



# AH173

## INTERNAL PULL-UP HALL EFFECT LATCH FOR HIGH TEMPERATURE

### Features

- Bipolar Hall Effect Latch Sensor
- 3V to 20V DC Operation Voltage
- Built-in Pull-Up Resistor
- 25mA Output Sink Current
- Operating Temperature:  $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
- Lead Free Finish/RoHS Compliant for Lead Free products (Note 1)
- Lead Free Package: SIP-3L, SC59-3L
- Green Package: SC59-3L

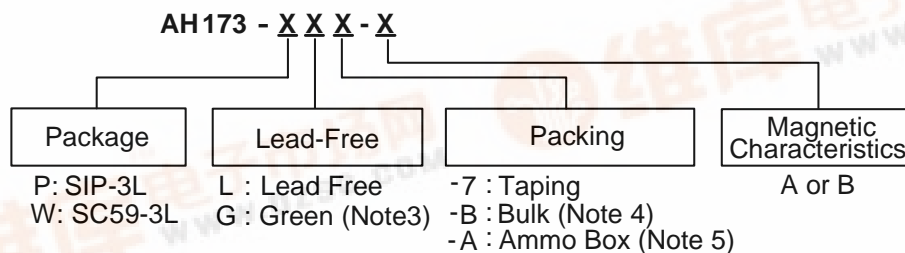
### General Description

AH173 is a single-digital-output Hall-effect sensor with pull-up resistor for high temperature operation. The device includes an on-chip Hall voltage generator for magnetic sensing, an amplifier to amplify Hall voltage, and a comparator to provide switching hysteresis for noise rejection, and an output driver with a pull-up resistor (Rpu). An internal band-gap regulator is used to provide temperature compensated supply voltage for internal circuits and allows a wide operating supply range. While the magnetic flux density (B) is larger than operate point (Bop), the OUT pin turns on (low). If B moves toward release point (Brp), the OUT pin is latched "on" state prior to  $B < \text{Brp}$ . When  $B < \text{Brp}$ , the OUT pin goes into "off" state.

### Applications

- Rotor Position Sensing
- Current Switch
- Encoder
- RPM Detection

### Ordering Information



Note: 1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.

Device	Package Code	Packaging (Note 2)	Tube/Bulk		7" Tape and Reel		Ammo Box	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH173-P	P	SIP3-3L	1000	-B	NA	NA	4000/Box	-A
AH173-W	W	SC59-3L	NA	NA	3000/Tape & Reel	-7	NA	NA

Note: 2. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

3. Green is only available for SC59-3L

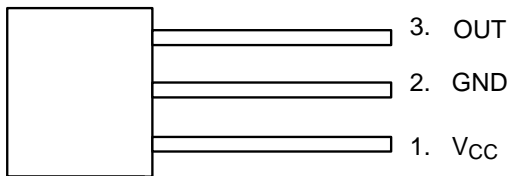
4. Bulk is for SIP-3 Straight Lead.

5. Ammo Box is for SIP-3 Spread Lead.

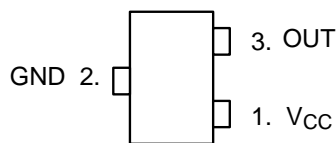


### Pin Assignment

(Top View)



(SIP-3L package)

