

■ General Description

The AME40 is a micropower 2-terminal band-gap voltage regulator diode. It operates over a 40µA to 20mA current range. Each circuit is trimmed at wafer sort to provide a ±0.50% initial tolerance. The design of the AME40 allows for a large range of load capacitances and operating currents. The low start-up current makes these parts ideal for battery applications.

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

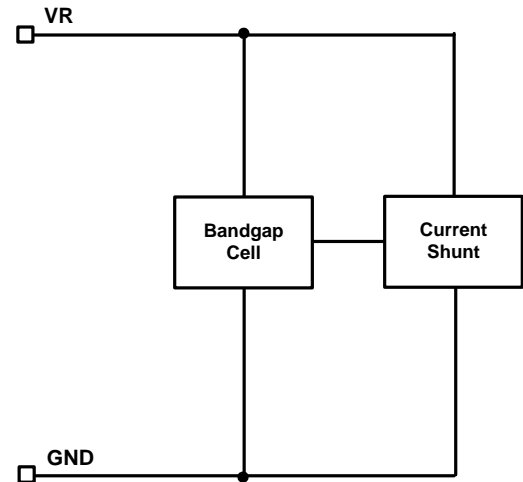
■ Features

- Small Packages: SOT-23, TO-92, SOP-8
- Tolerates Capacitive Loads
- Fixed Reverse Breakdown Voltage of 2.5V
- Tight Voltage Tolerance ----- ±0.5%
- Wide Operating Current ----- 40µA to 20mA
- Wide Temperature Range ----- -40°C to +85°C
- Low Temperature Coefficient --100ppm/°C (max)
- Excellent Transient Response
- Green Products Meet RoHS Standards

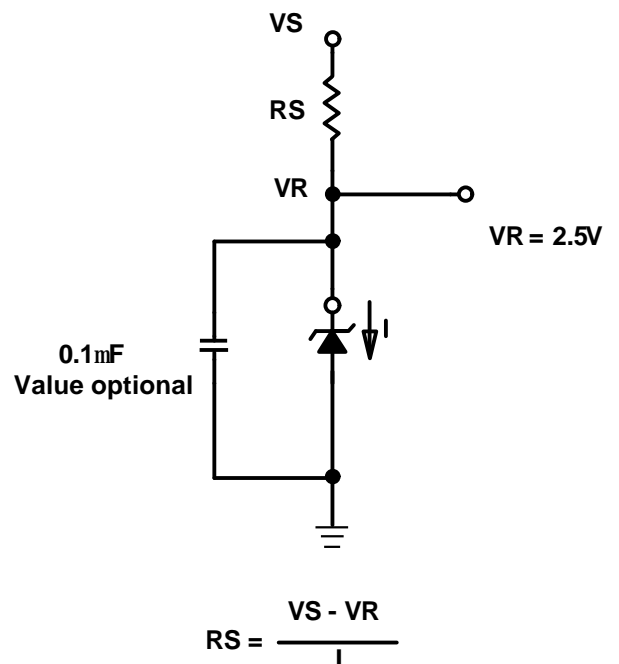
■ Applications

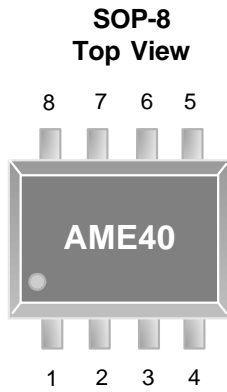
- Portable Electronics
- Power Supplies
- Computer Peripherals
- Data Acquisition Systems
- Battery Chargers
- Consumer Electronics

