



## ■ General Description

The AME8815 family of linear regulators feature low quiescent current (45 $\mu$ A typ.) with low dropout voltage, making them ideal for battery applications. It is available in D<sup>2</sup>PAK and TO-220 packages. The space-efficient SOT-223 and DPAK package are attractive for "Pocket" and "Hand Held" applications.

Output voltages are set at the factory and trimmed to 1.5% accuracy.

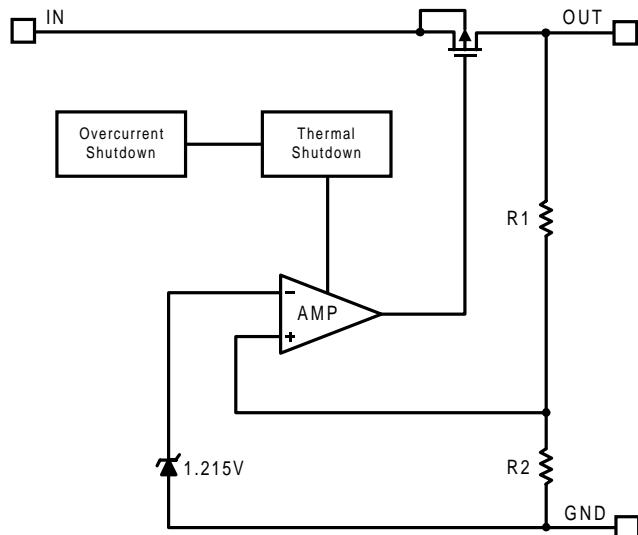
These rugged devices have both Thermal Shutdown, and Current Fold-back to prevent device failure under the "Worst" of operating conditions.

The AME8815 is stable with an output capacitance of 4.7 $\mu$ F or greater.

## ■ Features

- Very Low Dropout Voltage
- Guaranteed 1.5A Output
- Accurate to within 1.5%
- 45 $\mu$ A Quiescent Current Typically
- Over-Temperature Shutdown
- Current Limiting
- Short Circuit Current Fold-back
- Space-Efficient DPAK or SOT223 Package
- Low Temperature Coefficient

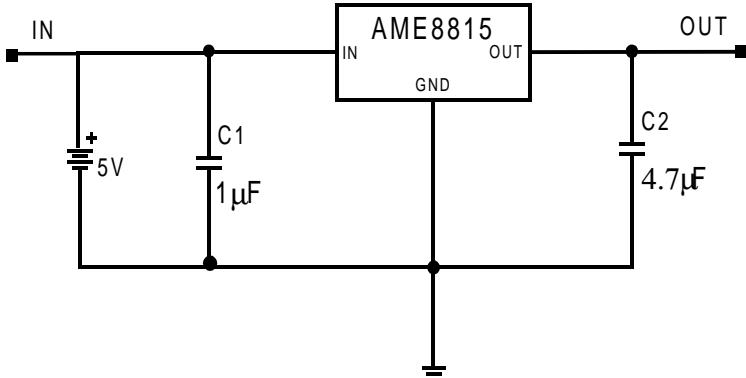
## ■ Functional Block Diagram



## ■ Applications

- Instrumentation
- Portable Electronics
- Wireless Devices
- PC Peripherals
- Battery Powered Widgets

