

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.

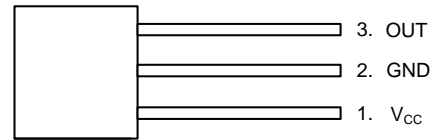
While the magnetic flux density (B) is larger than threshold B_{op} , the OUT pin turns on (low). If B removed toward B_{rp} , the OUT pin is latched "on" state prior to $B < B_{rp}$. When $B < B_{rp}$, the OUT pin go into "off" state.

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 to 125°C
- SIP3, SC59 and SC59R (Commonly known as SOT23 in Asia): Available in "Green" Molding Compound (No Br, Sb)
- **Totally Lead-free & Fully RoHS Compliant (Note 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

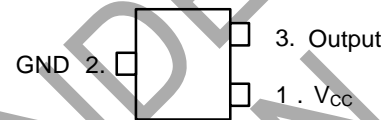
Pin Assignments

(Top View)



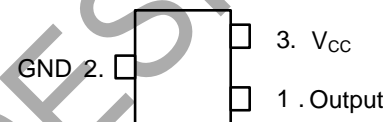
SIP3

(Top View)



SC59

(Top View)



SC59R

Applications

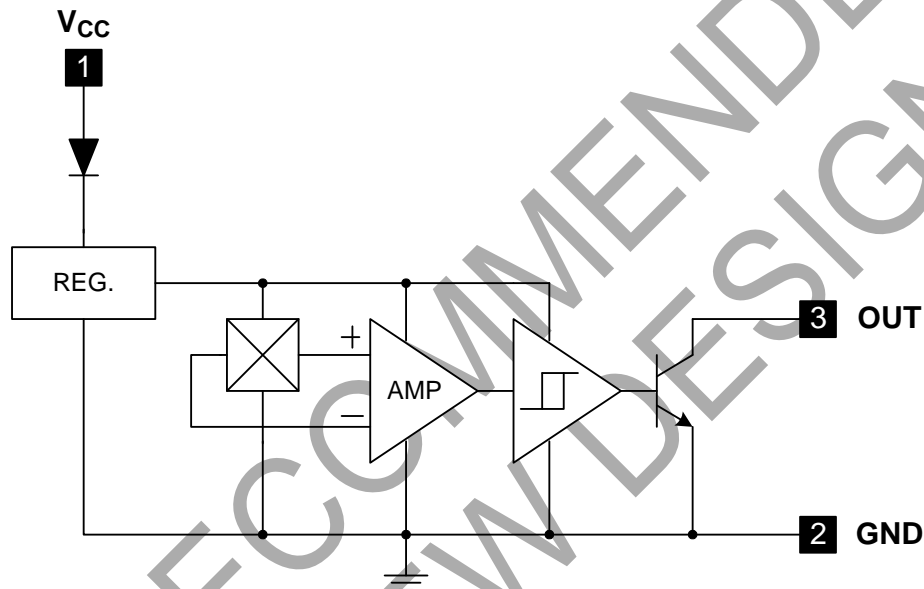
- Rotor Position Sensing
- Current Switch
- Encoder
- RPM Detection

Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3).compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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.

Pin Descriptions

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

Functional Block Diagram



Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Symbol | Parameter | Rating | Unit | |
|------------------------|------------------------------|----------------|------|----|
| V _{CC} | Supply Voltage | 20 | V | |
| V _{OUT} (off) | Output "OFF" Voltage | 20 | V | |
| I _O (sink) | Output "ON" Current | 100 | mA | |
| T _{ST} | Storage Temperature Range | -65 to +150 | °C | |
| T _{J(MAX)} | Maximum Junction Temperature | +150 | °C | |
| P _D | Power Dissipation | SIP3 | 550 | mW |
| | | SC59 and SC59R | 230 | mW |

Recommended Operating Conditions

| Symbol | Parameter | Conditions | Min | Max | Unit |
|----------|-----------------------------|--------------------|-----|------|------|
| V_{CC} | Supply Voltage | Operating (Note 4) | 3.5 | 20 | V |
| T_A | Operating Temperature Range | Operating | -40 | +125 | °C |

Note: 4. Operating, the output is switching as magnetic field change ($S > 300G$, $N < -300G$).