■ Functional Block Diagram



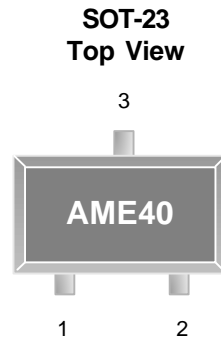
■ Typical Application



■ Pin Configuration


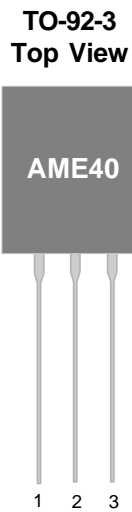
- AME40**
1. NC
 2. NC
 3. NC
 4. -
 5. NC
 6. NC
 7. NC
 8. +

*** Die Attach:
Conductive Epoxy**



- AME40**
1. +
 2. -
 3. NC*

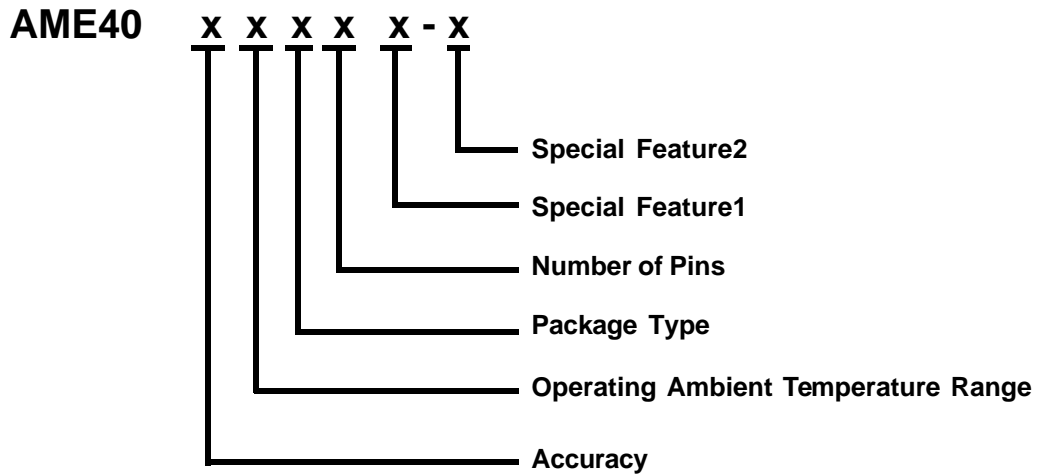
*** Die Attach:
Non-Conductive Epoxy**



- AME40**
1. NC*
 2. +
 3. -

*** 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% (SOT-23) (SOP-8) (TO-92-3)	E: -40°C to +85°C	A: TO-92 E: SOT-2X H: SOP	A: 8 T: 3	Z: Lead Free	<table border="1"> <thead> <tr> <th></th> <th>Package</th> <th>Lead Pitch</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>		Package	Lead Pitch	N/A:	Taping	5.08mm	1:	Bulk	2.54mm
	Package	Lead Pitch												
N/A:	Taping	5.08mm												
1:	Bulk	2.54mm												

■ Ordering Information

Part Number	Marking	Accuracy	Package	Operating Ambient Temperature Range
AME40AEET	ABZww	0.5%	SOT-23	- 40°C to +85°C
AME40AEETZ	ABZww	0.5%	SOT-23	- 40°C to +85°C
AME40AEAT	AME 40 AEAT yyww	0.5%	TO-92-3	- 40°C to +85°C
AME40AEAT-1	AME 40 AEAT yyww	0.5%	TO-92-3	- 40°C to +85°C
AME40AEATZ	AME 40 AEAT yyww	0.5%	TO-92-3	- 40°C to +85°C
AME40AEATZ-1	AME 40 AEAT yyww	0.5%	TO-92-3	- 40°C to +85°C
AME40AEHA	AME 40 AEHA yyww	0.5%	SOP-8	- 40°C to +85°C
AME40AEHAZ	AME 40 AEHA yyww	0.5%	SOP-8	- 40°C to +85°C

Note:

1. yyww & ww represents the date code.
2. A bar on top of the first letter represents lead free plating such as \bar{A} BZ.
3. 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	20	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		60 μ A ~ 12mA	