## ■ Typical Application





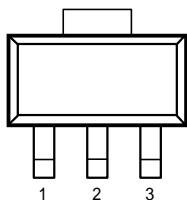
**AME, Inc.**

**AME8815**

**1.5A CMOS LDO**

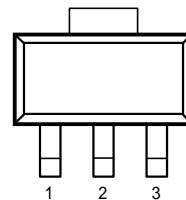
## ■ Pin Configuration

SOT-223 Top View



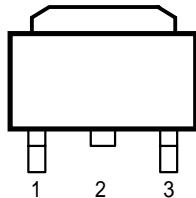
AME8815AEGTXXX

SOT-223 Top View



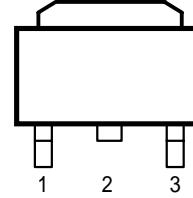
AME8815BEGTXXX

TO-252 (DPAK-2) Top View



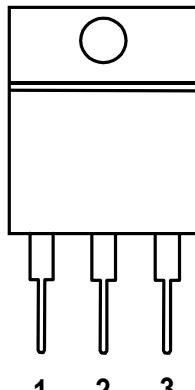
AME8815AECSXXX

TO-252 (DPAK-2) Top View



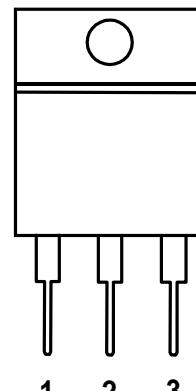
AME8815BECSXXX

TO-220 Top View



AME8815AEBTXXX

TO-220 Top View



AME8815BEBTXXX



## ■ Ordering Information

AME8815 X X X X XXX

**Voltage**

- 150: V=1.5V
- 180: V=1.8V
- 250: V=2.5V
- 330: V=3.3V
- 475: V=4.75V
- 500: V=5.0V

**Number of Pin**

- S: 2
- T: 3

**Package**

- B: TO-220
- C: TO-252
- D: TO-263
- G: SOT-223

**Operating Temperature**

- C: 0°C to 70°C
- E: -40°C to 85°C
- M: -40°C to 125°C

**Pin Configuration**

Please consult AME sales office or authorized Rep./Distr. For other output voltage and package type availability.

**■ Ordering Information**

Part Number	Marking	Output	Package	Operating Temp.
AME8815AEBT150	AME8815 AEBT150 yyww	1.50	TO-220	-40°C to +85°C
AME8815AEBT180	AME8815 AEBT180 yyww	1.80	TO-220	-40°C to +85°C
AME8815AEBT250	AME8815 AEBT250 yyww	2.50	TO-220	-40°C to +85°C
AME8815AEBT330	AME8815 AEBT330 yyww	3.30	TO-220	-40°C to +85°C
AME8815AEBT475	AME8815 AEBT475 yyww	4.75	TO-220	-40°C to +85°C
AME8815AEBT500	AME8815 AEBT500 yyww	5.00	TO-220	-40°C to +85°C
AME8815AECS150	AME8815 AECS150 yyww	1.50	TO-252	-40°C to +85°C
AME8815AECS180	AME8815 AECS180 yyww	1.80	TO-252	-40°C to +85°C
AME8815AECS250	AME8815 AECS250 yyww	2.50	TO-252	-40°C to +85°C
AME8815AECS330	AME8815 AECS330 yyww	3.30	TO-252	-40°C to +85°C
AME8815AECS475	AME8815 AECS475 yyww	4.75	TO-252	-40°C to +85°C
AME8815AECS500	AME8815 AECS500 yyww	5.00	TO-252	-40°C to +85°C

**■ Ordering Information**

Part Number	Marking	Output	Package	Operating Temp.
AME8815AEADS150	AME8815 AEADS150 yyww	1.50	TO-263	-40°C to +85°C
AME8815AEADS180	AME8815 AEADS180 yyww	1.80	TO-263	-40°C to +85°C
AME8815AEADS250	AME8815 AEADS250 yyww	2.50	TO-263	-40°C to +85°C
AME8815AEADS330	AME8815 AEADS330 yyww	3.30	TO-263	-40°C to +85°C
AME8815AEADS475	AME8815 AEADS475 yyww	4.75	TO-263	-40°C to +85°C
AME8815AEADS500	AME8815 AEADS500 yyww	5.00	TO-263	-40°C to +85°C
AME8815AEGT150	ASPww	1.50	SOT-223	-40°C to +85°C
AME8815AEGT180	AQUww	1.80	SOT-223	-40°C to +85°C
AME8815AEGT250	APRww	2.50	SOT-223	-40°C to +85°C
AME8815AEGT330	AKCww	3.30	SOT-223	-40°C to +85°C
AME8815AEGT475	AQRww	4.75	SOT-223	-40°C to +85°C
AME8815AEGT500	AQSww	5.00	SOT-223	-40°C to +85°C

**■ Ordering Information**

<b>Part Number</b>	<b>Marking</b>	<b>Output</b>	<b>Package</b>	<b>Operating Temp.</b>
AME8815BEBT150	AME8815 BEBT150 yyww	1.50	TO-220	-40°C to +85°C
AME8815BEBT180	AME8815 BEBT180 yyww	1.80	TO-220	-40°C to +85°C
AME8815BEBT250	AME8815 BEBT250 yyww	2.50	TO-220	-40°C to +85°C
AME8815BEBT330	AME8815 BEBT330 yyww	3.30	TO-220	-40°C to +85°C
AME8815BEBT475	AME8815 BEBT475 yyww	4.75	TO-220	-40°C to +85°C
AME8815BEBT500	AME8815 BEBT500 yyww	5.00	TO-220	-40°C to +85°C
AME8815BECS150	AME8815 BECS150 yyww	1.50	TO-252	-40°C to +85°C
AME8815BECS180	AME8815 BECS180 yyww	1.80	TO-252	-40°C to +85°C
AME8815BECS250	AME8815 BECS250 yyww	2.50	TO-252	-40°C to +85°C
AME8815BECS330	AME8815 BECS330 yyww	3.30	TO-252	-40°C to +85°C
AME8815BECS475	AME8815 BECS475 yyww	4.75	TO-252	-40°C to +85°C
AME8815BECS500	AME8815 BECS500 yyww	5.00	TO-252	-40°C to +85°C

