Analog Microelectronics, Inc.

AME40 **Micropower Voltage Reference Diode**

■ 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 ±0.20% and ±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 part ideal for battery applications.

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

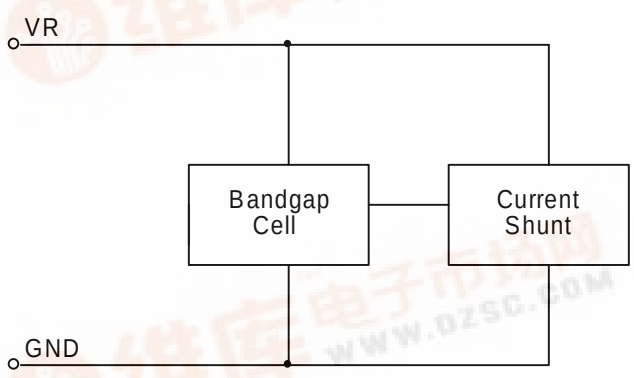
■ Key Features

- Small packages: SOT-23, TO-92, SO-8
- Tolerates capacitive loads
- Fixed reverse breakdown voltage of 2.5V
- Tight voltage tolerance ---------- ±0.20%, ±0.50%
- Wide operating current ---------- 40μA to 20mA
- Wide temperature range -------- -40°C to +85°C
- Low temperature coefficient --- 100ppm/°C (max)
- Excellent transient response

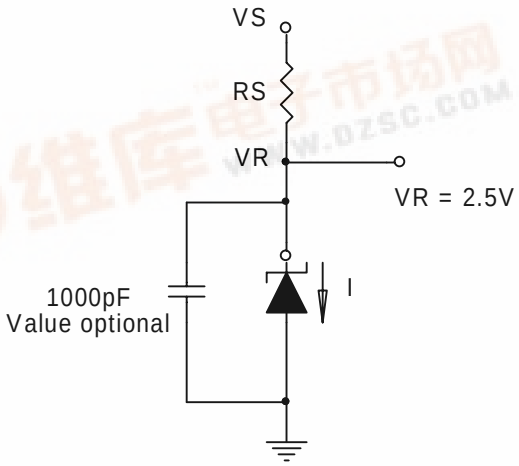
■ Applications

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

■ Functional Block Diagram



■ Typical Application



$$RS = \frac{VS - VR}{I}$$

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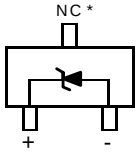
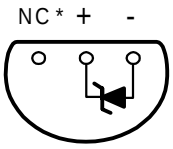
■ Package Outline

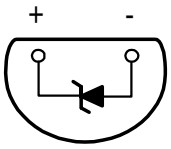
SOT-23 Top View



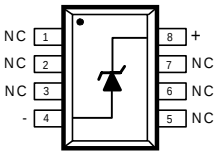
TO-92-3 Bottom View



TO-92-2 Bottom View



SO-8 Top View



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

■ Ordering Information

Part Number	Accuracy	Marking	Package	Operating Temp. Range
AME40BEET	0.2%	ACUww	SOT-23	-40^{O}C to +85^{O}C
AME40BEHA	0.2%	AME 40BEHA yyww	SO-8	-40^{O}C to +85^{O}C
AME40AEET	0.5%	ABZww	SOT-23	-40^{O}C to +85^{O}C
AME40AEAS	0.5%	AME 40 AEAS yyww	TO-92-2	-40^{O}C to +85^{O}C
AME40AEAT	0.5%	AME 40 AEAT yyww	TO-92-3	-40^{O}C to +85^{O}C
AME40AEHA	0.5%	AME 40AEHA yyww	SO-8	-40^{O}C to +85^{O}C

Please consult AME sales office or authorized Rep./Distributor for other voltage accuracy and

■ Absolute Maximum Ratings

Parameter	Maximum	Unit
Supply Current	20	mA

■ Recommended Operating Conditions

Parameter	Rating	Unit
Supply Current	60μA ~ 12mA	
Ambient Temperature Range	-40 to +85	°C
Junction Temperature	-40 to +125	°C

■ Thermal Information

Parameter		Maximum	Unit
Thermal Resistance	SOT-23	336	°C / W
	TO-92	180	
Maximum Junction Temperature		150	°C
Maximum Lead Temperature (10 Sec)		300	°C

