

### Features

- Bipolar Hall Effect Latch Sensor
- 3.5V to 20V DC Operation Voltage
- Open Collector Pre-Driver
- 50mA Output Sink Current
- Chip Power Reverse-Connection Protection
- Operating Temperature: -40°C~125°C
- SIP3, SC59 and SC59R (Commonly known as SOT23 in Asia): Available in "Green" Molding Compound (No Br, Sb)
- Lead Free Finish/ RoHS Compliant (Note 1)

### General Description

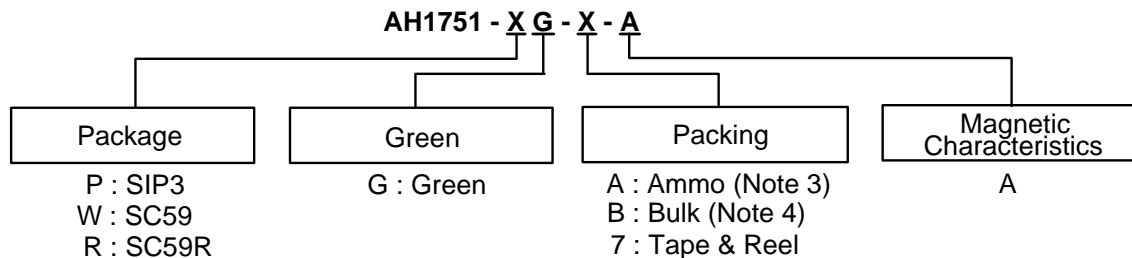
AH1751 is a single-digital-output Hall-effect sensor for high temperature operation. The device includes an on-chip Hall voltage generator for magnetic sensing, an amplifier to amplify Hall voltage, and a comparator to provide switching hysteresis for noise rejection, and an open-collector output pre-driver. 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

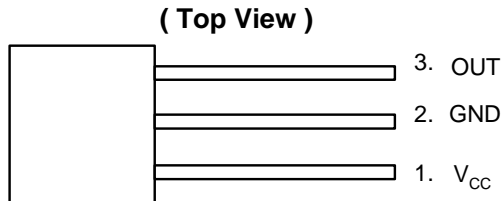


| Device  | Package Code | Packaging (Note 2) | Tube/Bulk |                    | 7" Tape and Reel |                    | Ammo Box |                    | Magnetic Characteristics |
|---|--------------|--------------------|-----------|--------------------|------------------|--------------------|----------|--------------------|--------------------------|
|   |              |                    | Quantity  | Part Number Suffix | Quantity         | Part Number Suffix | Quantity | Part Number Suffix |                          |
|  AH1751-PG-A-A | P            | SIP3               | NA        | NA                 | NA               | NA                 | 4000/Box | -A                 | A                        |
|  AH1751-PG-B-A | P            | SIP3               | 1000      | -B                 | NA               | NA                 | NA       | NA                 | A                        |
|  AH1751-WG-7-A | W            | SC59               | NA        | NA                 | 3000/Tape & Reel | -7                 | NA       | NA                 | A                        |
|  AH1751-RG-7-A | R            | SC59R              | NA        | NA                 | 3000/Tape & Reel | -7                 | NA       | NA                 | A                        |

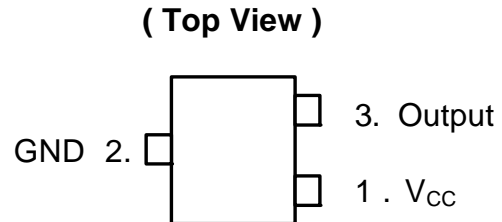
- Notes:
1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at [http://www.diodes.com/products/lead\\_free.html](http://www.diodes.com/products/lead_free.html)
  2. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  3. Ammo Box is for SIP3 Spread Lead.
  4. Bulk is for SIP3 Straight Lead.

