

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.

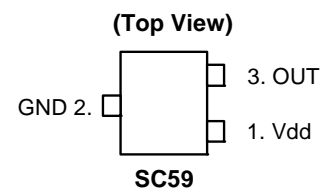
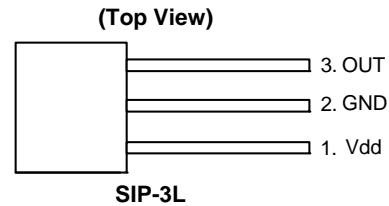
The AH375 is available in SIP-3L and SC59 packages.

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.

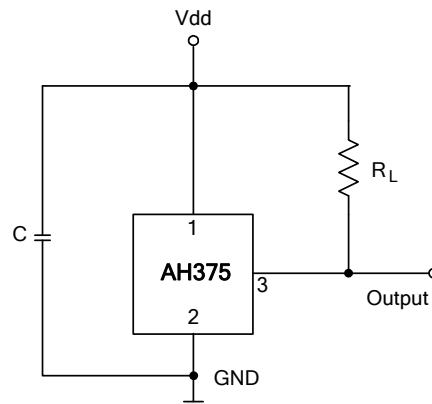
Pin Assignments



Applications

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

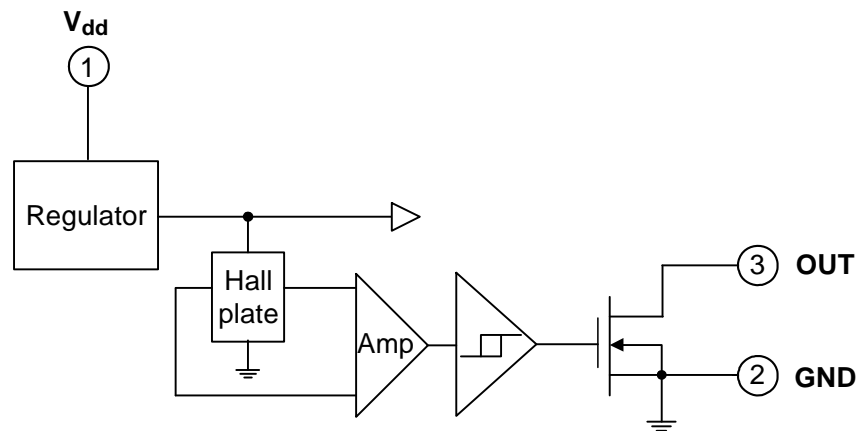
Typical Application Circuit



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 _{DS} | Output OFF Voltage | 30 | V |
| I _d | Output "On" Current | Continuous | 25 mA |
| T _S | Storage Temperature Range | -65~+150 | °C |
| T _{J(MAX)} | Maximum Junction Temperature | 150 | °C |
| P _D | Package Power Dissipation | SIP-3L | 550 |
| | | SC59 | 230 |
| θ_{JC} | Thermal Resistance | SIP-3L | 227 |
| | | SC59 | 543 |

Recommended Operating Conditions

| Symbol | Parameter | Conditions | Min | Max | Unit |
|----------------|-------------------------------|------------|-----|-----|------|
| Vdd | Supply Voltage (Note 2) | Operating | 2.2 | 20 | V |
| T _A | 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 ($T_A = 25\text{ }^\circ\text{C}$, $V_{DD} = 12\text{V}$)

| 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 | μA |
| I_{DD} | Supply Current | Output Open | - | 2 | 4 | mA |