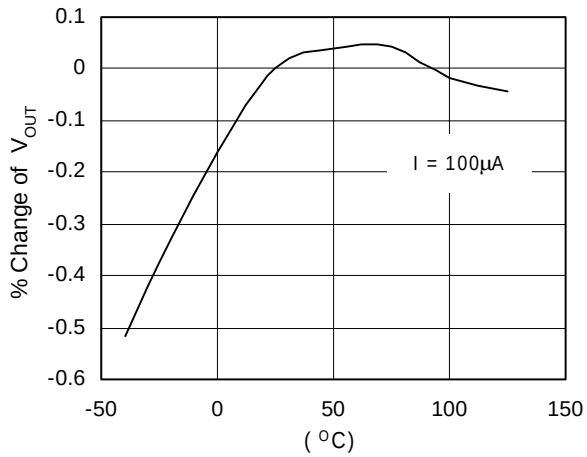
Caution: Stress above the listed absolute rating may cause permanent damage to the device

■ Electrical Specifications

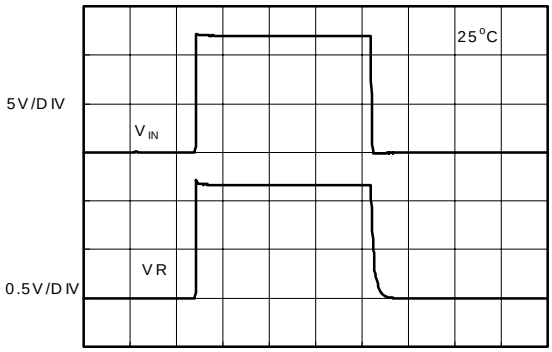
Unless otherwise specified, TA = 25^{o}C, I = 100μA

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Reference Voltage, ±0.2%	V_{REF}	T_A=25^{o}C, I_{REF}=100μA	2.495	2.500	2.505	V
Reference Voltage, ±0.5%			2.487	2.500	2.513	V
Minimum Current	I_{MIN}				40	μA
Reference Voltage Change With Current	$dV_{REF/I}$	$I_{MIN} \leq I \leq$ 1mA		1.5	3	mV
		1mA $\leq I \leq$ 20mA		4	8	
Reference Voltage Temp. Coeff.	V_{REFTC}	0^{o}C < T_A < 70^{o}C			100	ppm/^{o}C

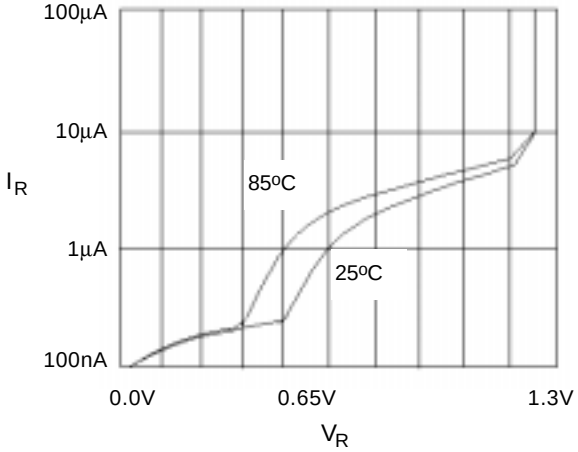
Normalized Percentage Change vs. Temperature