**■ Ordering Information**

Part Number	Marking	Output	Package	Operating Temp.
AME8815BEDS150	AME8815 BEDS150 yyww	1.50	TO-263	-40°C to +85°C
AME8815BEDS180	AME8815 BEDS180 yyww	1.80	TO-263	-40°C to +85°C
AME8815BEDS250	AME8815 BEDS250 yyww	2.50	TO-263	-40°C to +85°C
AME8815BEDS330	AME8815 BEDS330 yyww	3.30	TO-263	-40°C to +85°C
AME8815BEDS475	AME8815 BEDS475 yyww	4.75	TO-263	-40°C to +85°C
AME8815BEDS500	AME8815 BEDS500 yyww	5.00	TO-263	-40°C to +85°C
AME8815BEGT150	AJYww	1.50	SOT-223	-40°C to +85°C
AME8815BEGT180	AJZww	1.80	SOT-223	-40°C to +85°C
AME8815BEGT250	AKBww	2.50	SOT-223	-40°C to +85°C
AME8815BEGT330	AKDww	3.30	SOT-223	-40°C to +85°C
AME8815BEGT475	AMNww	4.75	SOT-223	-40°C to +85°C
AME8815BEGT500	AQTww	5.00	SOT-223	-40°C to +85°C

### ■ Absolute Maximum Ratings:

Parameter	Maximum	Unit
Input Voltage	8	V
Output Current	$P_D / (V_{IN} - V_O)$	mA
Output Voltage	GND - 0.3 to $V_{IN} + 0.3$	V
ESD Classification	B	

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

### ■ Recommended operating Conditions:

Parameter	Rating	Unit
Ambient Temperature Range	-40 to +85	°C
Junction Temperature	-40 to +125	°C

### ■ Thermal Information

Parameter	Maximum	Unit
Thermal Resistance ( $\theta_{ja}$ )	SOT-223	160
	TO-252 (DPAK)	90
	D <sup>2</sup> PAK	60
	TO-220	50
Internal Power Dissipation ( $P_D$ ) ( $\Delta T = 100^\circ\text{C}$ )	SOT-223	625
	TO-252 (DPAK)	1200
	D <sup>2</sup> PAK	2800
	TO-220	3000
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (10 Sec)	300	°C



## ■ Electrical Specifications

$V_{IN} = V_{O(nom)} + 2V$ ,  $TA = 25^\circ C$  unless otherwise noted

Parameter	Symbol	Test Condition		Min	Typ	Max	Units
Input Voltage	$V_{IN}$			Note 1		7	V
Output Voltage Accuracy	$V_O$	$I_O=1mA$		-1.5		1.5	%
Dropout Voltage	$V_{DROPOUT}$	$I_O=1.5A$ $V_O=V_{ONOM}-2.0\%$	1.4V < $V_O(NOM)$ <= 2.0V		See chart	1300	mV
			2.0V < $V_O(NOM)$ <= 2.8V			800	
			2.8V < $V_O(NOM)$			600	
Output Current	$I_O$	$V_O > 1.2V$		1500			mA
Current Limit	$I_{LIM}$	$V_O > 1.2V$		1500	2000		mA
Short Circuit Current	$I_{SC}$	$V_O < 0.4V$			750		mA
Quiescent Current	$I_Q$	$I_O=0mA$			45	70	$\mu A$
Ground Pin Current	$I_{GND}$	$I_O=1mA$ to 1500mA			45		$\mu A$
Line Regulation	$REG_{LINE}$	$I_O=1mA$ $V_{IN}=V_O+1$ to $V_O+2$	$V_O < 2.0V$	-0.15		0.15	%
			4.0V > $V_O \geq 2.0V$	-0.1	0.02	0.1	%
			4.0V <= $V_O$	-0.4		0.4	%
Load Regulation	$REG_{LOAD}$	$I_O=1mA$ to 1500mA		-1	0.2	1	%
Over Temperature Shutdown	OTS				150		$^\circ C$
Over Temperature Hysteresis	OTH				30		$^\circ C$
$V_O$ Temperature Coefficient	TC				30		$ppm/^\circ C$
Power Supply Rejection	$PSRR$	$I_O=100mA$ $C_O=4.7\mu F$	$f=1kHz$		50		dB
			$f=10kHz$		20		
			$f=100kHz$		15		
Output Voltage Noise	$eN$	$f=10Hz$ to $100kHz$ $I_O=10mA$	$C_O=4.7\mu F$		30		$\mu V_{rms}$

Note1: $V_{IN(min)}=V_{OUT}+V_{DROPOUT}$



## ■ Detailed Description

The AME8815 family of CMOS regulators contain a PMOS pass transistor, voltage reference, error amplifier, over-current protection, and thermal shutdown.

