

### Features

- Bipolar Hall Effect Latch Sensor
- 3.5V to 20V DC Operation Voltage
- Open Collector Pre-Driver
- 25mA Output Sink Current
- Chip Power Reverse-Connection Protection
- Operating Temperature: -40°C to +150°C
- Lead Free Packages: SIP-3L and SC59-3L (Commonly known as SOT23 in Asia) (Note 1)
- SC59-3L: Available in "Green" Molding Compound (No Br, Sb)
- Lead Free Finish/RoHS Compliant (Note 2)

### General Description

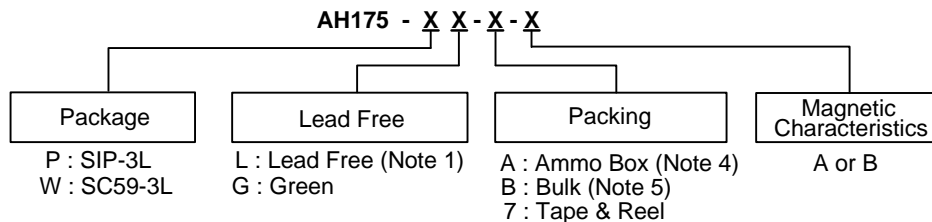
AH175 is a single-digital-output Hall-effect sensor for high temperature operation. The device includes an on-chip Hall voltage generator for magnetic sensing, an amplifier to amplify Hall voltage, and a comparator to provide switching hysteresis for noise rejection, and an open-collector output pre-driver. 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 threshold Bop, the OUT pin turns on (low). If B removed toward Brp, the OUT pin is latched "on" state prior to B < Brp. When B < Brp, the OUT pin goes into "off" state.

### Applications

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

### Ordering Information



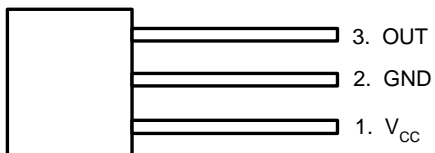
Device	Package Code	Packaging (Note 3)	Tube/Bulk		7" Tape and Reel		Ammo Box		Magnetic Characteristics
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix	
AH175-PL-A-A	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	A
AH175-PL-A-B	P	SIP-3L	NA	NA	NA	NA	4000/Box	-A	B
AH175-PL-B-A	P	SIP-3L	1000	-B	NA	NA	NA	NA	A
AH175-PL-B-B	P	SIP-3L	1000	-B	NA	NA	NA	NA	B
AH175-WL-7-A	W	SC59-3L	NA	NA	3000/Tape & Reel	-7	NA	NA	A
AH175-WL-7-B	W	SC59-3L	NA	NA	3000/Tape & Reel	-7	NA	NA	B
AH175-WG-7-A	W	SC59-3L	NA	NA	3000/Tape & Reel	-7	NA	NA	A
AH175-WG-7-B	W	SC59-3L	NA	NA	3000/Tape & Reel	-7	NA	NA	B

- Notes:
1. SIP-3L is available in "Lead Free" product only.
  2. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at [http://www.diodes.com/products/lead\\_free.html](http://www.diodes.com/products/lead_free.html).
  3. 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>.
  4. Ammo Box is for SIP-3L Spread Lead.
  5. Bulk is for SIP-3L Straight Lead.

**Pin Assignment**

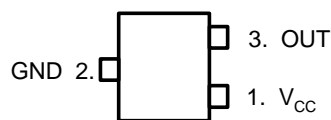
(1) SIP-3L

(Top view)



(2) SC59-3L (Commonly known as SOT23 in Asia)

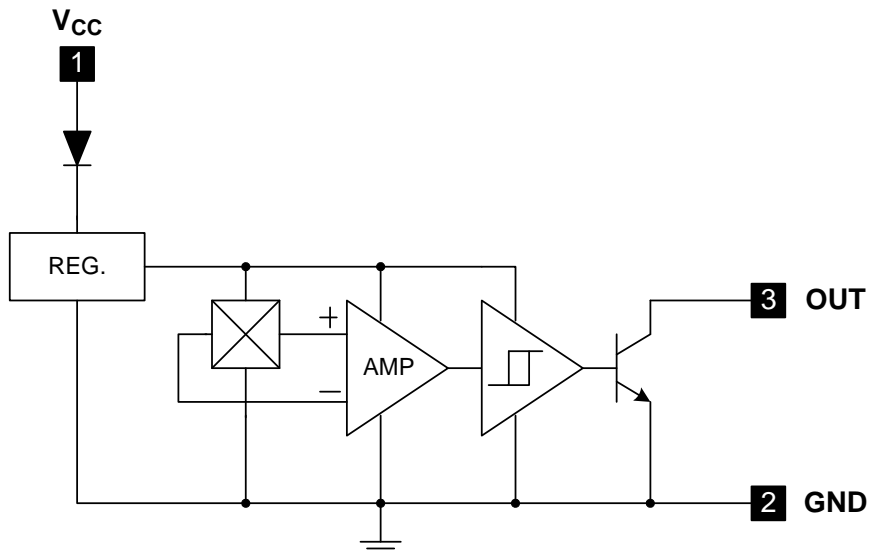
(Top view)