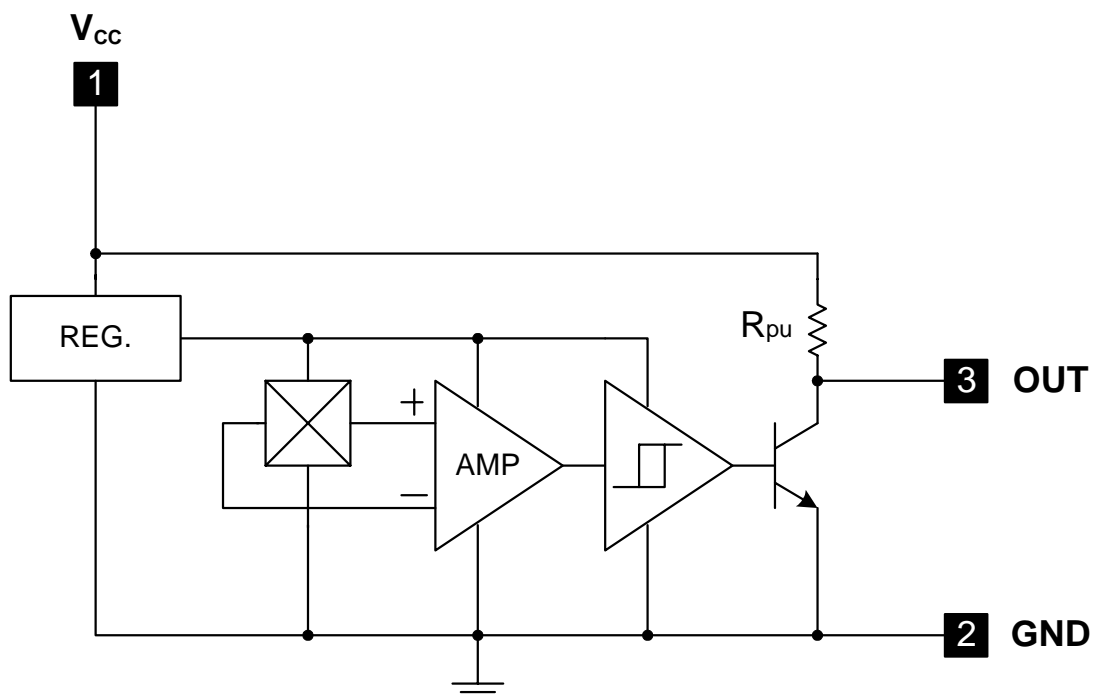


(SC59-3L Package)

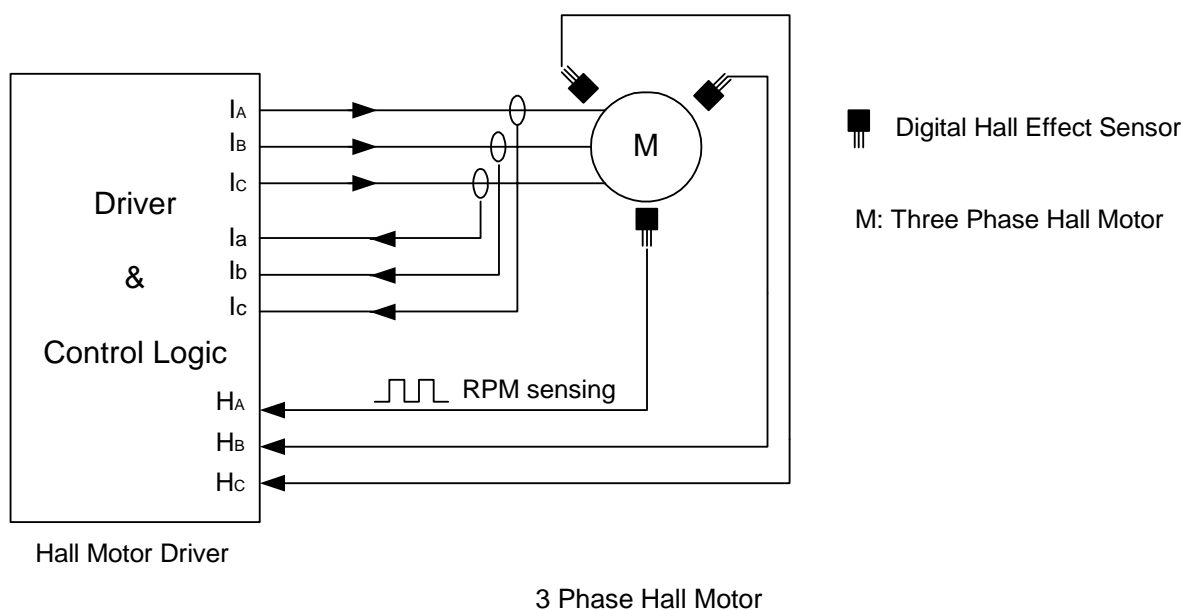
### Pin Description

Name	Description
V <sub>CC</sub>	Positive Power Supply
GND	Ground
OUT	Output Stage

