

## ■ General Description

The AME385-2.5 is a micropower 2-terminal band-gap voltage regulator diode. It operates over a 20 $\mu$ A to 20mA current range. Each circuit is trimmed at wafer sort to provide a  $\pm 0.20\%$  and  $\pm 0.50\%$  initial tolerance. The design of the AME385-2.5 allows for a large range of load capacitances and operating currents. The low start-up current makes these part ideal for battery applications.

Analog Microelectronics offers this part in a TO-92 and SO-8 package as well as the space saving SOT-23.

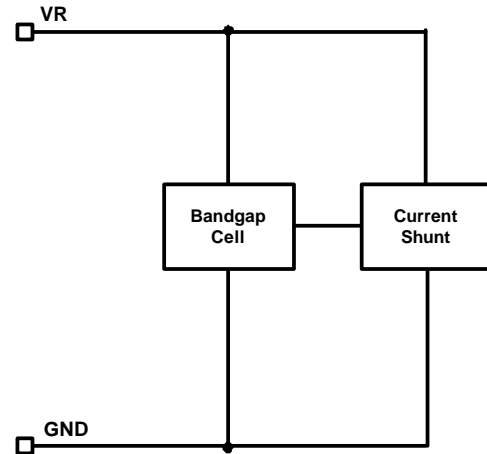
## ■ Features

- Small packages: SOT-23, TO-92, SO-8
- Tolerates capacitive loads
- Fixed reverse breakdown voltage of 2.5V
- Tight voltage tolerance -----  $\pm 0.20\%$ ,  $\pm 0.5\%$
- Wide operating current ----- 20 $\mu$ A to 20mA
- Wide temperature range -----  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Low temperature coefficient --100ppm/ $^{\circ}\text{C}$  (max)
- Excellent transient response

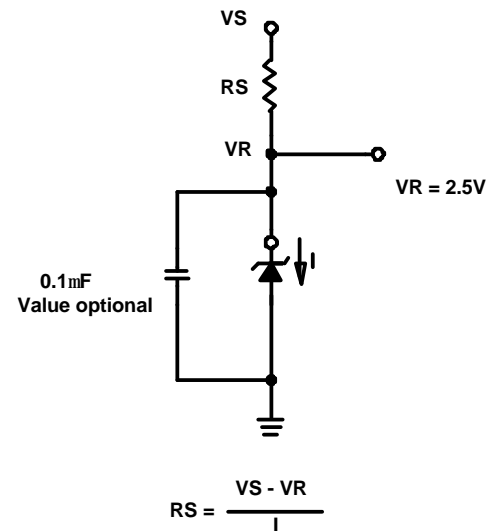
## ■ Applications

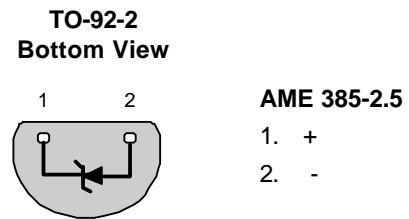
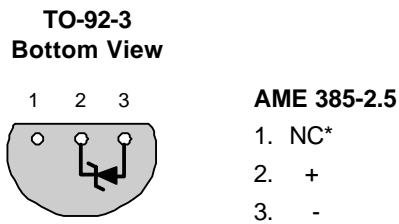
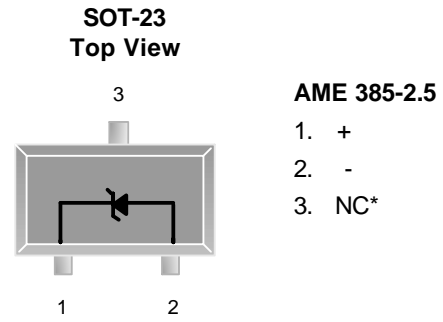
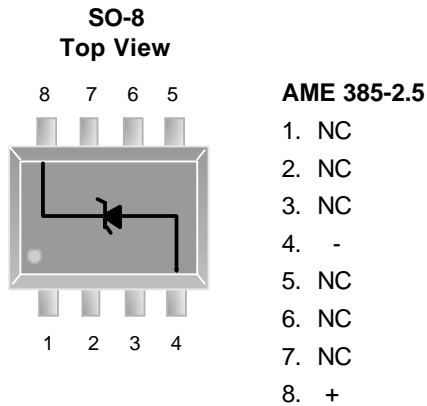
- Portable electronics
- Power supplies
- Computer peripherals
- Data acquisition systems
- Battery chargers
- Consumer electronics

