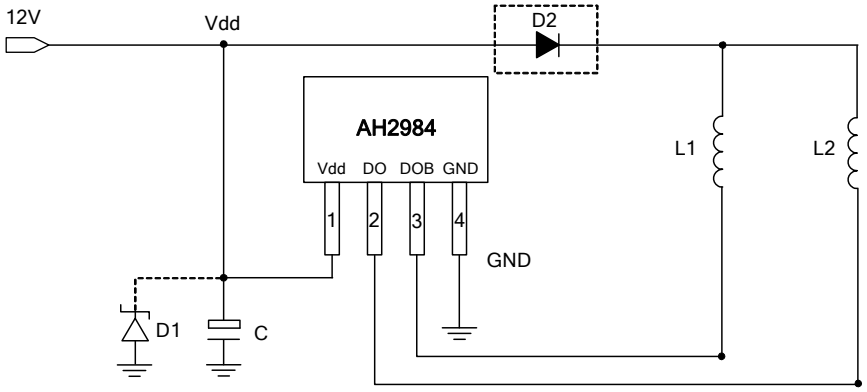
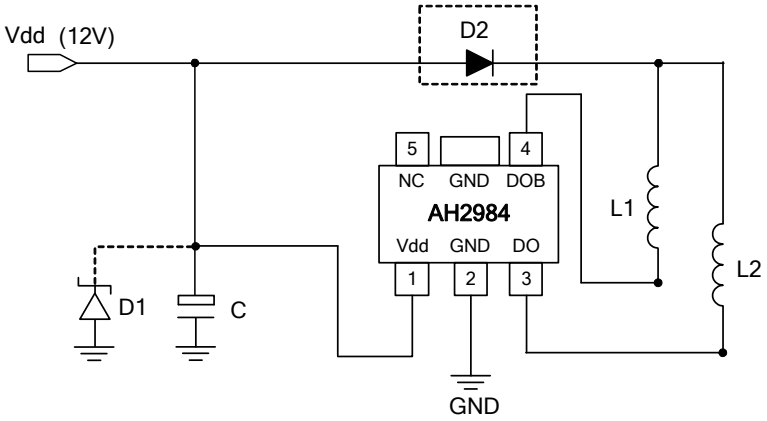
## Typical Applications Circuit (Note 4)

### (1) For SIP-4




**12V Brushless DC Fan**

### (2) For SOT89-5




**12V Brushless DC Fan**

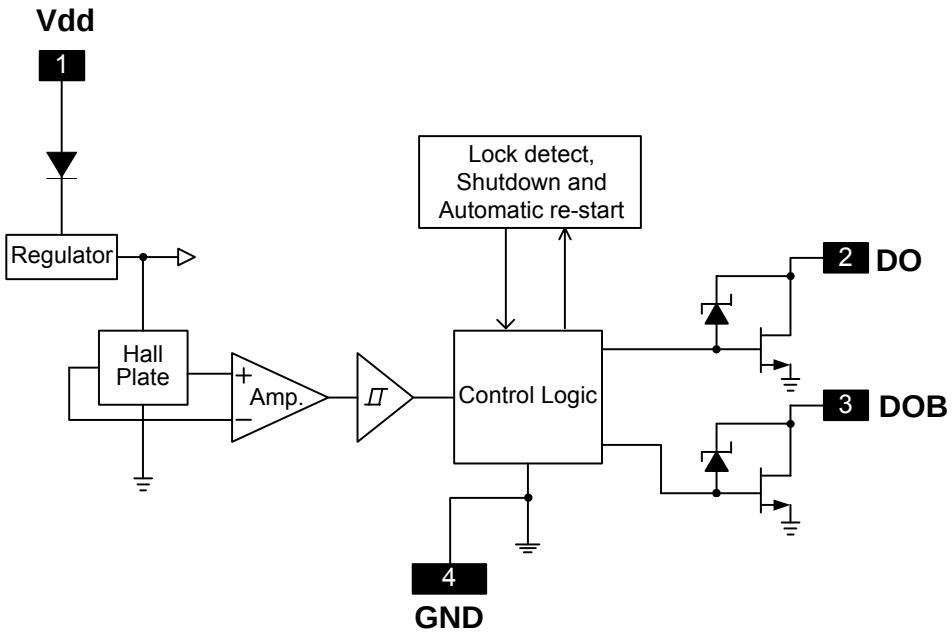
Note: 4. D1 (Zener Diode) and Capacitor C are for power stabilization. Recommended value of C is 1μF/ 50V (E-Cap). Diode D2 is optional and helps to protect the device and fan coils from reverse power conditions. The AH2984 also includes an internal reverse blocking diode at $V_{DD}$ pin.