### Block Diagram



### Functional Application Circuit



### Absolute Maximum Ratings (T<sub>A</sub> = 25°C)

Characteristics	Symbol	Values	Unit
Supply Voltage	V <sub>CC</sub>	20	V
Output "Off" Voltage	V <sub>out</sub> (off)	20	V
Output "On" Current	I <sub>o</sub> (sink)	25	mA
Operating Temperature Range	Top	-40~+125	°C
Storage Temperature Range	Tstg	-65~+150	°C
Maximum Junction Temperature	T <sub>j</sub>	+150	°C
Power Dissipation	SIP-3L	550	mW
	SC59-3L	230	mW

### Electrical Characteristics (T<sub>A</sub> = 25°C)

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	V <sub>CC</sub>		3	-	20	V
Output Saturation Voltage	V <sub>out</sub> (sat)	V <sub>CC</sub> = 12V, OUT "ON" I <sub>o</sub> = 10mA	-	300	400	mV
Supply Current	I <sub>CC</sub>	V <sub>CC</sub> = 12V, OUT "OFF"	-	3.5	6	mA
Internal Pull-up Resistor	R <sub>pu</sub>		7	10	13	KΩ
Dropout Voltage	V <sub>d</sub>	V <sub>d</sub> = V <sub>CC</sub> - V <sub>CE</sub>	-	-	0.3	V

## Functional Application Circuit

(1mT = 10 Gauss)

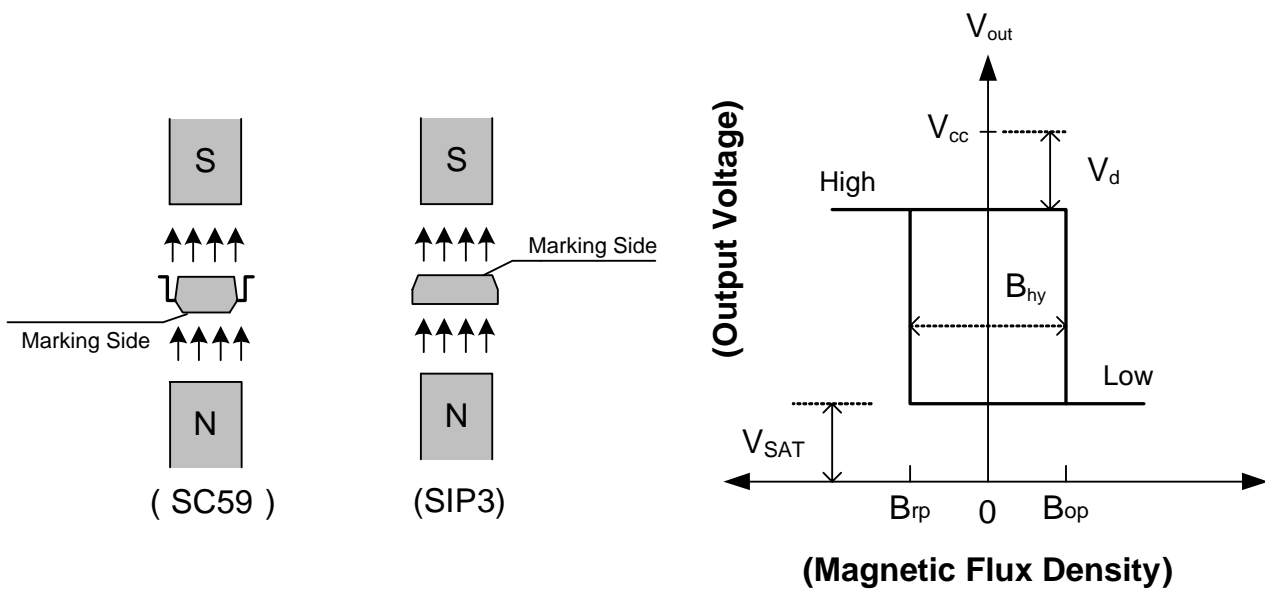
### A grade

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Operation Point	Bop	15	-	60	Gauss
Release Point	Brp	-60	-	-15	Gauss
Hysteresis	Bhy	-	80	-	Gauss