## ■ Functional Block Diagram

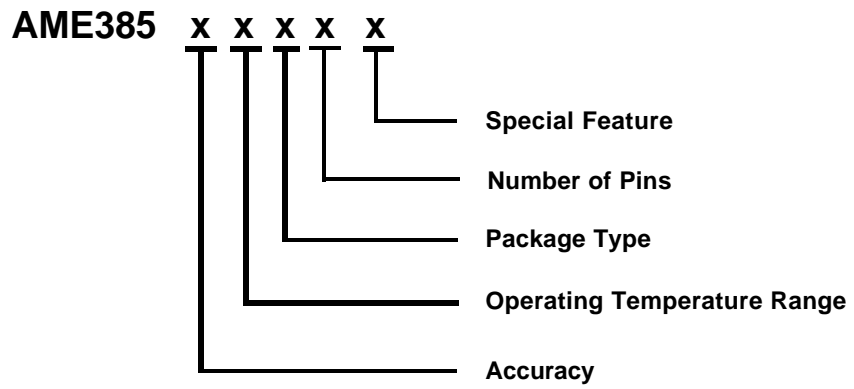


## ■ Typical Application



**■ Pin Configuration**


\* The NC pin must float or be connected to - (negative)

**■ Ordering Information**


| Accuracy           | Operating Temperature Range | Package Type                     | Number of Pins       | Special Feature  |
|--------------------|-----------------------------|----------------------------------|----------------------|--|
| D: 0.2%<br>B: 0.5% | E: -40°C to 85°C            | A: TO-92<br>E: SOT-2X<br>H: SO-8 | A: 8<br>S: 2<br>T: 3 | L: Low Profile<br>Y: Lead Free & Low Profile<br>Z: Lead Free |

**■ Ordering Information (contd.)**

| Part Number | Marking                    | Accuracy | Package | Operating Temp. Range |
|-------------|----------------------------|----------|---------|-----------------------|
| AME385DEET  | ACSww                      | 0.2%     | SOT-23  | - 40°C to + 85°C      |
| AME385DEETL | ACSww                      | 0.2%     | TSOT-23 | - 40°C to + 85°C      |
| AME385DEETY | ACSww                      | 0.2%     | TSOT-23 | - 40°C to + 85°C      |
| AME385DEETZ | ACSww                      | 0.2%     | SOT-23  | - 40°C to + 85°C      |
| AME385DEHA  | 385<br>DEHA<br>yyww        | 0.2%     | SO-8    | - 40°C to + 85°C      |
| AME385DEHAZ | 385<br>DEHA<br>yyww        | 0.2%     | SO-8    | - 40°C to + 85°C      |
| AME385BEET  | ABYww                      | 0.5%     | SOT-23  | - 40°C to + 85°C      |
| AME385BEETL | ABYww                      | 0.5%     | TSOT-23 | - 40°C to + 85°C      |
| AME385BEETY | ABYww                      | 0.5%     | TSOT-23 | - 40°C to + 85°C      |
| AME385BEETZ | ABYww                      | 0.5%     | SOT-23  | - 40°C to + 85°C      |
| AME385BEAT  | AME<br>385<br>BEAT<br>yyww | 0.5%     | TO-92-3 | - 40°C to + 85°C      |
| AME385BEATZ | AME<br>385<br>BEAT<br>yyww | 0.5%     | TO-92-3 | - 40°C to + 85°C      |
| AME385BEAS  | AME<br>385<br>BEAS<br>yyww | 0.5%     | TO-92-2 | - 40°C to + 85°C      |
| AME385BEASZ | AME<br>385<br>BEAS<br>yyww | 0.5%     | TO-92-2 | - 40°C to + 85°C      |
| AME385BEHA  | 385<br>BEHA<br>yyww        | 0.5%     | SO-8    | - 40°C to + 85°C      |
| AME385BEHAZ | 385<br>BEHA<br>yyww        | 0.5%     | SO-8    | - 40°C to + 85°C      |