## Pin Descriptions

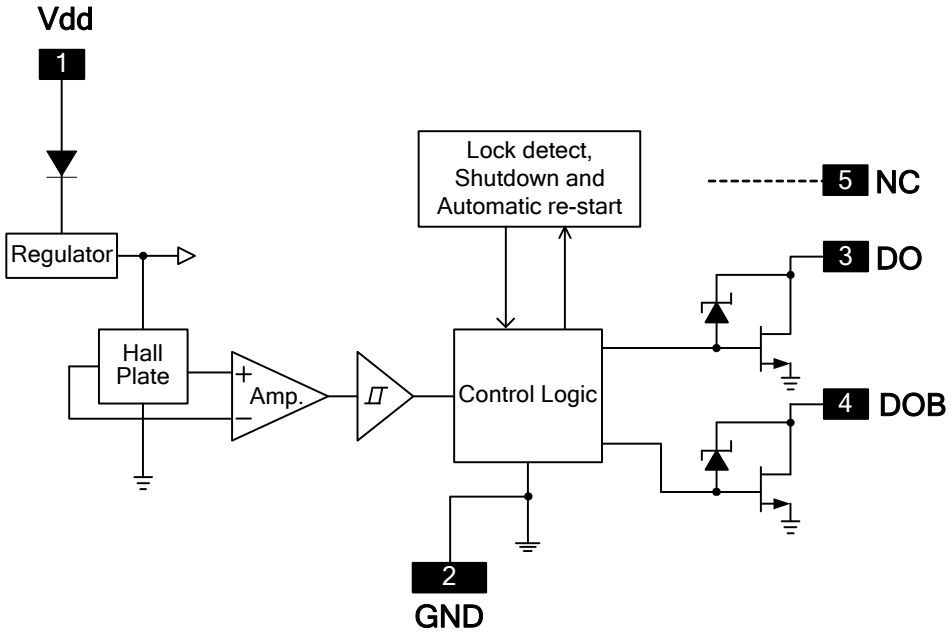
| Pin Name | SIP-4 | SOT89-5 | Description |
|---|---|---|---|
| $V_{DD}$ | 1 | 1 | Input Power |
| DO | 2 | 3 | Output Pin |
| DOB | 3 | 4 | Output Pin |
| GND | 4 | 2 | Ground |
| NC | — | 5 | No Connection |

