

### Description

AH375 is an integrated Hall-Effect latched sensor designed for electronic commutation of brush-less DC motor applications. The device includes an on-chip Hall voltage generator for magnetic sensing, a comparator that amplifies the Hall voltage, and a Schmitt trigger to provide switching hysteresis for noise rejection, and open drain output. 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 (**Bop**), 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.

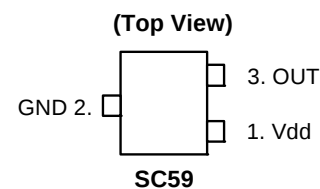
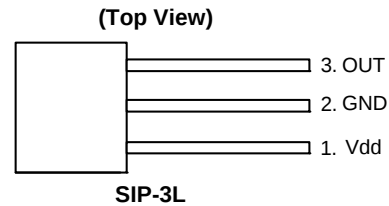
The AH375 is available in SIP-3L and SC59 packages.

### Features

- Bipolar Hall-Effect latch sensor
- 2.2V to 20V DC Operating voltage
- Temperature compensation
- Open drain pre-driver
- 25mA maximum output sink current
- Operating temperature: -40°C to +125°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](http://www.diodes.com/products/lead_free.html).

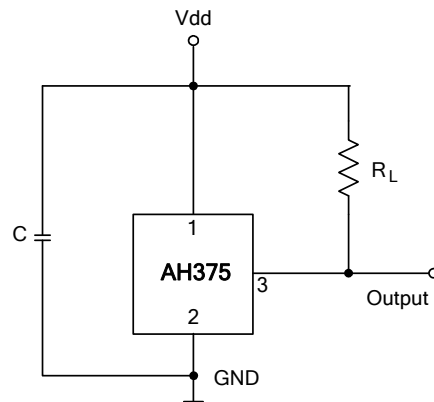
### Pin Assignments



### Applications

- Brush-Less DC Motor
- Brush-Less DC Fan
- Revolution Counting
- Speed Measurement

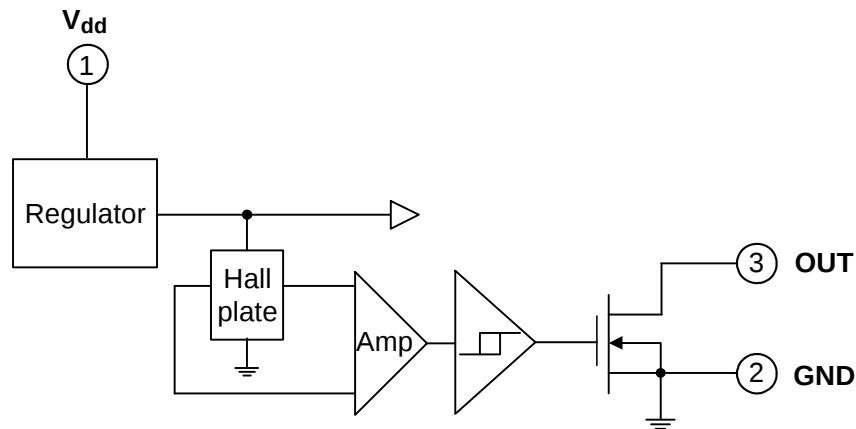
### Typical Application Circuit



## Pin Descriptions

| Pin Name | P/I/O | Pin # | Description           |
|----------|-------|-------|-----------------------|
| Vdd      | P     | 1     | Positive Power Supply |
| GND      | P     | 2     | Ground                |
| OUT      | O     | 3     | Output Pin            |

## Functional Block Diagram



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

| Symbol              | Characteristics              |            | Values    | Unit |
|---------------------|------------------------------|------------|-----------|------|
| Vdd                 | Supply Voltage               |            | 20        | V    |
| B                   | Magnetic Flux Density        |            | Unlimited |      |
| V <sub>DS</sub>     | Output OFF Voltage           |            | 30        | V    |
| I <sub>d</sub>      | Output "On" Current          | Continuous | 25        | mA   |
| T <sub>S</sub>      | Storage Temperature Range    |            | -65~+150  | °C   |
| T <sub>J(MAX)</sub> | Maximum Junction Temperature |            | 150       | °C   |
| P <sub>D</sub>      | Package Power Dissipation    | SIP-3L     | 550       | mW   |
|                     |                              | SC59       | 230       |      |
| $\theta_{JC}$       | Thermal Resistance           | SIP-3L     | 227       | °C/W |
|                     |                              | SC59       | 543       |      |