**\* Package Option**

| Part Number  | Package      | Lead Pitch |
|--------------|--------------|------------|
| AME385XEAX   | TO-92 Taping | 5.04mm     |
| AME385XEAX-1 | TO-92 Bulk   | 2.54mm     |

Note: yyww & ww represents the date code

\* A line on top of the first letter represents lead free plating such as  $\overline{\text{ACS}}$ .

Please consult AME sales office or authorized Rep./Distributor for the availability of voltage accuracy and package type.

**■ Absolute Maximum Ratings**

| Parameter      | Maximum | Unit |
|----------------|---------|------|
| Supply Current | 50      | mA   |

Caution: Stress above the listed absolute maximum rating may cause permanent damage to the device

**■ Recommended Operating Conditions**

| Parameter                 | Rating             | Unit         |
|---------------------------|--------------------|--------------|
| Supply Current            | 100 $\mu$ A ~ 20mA |              |
| Ambient Temperature Range | - 40 to + 85       | $^{\circ}$ C |
| Junction Temperature      | - 40 to + 125      | $^{\circ}$ C |

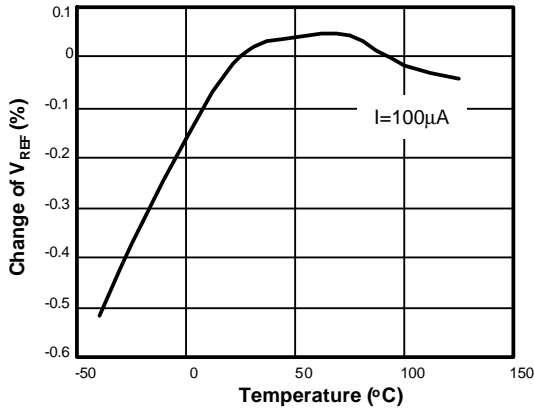
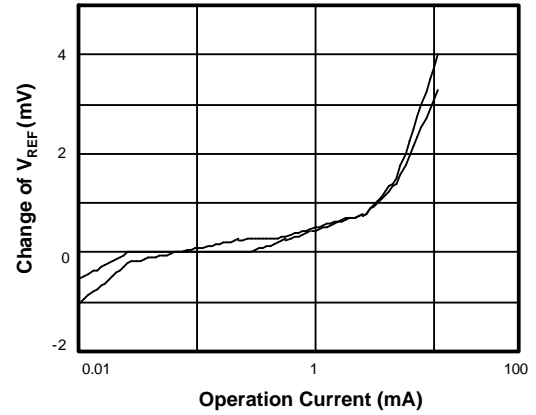
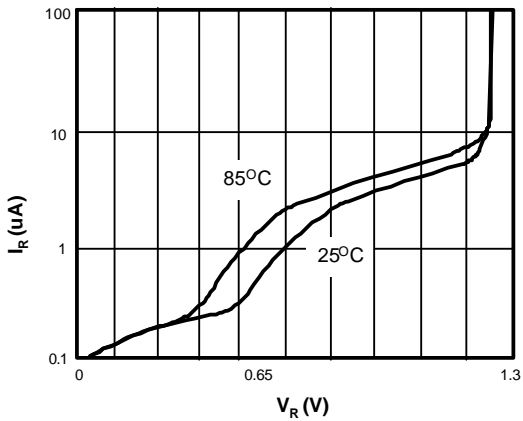
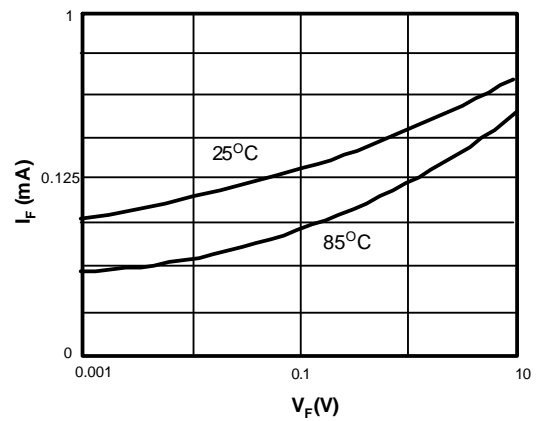
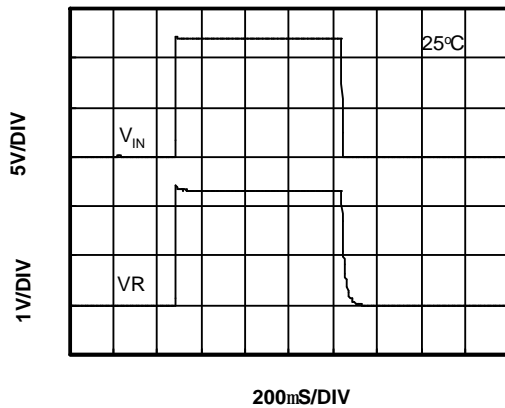
**■ Thermal Information**