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------------|---------------------------|---|-----|-----|-----|------|
| $V_{OUT(SAT)}$ | Output Saturation Voltage | $V_{CC} = 12V$, OUT "ON" $I_O = 50mA$ | - | 200 | 300 | mV |
| I_{CC} | Supply Current | $V_{CC} = 12V$, OUT "OFF" | - | 3.5 | 6 | mA |

Magnetic Characteristics (@ $T_A = +25^\circ\text{C}$, $V_{CC} = 4V$ to $20V$, unless otherwise specified. Note 5)

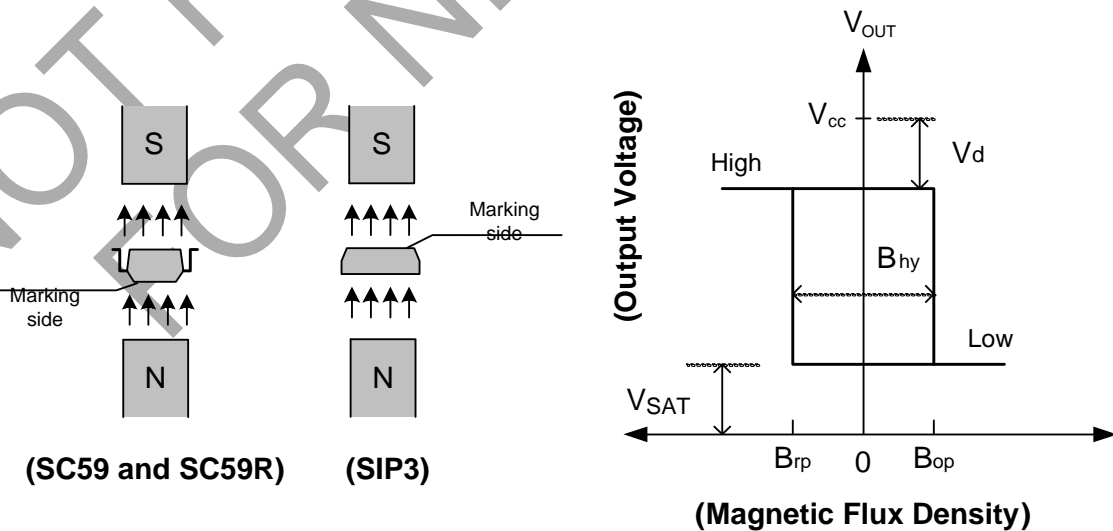
A grade

(1mT = 10 Gauss)

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

Notes: 5. Magnetic characteristics are for design information, which will vary with supply voltage, operating temperature and after soldering.