## Recommended Operating Conditions

| Symbol         | Parameter                     | Conditions | Min | Max | Unit |
|----------------|-------------------------------|------------|-----|-----|------|
| Vdd            | Supply Voltage (Note 2)       | Operating  | 2.2 | 20  | V    |
| T <sub>A</sub> | Operating Ambient Temperature | Operating  | -40 | 125 | °C   |

Notes: 2. The output of IC will be switched after the supply voltage is over 2.2V, but the magnetic characteristics won't be normal until the supply is over 2.5V.

**Electrical Characteristics ( $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 12\text{V}$ )**

| Symbol        | Characteristic            | Test Conditions         | Min | Typ. | Max | Unit          |
|---------------|---------------------------|-------------------------|-----|------|-----|---------------|
| $V_{DS(SAT)}$ | Output Saturation Voltage | $I_{out} = 20\text{mA}$ | -   | 300  | 700 | mV            |
| $I_{off}$     | Output Leakage Current    | $V_{DD} = 14\text{V}$   | -   | <0.1 | 10  | $\mu\text{A}$ |
| $I_{dd}$      | Supply Current            | Output Open             | -   | 2    | 4   | mA            |

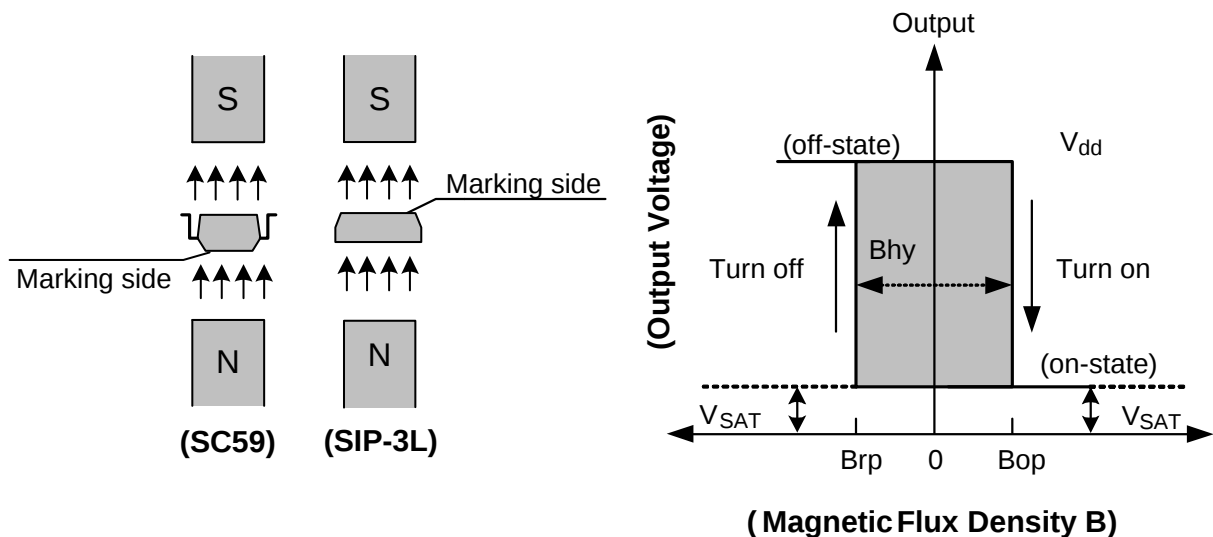
**Magnetic Characteristics ( $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 2.5\text{V to } 20\text{V}$ , Note 3)**

(1mT = 10 Gauss)

| Symbol                          | Parameter       | Min | Typ. | Max | Unit  |
|---------------------------------|-----------------|-----|------|-----|-------|
| Bops(south pole to brand side)  | Operation Point | 5   | 30   | 60  | Gauss |
| Brps(south pole to brand side)  | Release Point   | -60 | -30  | -5  | Gauss |
| $B_{hy}( B_{opx}  -  B_{rpx} )$ | Hysteresis      | -   | 60   | -   | Gauss |

Notes: 3. Magnetic characteristics may vary with supply voltage, operating temperature and after soldering.