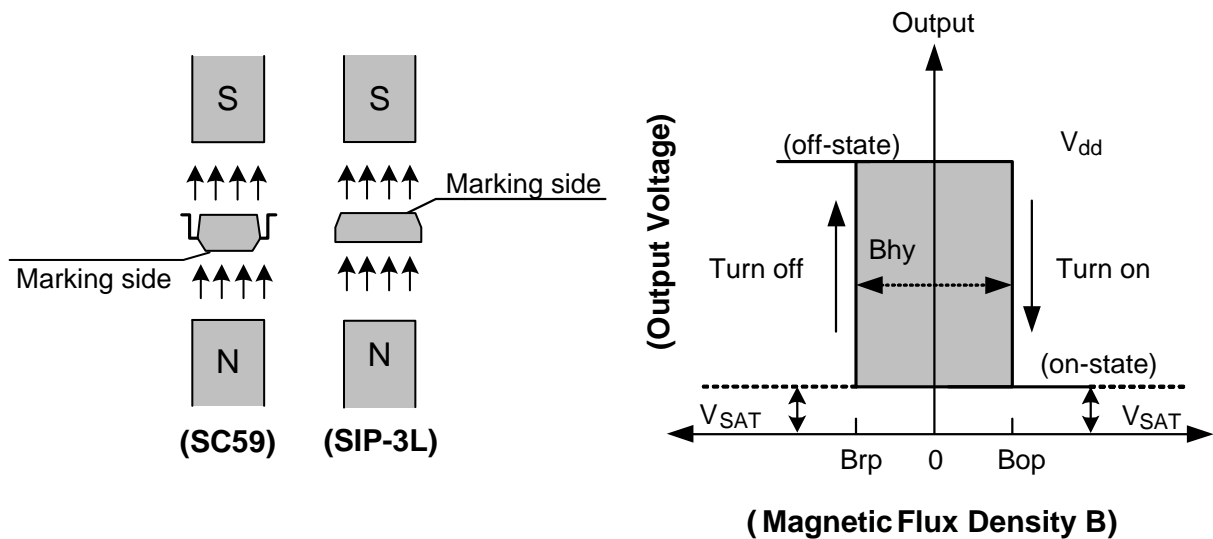
Magnetic Characteristics ($T_A = 25\text{ }^\circ\text{C}$, $V_{DD} = 2.5\text{V to } 20\text{V}$, Note 3)

(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.

