

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~+150°C
- Lead Free Packages: SIP-3L and SC59-3L (Commonly known as SOT23 in Asia)
- SC59-3L: Available in "Green" Molding Compound (No Br, Sb)
- Lead Free Finish/RoHS Compliant (Note 1)

General Description

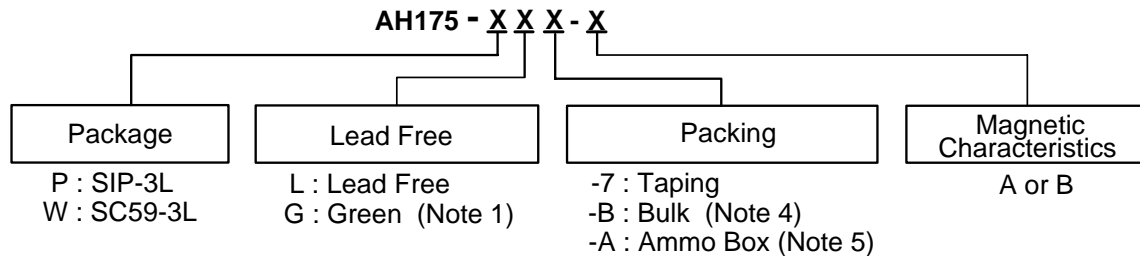
AH175 is a single-digital-output Hall-effect sensor for high temperature operation. The device includes an on-chip Hall voltage generator for magnetic sensing, an amplifier to amplify Hall voltage, and a comparator to provide switching hysteresis for noise rejection, and an open-collector output pre-driver. 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



- Note: 1. Green is only available for SC59-3L.
2. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.

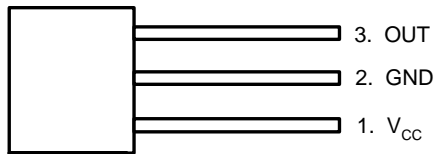
| Device | Package Code | Packaging (Note 3) | Tube/Bulk | | 7" Tape and Reel | | Ammo Box | |
|---------|--------------|--------------------|-----------|--------------------|------------------|--------------------|----------|--------------------|
| | | | Quantity | Part Number Suffix | Quantity | Part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

- Note: 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. Bulk is for SIP-3L Straight Lead.
5. Ammo Box is for SIP-3L Spread Lead.

Pin Assignment

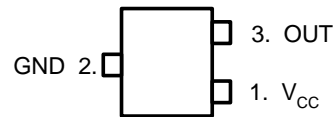
(1) SIP-3L

(Top view)



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

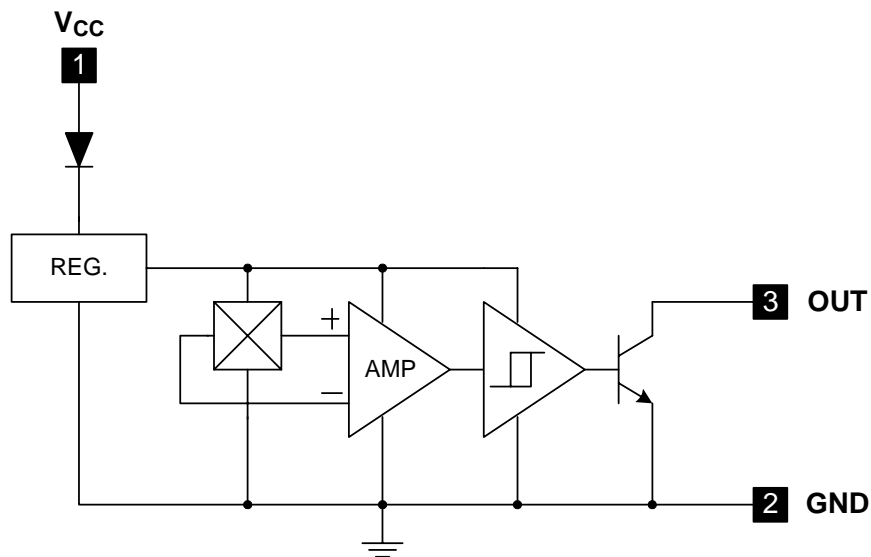
(Top view)



