

Description

AH173 is a single-digital-output Hall-Effect latch 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, a comparator to provide switching hysteresis for noise rejection, and an output driver with a pull-up resistor (R_{pu}). An internal band-gap regulator provides a temperature compensated supply voltage for internal circuits and allows a wide operating supply range.

When the magnetic flux density (B) is larger than operate point (B_{op}), output is switched on (OUT pin is pulled low). The output state is held on until a magnetic flux density reversal falls below Brp . When B is less than Brp , the output is switched off.

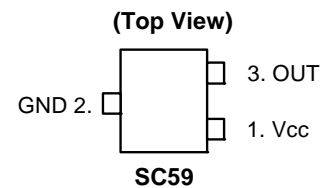
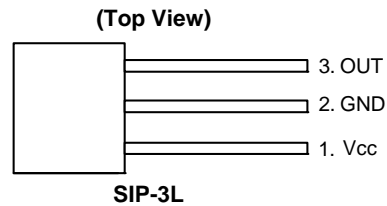
The AH173 is available in SIP-3L and SC59 packages.

Features

- Bipolar Hall-Effect latch sensor
- 3V to 20V DC operating voltage
- Built-in pull-up resistor
- 25mA output sink current
- Operating temperature: -40°C to $+125^{\circ}\text{C}$
- SIP-3L and SC59 packages (SC59 is commonly known as SOT23 in Asia)
- Green Molding Compound (No Br, Sb) (Note 1)

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.