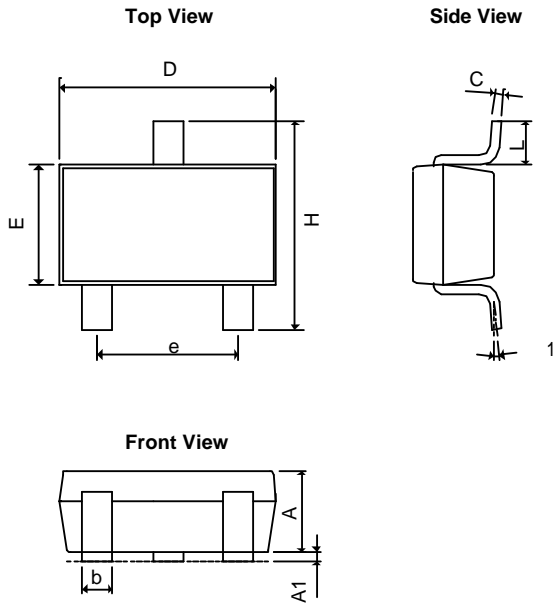
| Parameter                         | Maximum | Unit         |
|-----------------------------------|---------|--------------|
| Thermal Resistance                | SOT-23  | 325          |
|                                   | TO-92   | 180          |
|                                   | SO-8    | 125          |
| Maximum Junction Temperature      | 150     | $^{\circ}$ C |
| Maximum Lead Temperature (10 Sec) | 300     | $^{\circ}$ C |

**■ Electrical Specifications**

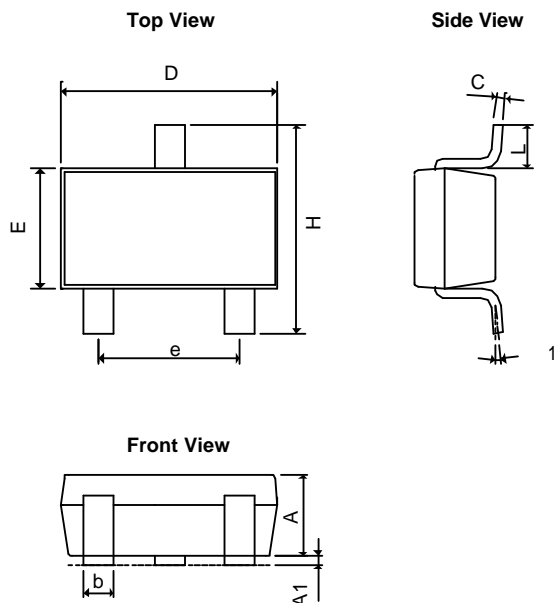
 Unless otherwise specified,  $T_A = 0\sim 70^\circ\text{C}$ ,  $I = 100\mu\text{A}$ 