## Pin Assignment

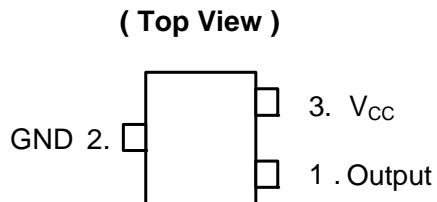
(1) SIP3



(2) SC59



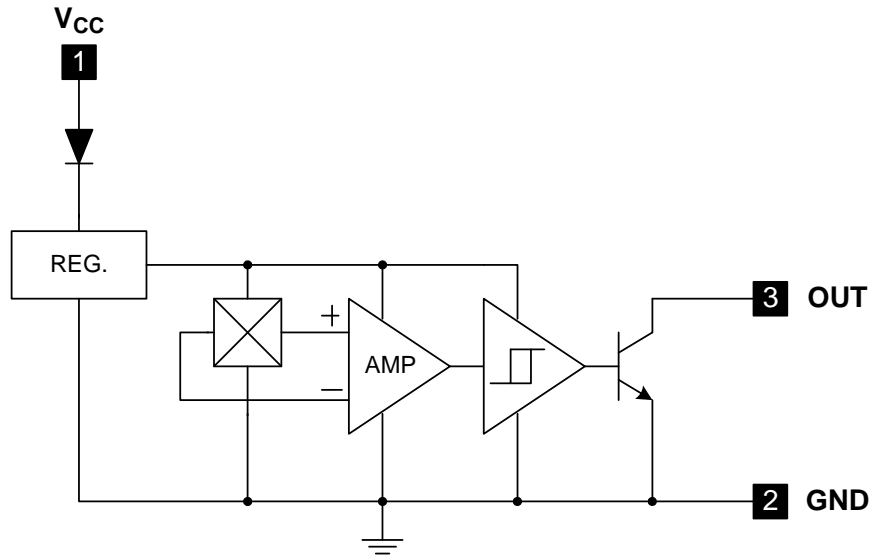
(3) SC59R



## Pin Descriptions

| Pin Name | Description  |
|----------|--------------|
| $V_{CC}$ | Input Power  |
| GND      | Ground       |
| OUT      | 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</sub> (off) | Output “OFF ” Voltage        |                | 20       | V    |
| I <sub>o</sub> (sink)  | Output “ON” Current          |                | 100      | mA   |
| T <sub>ST</sub>        | Storage Temperature Range    |                | -65~+150 | °C   |
| T <sub>J(MAX)</sub>    | Maximum Junction Temperature |                | +150     | °C   |
| P <sub>D</sub>         | Power Dissipation            | SIP3           | 550      | mW   |
|                        |                              | SC59 and SC59R | 230      | mW   |

## Recommended Operating Conditions

| Symbol          | Parameter                   | Conditions         | Min | Max | Unit |
|-----------------|-----------------------------|--------------------|-----|-----|------|
| V <sub>CC</sub> | Supply Voltage              | Operating (Note 5) | 3.5 | 20  | V    |
| T <sub>A</sub>  | Operating Temperature Range | Operating          | -40 | 125 | °C   |

Notes: 5. Operating, the output is switching as magnetic field change (S>300G, N<-300G).

## 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"<br>$I_o = 50\text{mA}$ | -   | 200  | 300 | mV   |
| $I_{CC}$       | Supply Current            | $V_{CC} = 12\text{V}$ , OUT "OFF"                       | -   | 3.5  | 6   | mA   |

## Magnetic Characteristics $(T_A = 25^\circ\text{C}, V_{CC} = 4\sim 20\text{V}$ , Note 6)

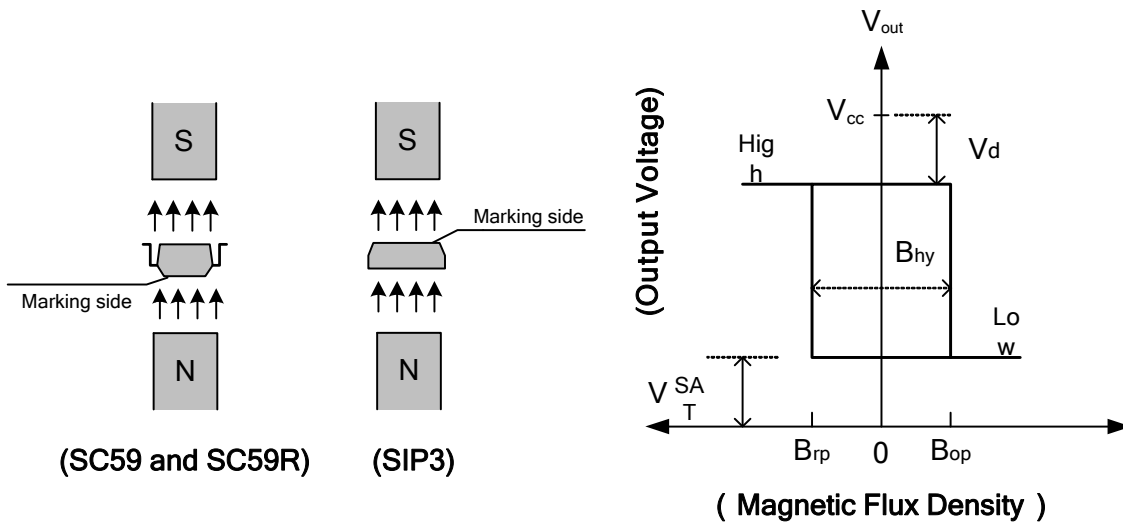
A grade

(1mT = 10 Gauss)