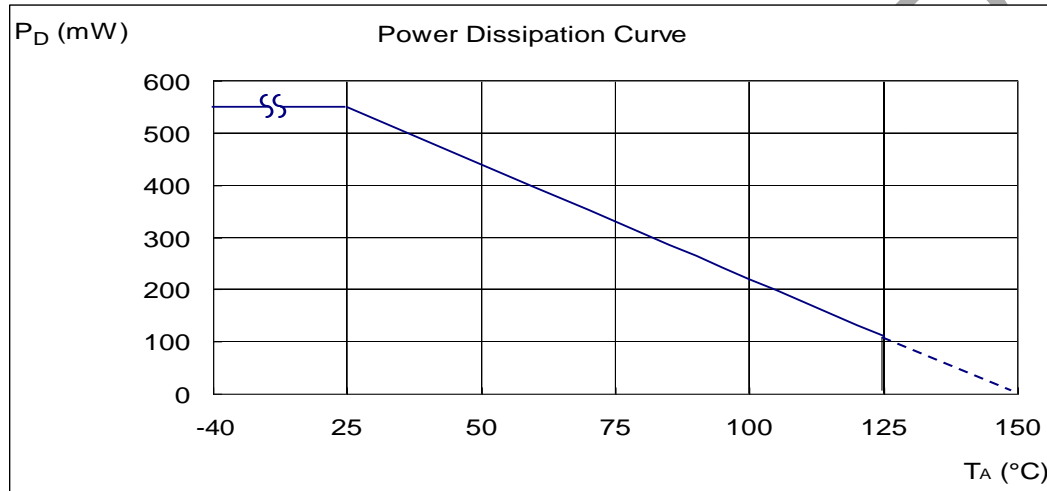
Operating Characteristics



Performance Characteristics

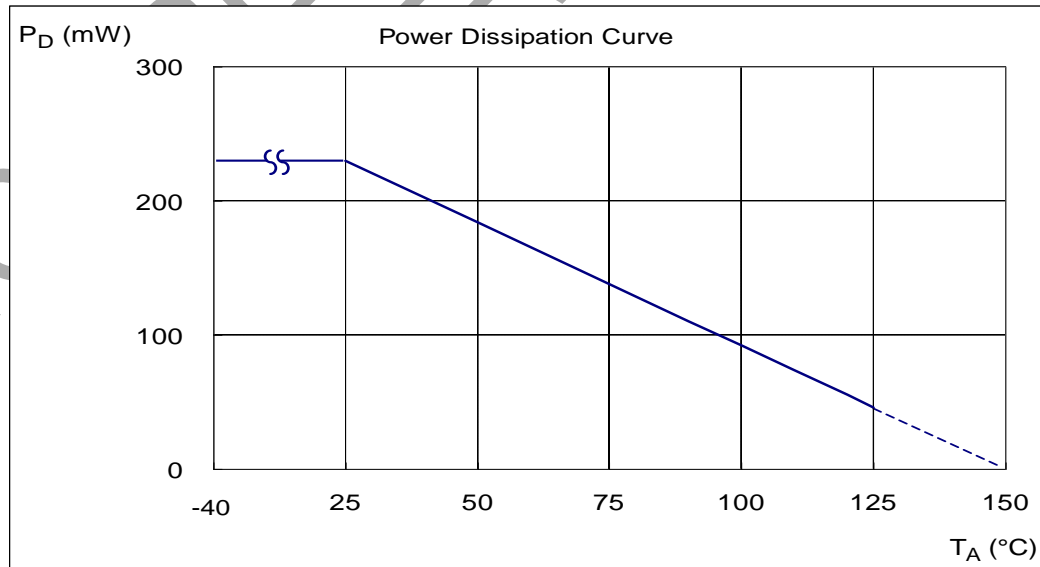
(1) SIP3

| | | | | | | | | | |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 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 |



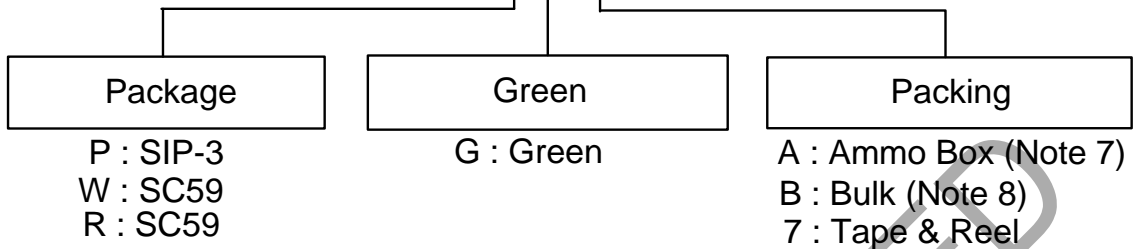
(2) SC59 and SC59R (Commonly known as SOT23 in Asia)

| | | | | | | | | | | | | | |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 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 |



Ordering Information

AH1751 -X X - X

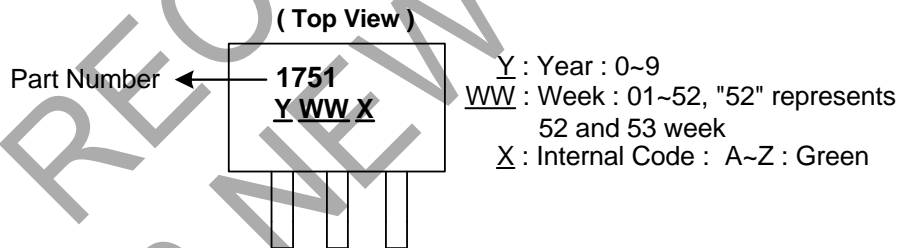


| Part Number | Status (Note 9) | Package Code | Packaging (Note 6) | Bulk | | 7" Tape and Reel | | Ammo Box | |
|---------------|-----------------|--------------|--------------------|----------|--------------------|------------------|--------------------|----------|--------------------|
| | | | | Quantity | Part Number Suffix | Quantity | Part Number Suffix | Quantity | Part Number Suffix |
| AH1751-PG-A-A | NRND | P | SIP-3 | NA | NA | NA | NA | 4000/Box | A |
| AH1751-PG-B-A | NRND | P | SIP-3 | 1000 | -B | NA | NA | NA | NA |
| AH1751-WG-7-A | NRND | W | SC59 | NA | NA | 3000/Tape & Reel | -7 | NA | NA |
| AH1751-RG-7-A | NRND | W | SC59R | NA | NA | 3000/Tape & Reel | -7 | NA | NA |