## Functional Block Diagram

### (1) For SIP-4

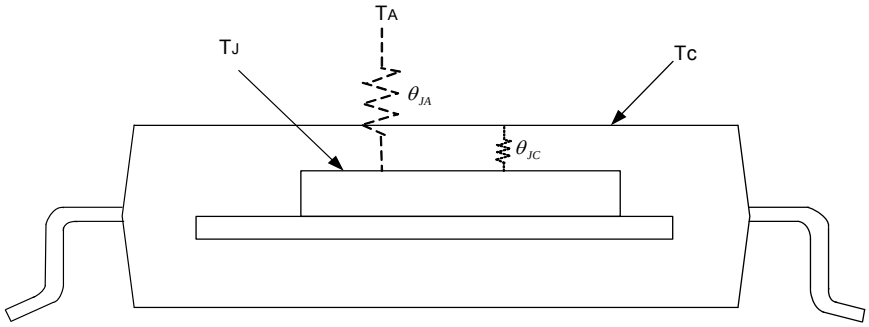



### (2) For SOT89-5



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

| Symbol | Conditions | | Rating | Unit |
|---|---|---|---|---|
| $V_{DD}$ | Supply Voltage | | 18 | V |
| $V_{RDD}$ | Reverse $V_{DD}$ Polarity Voltage | | -15 | V |
| $I_{O(AVE)}$ | Output Current (Note 5) | | 500 | mA |
| $I_{O(peak\ as\ hold)}$ | | | 800 | |
| $P_D$ | Power Dissipation | SIP-4 | 550 | mW |
| | | SOT89-5 | 800 | mW |
| $T_{ST}$ | Storage Temperature | | -55 to +150 | °C |
| $T_J$ | Maximum Junction Temperature | | +150 | °C |
| $\theta_{JA}$ | Thermal Resistance (Note 6) | SIP-4 | 227 | °C/W |
| | | SOT89-5 | 168 | °C/W |
| $\theta_{JC}$ | Thermal Resistance (Note 6) | SIP-4 | 49 | °C/W |
| | | SOT89-5 | 36 | °C/W |




## Recommended Operating Conditions (@$T_A$ = +25°C, unless otherwise specified.)

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_{DD}$ | Supply Voltage | Operating | 2.5 | 15 | V |
| $T_A$ | Operating Ambient Temperature (Note 5) | Operating | -40 | +105 | °C |

## Electrical Characteristics (@$T_A$ = +25°C; $V_{DD}$ = 12V; unless otherwise specified, Note 4)

| Symbol | Characteristics | Conditions | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| $I_{DD}$ | Supply Current | Operating, $V_{DD}$ = 12V | 2.0 | 3.5 | 5.0 | mA |
| $T_{on}$ | Locked Protection On Time | — | — | 0.25 | — | s |
| $T_{off}$ | Locked Protection Off Time | — | — | 3.25 | — | s |
| $R_{duty}$ | Locked Protection Duty Ratio | $T_{off}/T_{on}$ | — | 13 | — | — |
| $R_{DS(ON)}$ | Output On Resistance | $I_O$= 300mA | — | 1 | 1.67 | Ω |
| | | $I_O$= 500mA | — | 1.25 | 1.8 | |
| $V_Z$ | Output Zener-Breakdown Voltage | (Note 7) | 24 | 33 | 42 | V |

Notes: 5. Shall not exceed $P_D$ and Safety Operation Area.
6. $\theta_{JA}$ should be confirmed with heat sink thermal resistance. SOT89 exposed pad soldered to minimum recommended landing pads (see Package Outline Dimension section) on 2"x2" two-layer 2oz.copper FR4 PCB with thermal vias in the exposed pad connecting to the copper flood on the bottom layer.
7. The $V_Z$ value is in D.C voltage measurement. The $V_Z$ may vary with coils in A.C. voltage measurements.

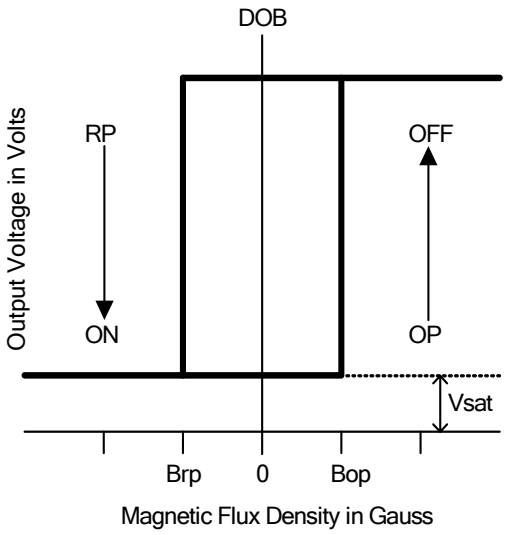
## Magnetic Characteristics ($T_A$ = +25°C, $V_{DD}$ = 2.5V to 15V, Note 8)

