

## AME41-1.2

## Shunt Bandgap Voltage Reference

### ■ General Description

The AME41-1.2 is a micropower 2-terminal band-gap voltage regulator diode. It operates over a 30 $\mu$ A to 20mA current range. Each circuit is trimmed at wafer sort to provide a  $\pm 0.50\%$  initial tolerance. The design of the AME41-1.2 allows for a large range of load capacitances and operating currents. The low start-up current makes these parts ideal for battery applications.

AME, Inc. offers this part in a TO-92 and SOP-8 packages as well as the space saving SOT-23.

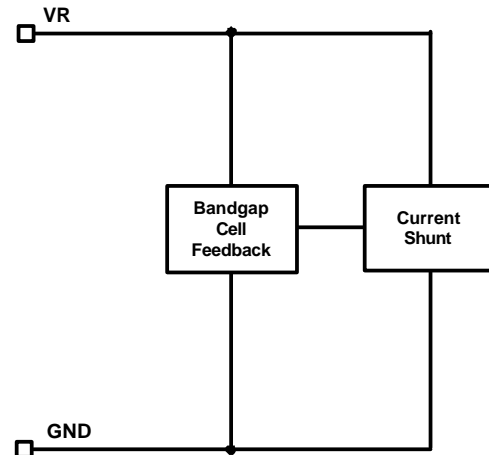
### ■ Features

- Small Packages: SOT-23, TO-92, SOP-8
- Tolerates Capacitive Loads
- Fixed Reverse Breakdown Voltage of 1.25V
- Tight Voltage Tolerance -----  $\pm 0.5\%$
- Wide Operating Current ----- 30 $\mu$ A to 20mA
- Wide Temperature Range ----- -40 $^{\circ}$ C to 85 $^{\circ}$ C
- Low Temperature Coefficient --100ppm/ $^{\circ}$ C<sub>(max)</sub>
- Excellent Transient Response
- All AME's Lead Free Products Meet RoHS Standards

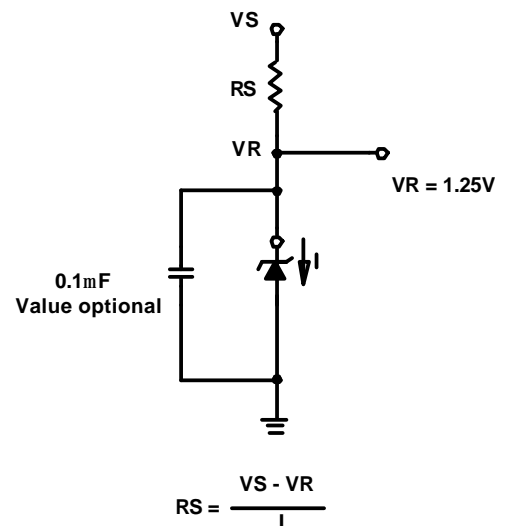
### ■ Applications

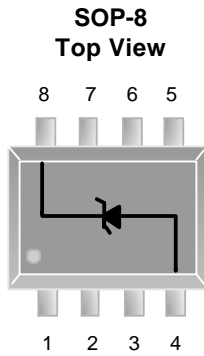
- Portable Electronics
- Power Supplies
- Computer Peripherals
- Data Acquisition Systems
- Battery Chargers
- Consumer Electronics

### ■ Functional Block Diagram



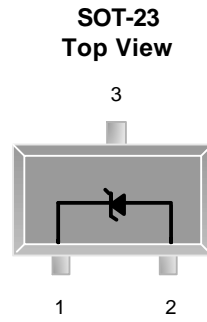
### ■ Typical Application



**■ Pin Configuration**

**AME 41-1.2**

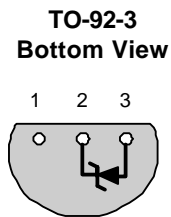
1. NC
2. NC
3. NC
4. -
5. NC
6. NC
7. NC
8. +