Pin Description

| Name | Pin # | Description |
|-----------------|-------|--------------|
| V _{CC} | 1 | Input Power |
| GND | 2 | Ground |
| OUT | 3 | Output Stage |

Block Diagram



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$)

| Symbol | Parameter | Rating | Unit | |
|-----------------|------------------------------|----------|------------------|----|
| V_{CC} | Supply Voltage | 20 | V | |
| V_{out} (off) | Output "OFF" Voltage | 20 | V | |
| I_o (sink) | Output "ON" Current | 25 | mA | |
| P_D | Power Dissipation | SIP-3L | 550 | mW |
| | | SC59-3L | 230 | mW |
| $T_{J(MAX)}$ | Maximum Junction Temperature | 150 | $^\circ\text{C}$ | |
| T_{ST} | Storage Temperature Range | -65~+150 | $^\circ\text{C}$ | |

Recommended Operating Conditions

| Symbol | Parameter | Conditions | Min | Max | Unit |
|----------|---|------------|-----|-----|------------------|
| V_{CC} | Supply Voltage | Operating | 3.5 | 20 | V |
| T_A | Operating Ambient Temperature (Note 6) | Operating | -40 | 150 | $^\circ\text{C}$ |

 Note: 6. Shall not exceed P_D and Safety Operation Area.

Electrical Characteristics ($T_A = 25^\circ\text{C}$)

| Symbol | Parameter | Conditions | Min | Typ. | Max | Unit |
|-----------------|---------------------------|---|-----|------|-----|------|
| V_{out} (SAT) | Output Saturation Voltage | $V_{CC} = 12\text{V}$, OUT "ON" $I_o = 10\text{mA}$ | - | 300 | 400 | mV |
| I_{CC} | Supply Current | $V_{CC} = 12\text{V}$, OUT "OFF" | - | 3.5 | 6 | mA |

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

(1mT = 10 Gauss)

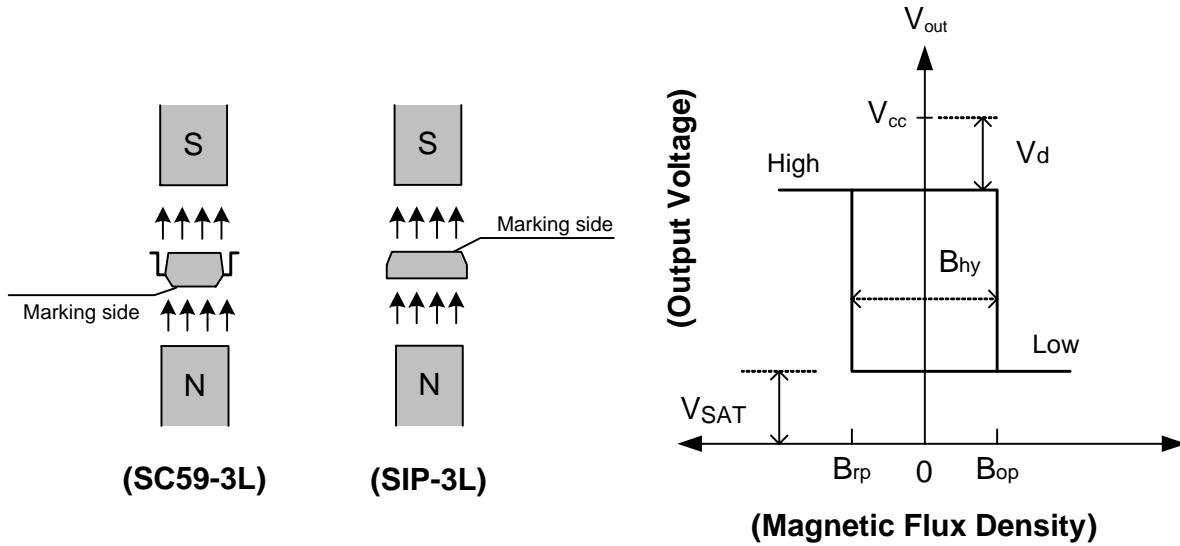
A grade

| | Symbol | Min. | Typ. | Max. | Unit |
|-----------------|--------|------|------|------|-------|
| Operation Point | Bop | 15 | - | 60 | Gauss |
| Release Point | Brp | -60 | - | -15 | Gauss |
| Hysteresis | Bhy | 30 | 80 | 120 | Gauss |