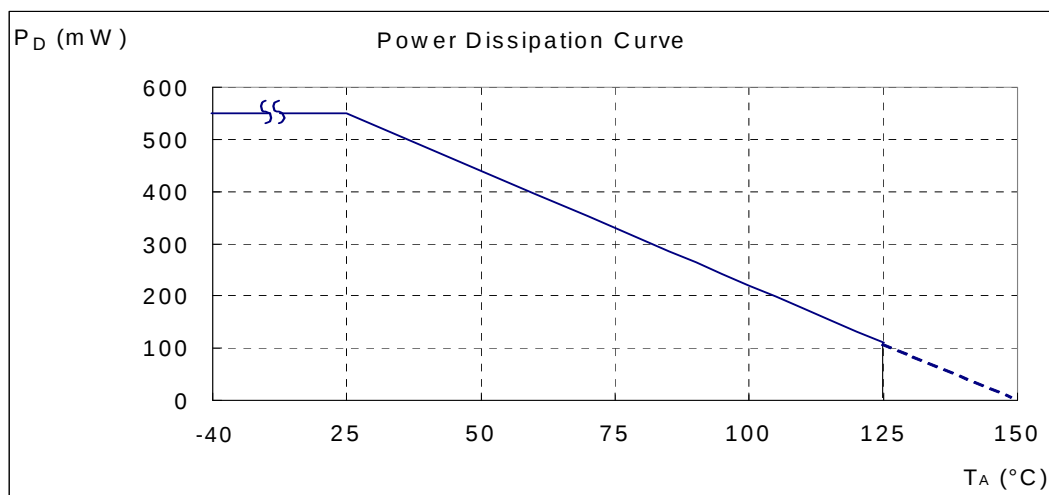
**Operating Characteristics**



## Performance Characteristics

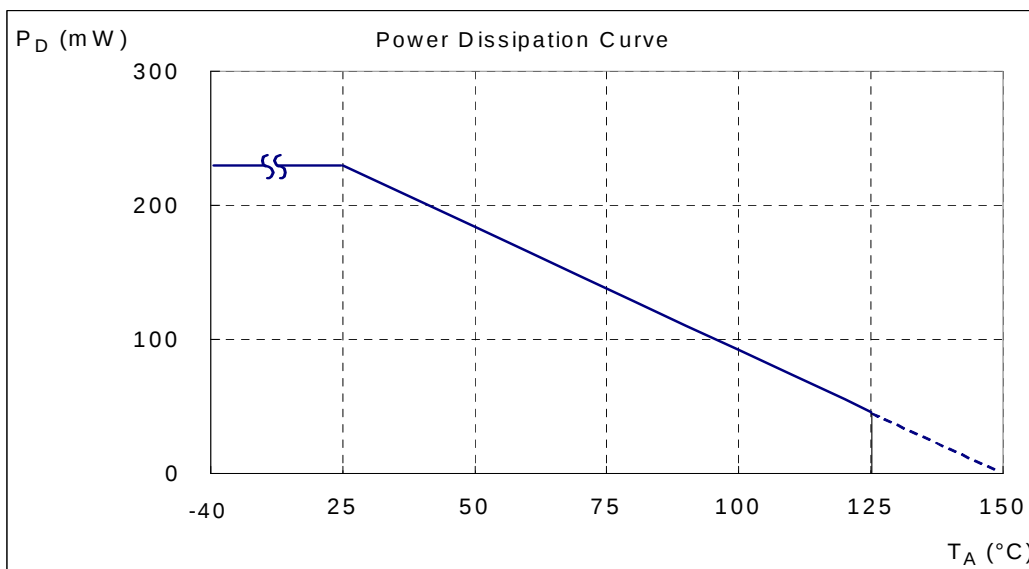
### (1) SIP-3L

| $T_A$ (°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   |

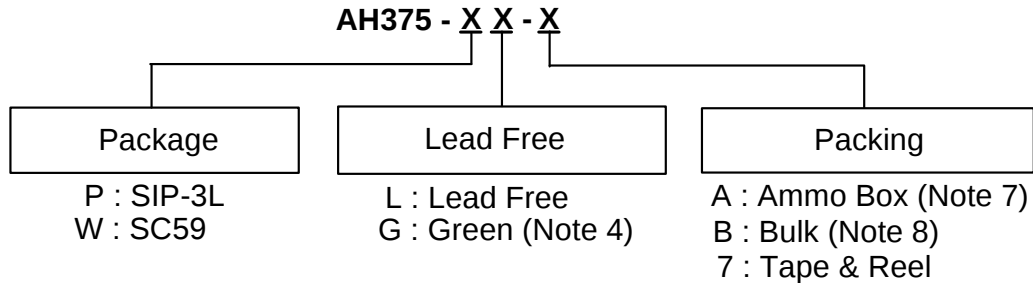


### (2) SC59 (commonly known as SOT23 in Asia)

| $T_A$ (°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

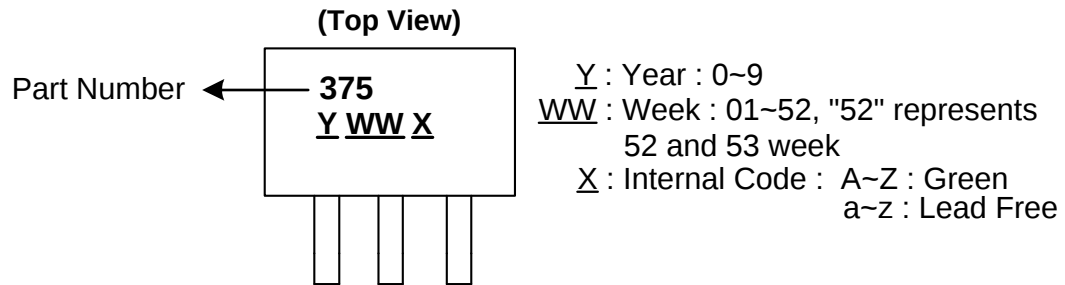


| Device                                                                                         | Package Code | Packaging (Note 5, 6) | Bulk     |                    | 7" Tape and Reel |                    | Ammo Box |                    |
|------------------------------------------------------------------------------------------------|--------------|-----------------------|----------|--------------------|------------------|--------------------|----------|--------------------|
|                                                                                                |              |                       | Quantity | Part Number Suffix | Quantity         | Part Number Suffix | Quantity | Part Number Suffix |
|  AH375-PL-A   | P            | SIP-3L                | NA       | NA                 | NA               | NA                 | 4000/Box | -A                 |