**\* Die Attach:  
Non-Conductive Epoxy**


**AME41-1.2**

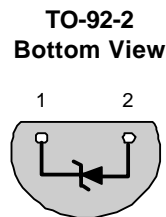
1. +
2. -
3. NC\*

**\* Die Attach:  
Non-Conductive Epoxy**


**AME 41-1.2**

1. NC\*
2. +
3. -

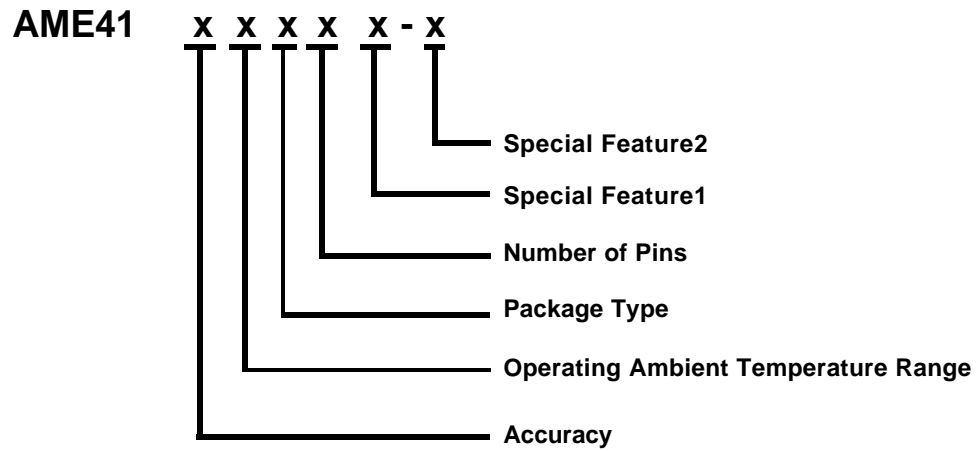
**\* Die Attach:  
Non-Conductive Epoxy**


**AME41-1.2**

1. +
2. -

**\* Die Attach:  
Non-Conductive Epoxy**

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

**■ Ordering Information**


Accuracy	Operating Ambient Temperature Range	Package Type	Number of Pins	Special Feature1	Special Feature2 (For TO-92 Package Only)									
A: 0.5% <small>(SOT-23)</small> <small>(SOP-8)</small> <small>(TO-92-2)</small> <small>(TO-92-3)</small>	E: -40°C to 85°C	A: TO-92 E: SOT-2X H: SOP	A: 8 S: 2 T: 3	Z: Lead Free	<table border="0"> <thead> <tr> <th></th> <th><u>Package</u></th> <th><u>Lead Pitch</u></th> </tr> </thead> <tbody> <tr> <td>N/A:</td> <td>Taping</td> <td>5.08mm</td> </tr> <tr> <td>1:</td> <td>Bulk</td> <td>2.54mm</td> </tr> </tbody> </table>		<u>Package</u>	<u>Lead Pitch</u>	N/A:	Taping	5.08mm	1:	Bulk	2.54mm
	<u>Package</u>	<u>Lead Pitch</u>												
N/A:	Taping	5.08mm												
1:	Bulk	2.54mm												