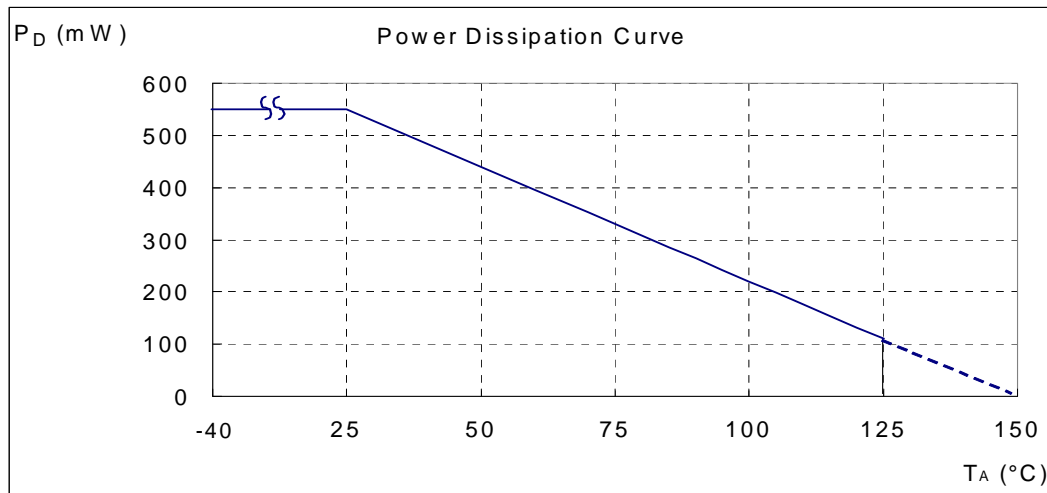
Operating Characteristics



Performance Characteristics

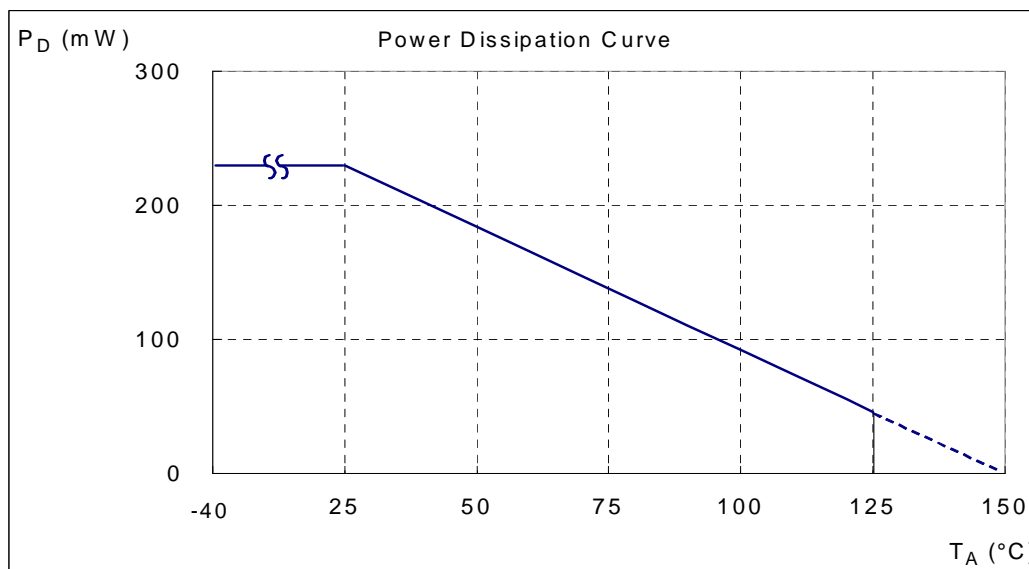
(1) SIP-3L

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

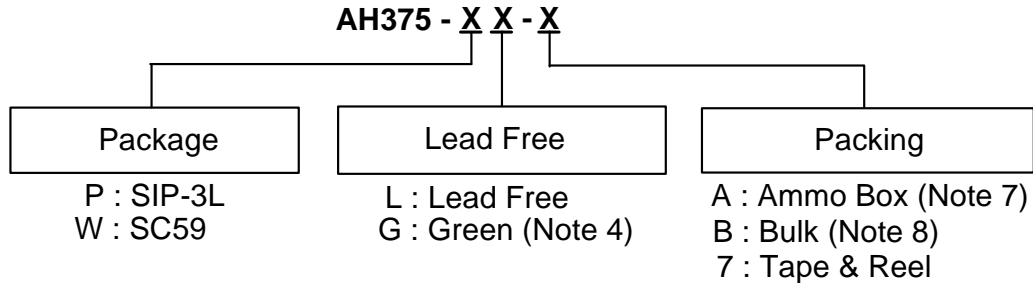








(2) SC59 (commonly known as SOT23 in Asia)

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

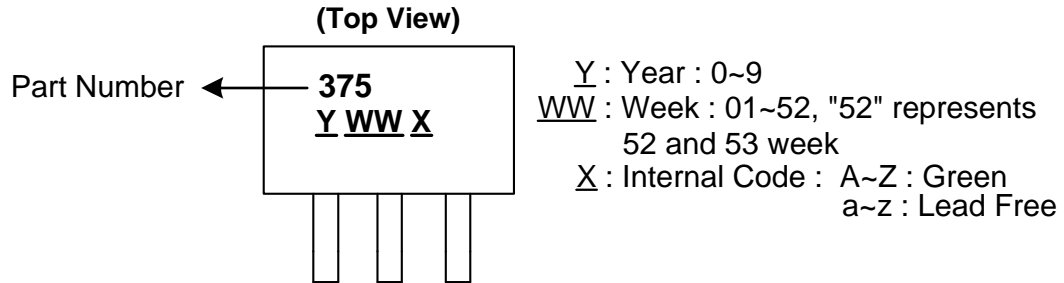


| Device | Package Code | Packaging (Note 5, 6) | Bulk | | 7" Tape and Reel | | Ammo Box | |
|--|--------------|-----------------------|----------|--------------------|------------------|--------------------|----------|--------------------|
| | | | Quantity | Part Number Suffix | Quantity | Part Number 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 |

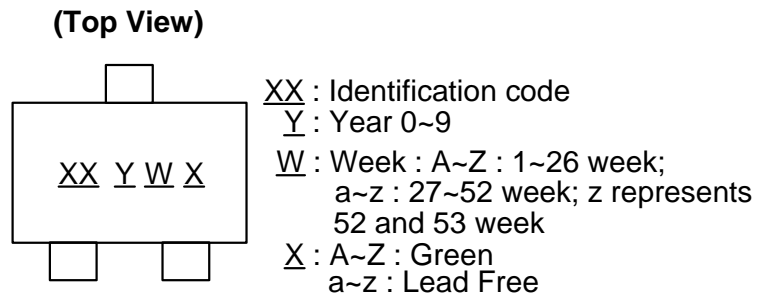
- Notes:
4. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.
 5. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
 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