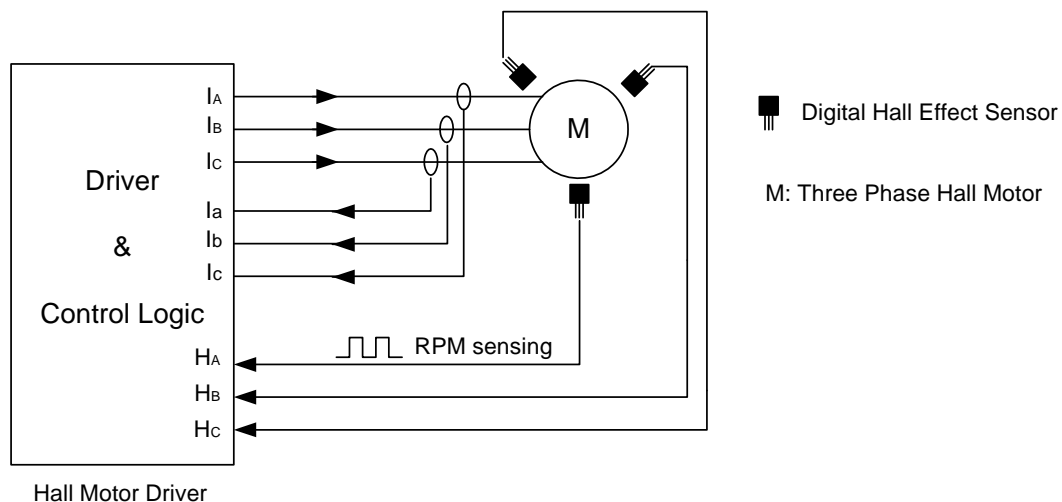
Pin Assignments



Applications

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

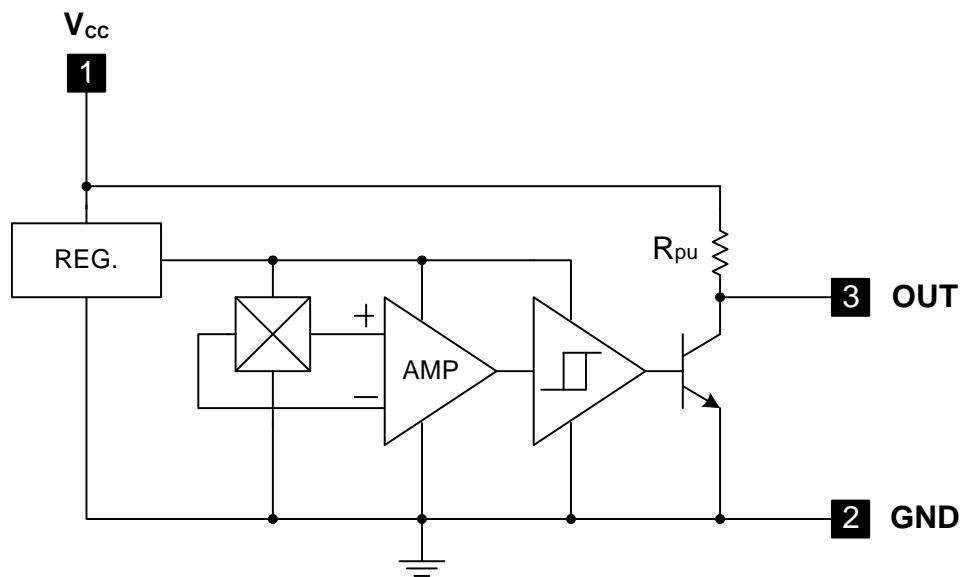
Typical Application Circuit



Pin Descriptions

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

Functional Block Diagram



Absolute Maximum Ratings (T_A = 25°C)

| Symbol | Characteristics | Values | Unit | |
|------------------------|------------------------------|----------|------|----|
| V _{CC} | Supply Voltage | 20 | V | |
| V _{OUT (off)} | Output "Off" Voltage | 20 | V | |
| I _{o (sink)} | Output "On" Current | 25 | mA | |
| T _s | Storage Temperature Range | -65~+150 | °C | |
| T _J | Maximum Junction Temperature | +150 | °C | |
| P _D | Power Dissipation | SIP-3L | 550 | mW |
| | | SC59 | 230 | mW |

Recommended Operating Conditions

| Symbol | Characteristic | Conditions | Min | Max | Unit |
|-----------------|-------------------------------|------------|-----|-----|------|
| V _{CC} | Supply Voltage | Operating | 3 | 20 | V |
| T _A | Operating Ambient Temperature | Operating | -40 | 125 | °C |

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

| Symbol | Characteristics | 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 |
| R_{pu} | Internal Pull-up Resistor | | 7 | 10 | 13 | $K\Omega$ |
| V_d | Dropout Voltage | $V_d = V_{CC} - V_{Ce}$ | - | - | 0.3 | V |

Magnetic Characteristics ($T_A = 25^\circ\text{C}$, $V_{CC} = 12\text{V}$, unless otherwise specified, Note 2)

(1mT = 10 Gauss)

A grade

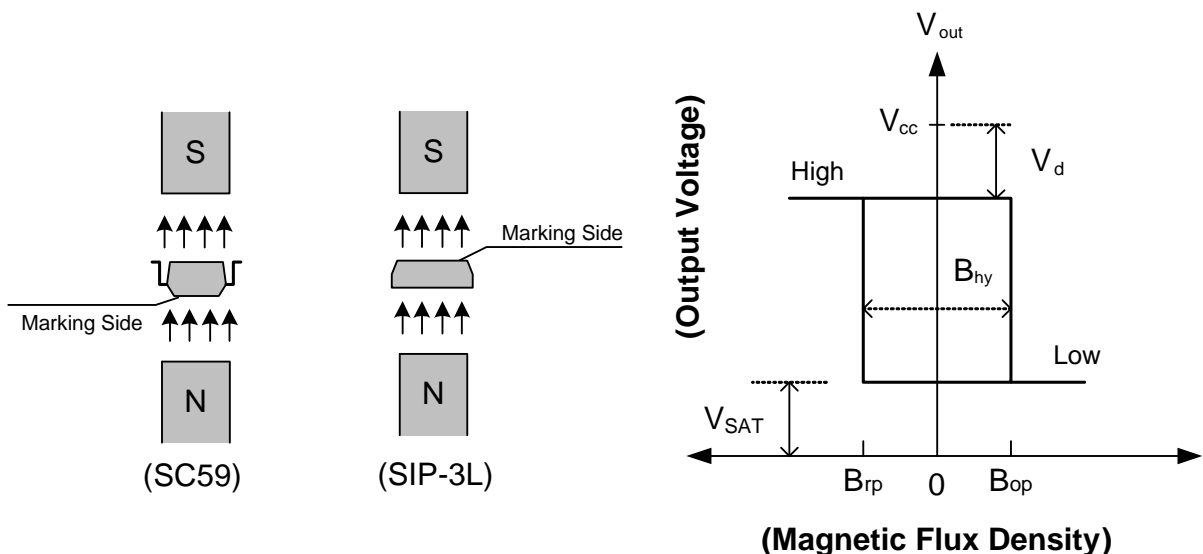
| Symbol | Parameter | Min | Typ. | Max | Unit |
|---------------------------------|-----------------|-----|------|-----|-------|
| Bops(south pole to brand side) | Operation Point | 15 | - | 60 | Gauss |
| Brps(south pole to brand side) | Release Point | -60 | - | -15 | Gauss |
| $B_{hy}(B_{opx} - B_{rpx})$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

Notes: 2. Magnetic characteristics may vary with supply voltage, operating temperature and after soldering.