The P-channel pass transistor receives data from the error amplifier, over-current shutdown, and thermal protection circuits. During normal operation, the error amplifier compares the output voltage to a precision reference. Over-current and Thermal shutdown circuits become active when the junction temperature exceeds 150°C, or the current exceeds 2.2A. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120°C.

The AME8815 behaves like a current source when the load reaches 2.2A. However, if the load impedance drops below 0.3 ohms, the current drops back to 600mA to prevent excessive power dissipation. Normal operation is restored when the load resistance exceeds 0.75 ohms.

## ■ External Capacitors

The AME8815 is stable with an output capacitor to ground of 4.7µF or greater. Ceramic capacitors have the lowest ESR, and will offer the best AC performance. Conversely, Aluminum Electrolytic capacitors exhibit the highest ESR, resulting in the poorest AC response. Unfortunately, large value ceramic capacitors are comparatively expensive. One option is to parallel a 0.1µF ceramic capacitor with a 10µF Aluminum Electrolytic. The benefit is low ESR, high capacitance, and low overall cost.

A second capacitor is recommended between the input and ground to stabilize Vin. The input capacitor should be at least 0.1µF to have a beneficial effect.

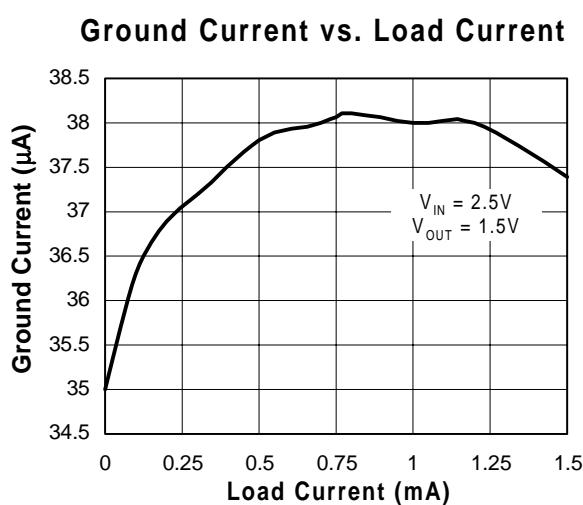
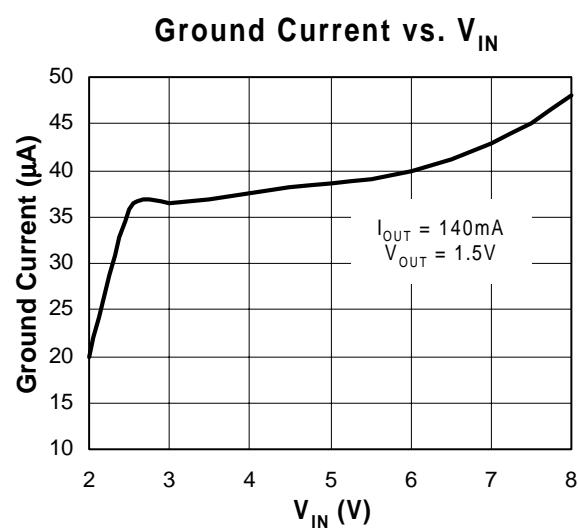
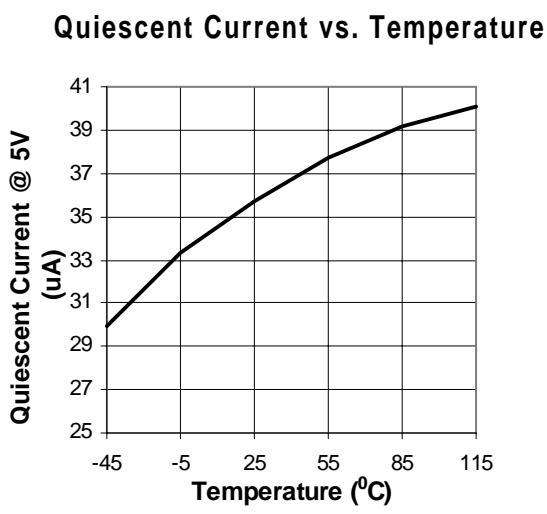
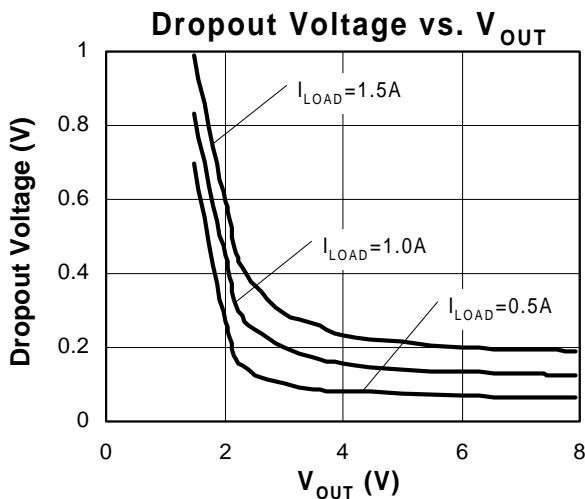
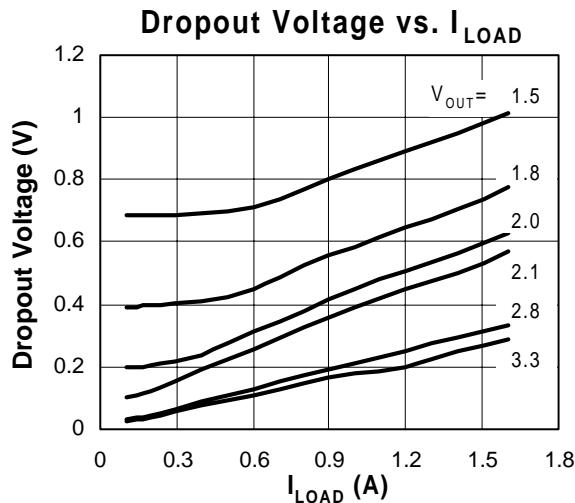
All capacitors should be placed in close proximity to the pins. A "Quiet" ground termination is desirable. This can be achieved with a "Star" connection.