**■ Ordering Information**

Part Number	Marking*	Accuracy	Package	Operating Ambient Temperature Range
AME41AEET	ACAww	0.5%	SOT-23	- 40°C to 85°C
AME41AEETZ	ACAww	0.5%	SOT-23	- 40°C to 85°C
AME41AEAS	AME 41 AEAS yyww	0.5%	TO-92-2	- 40°C to 85°C
AME41AEAS-1	AME 41 AEAS yyww	0.5%	TO-92-2	- 40°C to 85°C
AME41AEASZ	AME 41 AEAS yyww	0.5%	TO-92-2	- 40°C to 85°C
AME41AEASZ-1	AME 41 AEAS yyww	0.5%	TO-92-2	- 40°C to 85°C
AME41AEAT	AME 41 AEAT yyww	0.5%	TO-92-3	- 40°C to 85°C
AME41AEAT-1	AME 41 AEAT yyww	0.5%	TO-92-3	- 40°C to 85°C
AME41AEATZ	AME 41 AEAT yyww	0.5%	TO-92-3	- 40°C to 85°C
AME41AEATZ-1	AME 41 AEAT yyww	0.5%	TO-92-3	- 40°C to 85°C
AME41AEHA	41 AEHA yyww	0.5%	SOP-8	- 40°C to 85°C
AME41AEHAZ	41 AEHA yyww	0.5%	SOP-8	- 40°C to 85°C

Note: ww & yyww represents date code

\* A line on top of the first letter represents lead free plating such as ACA.

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	Symbol	Rating	Unit
Ambient Temperature Range	$T_A$	- 40 to 85	°C
Junction Temperature Range	$T_J$	- 40 to 125	°C
Storage Temperature Range	$T_{STG}$	- 65 to 150	°C
Supply Current		100 $\mu$ A ~ 20mA	

**■ Thermal Information**

Parameter	Package	Die Attach	Symbol	Maximum	Unit
Thermal Resistance* (Junction to Case)	SOT-23	Non-Conductive Epoxy	$\theta_{JC}$	140	°C / W
	TO-92-2 TO-92-3			80	
Thermal Resistance (Junction to Ambient)	SOT-23	Non-Conductive Epoxy	$\theta_{JA}$	280	°C / W
	TO-92-2 TO-92-3			150	
Internal Power Dissipation	SOT-23	Non-Conductive Epoxy	$P_D$	400	mW
	TO-92-2 TO-92-3			625	
Maximum Junction Temperature				150	°C
Solder Iron (10 Sec)**				350	°C

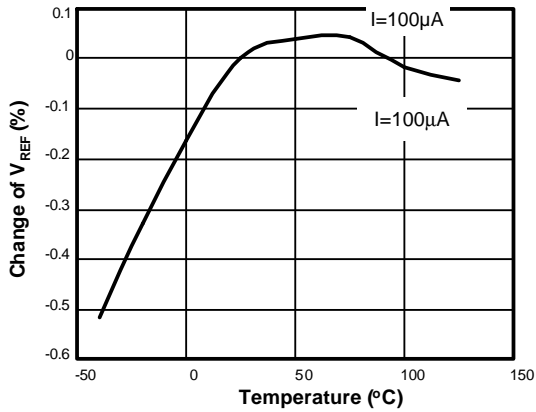
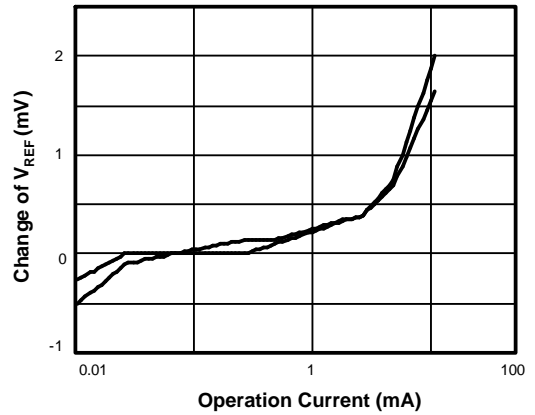
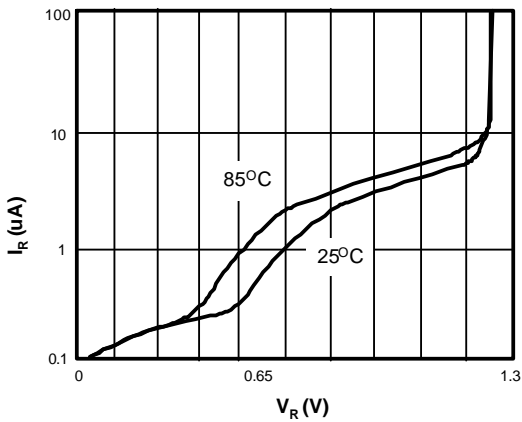
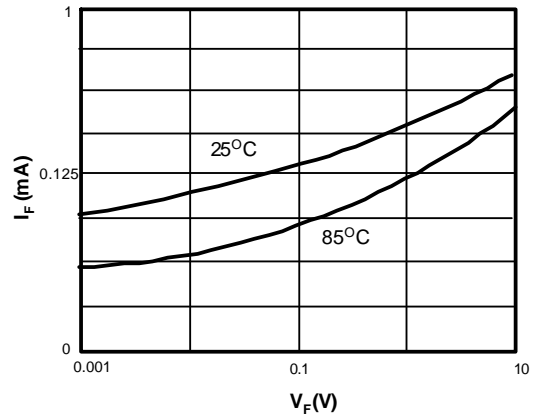
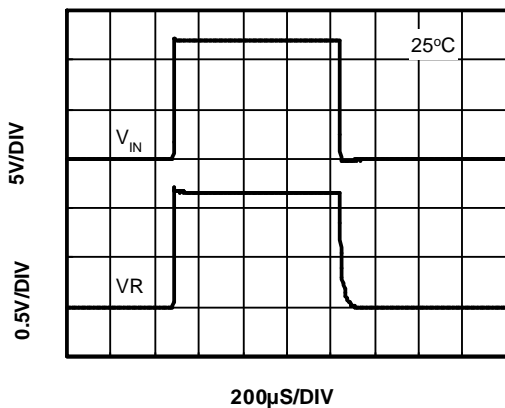
\* Measure  $\theta_{JC}$  on center of molding compound if IC has no tab.