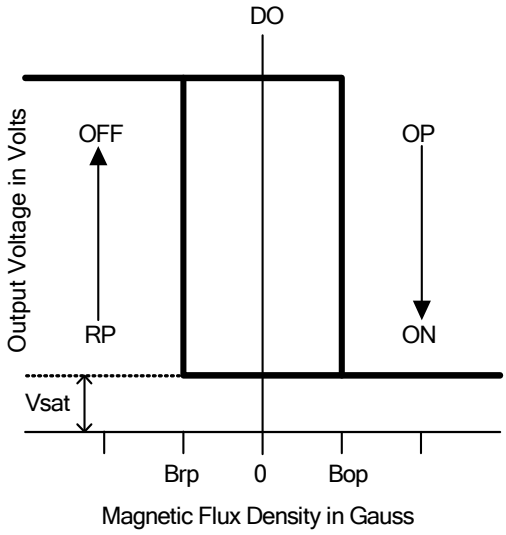
(1mT=10 Gauss)

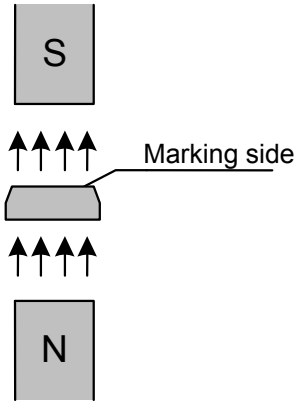
| Symbol | Characteristics | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|
| $B_{OP}$ | Operate Point | 5 | 30 | 60 | Gauss |
| $B_{RP}$ | Release Point | -60 | -30 | -5 | Gauss |
| $B_{HY}$ | Hysteresis | 20 | 60 | 120 | Gauss |

Note: 8. The magnetic characteristics may vary with supply voltage, operating temperature and after soldering.

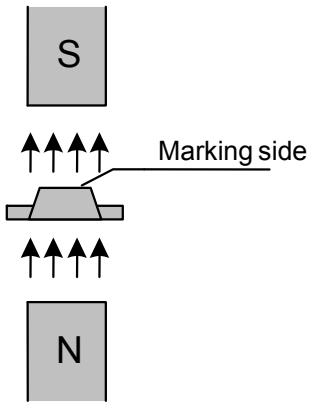
## Operating Characteristics




(SIP-4)

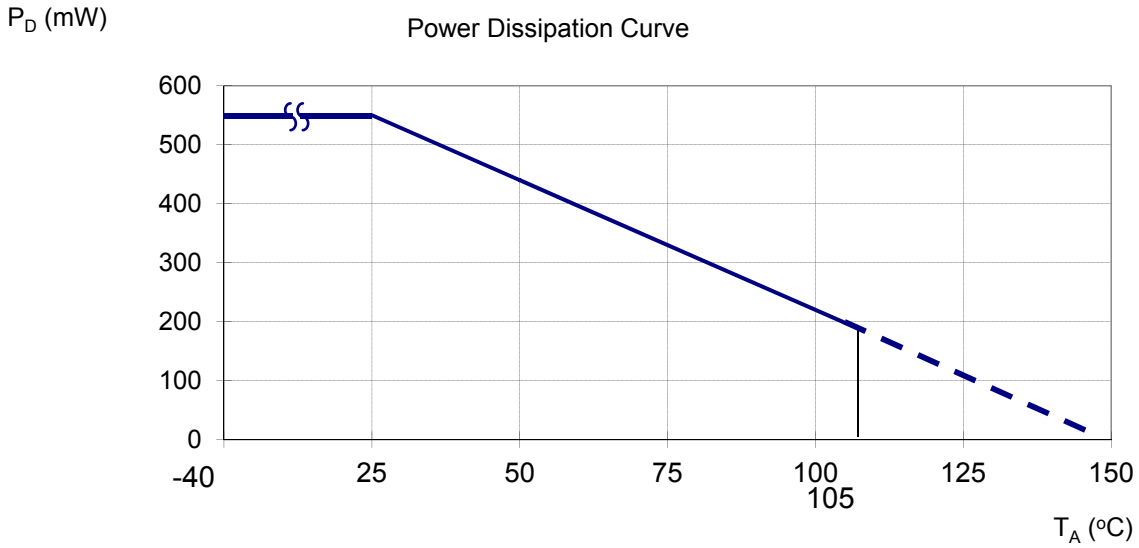



(SOT89-5)