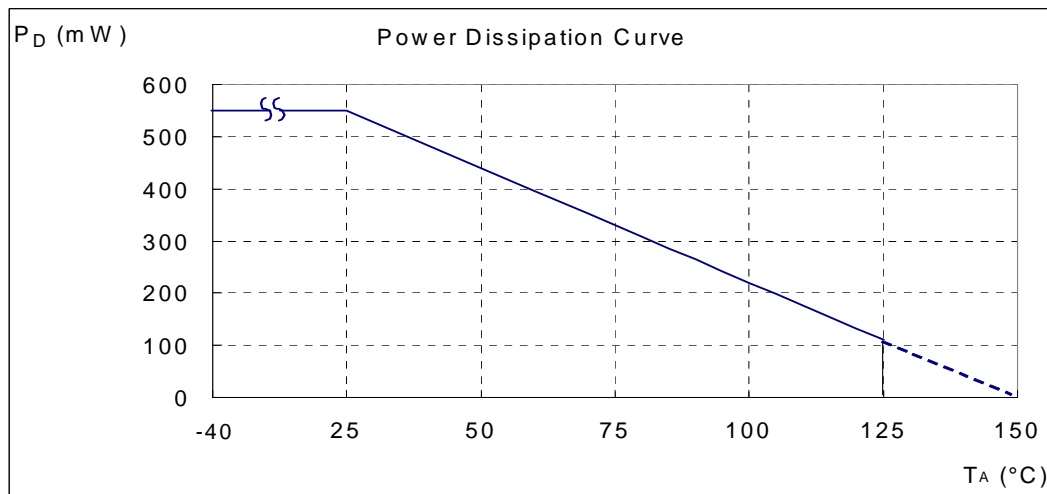
Operating Characteristics



Performance Characteristics

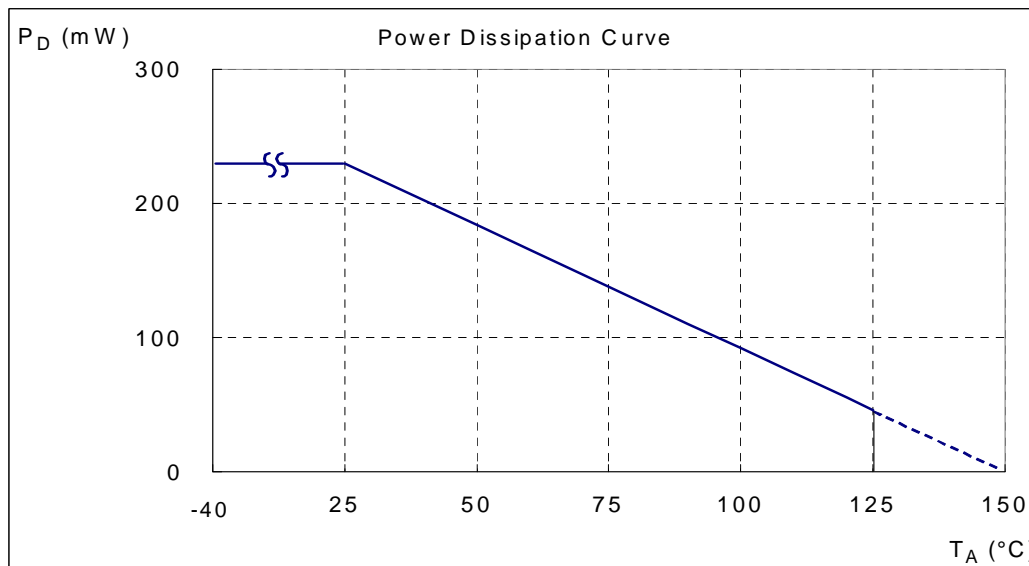
(1) SIP-3L

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

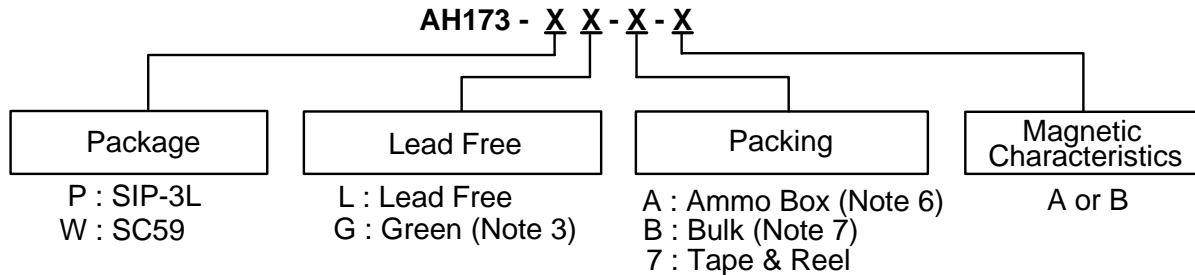














(2) SC59 (commonly known as SOT23 in Asia)

| | | | | | | | | | | | | | |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| T_A (°C) | 25 | 50 | 60 | 70 | 80 | 85 | 90 | 100 | 110 | 120 | 130 | 140 | 150 |
| P_D (mW) | 230 | 184 | 166 | 147 | 129 | 120 | 110 | 92 | 74 | 55 | 37 | 18 | 0 |



Ordering Information

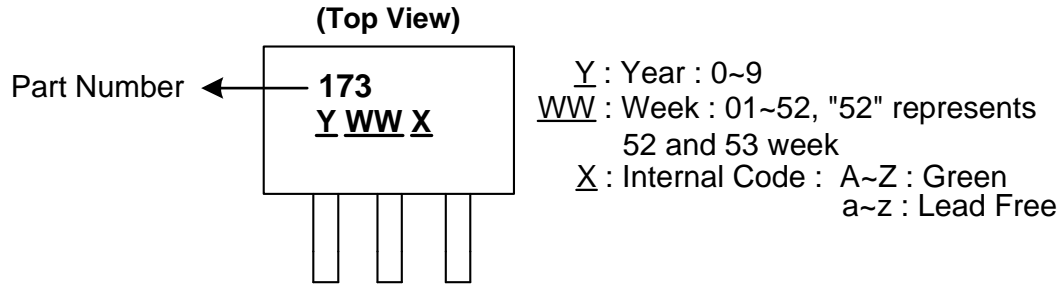


| Device | Package Code | Packaging (Note 4, 5) | Tube/Bulk | | 7" Tape and Reel | | Ammo Box | | Magnetic Characteristics |
|--|--------------|-----------------------|-----------|--------------------|------------------|--------------------|----------|--------------------|--------------------------|