B grade

| | Symbol | Min. | Typ. | Max. | Unit |
|-----------------|--------|------|------|------|-------|
| Operation Point | Bop | 5 | - | 80 | Gauss |
| Release Point | Brp | -80 | - | -5 | Gauss |
| Hysteresis | Bhy | 10 | 80 | 160 | Gauss |

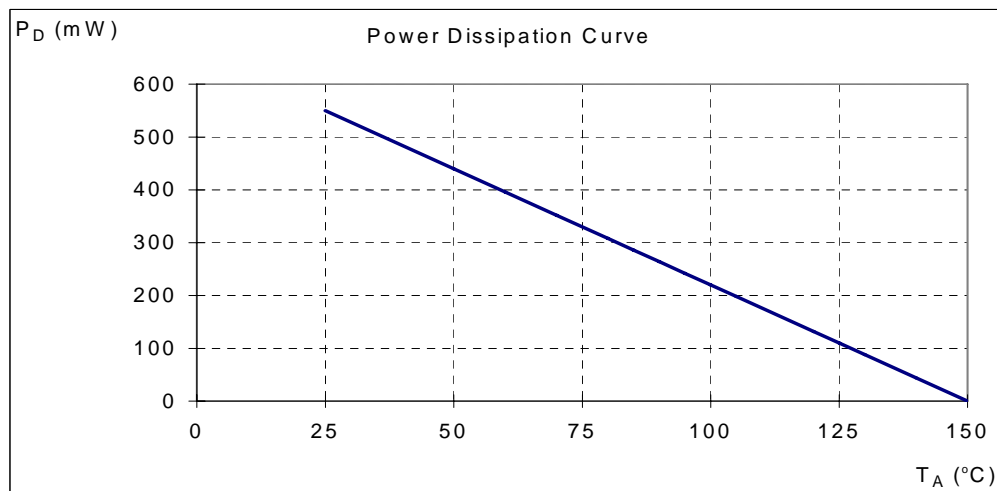
Operating Characteristics



Performance Characteristics

(1) SIP-3L

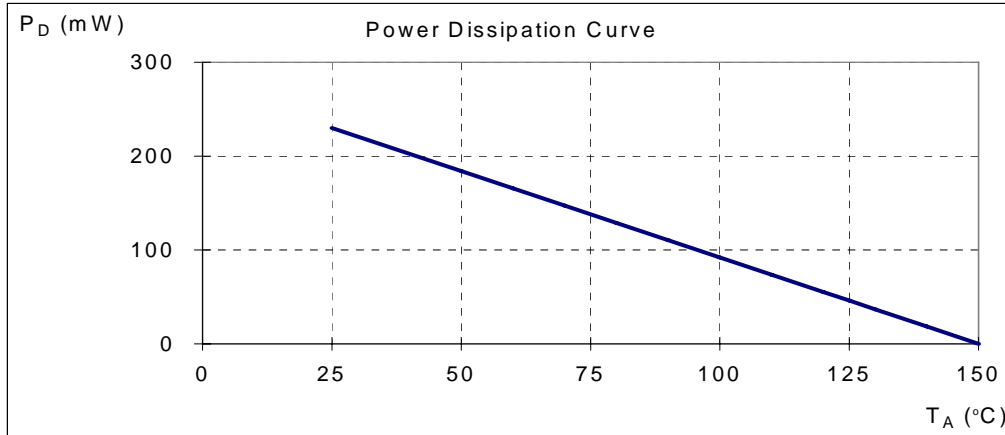
| | | | | | | | | | |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| T_A (°C) | 25 | 50 | 60 | 70 | 80 | 85 | 90 | 95 | 100 |
| P_D (mW) | 550 | 440 | 396 | 352 | 308 | 286 | 264 | 242 | 220 |
| T_A (°C) | 105 | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 150 |
| P_D (mW) | 198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