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AME8815

1.5A CMOS LDO

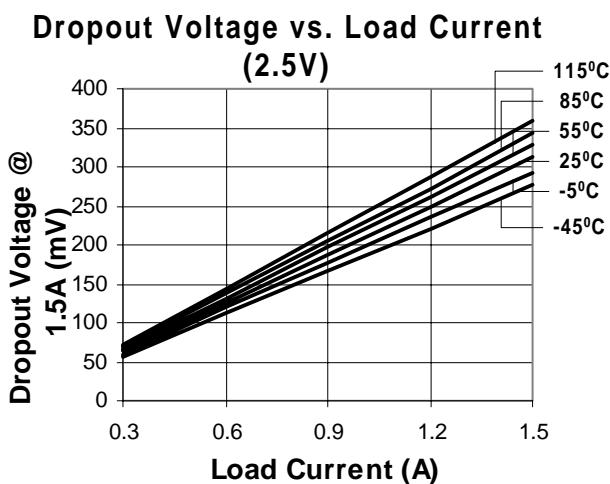
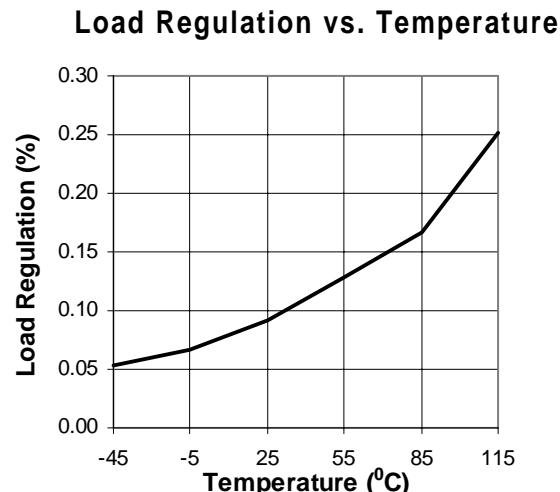
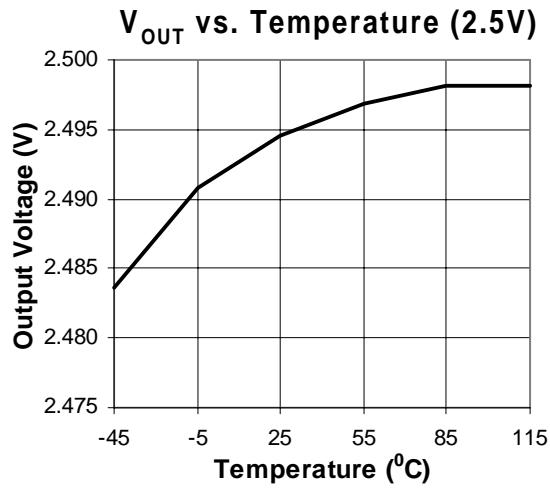




