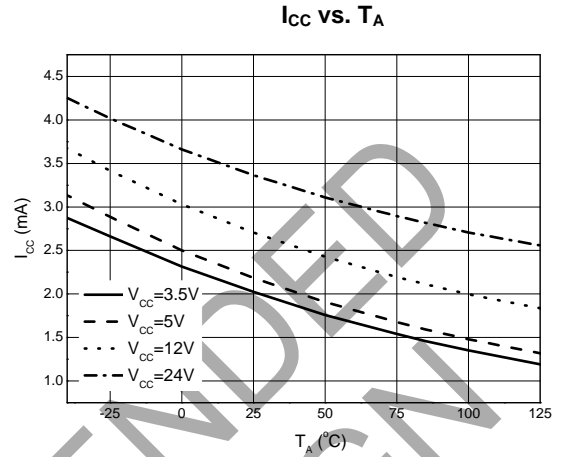
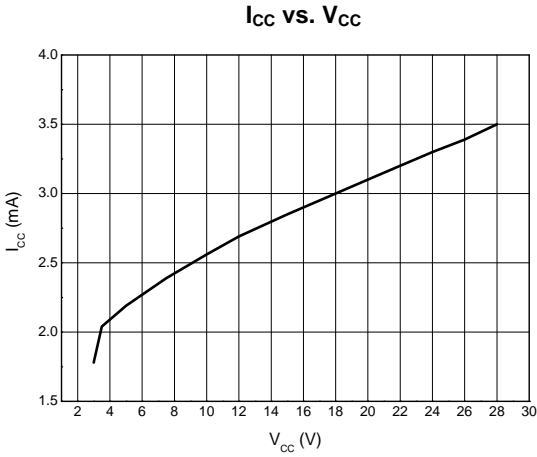
- Notes:
- 7. The output saturation voltage V<sub>SAT</sub> is measured at V<sub>CC</sub>=12V.
  - 8. The device is put under the magnetic field:  $B > B_{OP}$ .



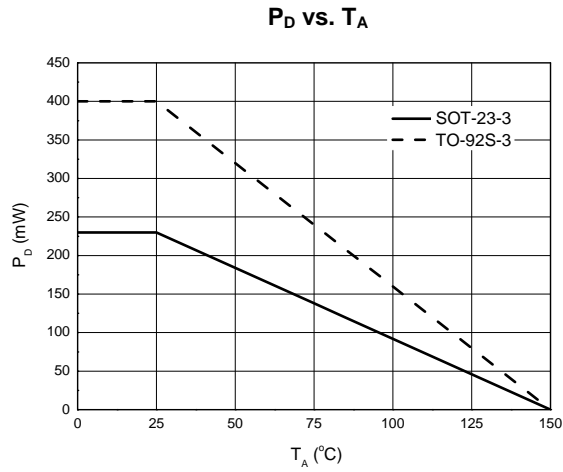
**Test Conditions of AH922 (Output Leakage Current)**

- Notes:
- 9. The device is put under the magnetic field:  $B < B_{RP}$ .
  - 10. V<sub>DC</sub>=12V.