| Symbol                         | Parameter       | Min | Typ. | Max | Unit  |
|--------------------------------|-----------------|-----|------|-----|-------|
| Bops(south pole to brand side) | Operation Point | 5   | -    | 70  | Gauss |
| Brps(south pole to brand side) | Release Point   | -70 | -    | -5  | Gauss |
| Bhy( $ B_{opx} - B_{rpx} $ )   | Hysteresis      | -   | 75   | -   | Gauss |

Notes: 6. Magnetic characteristics are for design information, which will vary with supply voltage, operating temperature and after soldering.

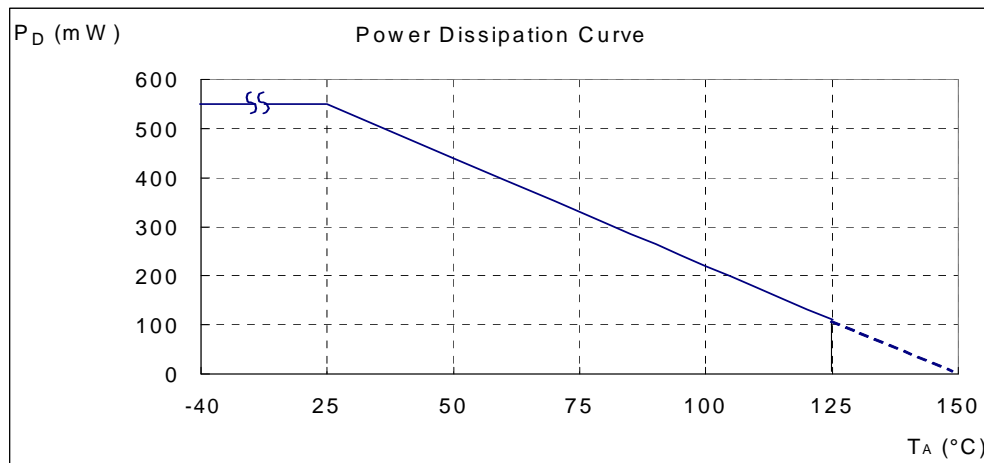
## Operating Characteristics



## Performance Characteristics

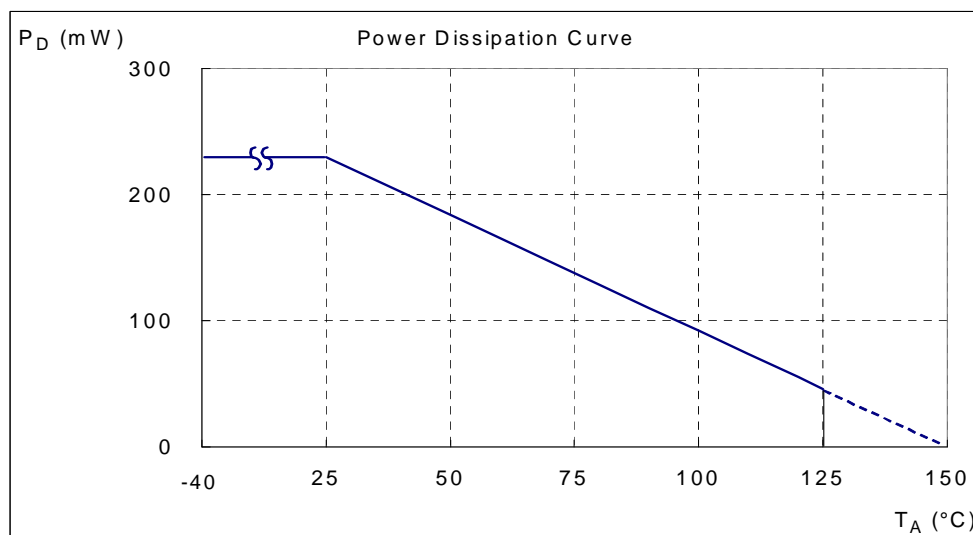