**Pin Description**

Pin Name	Pin #	Description
V <sub>CC</sub>	1	Input Power
GND	2	Ground
OUT	3	Output Stage

**Block Diagram**



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

Symbol	Parameter	Rating	Unit	
V <sub>CC</sub>	Supply Voltage	20	V	
V <sub>out (off)</sub>	Output "OFF" Voltage	20	V	
I <sub>o (sink)</sub>	Output "ON" Current	25	mA	
P <sub>D</sub>	Power Dissipation	SIP-3L	550	mW
		SC59-3L	230	mW
T <sub>J(MAX)</sub>	Maximum Junction Temperature	150	°C	
T <sub>ST</sub>	Storage Temperature Range	-65~+150	°C	

### Recommended Operating Conditions

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CC</sub>	Supply Voltage	Operating	3.5	20	V
T <sub>A</sub>	Operating Ambient Temperature (Note 6)	Operating	-40	150	°C

Notes: 6. Shall not exceed P<sub>D</sub> and Safety Operation Area.

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

Symbol	Parameter	Conditions	Min	Typ.	Max	Unit
V <sub>out (SAT)</sub>	Output Saturation Voltage	V <sub>CC</sub> = 12V, OUT "ON" I <sub>o</sub> = 10mA	-	300	400	mV
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = 12V, OUT "OFF"	-	3.5	6	mA

### Magnetic Characteristics ( $T_A = 25^\circ\text{C}$ , $V_{CC} = 12\text{V}$ , Note 7)

(1mT = 10 Gauss)

#### A grade

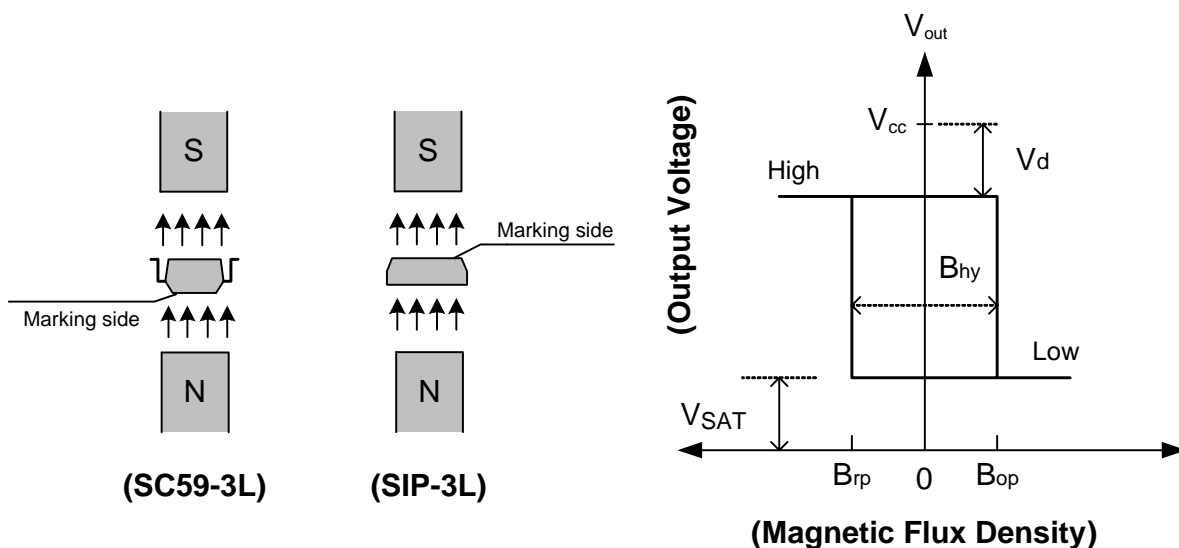
Symbol	Parameter	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operation Point	15	-	60	Gauss
Brps(south pole to brand side)	Release Point	-60	-	-15	Gauss
$B_{hy}( B_{opx} - B_{rpx} )$	Hysteresis	30	80	120	Gauss

#### B grade

Symbol	Parameter	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operation Point	5	-	80	Gauss
Brps(south pole to brand side)	Release Point	-80	-	-5	Gauss
$B_{hy}( B_{opx} - B_{rpx} )$	Hysteresis	10	80	160	Gauss

Notes: 7. Magnetic characteristics are for design information, which will vary with supply voltage, operating temperature and after soldering.