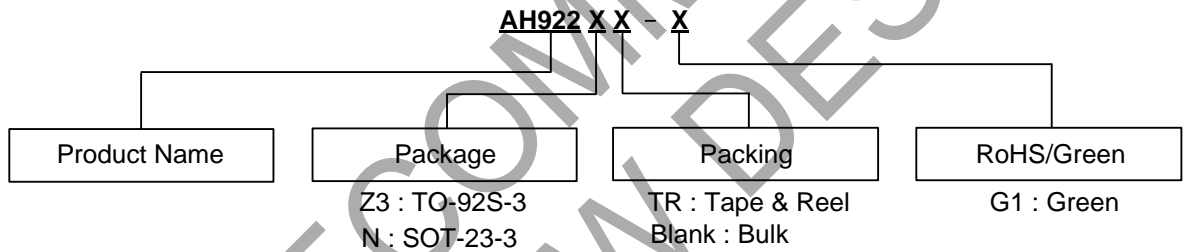
**Performance Characteristics**



**Performance Characteristics (Cont.)**



**Ordering Information**

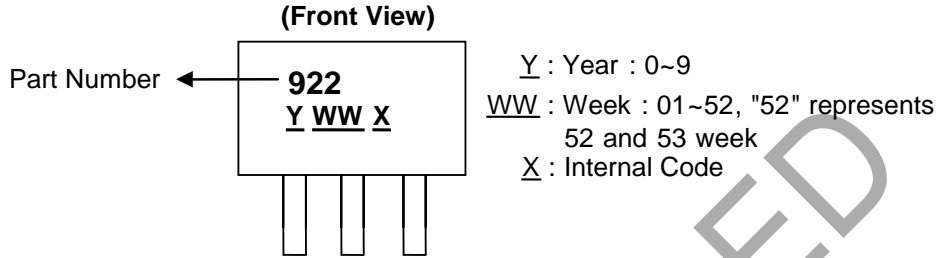


Device	Status(Note 11)	Package Code	Packaging	Bulk	7" Tape and Reel
				Quantity	Quantity
AH922Z3-G1	NRND	Z3	TO-92S-3	1000/Bulk	NA
AH922NTR-G1	NRND	N	SOT-23-3	NA	3000/Tape & Reel

Note 11: NRND = Not Recommended for New Design.