| Parameter                             | Symbol       | Test Condition   | Min   | Typ  | Max   | Units                 |
|---------------------------------------|--------------|--|-------|------|-------|-----------------------|
| Reference Voltage, $\pm 0.2\%$        | $V_{REF}$    | $I_{REF} = 100\mu\text{A}$   | 2.495 | 2.50 | 2.505 | V                     |
| Reference Voltage, $\pm 0.5\%$        |              |  | 2.487 | 2.50 | 2.513 | V                     |
| Minimum Current                       | $I_{MIN}$    |  |       |      | 20    | $\mu\text{A}$         |
| Reference Voltage Change With Current | $dV_{REF/I}$ | $I_{MIN} \leq I \leq 1\text{mA}$   |       | 1.5  | 3     | mV                    |
|                                       |              | $1\text{mA} \leq I \leq 20\text{mA}$   |       | 5    | 20    |                       |
| Maximum Operation Current             | $I_{Lmax}$   |  | 20    |      |       | mA                    |
| Reverse Dynamic Impedence             | RDI          | $I_R = 100\text{mA}$ , $f = 20\text{Hz}$                                     |       | 1.5  |       | Ohm                   |
| Wideband Noise (rms)                  | $V_n$        | $I_R = 100\text{mA}$ , $10\text{ Hz} < f < 10\text{KHz}$                     |       | 60   |       | $\mu\text{V}$         |
| Long term Stability                   |              | $I_R = 100\text{mA}$ , $T_A = 25^\circ\text{C}$ ,<br>$T = 1000\text{ Hours}$ |       | 20   |       | ppm                   |
| Reference Voltage Temp. Coeff.        | $V_{REFTC}$  | $0^\circ\text{C} < T_A < 70^\circ\text{C}$                                   |       |      | 100   | ppm/ $^\circ\text{C}$ |

**Normalized Percentage Change vs. Temp.**

**Reference Voltage Change vs. Current**

**Reverse Characteristic**

**Forward Characteristic**

**Line Transient Response**


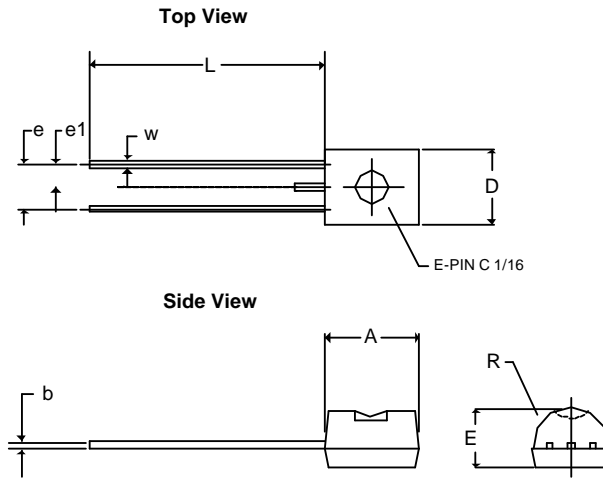
**■ Package Dimension**
**SOT-23**


| SYMBOLS              | MILLIMETERS |      | INCHES     |         |
|----------------------|-------------|------|------------|---------|
|                      | MIN         | MAX  | MIN        | MAX     |
| <b>A</b>             | 1.00        | 1.40 | 0.0394     | 0.0551  |
| <b>A<sub>1</sub></b> | 0.00        | 0.15 | 0.0000     | 0.0059  |
| <b>b</b>             | 0.35        | 0.50 | 0.0138     | 0.0197  |
| <b>C</b>             | 0.09        | 0.25 | 0.0035     | 0.0098  |
| <b>D</b>             | 2.70        | 3.10 | 0.1063     | 0.1220  |
| <b>E</b>             | 1.40        | 1.80 | 0.0551     | 0.0709  |
| <b>e</b>             | 1.90 BSC    |      | 0.0748 BSC |         |
| <b>H</b>             | 2.40        | 3.00 | 0.09449    | 0.11811 |
| <b>L</b>             | 0.35BSC     |      | 0.0138BSC  |         |
| <b>q1</b>            | 0°          | 10°  | 0°         | 10°     |