■ Thermal Information

Parameter	Package	Die Attach	Symbol	Maximum	Unit
Thermal Resistance* (Junction to Case)	SOT-23	Non-Conductive Epoxy	θ_{JC}	140	°C / W
	TO-92-3			80	
	SOP-8	Conductive Epoxy		60	
Thermal Resistance (Junction to Ambient)	SOT-23	Non-Conductive Epoxy	θ_{JA}	280	°C / W
	TO-92-3			150	
	SOP-8	Conductive Epoxy		150	
Internal Power Dissipation	SOT-23	Non-Conductive Epoxy	P_D	400	mW
	TO-92-3			625	
	SOP-8	Conductive Epoxy		810	
Maximum Junction Temperature				150	°C
Solder Iron (10 Sec)**				350	°C

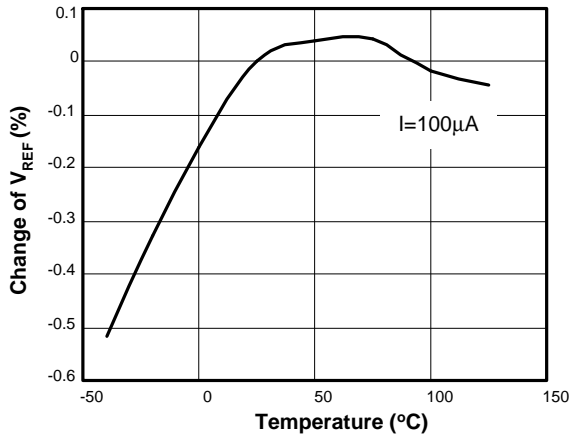
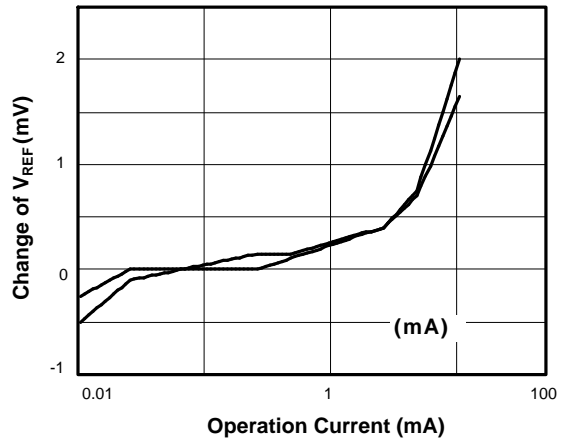
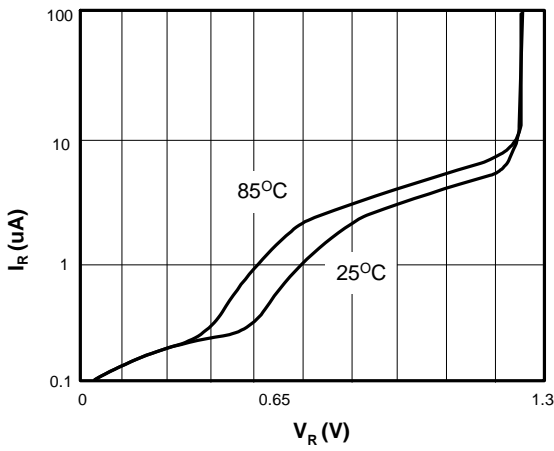
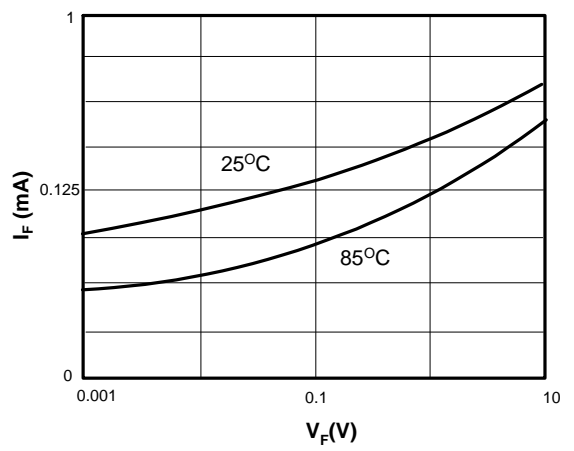
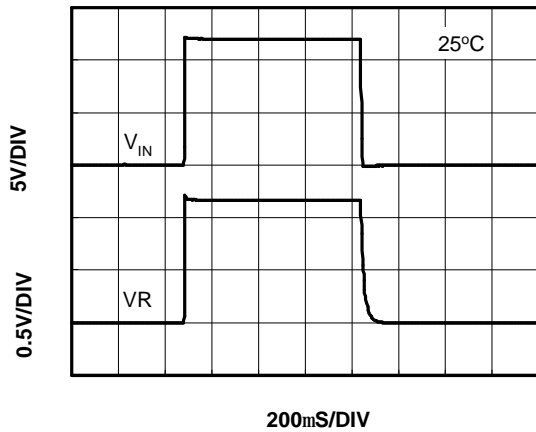
* Measure θ_{JC} on center of molding compound if IC has no tab.