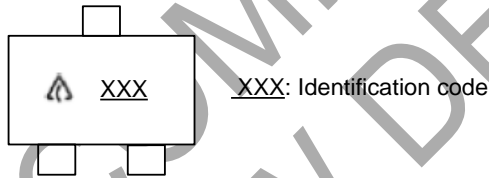
**Marking Information**

(1) Package Type: TO-92S-3



Part Number	Package	Identification Code
AH922	TO-92S-3	922

(2) Package Type: SOT-23-3



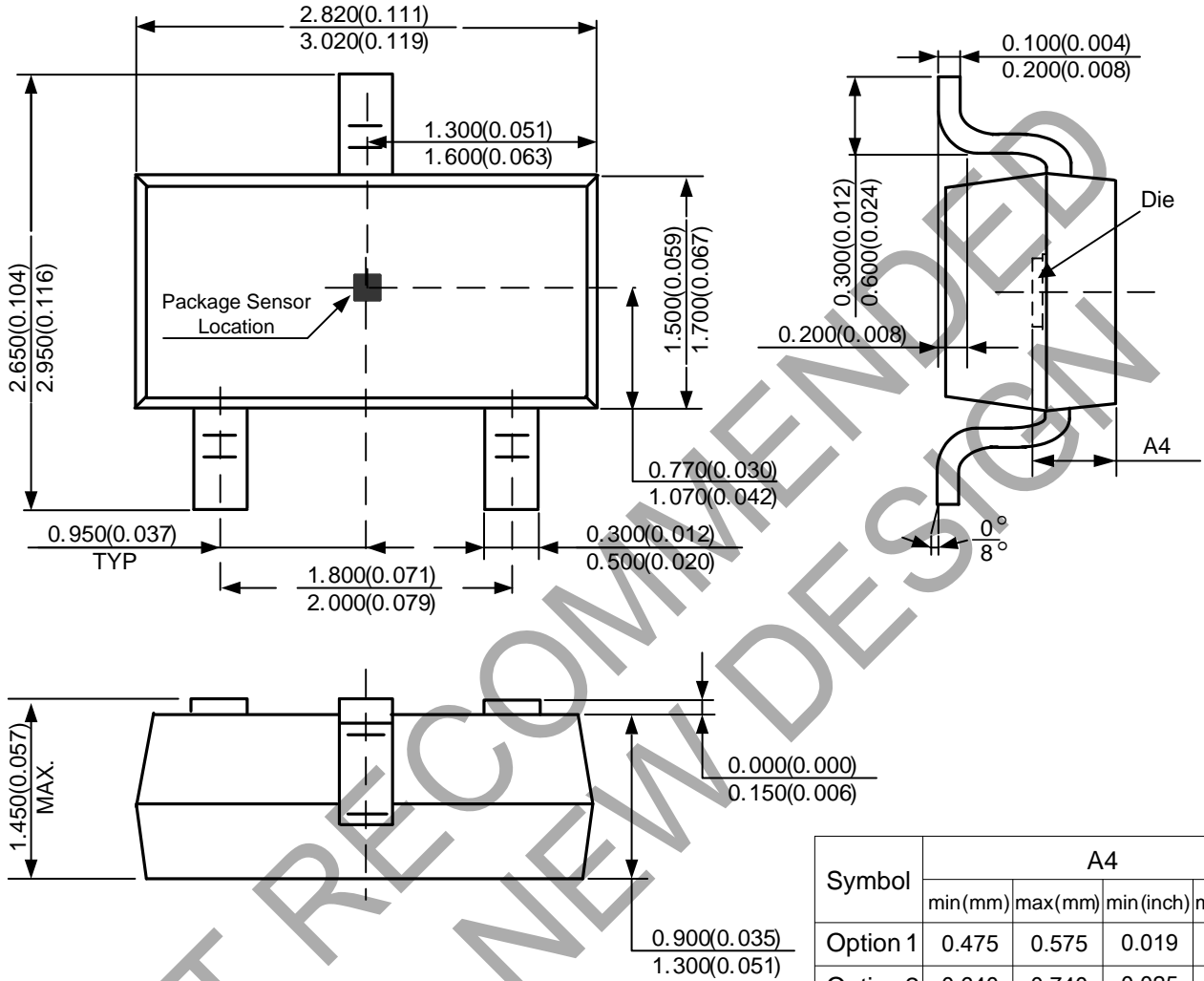
Part Number	Package	Identification Code
AH922	SOT-23-3	GT4