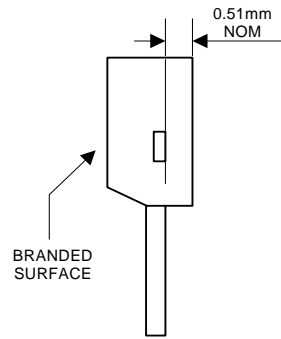
(2) SC59 (Commonly known as SOT23 in Asia)



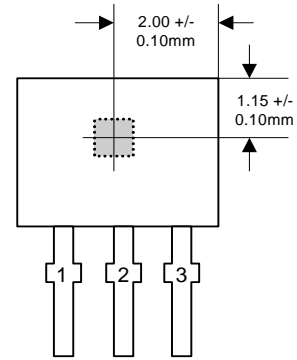
| Part Number | Package | Identification Code |
|-------------|---------|---------------------|
| AH375 | SC59 | P3 |

Package Outline Dimensions (All Dimensions in mm)

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

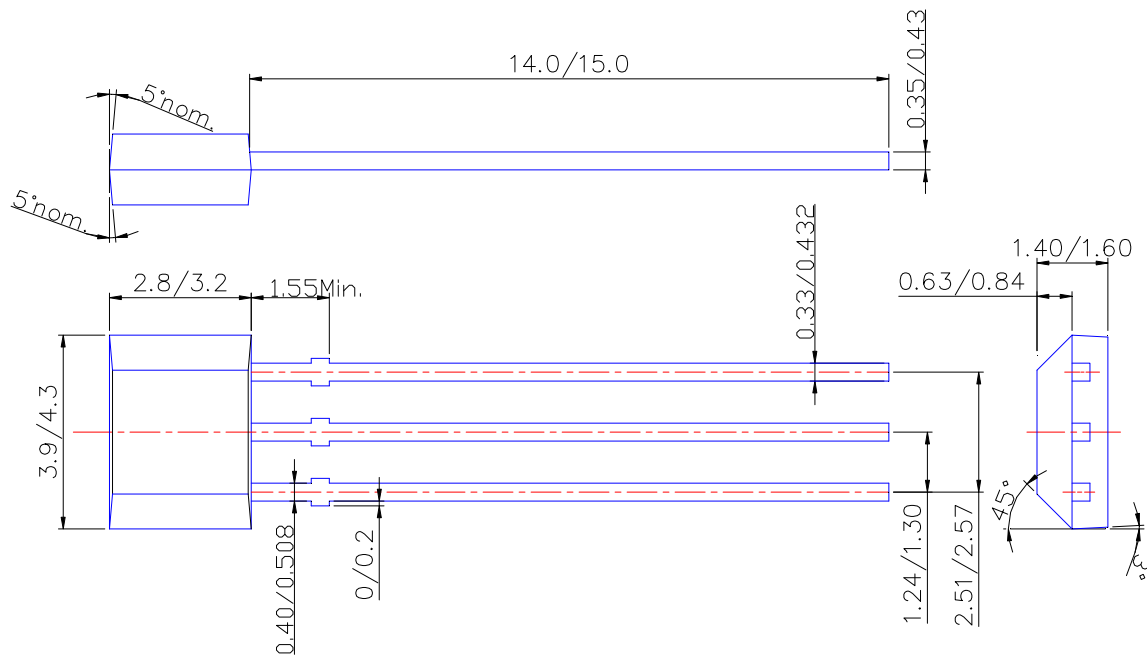


Active Area Depth



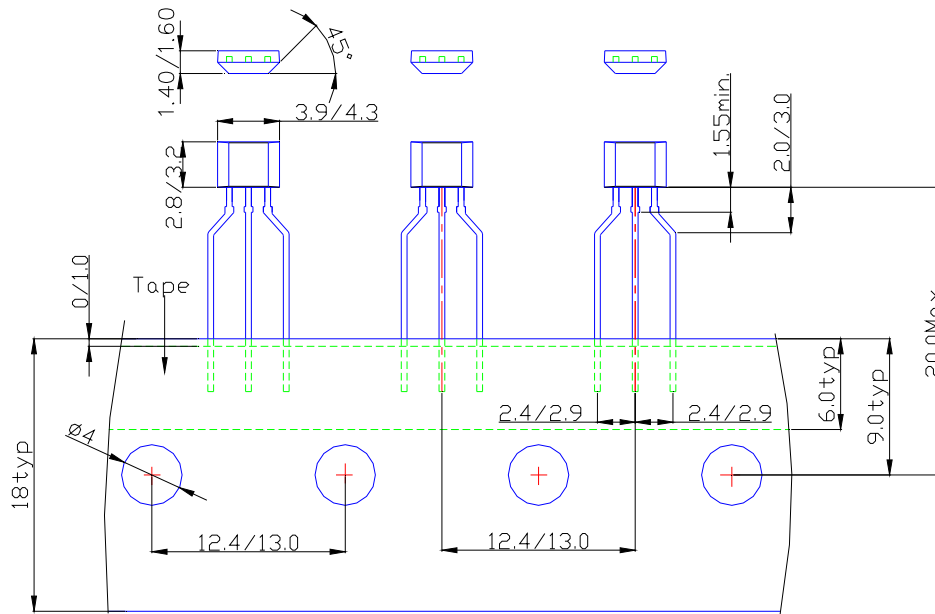
Sensor Location

Package Dimension

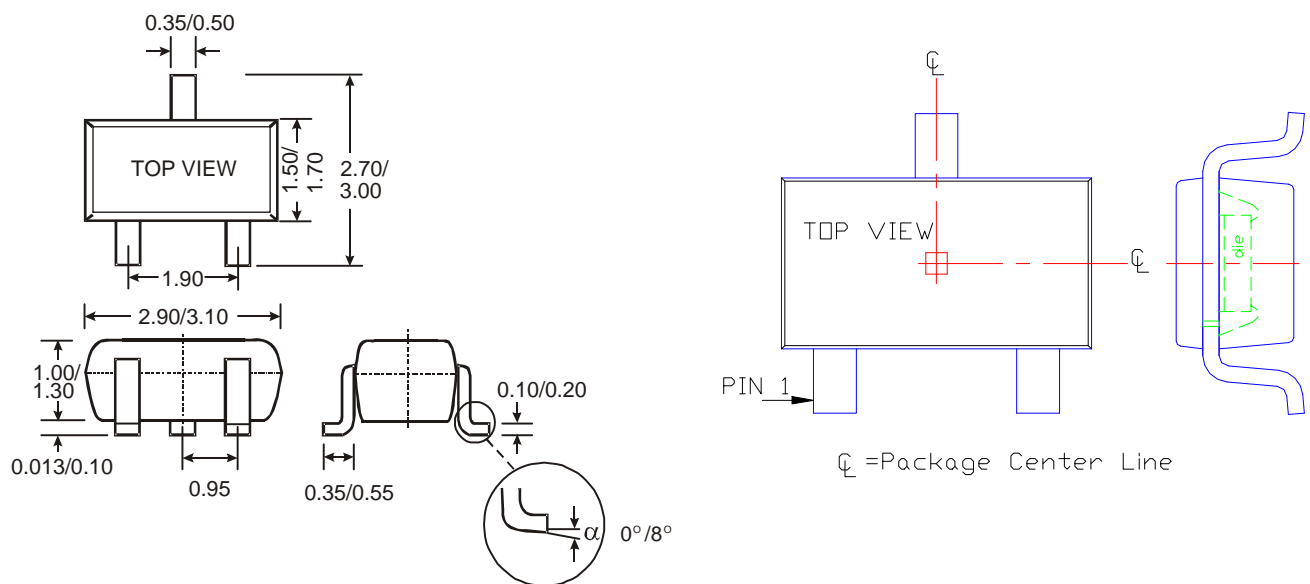


Package Outline Dimensions (Continued)

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



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



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