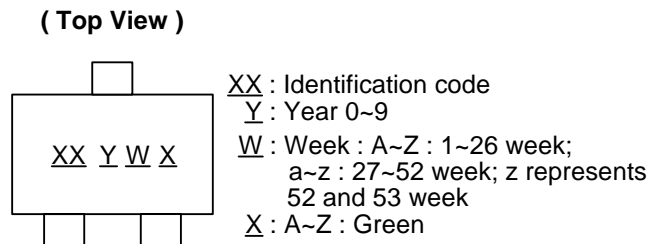
Notes: 6. Pad layout as shown on Diodes Inc. suggested pad layout document, which can be found on our website at <http://www.diodes.com/package-outlines.html>.
 7. Ammo Box is for SIP3 Spread Lead.
 8 . Bulk is for SIP-3 Straight Lead.
 9: NRND = Not Recommended for New Design

Marking Information

(1) Package Type: SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)



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

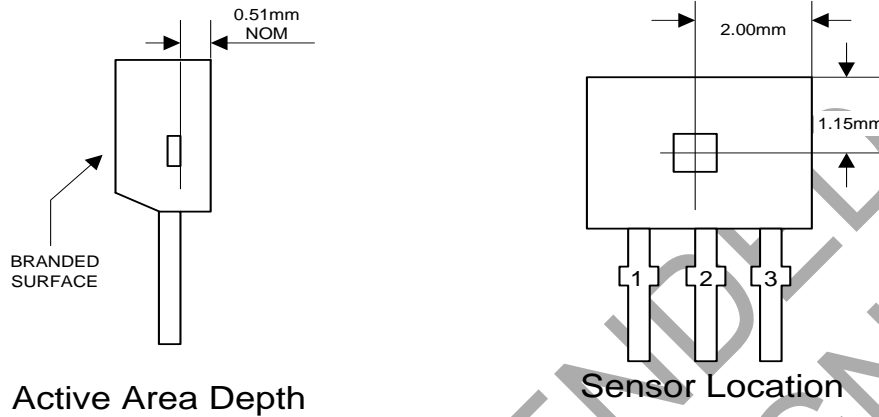


| Part Number | Package | Identification Code |
|-------------|---------|---------------------|
| AH1751 | SC59 | RK |
| AH1751 | SC59R | SK |

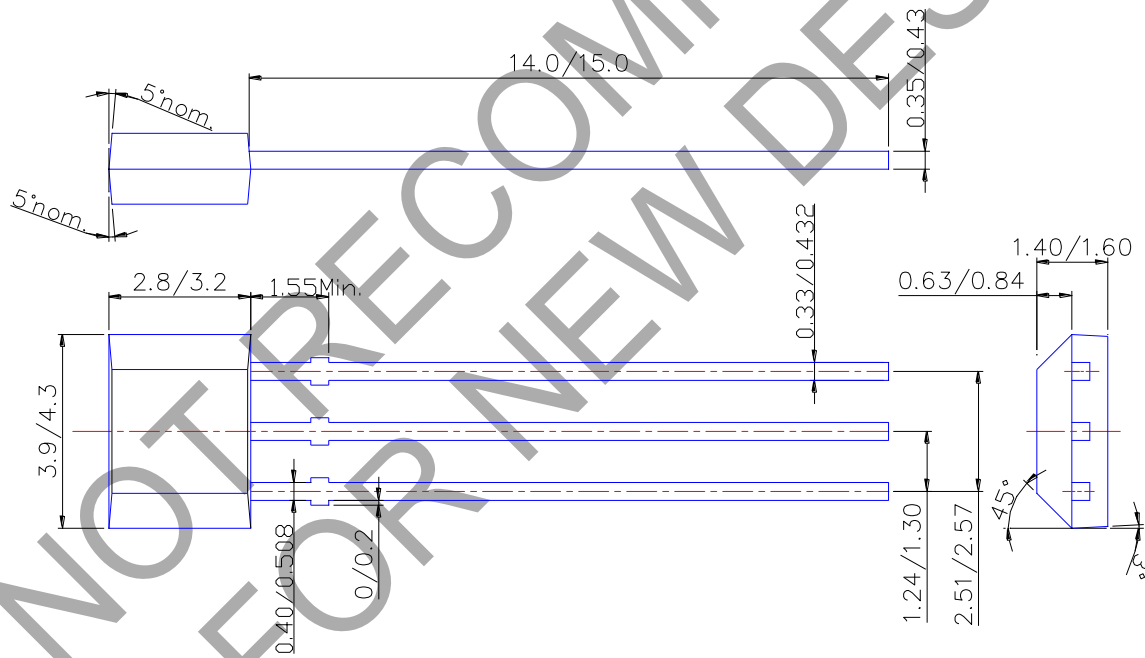
Package Outline Dimensions and Suggested Pad Layout (All dimensions in mm.)