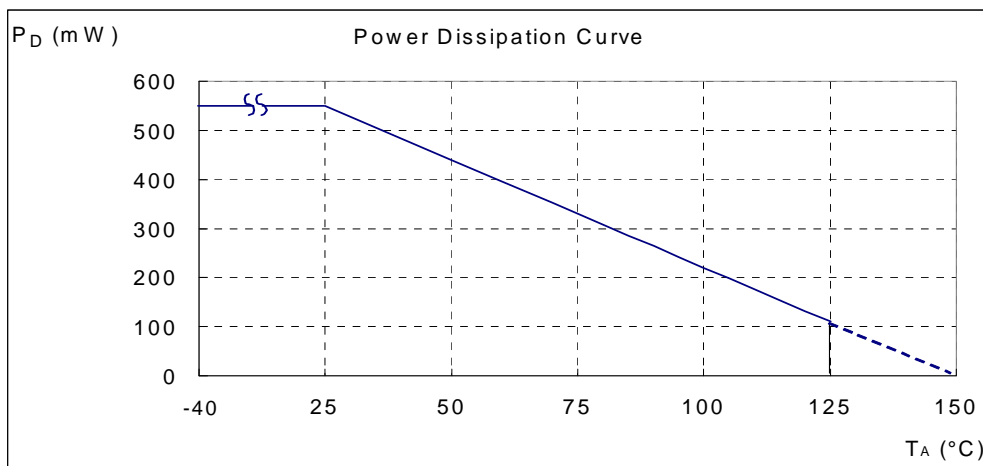
### Operating Characteristics



### Performance Characteristics

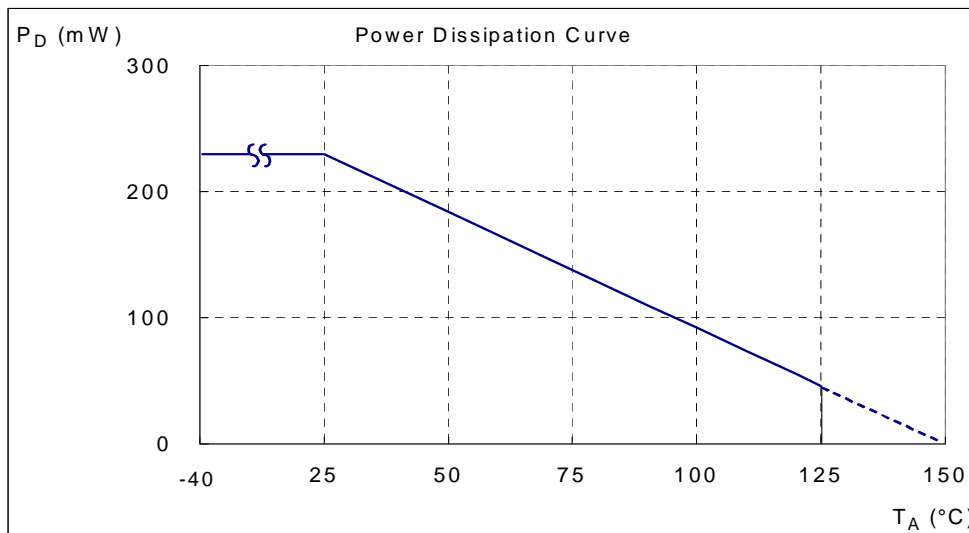
#### (1) SIP-3L

$T_A$ (°C)	25	50	60	70	80	85	90	95	100
$P_D$ (mW)	550	440	396	352	308	286	264	242	220
$T_A$ (°C)	105	110	115	120	125	130	135	140	150
$P_D$ (mW)	198	176	154	132	110	88	66	44	0