** MIL-STD-202G 210F

■ Electrical Specifications

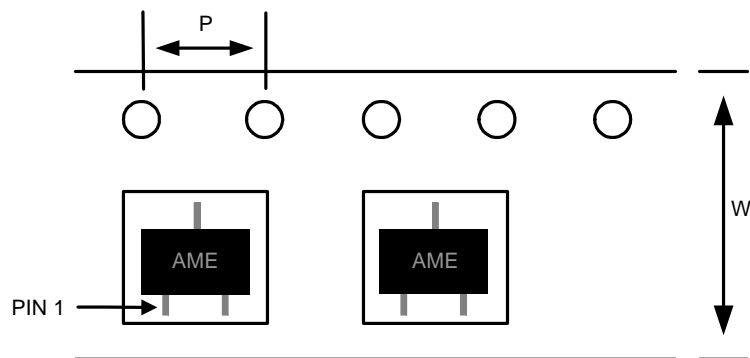
Unless otherwise specified, $T_A = 25^\circ\text{C}$, $I = 100\mu\text{A}$

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Reference Voltage, $\pm 0.5\%$	V_{REF}	$T_A = 25^\circ\text{C}$, $I_{REF} = 100\mu\text{A}$	2.487	2.500	2.513	V
Minimum Current	I_{MIN}				40	μA
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/°C

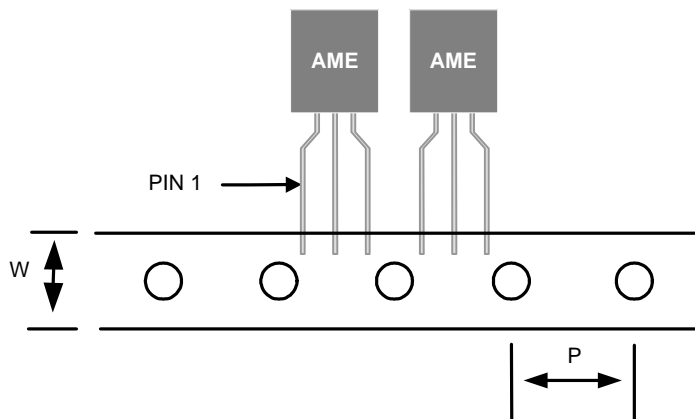
■ Characterization Curve
Normalized Percentage Change vs. Temp.