Performance Characteristics (Continued)

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

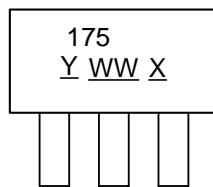
| T _A (°C) | 25 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 125 | 130 | 140 | 150 |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| P _D (mW) | 230 | 184 | 166 | 147 | 129 | 110 | 92 | 74 | 55 | 46 | 37 | 18 | 0 |



Marking Information

(1) SIP-3L

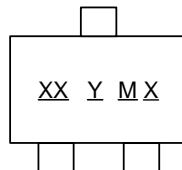
(Top View)



Y : Year : "7" = 2007
"8" = 2008
WW : Nth Week 01~52
X : Internal code
a-z : Lead Free

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

(Top View)

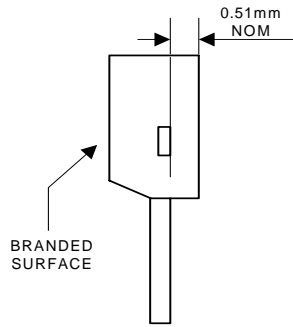


XX : J5 : AH175
Y : Year 0~9
M : Month A~L
X : Internal code
A~Z : Green
a-z : Lead Free

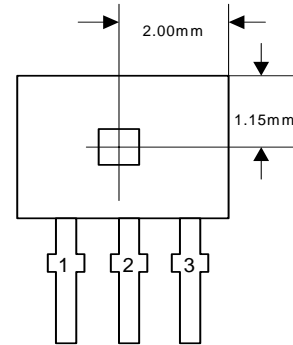
| Part Number | Package | Identification Code |
|-------------|---------|---------------------|
| AH175 | SC59-3L | J5 |

Package Information (unit: mm)