## Performance Characteristics

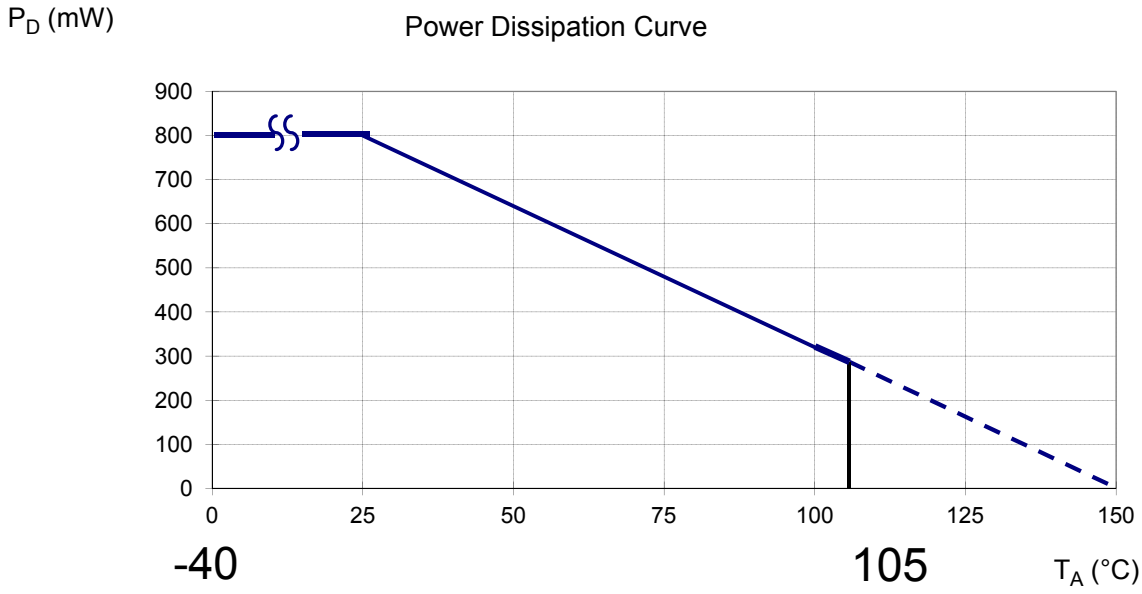
**(1) SIP-4**

| $T_A$(°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 |

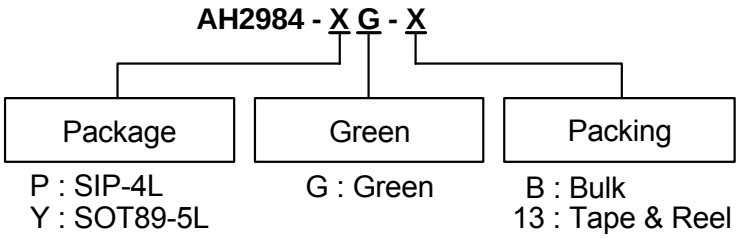



**(2) SOT89-5**

| $T_A$ (°C) | 25 | 50 | 60 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|
| $P_D$ (mW) | 800 | 640 | 576 | 512 | 480 | 448 | 416 | 384 | 352 | 320 |
| $T_A$ (°C) | 105 | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 145 | 150 |
| $P_D$ (mW) | 288 | 256 | 224 | 192 | 160 | 128 | 96 | 64 | 32 | 0 |