Reference Voltage Change vs. Current

Reverse Characteristic

Forward Characteristic

Line Transient Response


■ Date Code Rule

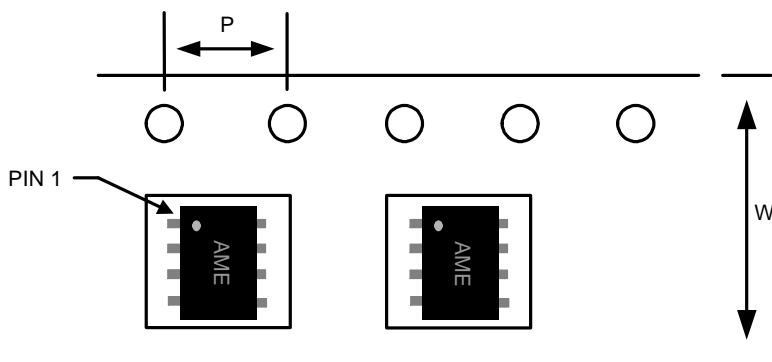
Marking			Date Code		Year
A	A	A	W	W	xxx0
A	A	A	W	<u>W</u>	xxx1
A	A	A	<u>W</u>	W	xxx2
A	A	A	<u>W</u>	<u>W</u>	xxx3
A	A	<u>A</u>	W	W	xxx4
A	A	<u>A</u>	W	<u>W</u>	xxx5
A	A	<u>A</u>	<u>W</u>	W	xxx6
A	A	<u>A</u>	<u>W</u>	<u>W</u>	xxx7
A	<u>A</u>	A	W	W	xxx8
A	<u>A</u>	A	W	<u>W</u>	xxx9

■ Tape and Reel Dimension
SOT-23

Carrier Tape, Number of Components Per Reel and Reel Size

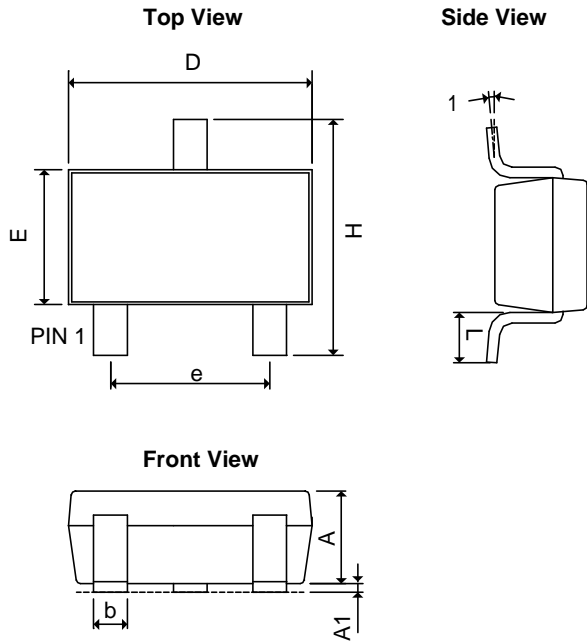
Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOT-23	8.0±0.1 mm	4.0±0.1 mm	3000pcs	180±1 mm

■ Tape and Reel Dimension (Contd.)
TO-92-3

Carrier Tape, Number of Components Per Reel and Reel Size

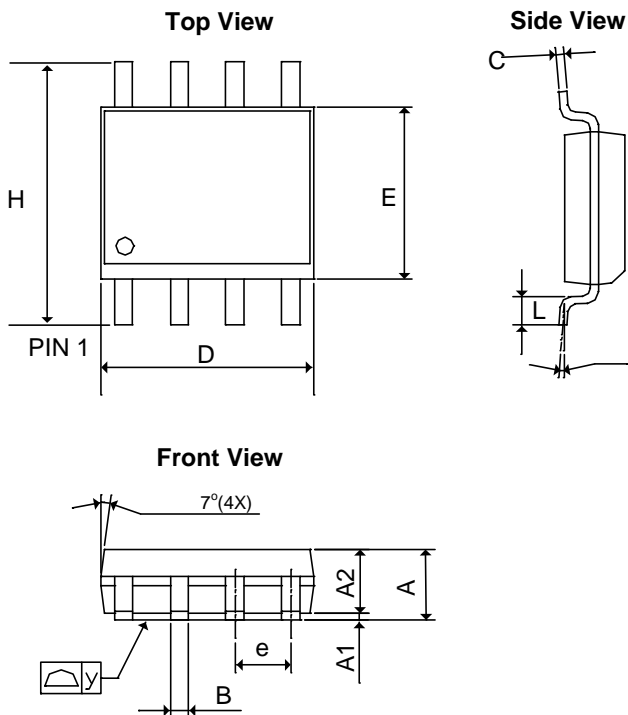
Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
TO-92-3	18.0 ^{+1.0} _{-0.5} mm	12.7±0.2 mm	2000pcs	N/A