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(1) Package Type: SIP3 for Bulk pack



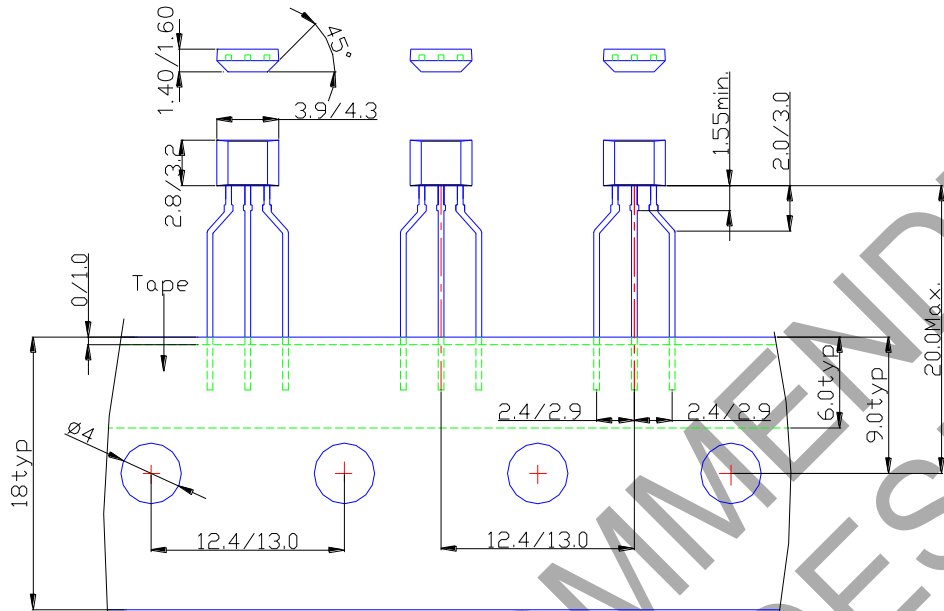
Package Dimension



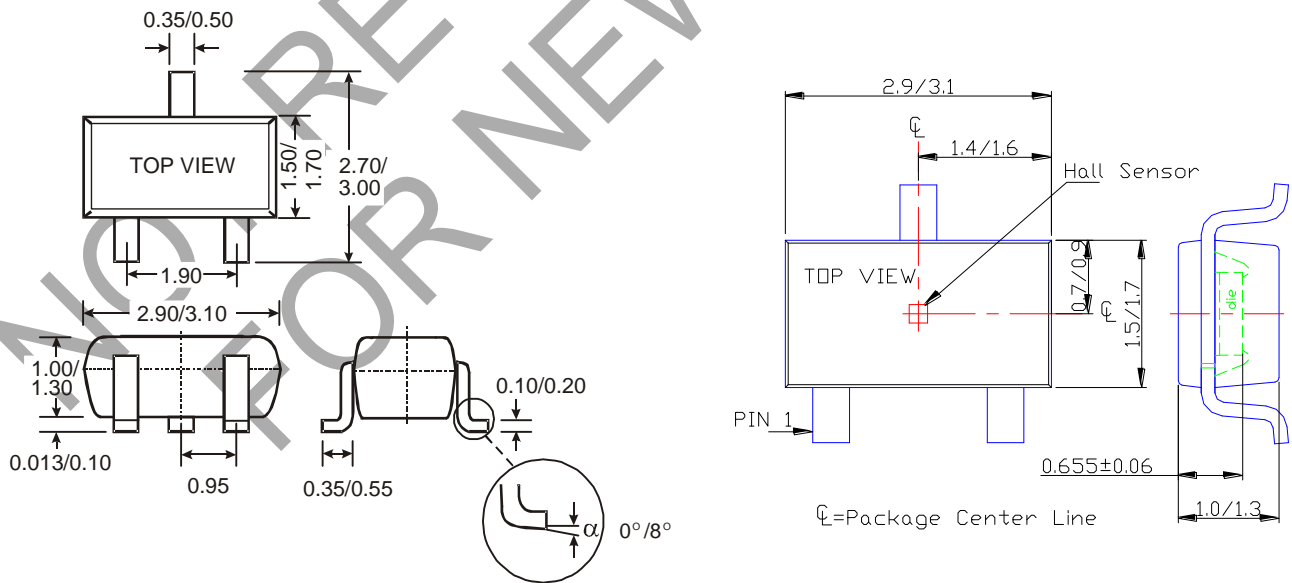
Package Outline Dimensions and Suggested Pad Layout (All dimensions in mm. Cont.)

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(2) Package Type: SIP3 for Ammo Pack



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



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