### B grade

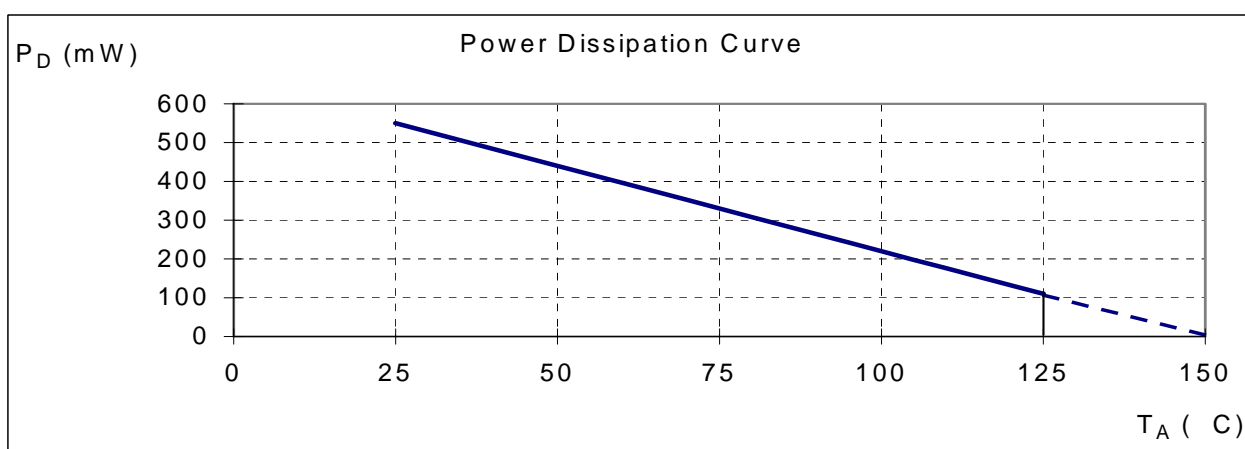
Characteristics	Symbol	Min.	Typ.	Max.	Unit
Operation Point	Bop	5	-	80	Gauss
Release Point	Brp	-80	-	-5	Gauss
Hysteresis	Bhy	-	80	-	Gauss

## Operating Characteristics

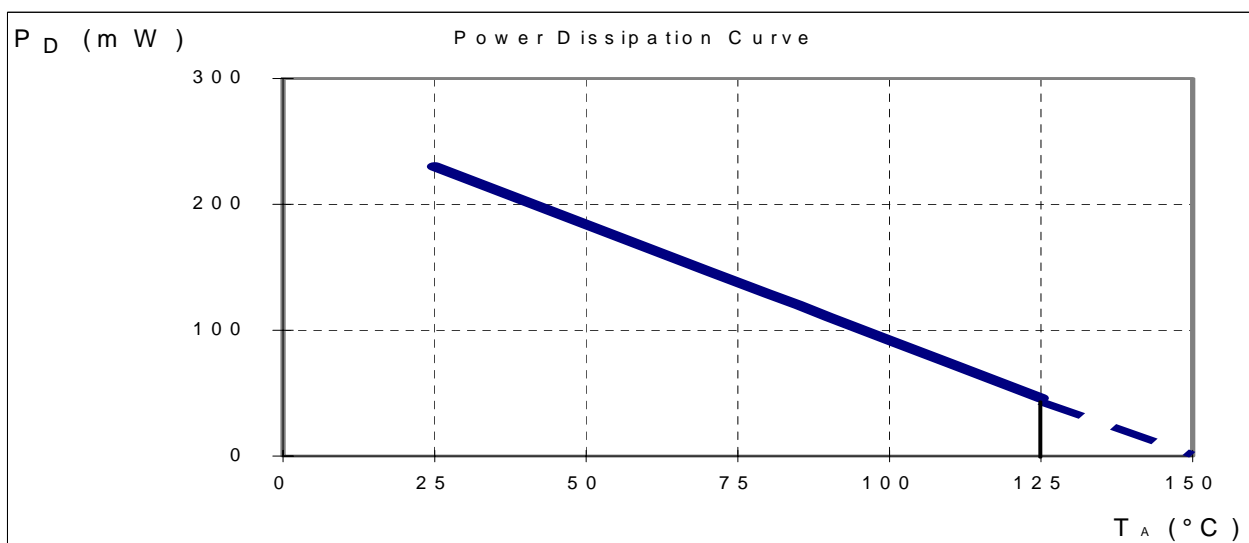


**Performance Characteristics (SIP-3L)**

T <sub>A</sub> (°C)	25	50	60	70	80	85	90	95	100
P <sub>D</sub> (mW)	550	440	396	352	308	286	264	242	220
T <sub>A</sub> (°C)	105	110	115	120	125	130	135	140	150
P <sub>D</sub> (mW)	198	176	154	132	110	88	66	44	0