| | | | Quantity | Part Number Suffix | Quantity | Part Number Suffix | Quantity | Part Number Suffix | |
|  AH173-PL-A-A | P | SIP-3L | NA | NA | NA | NA | 4000/Box | -A | A |
|  AH173-PL-A-B | P | SIP-3L | NA | NA | NA | NA | 4000/Box | -A | B |
|  AH173-PG-A-A | P | SIP-3L | NA | NA | NA | NA | 4000/Box | -A | A |
|  AH173-PG-A-B | P | SIP-3L | NA | NA | NA | NA | 4000/Box | -A | B |
|  AH173-PL-B-A | P | SIP-3L | 1000 | -B | NA | NA | NA | NA | A |
|  AH173-PL-B-B | P | SIP-3L | 1000 | -B | NA | NA | NA | NA | B |
|  AH173-PG-B-A | P | SIP-3L | 1000 | -B | NA | NA | NA | NA | A |
|  AH173-PG-B-B | P | SIP-3L | 1000 | -B | NA | NA | NA | NA | B |
|  AH173-WL-7-A | W | SC59 | NA | NA | 3000/Tape & Reel | -7 | NA | NA | A |
|  AH173-WL-7-B | W | SC59 | NA | NA | 3000/Tape & Reel | -7 | NA | NA | B |
|  AH173-WG-7-A | W | SC59 | NA | NA | 3000/Tape & Reel | -7 | NA | NA | A |
|  AH173-WG-7-B | W | SC59 | NA | NA | 3000/Tape & Reel | -7 | NA | NA | B |