### (1) SIP3

| $T_A$ (°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   |



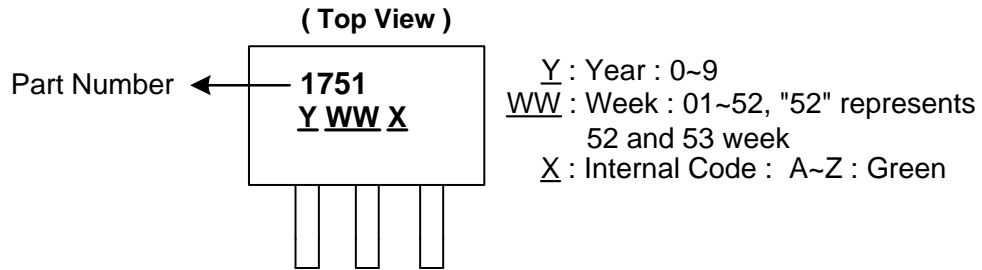
### (2) SC59 and SC59R (Commonly known as SOT23 in Asia)

| $T_A$ (°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   |

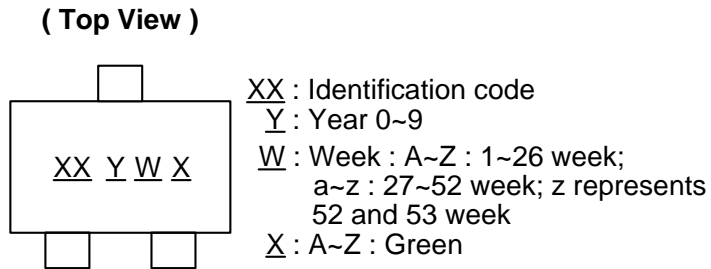


## Marking Information

### (1) SIP3



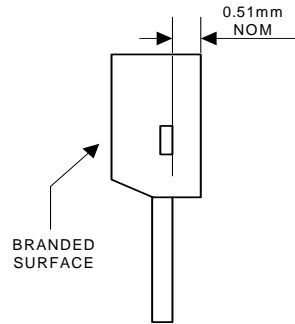
### (2) SC59 and SC59R (Commonly known as SOT23 in Asia)



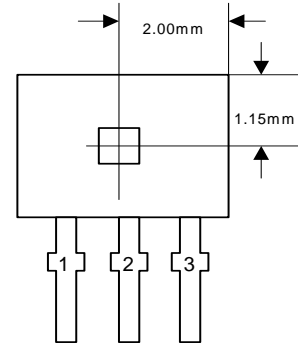
| Part Number | Package | Identification Code |
|-------------|---------|---------------------|
| AH1751      | SC59    | RK                  |
| AH1751      | SC59R   | SK                  |