## Ordering Information (Note 9)

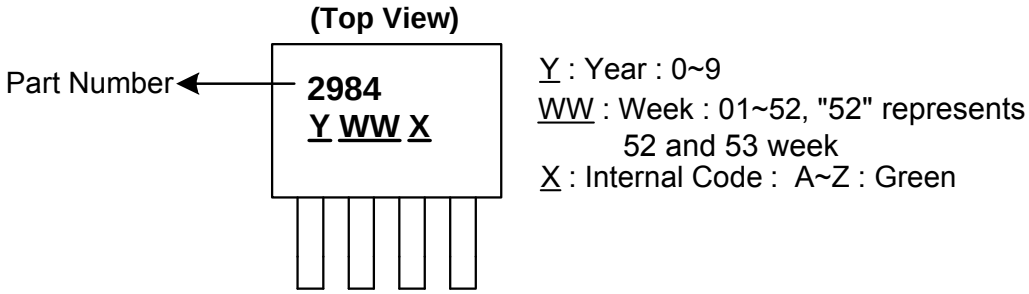



| Device | Package Code | Packaging (Note 9) | Bulk | | 13" Tape and Reel | |
|---|---|---|---|---|---|---|
| | | | Quantity | Part Number Suffix | Quantity | Part Number Suffix |
| AH2984-PG-B | P | SIP-4 | 1000 | -B | NA | NA |
| AH2984-YG-13 | Y | SOT89-5 | NA | NA | 2500/Tape & Reel | -13 |

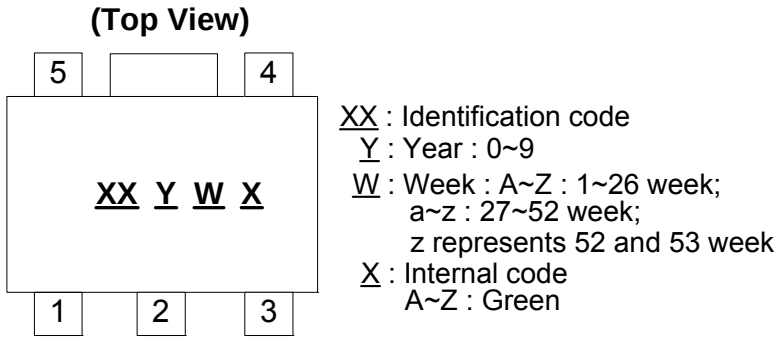
Note: 9. For packaging details, go to our website at http://www.diodes.com/products/packages.html

## Marking Information

### (1) SIP-4



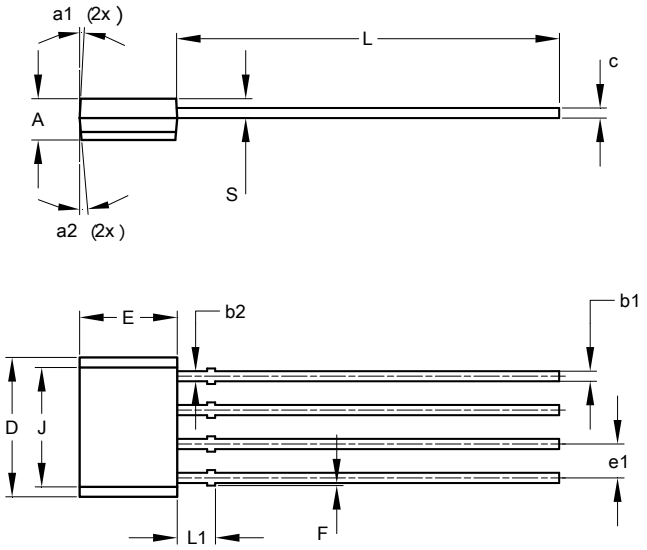

### (2) SOT89-5

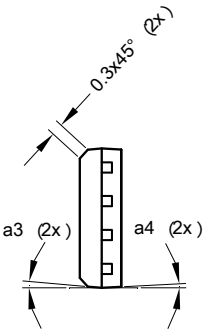



| Device | Package | Identification Code |
|---|---|---|
| AH2984 | SOT89-5 | K1 |