|  AH375-PL-B   | P            | SIP-3L                | 1000     | -B                 | NA               | NA                 | NA       | NA                 |
|  AH375-PG-A   | P            | SIP-3L                | NA       | NA                 | NA               | NA                 | 4000/Box | -A                 |
|  AH375-PG-B   | P            | SIP-3L                | 1000     | -B                 | NA               | NA                 | NA       | NA                 |
|  AH375-WL-7  | W            | SC59                  | NA       | NA                 | 3000/Tape & Reel | -7                 | NA       | NA                 |
|  AH375-WG-7 | W            | SC59                  | NA       | NA                 | 3000/Tape & Reel | -7                 | NA       | NA                 |

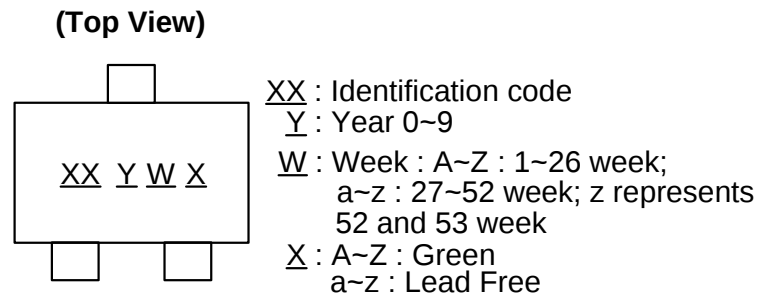
- Notes:
4. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at [http://www.diodes.com/products/lead\\_free.html](http://www.diodes.com/products/lead_free.html).
  5. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  6. 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>.
  7. Ammo Box is for SIP-3L Spread Lead.
  8. Bulk is for SIP-3L Straight Lead.