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1.5A CMOS LDO

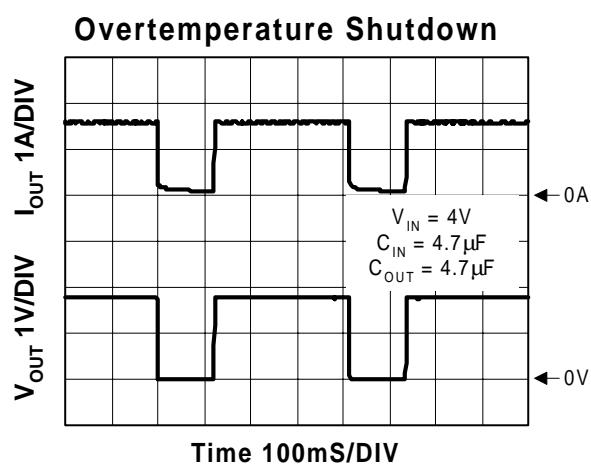
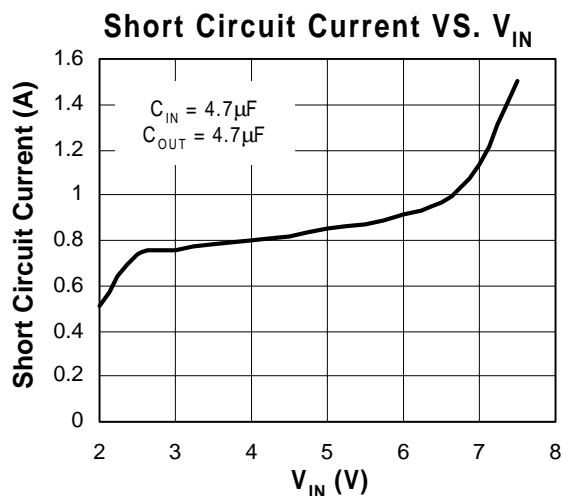
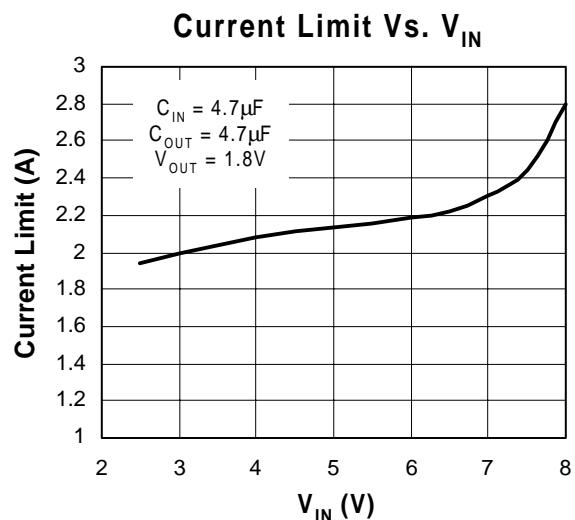
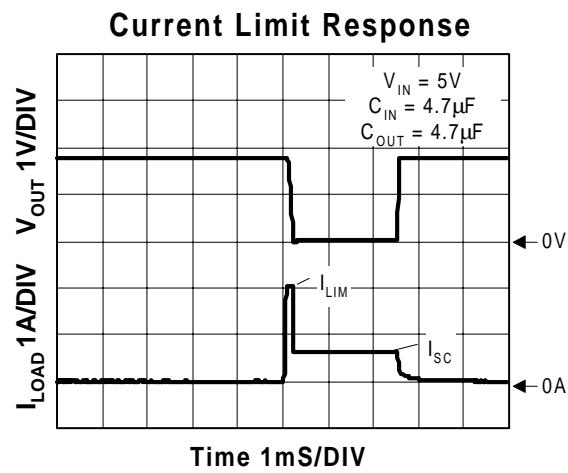
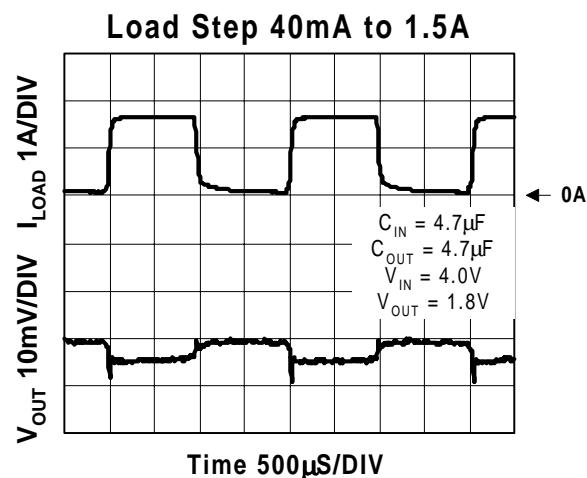
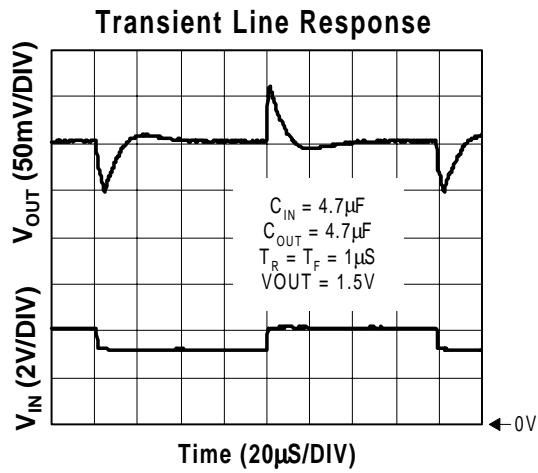