**TSOT-23**


| SYMBOLS                | MILLIMETERS |      | INCHES     |         |
|------------------------|-------------|------|------------|---------|
|                        | MIN         | MAX  | MIN        | MAX     |
| <b>A+A<sub>1</sub></b> | 0.80        | 1.30 | 0.0315     | 0.0512  |
| <b>b</b>               | 0.35        | 0.50 | 0.0138     | 0.0197  |
| <b>C</b>               | 0.08        | 0.25 | 0.0031     | 0.0098  |
| <b>D</b>               | 2.70        | 3.10 | 0.1063     | 0.1220  |
| <b>E</b>               | 1.20        | 1.80 | 0.0472     | 0.0709  |
| <b>e</b>               | 1.90 BSC    |      | 0.0748 BSC |         |
| <b>H</b>               | 2.40        | 3.00 | 0.09449    | 0.11811 |
| <b>L</b>               | 0.35BSC     |      | 0.0138BSC  |         |
| <b>q1</b>              | 0°          | 10°  | 0°         | 10°     |

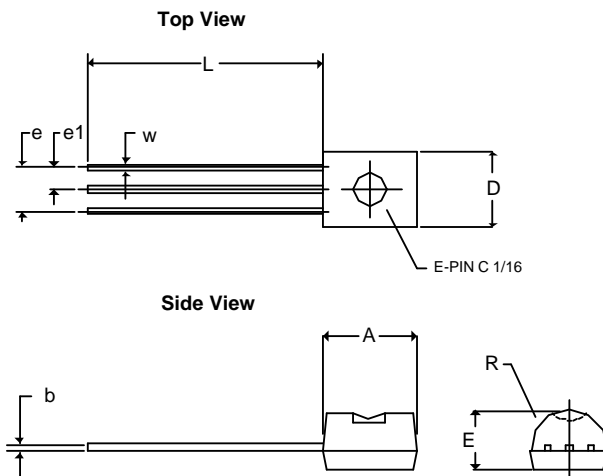


**■ Package Dimension**
**TO-92-2 (bulk pack)**


| SYMBOLS   | MILLIMETERS |       | INCHES    |        |
|-----------|-------------|-------|-----------|--------|
|           | MIN         | MAX   | MIN       | MAX    |
| <b>A</b>  | 4.00        | 4.95  | 0.1575    | 0.1949 |
| <b>b</b>  | 0.40REF     |       | 0.0157REF |        |
| <b>E</b>  | 3.94REF     |       | 0.1551REF |        |
| <b>e</b>  | 2.54REF     |       | 0.1000REF |        |
| <b>e1</b> | 1.27REF     |       | 0.0500REF |        |
| <b>L</b>  | 12.70       | 15.49 | 0.5000    | 0.6098 |
| <b>R</b>  | 2.29        |       | 0.0902    |        |
| <b>W</b>  | 0.35        | 0.76  | 0.0138    | 0.0299 |
| <b>D</b>  | 3.80        | 4.95  | 0.1496    | 0.1949 |