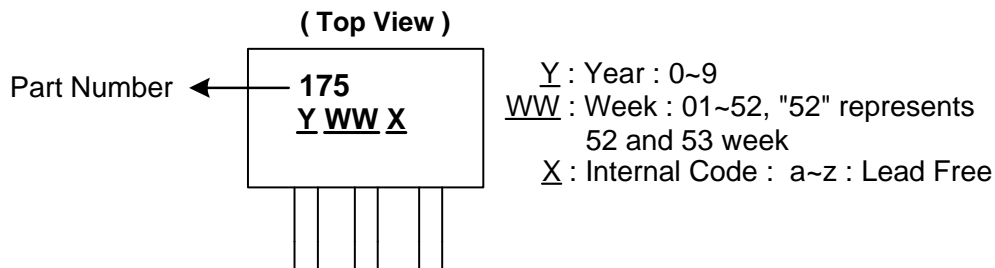
#### (2) SC59-3L (Commonly known as SOT23 in Asia)

$T_A$ (°C)	25	50	60	70	80	90	100	110	120	125	130	140	150
$P_D$ (mW)	230	184	166	147	129	110	92	74	55	46	37	18	0

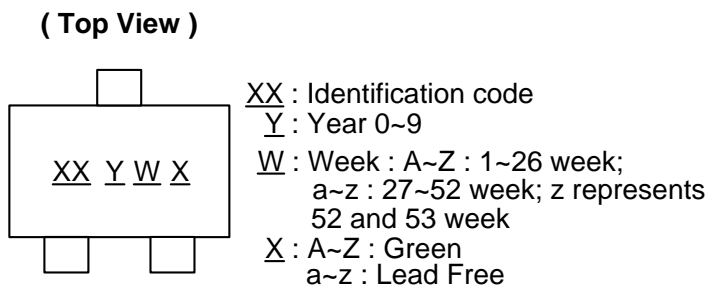


### Marking Information

(1) SIP-3L



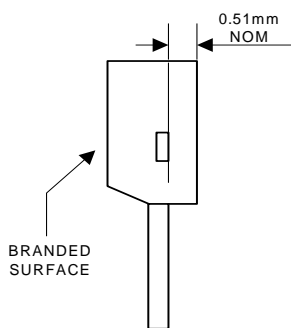
(2) SC59-3L (Commonly known as SOT23 in Asia)



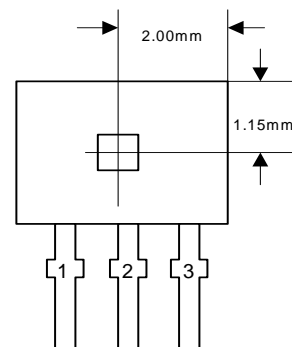
Part Number	Package	Identification Code
AH175	SC59-3L	J5