**Performance Characteristics (SC59-3L)**

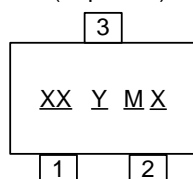
T <sub>A</sub> (°C)	25	50	60	70	80	85	90	100	110	120	125	130	140	150
P <sub>D</sub> (mW)	230	184	166	147	129	120	110	92	74	55	46	37	18	0



### Marking Information

#### (1) SC59-3L

(Top View)



XX : J3: AH173

Y : Year 0~9

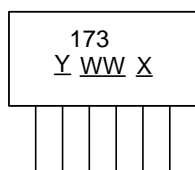
M : Month A~L

X : Internal code a~z: Lead Free  
A~Z: Green

Part Number	Package	Identification Code
AH173	SC59-3L	J3

#### (2) SIP-3L

(Top View)



Y : Year: "1"=2001

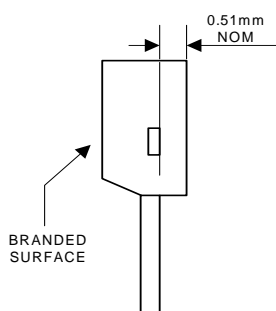
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WW : Nth Week 01~52

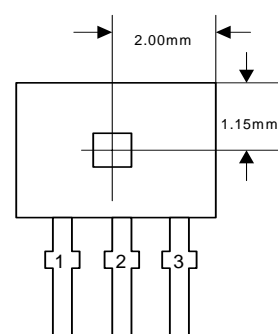
X : Internal code  
a~z: Lead Free

### Package Information

#### (1) Package Type: SIP-3L for Bulk pack



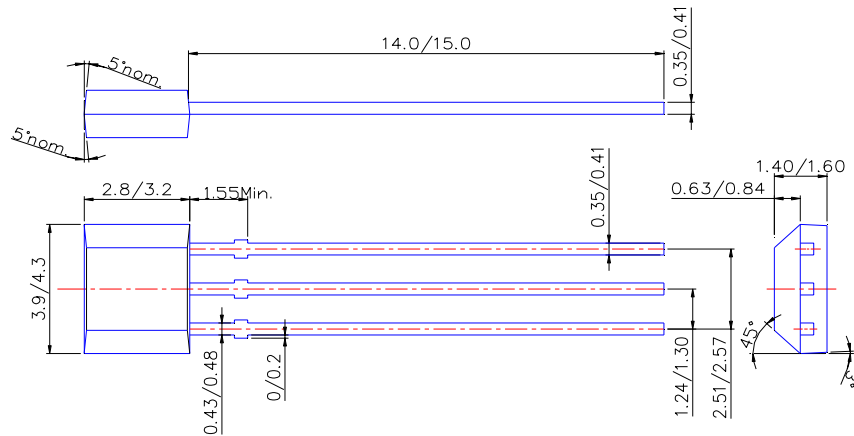
Active Area Depth



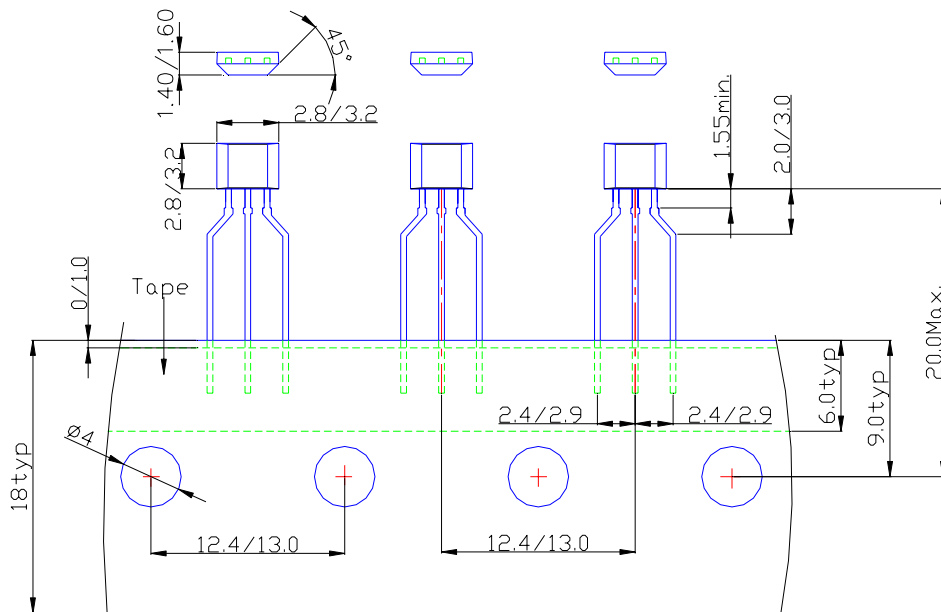
Sensor Location

## Package Information (Continued)

### Package Dimension

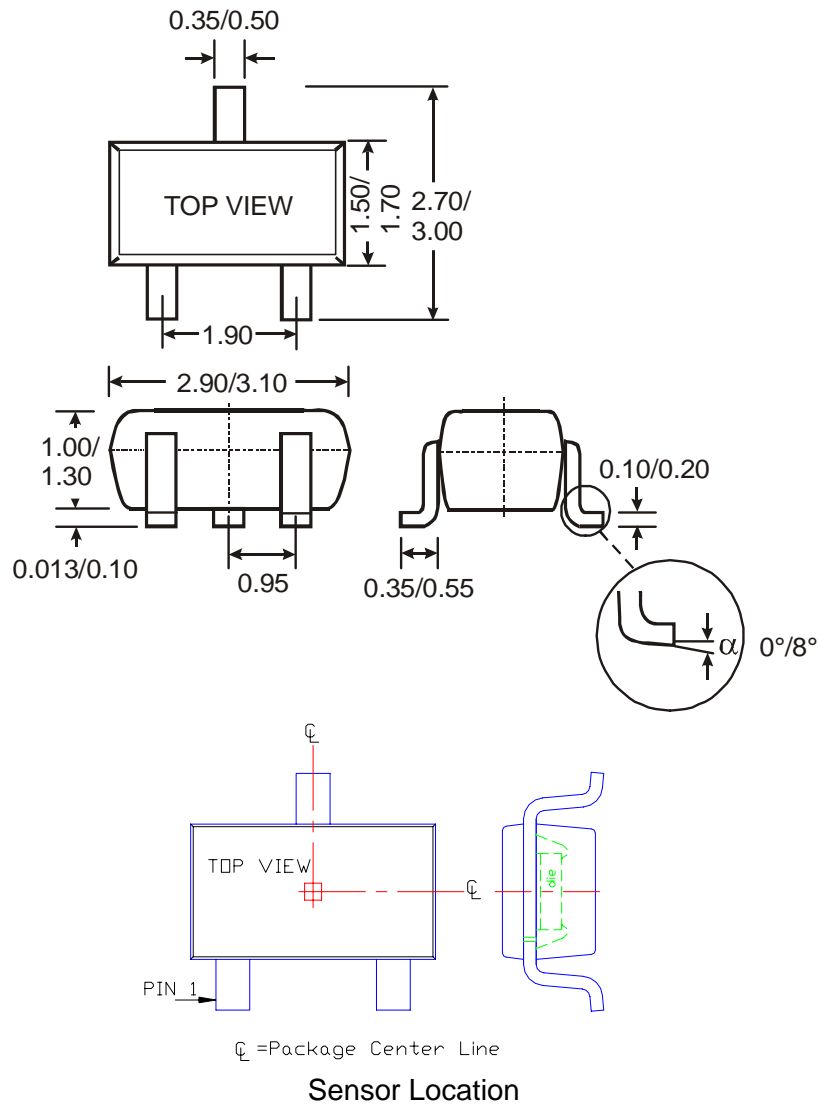


### (2) Package Type: SIP-3L for Ammo pack



**Package Information (Continued)**

**(3) Package Type: SC59-3L**





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