**Notes:**

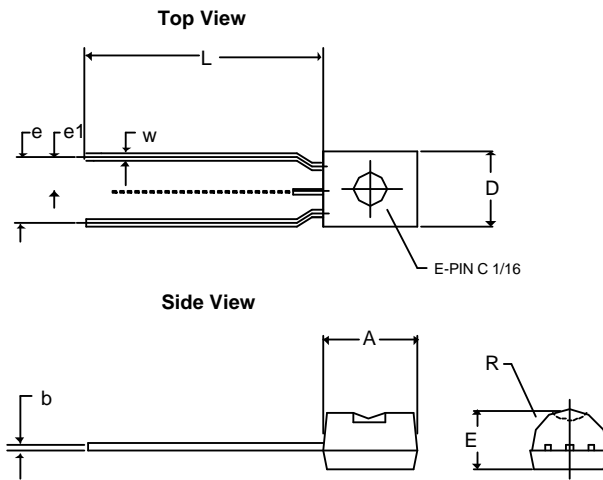
1. Package outline exclusive of any mold flashes dimension.
2. Package outline exclusive of burr dimension.
3. Lead pitch=2.54mm is bulk pack.
4. Lead pitch=5.08mm is tape pack.

**TO-92-3 (bulk pack)**


| SYMBOLS   | MILLIMETERS |       | INCHES    |        |
|-----------|-------------|-------|-----------|--------|
|           | MIN         | MAX   | MIN       | MAX    |
| <b>A</b>  | 2.80        | 4.95  | 0.1102    | 0.1949 |
| <b>b</b>  | 0.40REF     |       | 0.0157REF |        |
| <b>E</b>  | 3.94REF     |       | 0.1551REF |        |
| <b>e</b>  | 2.54REF     |       | 0.1000REF |        |
| <b>e1</b> | 1.27REF     |       | 0.0500REF |        |
| <b>L</b>  | 12.70       | 15.49 | 0.5000    | 0.6098 |
| <b>R</b>  | 2.29        |       | 0.0902    |        |
| <b>W</b>  | 0.35        | 0.76  | 0.0138    | 0.0299 |
| <b>D</b>  | 3.80        | 4.95  | 0.1496    | 0.1949 |

**Notes:**

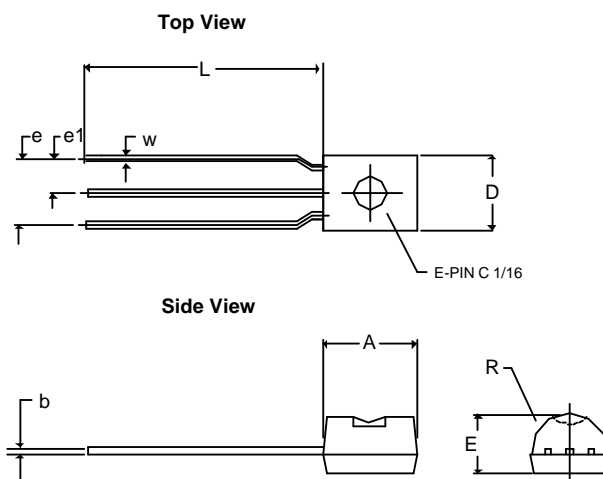
1. Package outline exclusive of any mold flashes dimension.
2. Package outline exclusive of burr dimension.
3. Lead pitch=2.54mm is bulk pack.
4. Lead pitch=5.08mm is tape pack.

**■ Package Dimension**
**TO-92-2 (tape pack)**


| SYMBOLS   | MILLIMETERS |       | INCHES    |        |
|-----------|-------------|-------|-----------|--------|
|           | MIN         | MAX   | MIN       | MAX    |
| <b>A</b>  | 2.80        | 4.95  | 0.1102    | 0.1949 |
| <b>b</b>  | 0.40REF     |       | 0.0157REF |        |
| <b>E</b>  | 2.40        | 3.94  | 0.0945    | 0.1551 |
| <b>e</b>  | 5.08REF     |       | 0.2REF    |        |
| <b>e1</b> | 2.54REF     |       | 0.1REF    |        |
| <b>L</b>  | 12.70       | 15.49 | 0.5000    | 0.6098 |
| <b>R</b>  | 2.00        |       | 0.0787    |        |
| <b>W</b>  | 0.35        | 0.76  | 0.0138    | 0.0299 |
| <b>D</b>  | 3.80        | 4.95  | 0.1496    | 0.1949 |