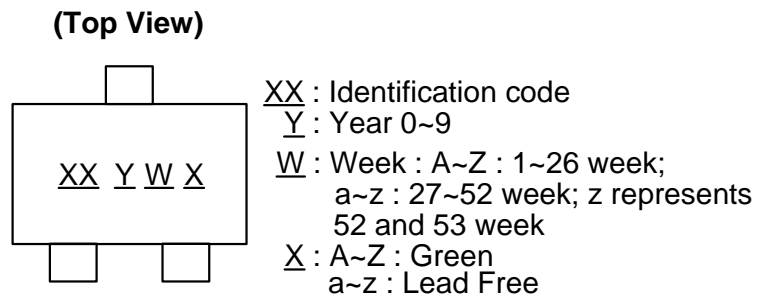
- Notes:
- EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.
 - Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
 - Reverse taping as shown on Diodes Inc. Surface Mount (SMD) Packaging document AP02007, which can be found on our website <http://www.diodes.com/datasheets/ap02007.pdf>.
 - Ammo Box is for SIP-3L Spread Lead.
 - Bulk is for SIP-3L Straight Lead.

Marking Information

(1) SIP-3L



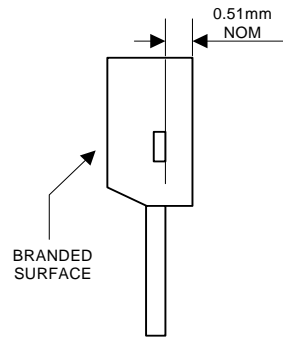
(2) SC59 (Commonly known as SOT23 in Asia)



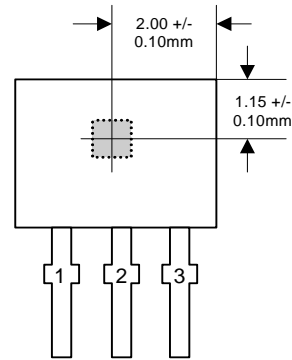
| Part Number | Package | Identification Code |
|-------------|---------|---------------------|
| AH173 | SC59 | J3 |

Package Outline Dimensions (All Dimensions in mm)