## Marking Information

### (1) SIP-3L



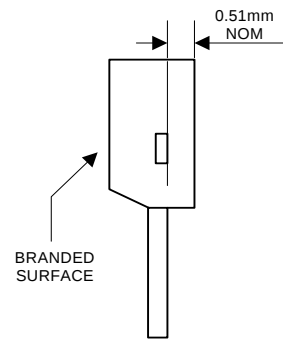
### (2) SC59 (Commonly known as SOT23 in Asia)



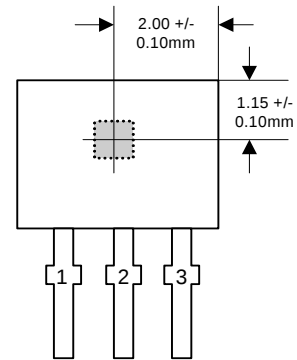
| Part Number | Package | Identification Code |
|-------------|---------|---------------------|
| AH375       | SC59    | P3                  |

### **Package Outline Dimensions (All Dimensions in mm)**

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

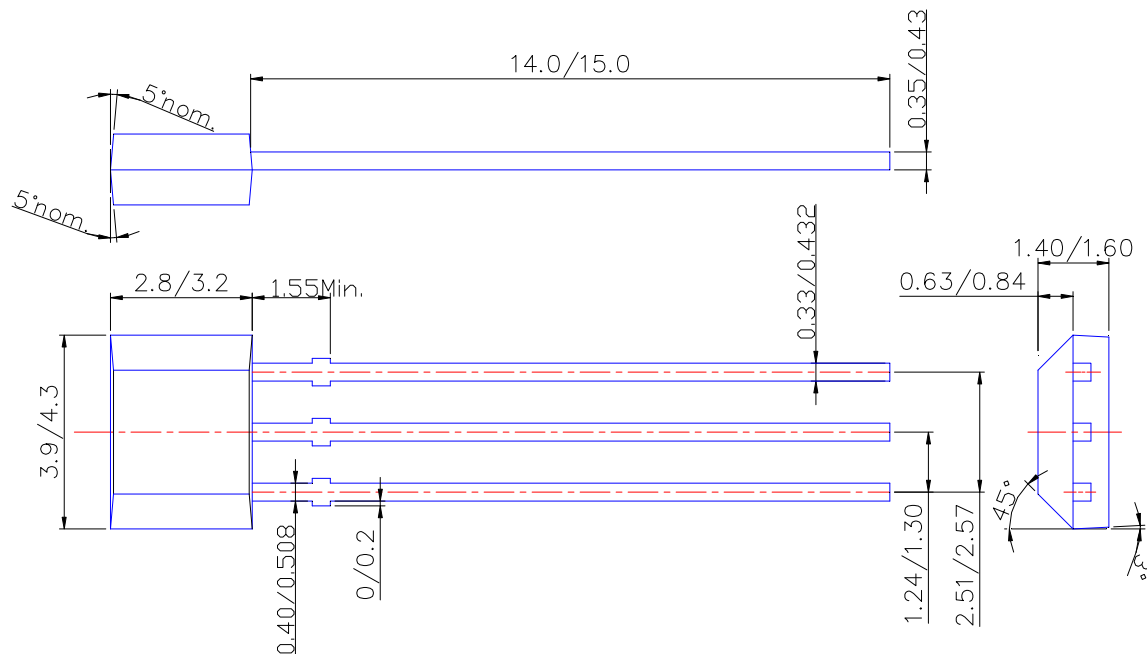


Active Area Depth



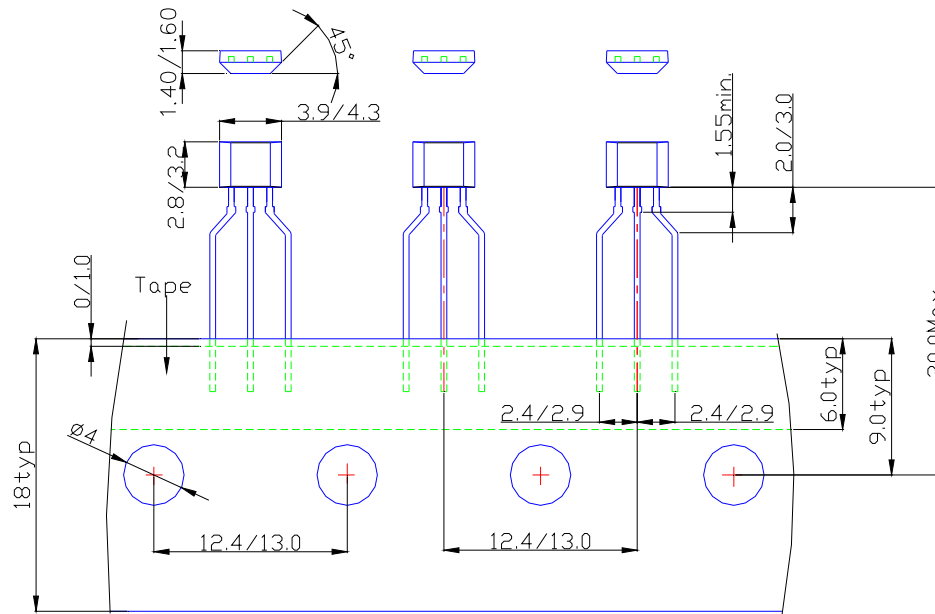
## Sensor Location

## Package Dimension

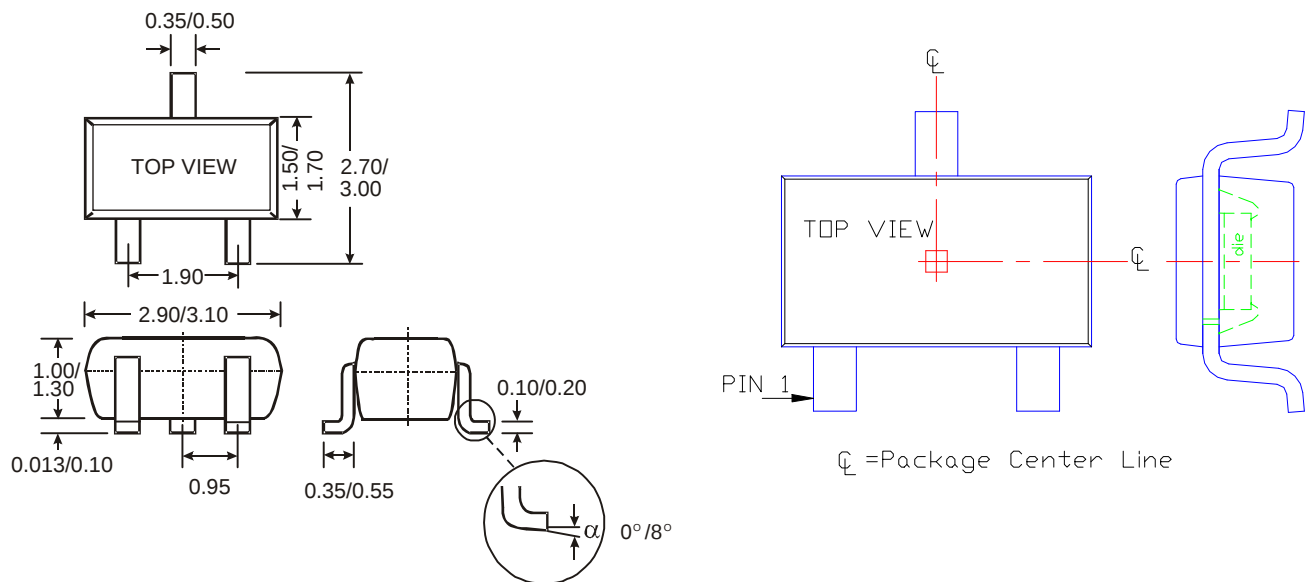


**Package Outline Dimensions (Continued)**

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



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



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