\*\* MIL-STD-202G 210F

**■ Electrical Specifications**

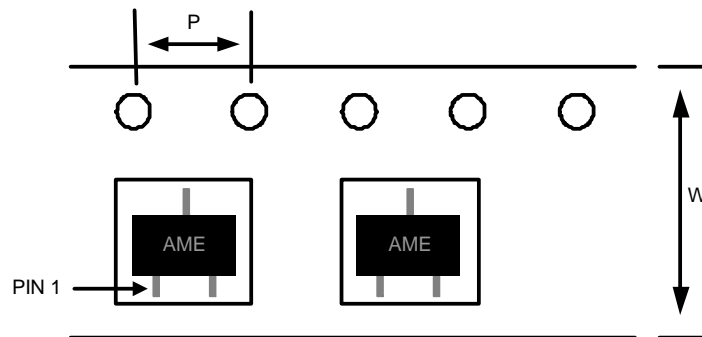
Unless otherwise specified,  $T_A = 25^\circ\text{C}$ ,  $I = 100\mu\text{A}$

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Reference Voltage, $\pm 0.5\%$	$V_{REF}$	$T_A = 25^\circ\text{C}$ , $I_{REF} = 100\mu\text{A}$	1.244	1.250	1.256	V
Minimum Current	$I_{MIN}$				30	$\mu\text{A}$
Reference Voltage Change With Current	$dV_{REF/I}$	$I_{MIN} \leq I \leq 1\text{mA}$		1.5	3	mV
		$1\text{mA} \leq I \leq 20\text{mA}$		4	8	
Reference Voltage Temp. Coeff.	$V_{REFTC}$	$0^\circ\text{C} < T_A < 70^\circ\text{C}$			100	ppm/ $^\circ\text{C}$