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

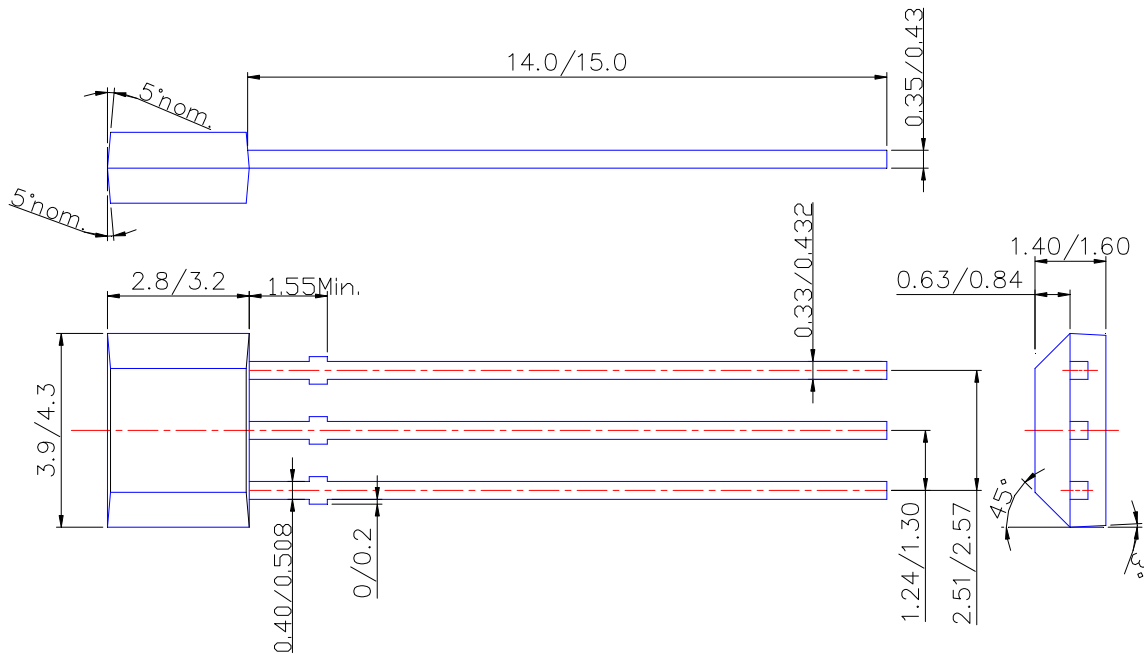


Active Area Depth



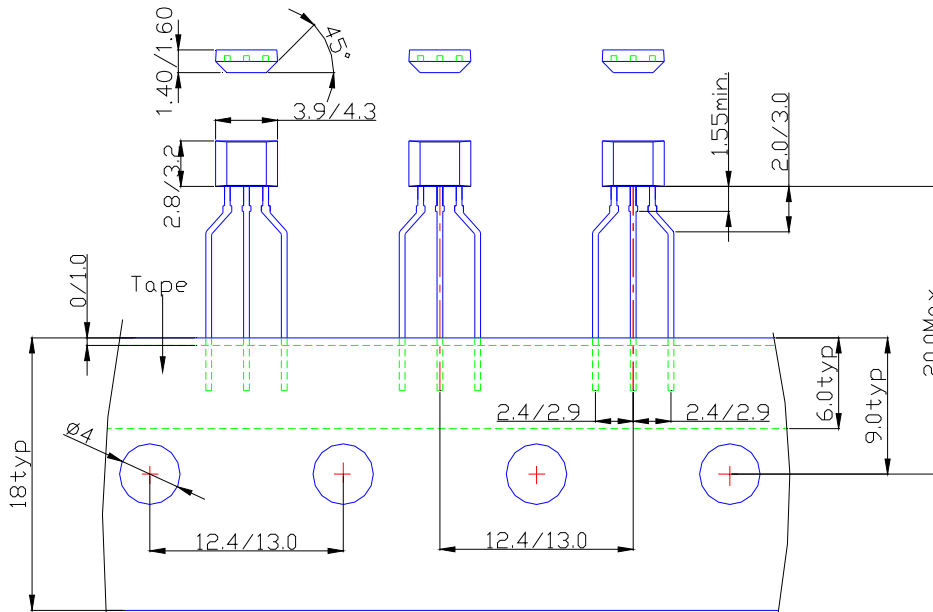
Sensor Location

Package Dimension

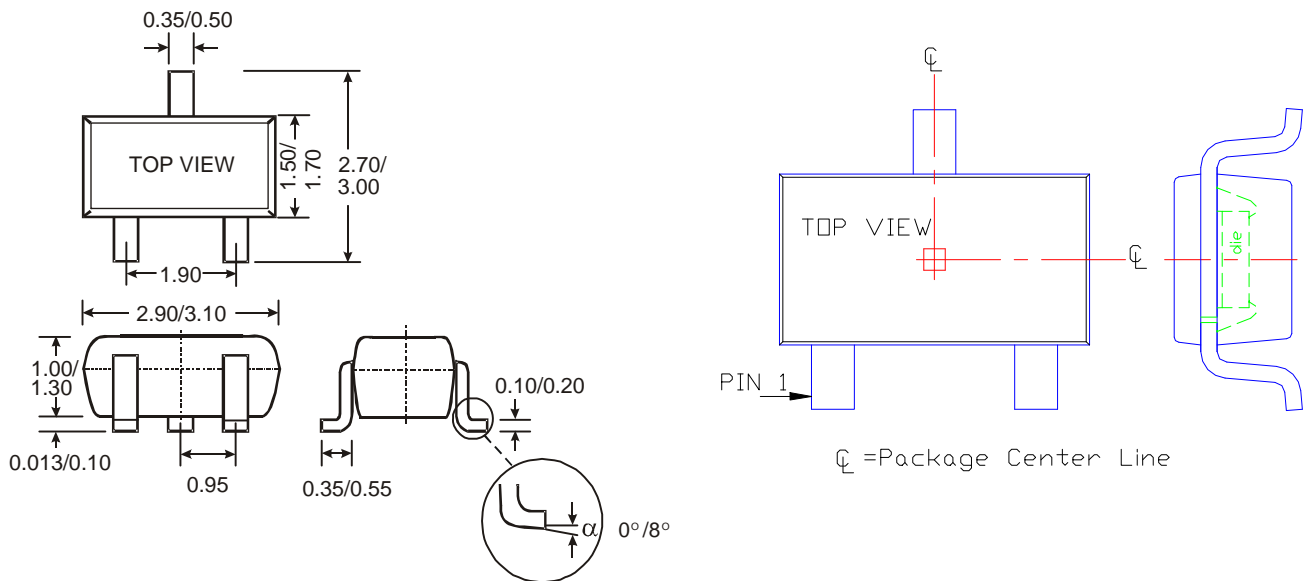


Package Outline Dimensions (Continued)

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



(3) SC59 (Commonly known as SOT23 in Asia)



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