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

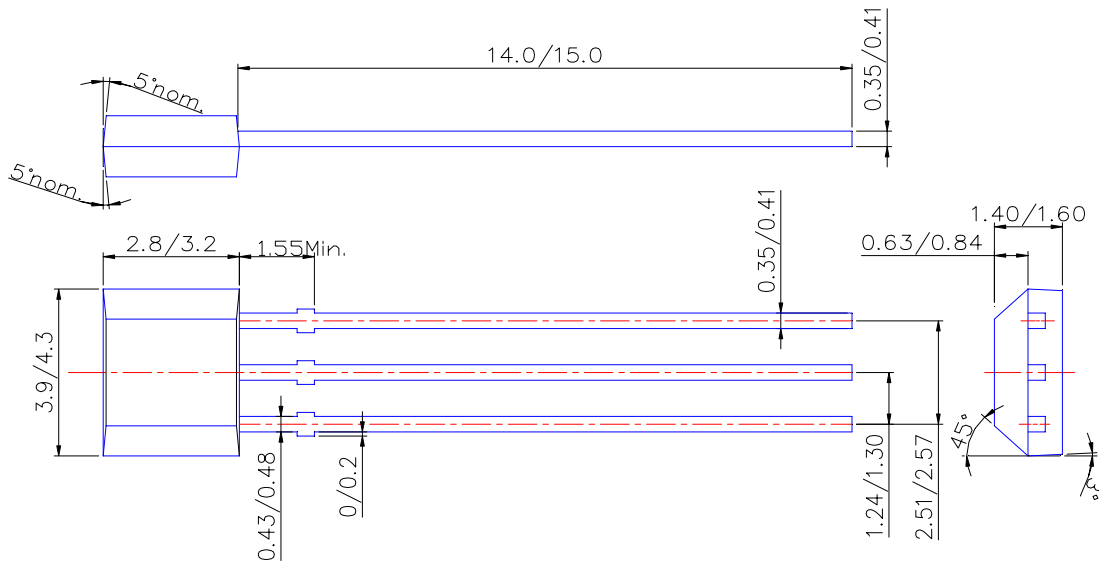


Active Area Depth



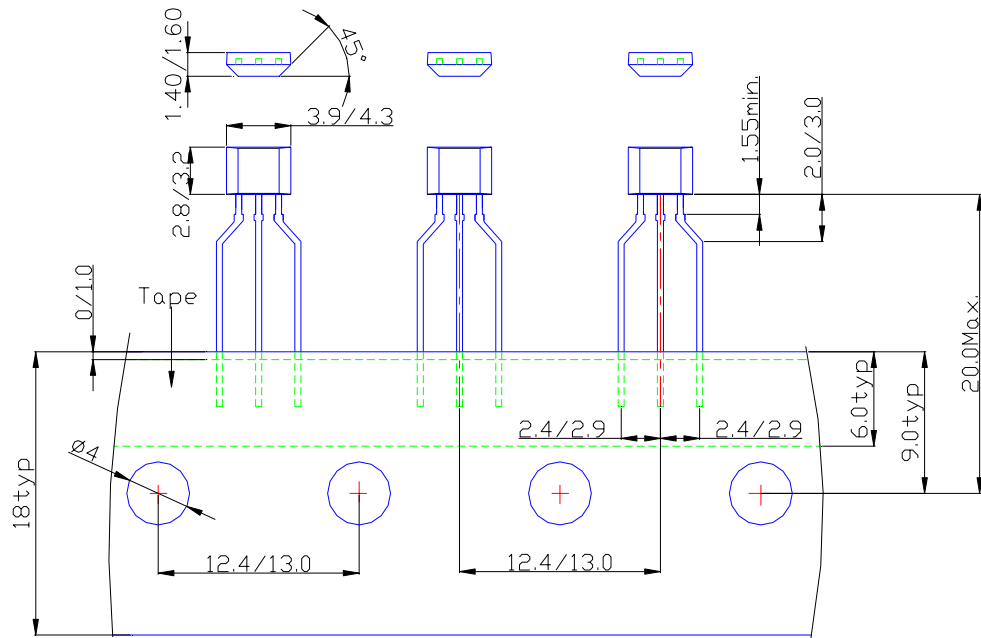
Sensor Location

Package Dimension

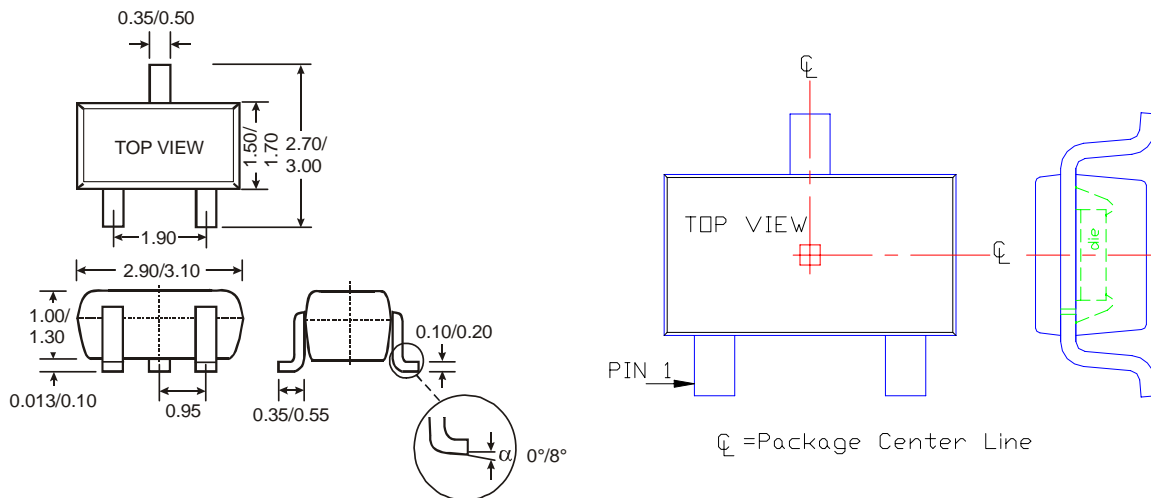


Package Information (Continued)

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



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



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