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1.5A CMOS LDO

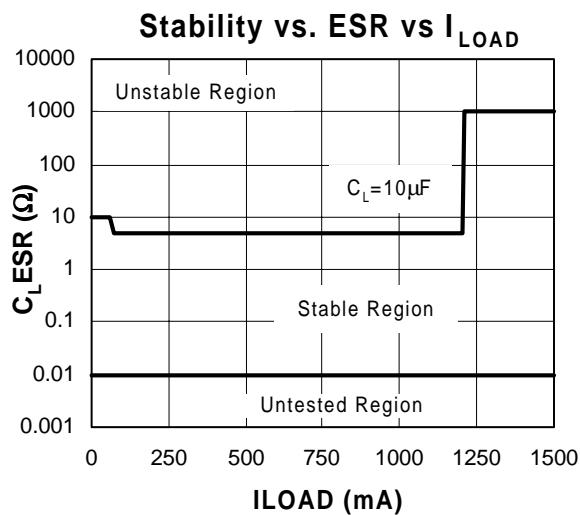
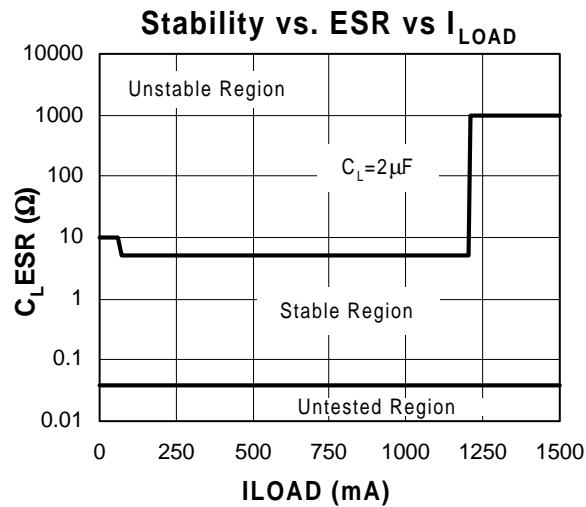
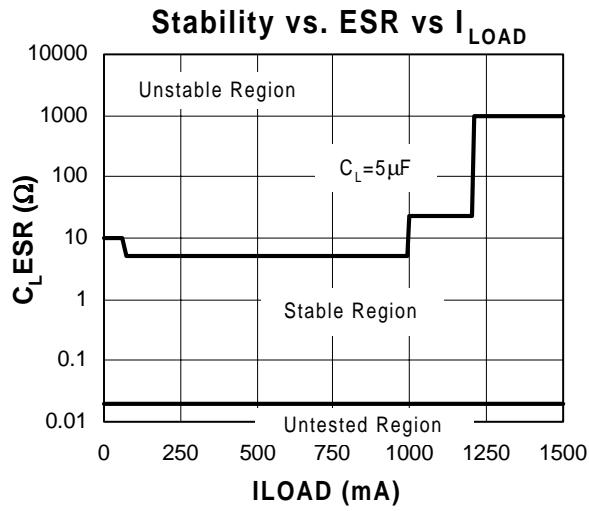