**■ Characterization Curve(For reference only)**
**Normalized Percentage Change vs. Temp.**

**Reference Voltage Change vs. Current**

**Reverse Characteristic**

**Forward Characteristic**

**Line Transient Response**


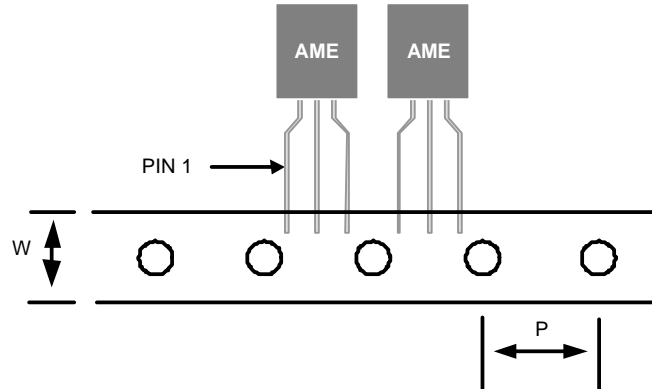
**■ Date Code Rule**

Marking			Date Code		Year
A	A	A	W	W	xxx0
A	A	A	W	<u>W</u>	xxx1
A	A	A	<u>W</u>	W	xxx2
A	A	A	<u>W</u>	<u>W</u>	xxx3
A	A	<u>A</u>	W	W	xxx4
A	A	<u>A</u>	W	<u>W</u>	xxx5
A	A	<u>A</u>	<u>W</u>	W	xxx6
A	A	<u>A</u>	<u>W</u>	<u>W</u>	xxx7
A	<u>A</u>	A	W	W	xxx8
A	<u>A</u>	A	W	<u>W</u>	xxx9

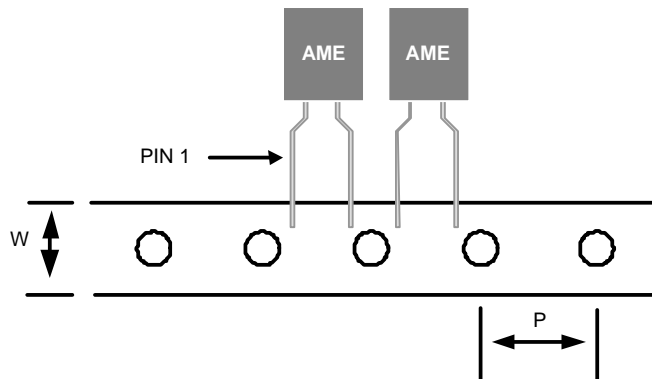
**■ Tape and Reel Dimension**
**SOT-23**

**Carrier Tape, Number of Components Per Reel and Reel Size**

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOT-23	8.0±0.1 mm	4.0±0.1 mm	3000pcs	180±1 mm