SOP-8

Carrier Tape, Number of Components Per Reel and Reel Size

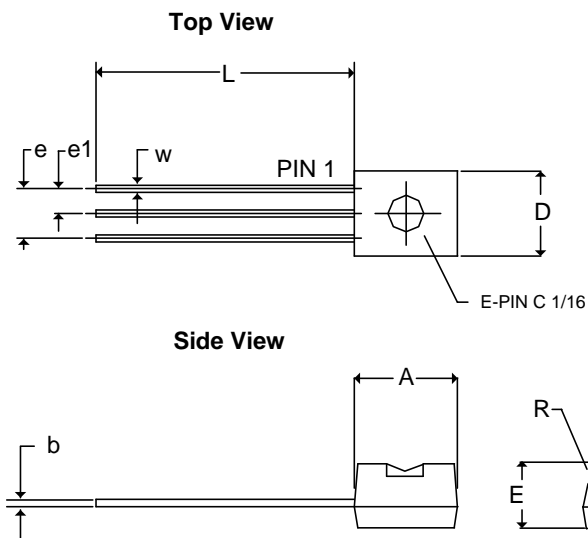
Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOP-8	12.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

■ Package Dimension
SOT-23


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.00	1.40	0.0394	0.0551
A ₁	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	
q ₁	0°	10°	0°	10°

SOP-8


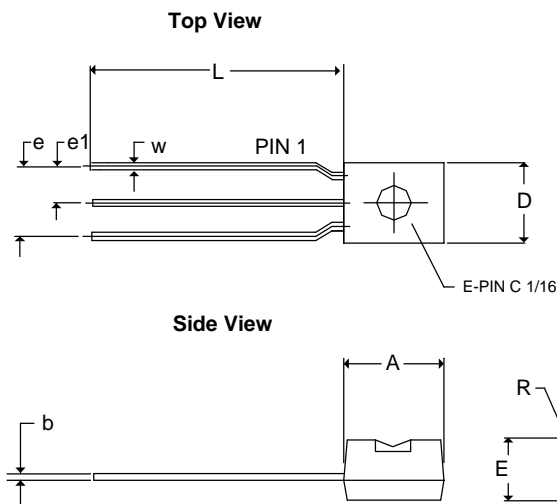
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.05315	0.0689
A ₁	0.10	0.30	0.00394	0.01181
A ₂	1.473 REF		0.05799 REF	
B	0.33	0.51	0.01299	0.02008
C	0.19	0.25	0.00748	0.00984
D	4.80	5.33	0.18898	0.20984
E	3.80	4.00	0.14961	0.15748
e	1.27 BSC		0.05000 BSC	
L	0.40	1.27	0.01575	0.05000
H	5.80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

■ Package Dimension (Contd.)
TO-92-3 (bulk pack)


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.80	4.95	0.1102	0.1949
b	0.40REF		0.0157REF	
E	3.94REF		0.1551REF	
e	2.54REF		0.1000REF	
e1	1.27REF		0.0500REF	
L	12.70	15.49	0.5000	0.6098
R	2.29		0.0902	
W	0.35	0.76	0.0138	0.0299
D	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 (tape pack)


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