**Package Information (All Dimensions in mm)**

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

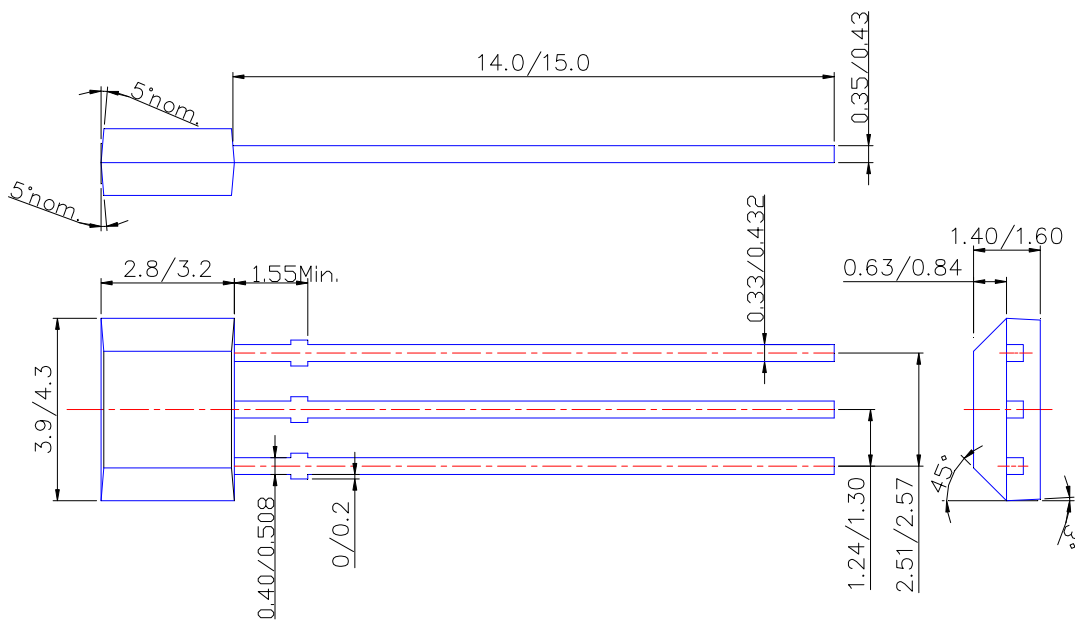


Active Area Depth



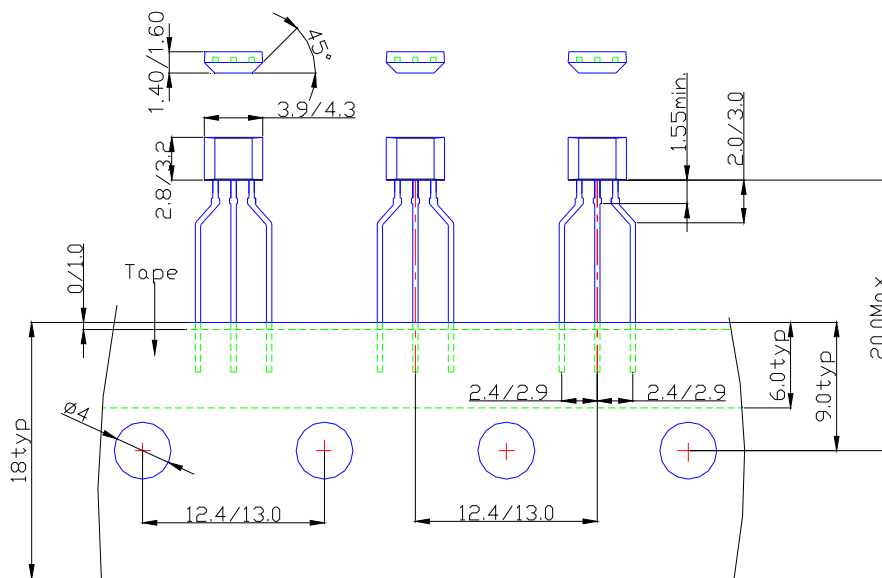
Sensor Location

**Package Dimension**

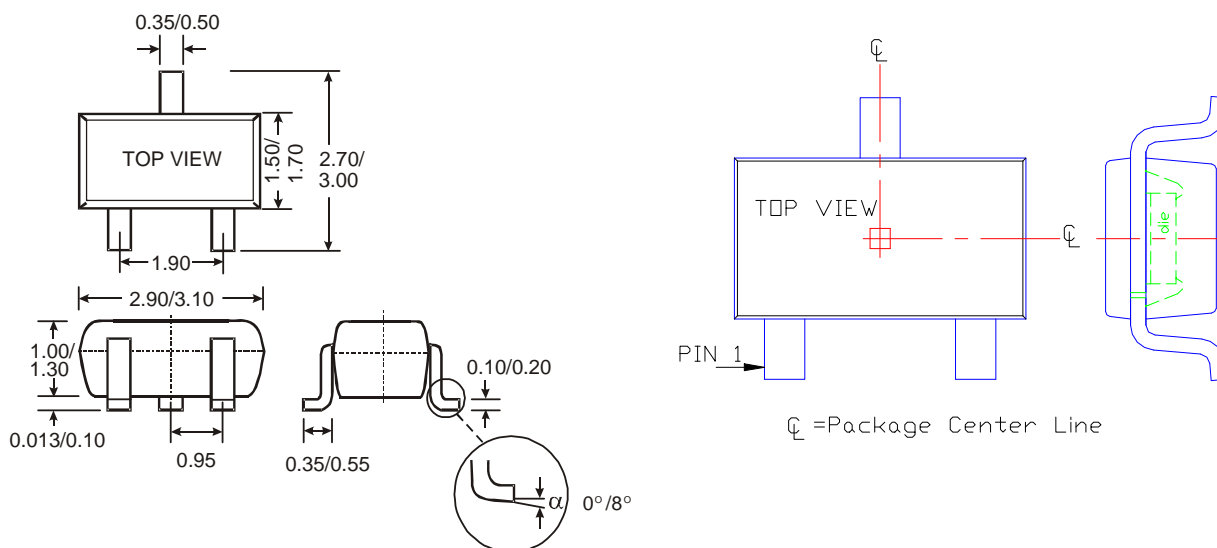


**Package Information (Continued)**

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



**(3) Package Type: SC59-3L (Commonly known as SOT23 in Asia)**





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