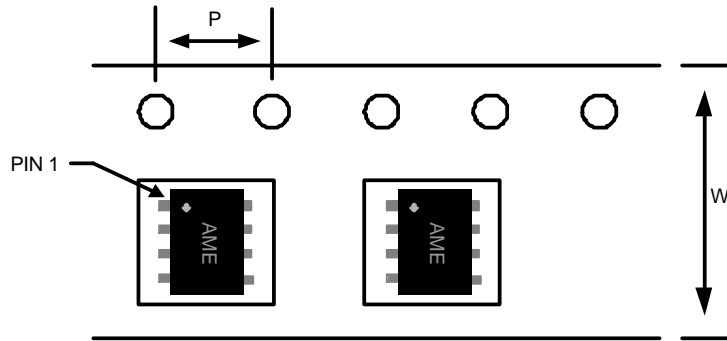


**■ Tape and Reel Dimension**
**TO-92-3**

**Carrier Tape, Number of Components Per Reel and Reel Size**

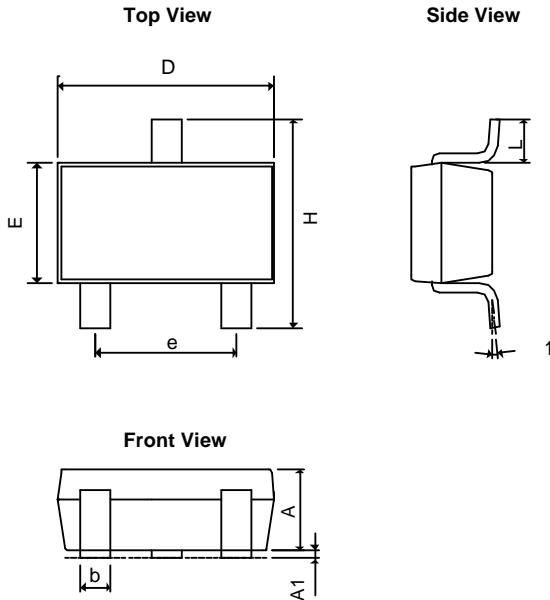
Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
TO-92-3	18.0 <sup>+1.0</sup> <sub>-0.5</sub> mm	12.7±0.2 mm	2000pcs	N/A

**TO-92-2**

**Carrier Tape, Number of Components Per Reel and Reel Size**

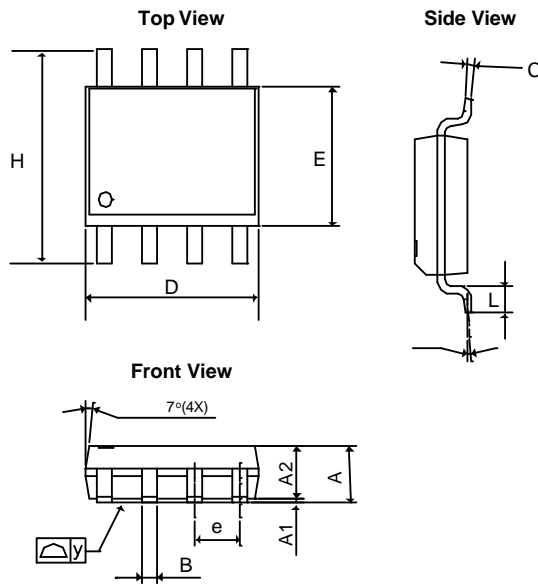
Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
TO-92-2	18.0 <sup>+1.0</sup> <sub>-0.5</sub> mm	12.7±0.2 mm	2000pcs	N/A

**■ Tape and Reel Dimension**
**SOP-8**

**Carrier Tape, Number of Components Per Reel and Reel Size**

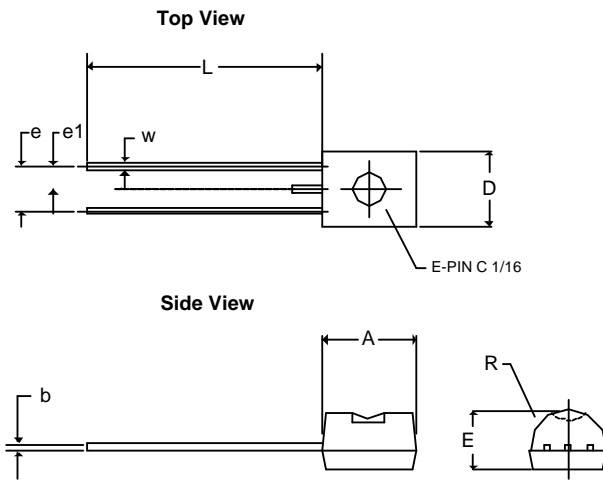
Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOP-8	12.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