**Notes:**

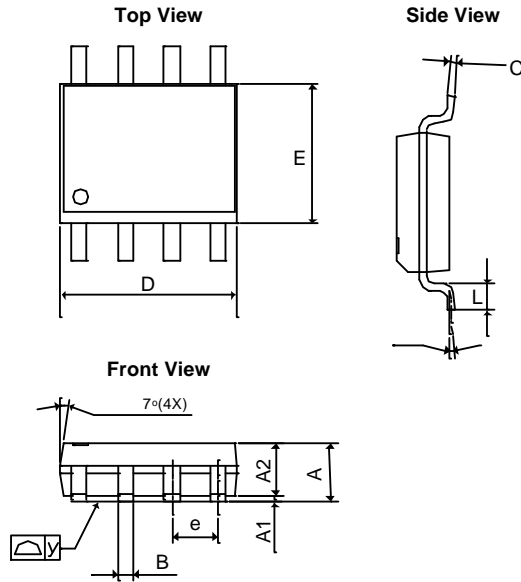
1. Package outline exclusive of any mold flashes.
2. Package outline exclusive of burr dimension.
3. Lead pitch=2.54mm is bulk pack.
4. Lead pitch=5.08mm is tape pack.

**TO-92-3 (tape pack)**


| SYMBOLS   | MILLIMETERS |       | INCHES    |        |
|-----------|-------------|-------|-----------|--------|
|           | MIN         | MAX   | MIN       | MAX    |
| <b>A</b>  | 2.80        | 4.95  | 0.1102    | 0.1949 |
| <b>b</b>  | 0.40REF     |       | 0.0157REF |        |
| <b>E</b>  | 2.40        | 3.94  | 0.0945    | 0.1551 |
| <b>e</b>  | 5.08REF     |       | 0.2REF    |        |
| <b>e1</b> | 2.54REF     |       | 0.1REF    |        |
| <b>L</b>  | 12.70       | 15.49 | 0.5000    | 0.6098 |
| <b>R</b>  | 2.00        |       | 0.0787    |        |
| <b>W</b>  | 0.35        | 0.76  | 0.0138    | 0.0299 |
| <b>D</b>  | 3.80        | 4.95  | 0.1496    | 0.1949 |

**Notes:**

1. Package outline exclusive of any mold flashes.
2. Package outline exclusive of burr dimension.
3. Lead pitch=2.54mm is bulk pack.
4. Lead pitch=5.08mm is tape pack.

**■ Package Dimension**
**SO-8**


| SYMBOLS              | MILLIMETERS |      | INCHES    |         |
|----------------------|-------------|------|-----------|---------|
|                      | MIN         | MAX  | MIN       | MAX     |
| <b>A</b>             | 1.35        | 1.75 | 0.05315   | 0.0689  |
| <b>A<sub>1</sub></b> | 0.10        | 0.25 | 0.00394   | 0.00984 |
| <b>A<sub>2</sub></b> | 1.473 REF   |      | 0.058 REF |         |
| <b>B</b>             | 0.33        | 0.51 | 0.01299   | 0.02008 |
| <b>C</b>             | 0.19        | 0.25 | 0.00748   | 0.00984 |
| <b>D</b>             | 4.80        | 5.00 | 0.18898   | 0.19685 |
| <b>E</b>             | 3.80        | 4.00 | 0.14961   | 0.15748 |
| <b>e</b>             | 1.27 BSC    |      | 0.050 BSC |         |
| <b>L</b>             | 0.40        | 1.27 | 0.01575   | 0.05    |
| <b>y</b>             | -           | 0.10 | -         | 0.004   |
| <b>q</b>             | 0°          | 8°   | 0°        | 8°      |



Life Support Policy:

These products of AME, Inc. are not authorized for use as critical components in life-support devices or systems, without the express written approval of the president of AME, Inc.

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