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

**(1) Package Type: SIP3 for Bulk pack**

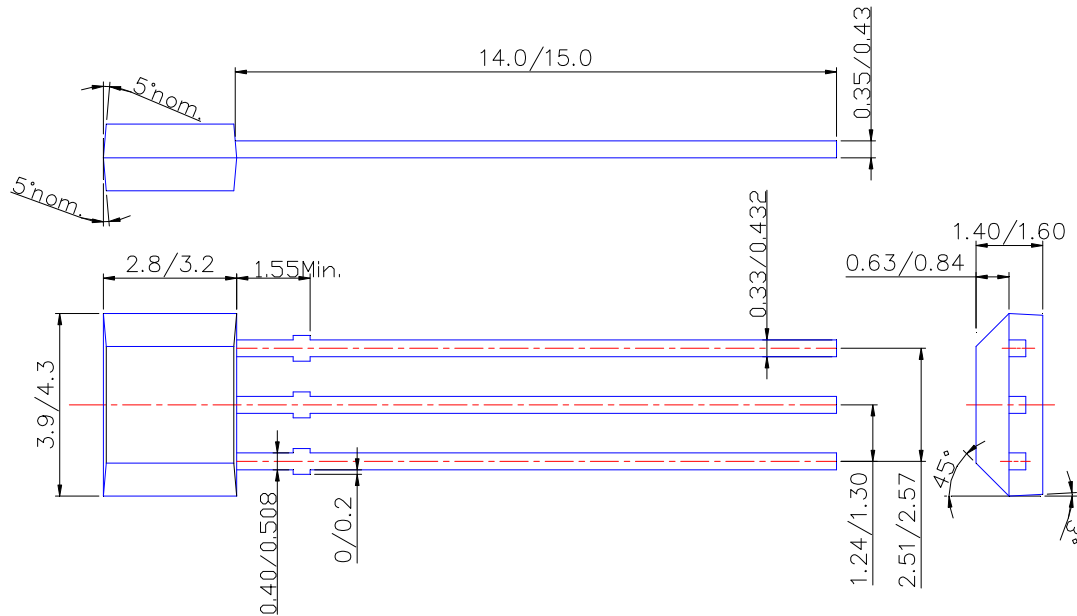


Active Area Depth



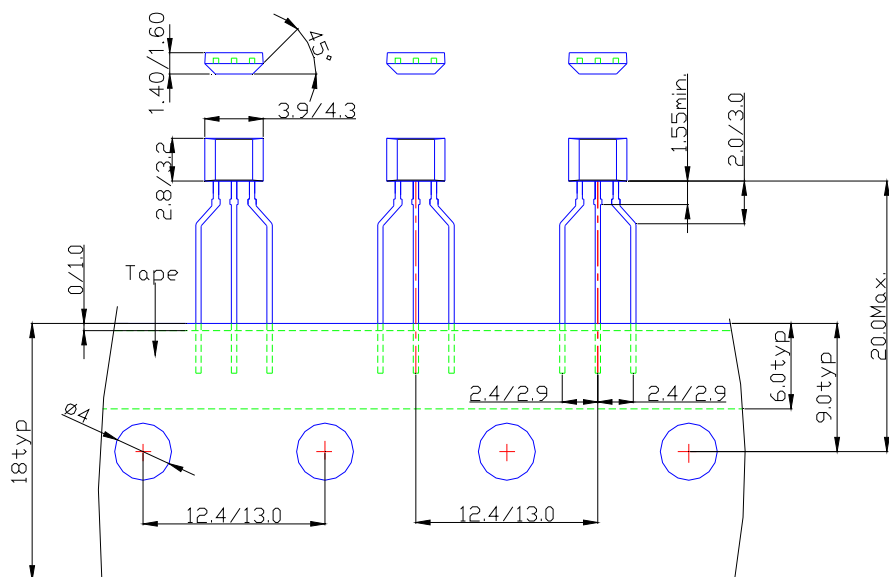
Sensor Location

**Package Dimension**

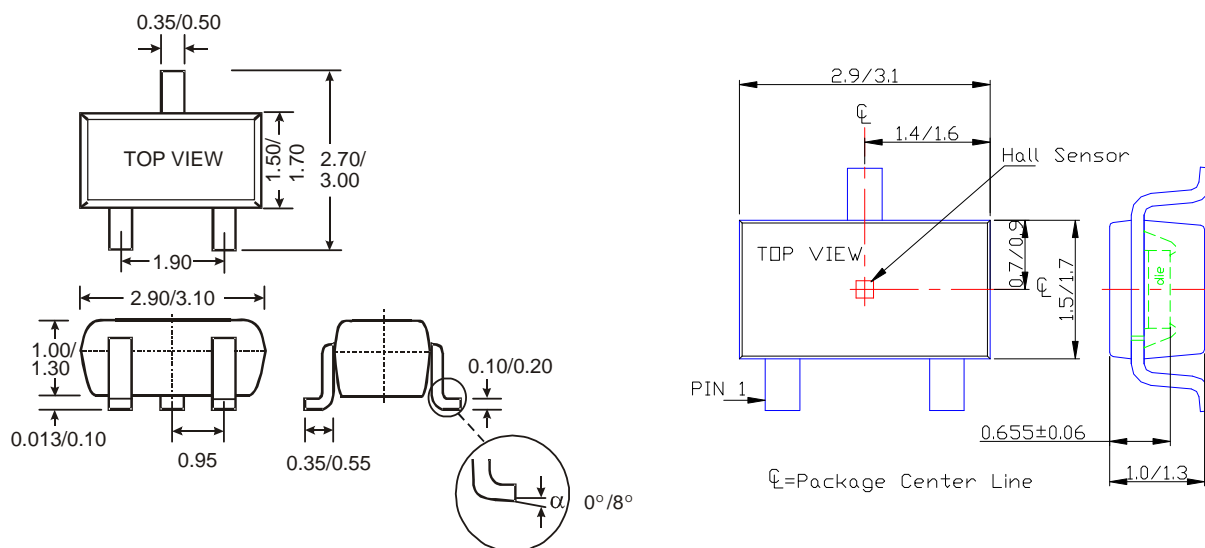


### Package Information (Continued)

**(2) Package Type: SIP3 for Ammo pack**



**(3) Package Type: SC59 and SC59R (Commonly known as SOT23 in Asia)**





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