**■ Package Dimension**
**SOT-23**


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

**SOP-8**


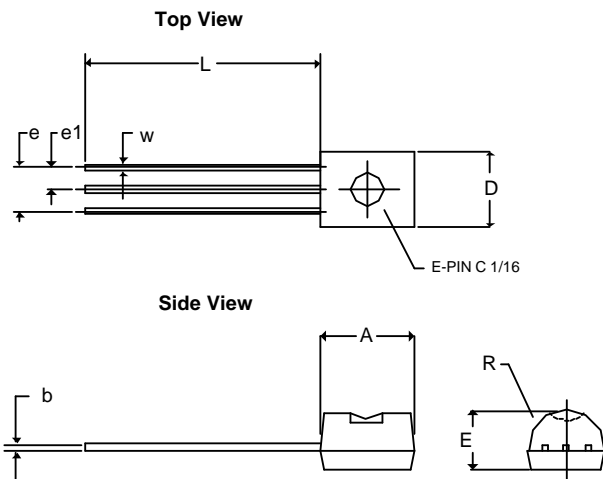
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.05315	0.0689
A <sub>1</sub>	0.10	0.30	0.00394	0.01181
A <sub>2</sub>	1.473 REF		0.05799 REF	
B	0.33	0.51	0.01299	0.02008
C	0.19	0.25	0.00748	0.00984
D	4.80	5.33	0.18898	0.20984
E	3.80	4.00	0.14961	0.15748
e	1.27 BSC		0.05000 BSC	
L	0.40	1.27	0.01575	0.05000
H	5.80	6.30	0.22835	0.24803
y	-	0.10	-	0.00394
q	0°	8°	0°	8°

**■ 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:**

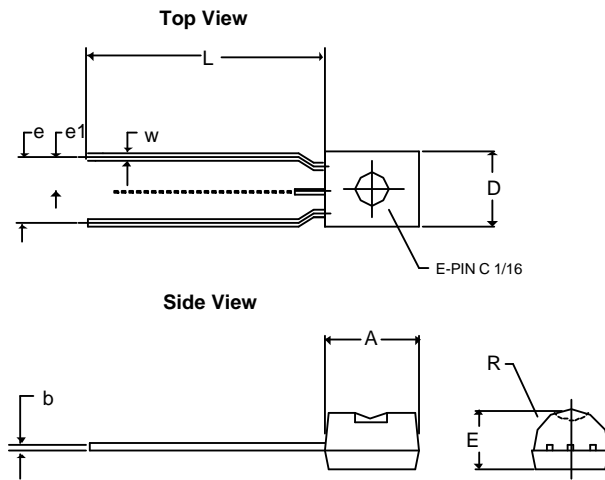
1. Package outline exclusive of any mold flashes dimension.
2. Package outline exclusive of burr dimension.
3. Lead pitch=2.54mm is bulk pack.
4. Lead pitch=5.08mm is tape pack.

**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:**

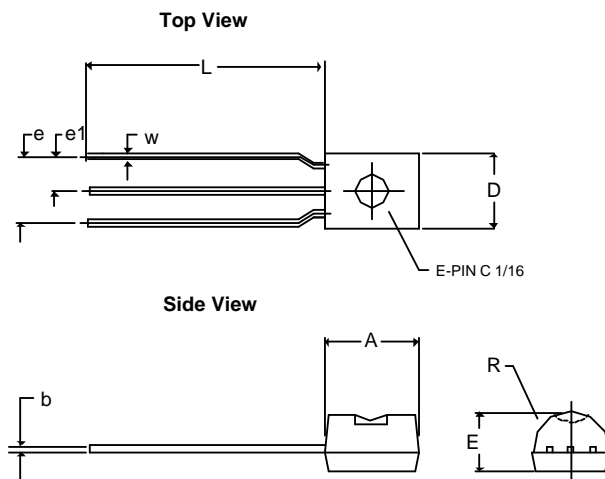
1. Package outline exclusive of any mold flashes dimension.
2. Package outline exclusive of burr dimension.
3. Lead pitch=2.54mm is bulk pack.
4. Lead pitch=5.08mm is tape pack.

**■ 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.



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Life Support Policy:

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AME, Inc. reserves the right to make changes in the circuitry and specifications of its devices and advises its customers to obtain the latest version of relevant information.

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