## Package Outline Dimensions (All dimensions in mm.)

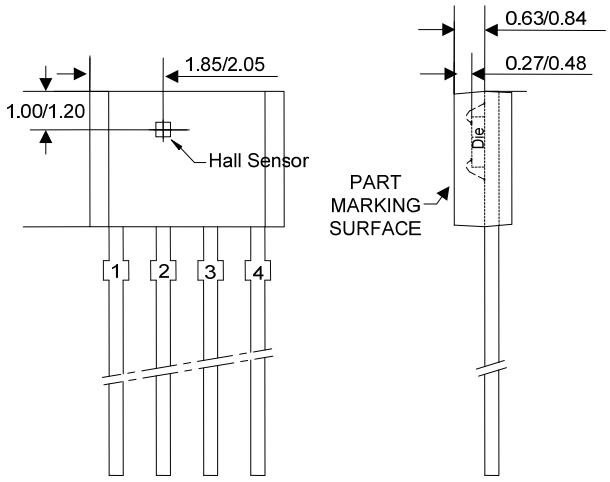
### (1) Package type: SIP-4L



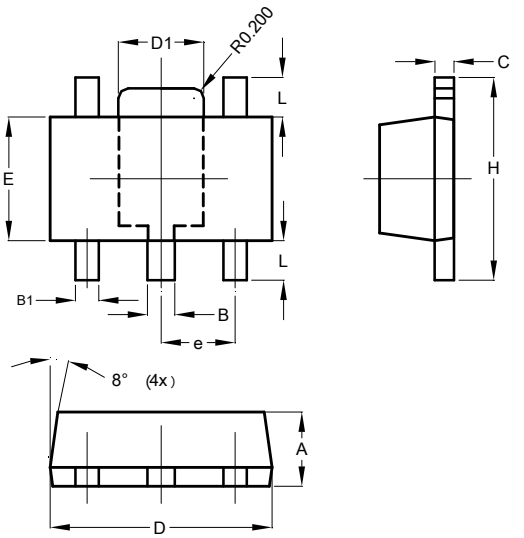

| SIP-4 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 1.45 | 1.65 | 1.55 |
| **b1** | 0.38 | 0.44 | 0.40 |
| **b2** | — | — | 0.48 |
| **c** | 0.35 | 0.45 | 0.40 |
| **D** | 5.12 | 5.32 | 5.22 |
| **e1** | 1.24 | 1.30 | 1.27 |
| **E** | 3.55 | 3.75 | 3.65 |
| **F** | 0.00 | 0.20 | — |
| **J** | 4.10 | 4.30 | 4.20 |
| **L** | 14.00 | 14.60 | 14.30 |
| **L1** | 1.32 | 1.52 | 1.42 |
| **S** | 0.63 | 0.83 | 0.73 |
| **a1** | — | 5° | 3° |
| **a2** | 4° | 7° | 5° |
| **a3** | 4° | 7° | 5° |
| **a4** | — | 5° | 3° |
| **All Dimensions in mm** | | | |

Min/Max (in mm)

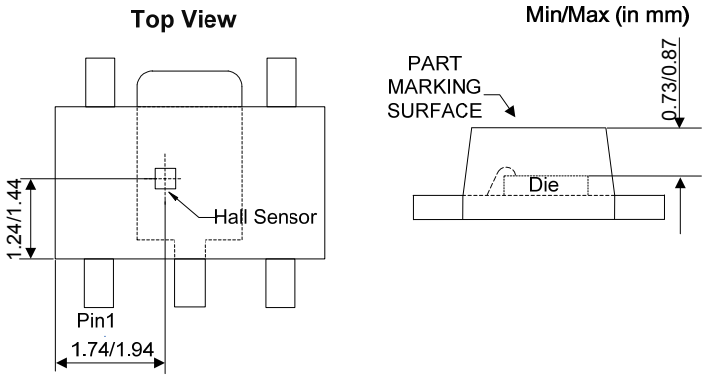


## Package Outline Dimensions (All dimensions in mm.)

### (2) Package type: SOT89-5L




| SOT89-5 | | | |
|---|---|---|---|
| Dim | Min | Max | Typ |
| A | 1.40 | 1.60 | 1.50 |
| B | 0.50 | 0.62 | 0.56 |
| B1 | 0.44 | 0.54 | 0.48 |
| C | 0.35 | 0.43 | 0.38 |
| D | 4.40 | 4.60 | 4.50 |
| D1 | 1.62 | 1.83 | 1.733 |
| E | 2.40 | 2.60 | 2.50 |
| e | — | — | 1.50 |
| H | 3.95 | 4.25 | 4.10 |
| L | 0.65 | 0.95 | 0.80 |
| All Dimensions in mm | | | |



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