NOT RECOMMENDED FOR NEW DESIGN



**Package Outline Dimensions** (All dimensions in mm(inch).)

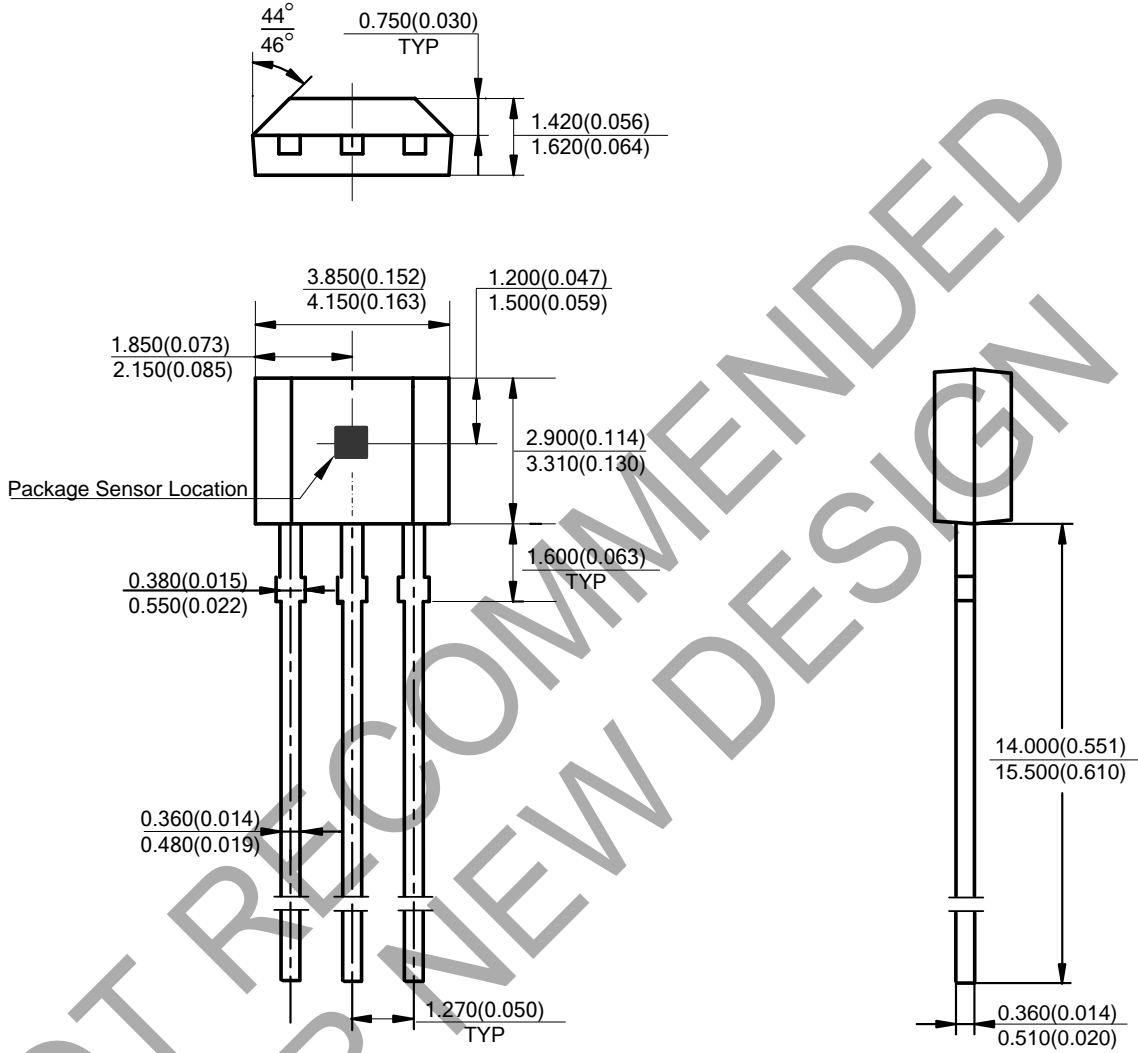
(1) Package Type: SOT-23-3



Symbol	A4			
	min(mm)	max(mm)	min(inch)	max(inch)
Option 1	0.475	0.575	0.019	0.023
Option 2	0.640	0.740	0.025	0.029

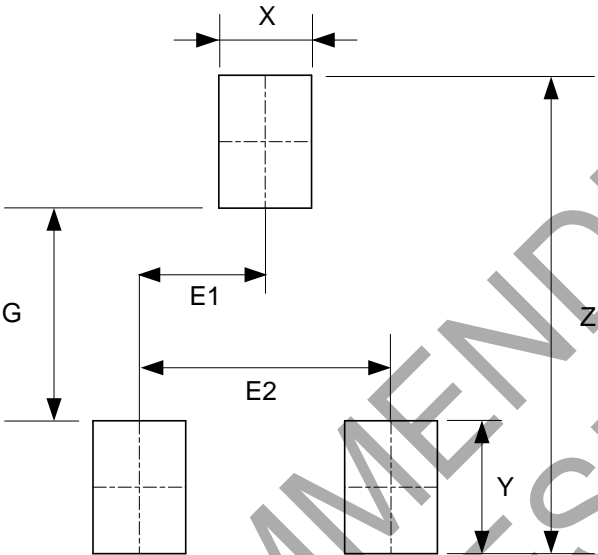
**Package Outline Dimensions** (All dimensions in mm(inch).) (Cont.)

(2) Package Type: TO-92S-3



**Suggested Pad Layout**

(1) Package Type: SOT-23-3



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E1 (mm)/(inch)	E2 (mm)/(inch)
Value	3.600/0.142	1.600/0.063	0.700/0.028	1.000/0.039	0.950/0.037	1.900/0.075

NOT RECOMMENDED FOR NEW DESIGN

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