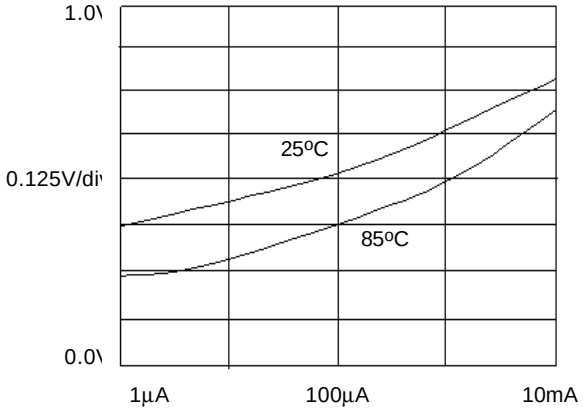
Output Voltage Change vs. Current



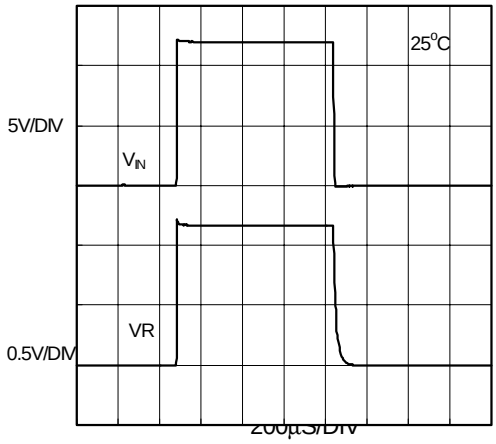
Reverse Characteristic



Forward Characteristic

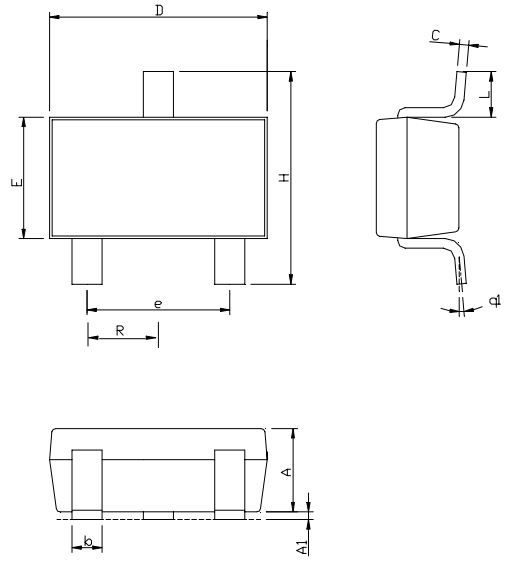


Transient Response



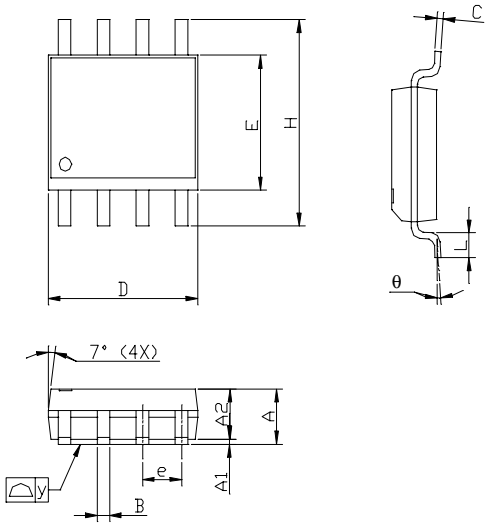
■ Package Dimension

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
C	0.09	0.25	0.0035	0.0098
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	2.60	3.00	0.1024	0.1181
L	0.35	0.55	0.0138	0.0197
θ1	0°	9°	0°	9°
R	0.95(TYP)		0.0374(TYP)	

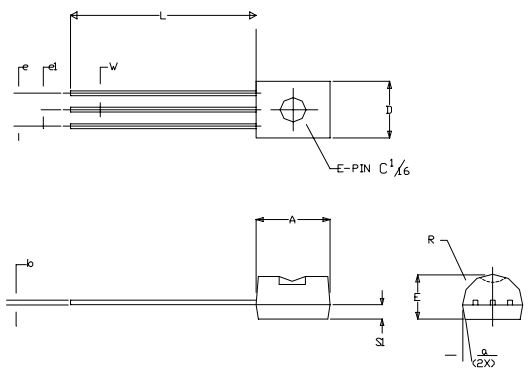
SO-8



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A_1	0.10	0.25	0.004	0.010
A2	1.45 REF		0.057 REF	
B	0.33	0.51	0.013	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.00	0.189	0.1970
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
y		0.10		0.004
θ	0°	8°	0°	8°

■ Package Dimension

TO-92-3

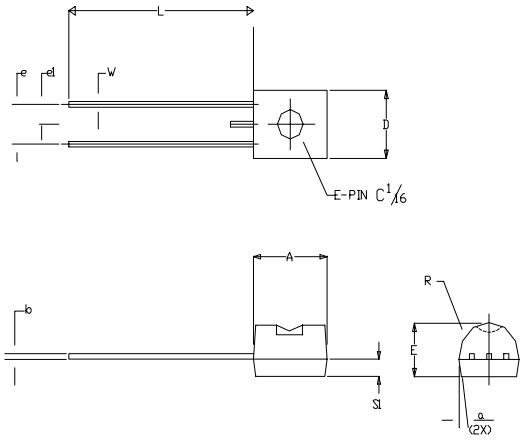


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	4.95	0.170	0.195
b	0.36	0.51	0.014	0.020
E	3.30	3.94	0.130	0.155
e	2.41	2.67	0.095	0.105
e1	1.14	1.40	0.045	0.055
L	12.70	15.49	0.500	0.610
R	2.16	2.41	0.085	0.095
S1	1.14	1.52	0.045	0.060
W	0.41	0.56	0.016	0.022
D	4.45	4.95	0.175	0.195
a	4°	6°	4°	6°

NOTE:

1. PACKAGE OUTLINE EXCLUSIVE OF ANY MOLD FLASHES DIMENSION
2. PACKAGE OUTLINE EXCLUSIVE OF BURR DIMENSION

TO-92-2



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	4.95	0.170	0.195
b	0.36	0.51	0.014	0.020
E	3.30	3.94	0.130	0.155
e	2.41	2.67	0.095	0.105
e1	1.14	1.40	0.045	0.055
L	12.70	15.49	0.500	0.610
R	2.16	2.41	0.085	0.095
S1	1.14	1.52	0.045	0.060
W	0.41	0.56	0.016	0.022
D	4.45	4.95	0.175	0.195
a	4°	6°	4°	6°

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