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1.5A CMOS LDO





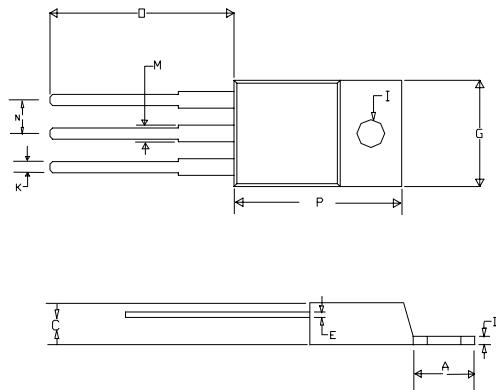
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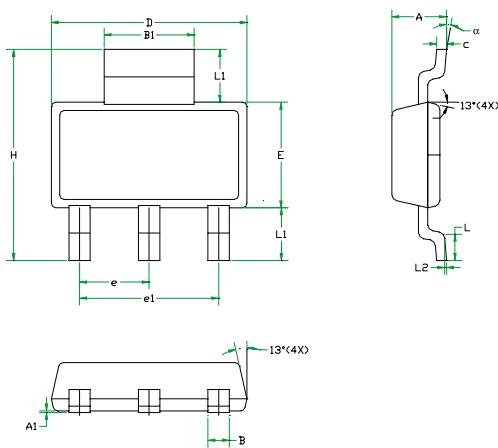
## ■ Package Dimension

TO-220



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.58	7.49	0.2197	0.2949
C	3.56	4.83	0.1400	0.1900
D	0.51	1.40	0.0200	0.0550
E	0.31	1.14	0.0120	0.0450
G	9.65	10.67	0.3800	0.4200
I	3.53	4.09	0.1390	0.1610
K	0.51	1.14	0.0200	0.0450
M	1.14	1.78	0.0449	0.0700
N	2.29	2.79	0.0900	0.1100
O	12.70	14.73	0.5000	0.5800
P	14.22	16.51	0.5600	0.6500

SOT-223



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.50	1.80	0.0591	0.0709
A <sub>1</sub>	0.02	0.10	0.0008	0.0039
B	0.60	0.84	0.0236	0.0330
B <sub>1</sub>	2.90	3.15	0.1140	0.1240
C	0.24	0.38	0.0094	0.0150
D	6.30	6.71	0.2480	0.2640
E	3.30	3.71	0.1299	0.1460
e	2.30 BSC		0.0906 BSC	
e <sub>1</sub>	4.60 BSC		0.1811 BSC	
H	6.70	7.30	0.2638	0.2874
L	0.91 MIN		0.0358 MIN	
L <sub>1</sub>	2.00 MAX		0.0787 MAX	
L <sub>2</sub>	0.06 BSC		0.0024 BSC	
a	0°	10°	0°	10°



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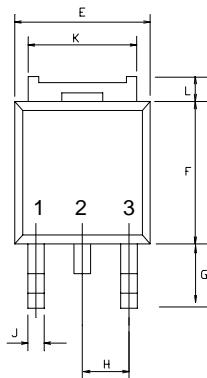
AME8815

1.5A CMOS LDO

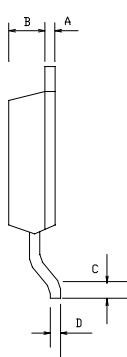
## ■ Package Dimension

TO-252

Top View



Side View



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.40	0.60	0.0157	0.0236
B	1.60	2.00	0.0630	0.0787
C	0.50	-	0.0197	-
D	0.40	0.60	0.0157	0.0236
E	6.35	6.80	0.2500	0.2677
F	5.33	6.30	0.2098	0.2480
G	2.20	3.00	0.0866	0.1181
H	1.98	2.50	0.0780	0.0984
J	0.61	0.97	0.0240	0.0382
K	5.04	5.64	0.1984	0.2220
L	0.40	2.03	0.0157	0.0799

\* : Typical value

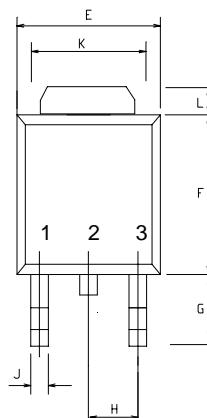
NOTES :

1. CONTROLLING DIMENSION : MILLIMETERS.
2. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS  
MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

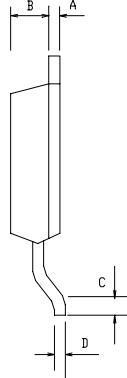
Or

TO-252

Top View



Side View



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.40	0.60	0.0157	0.0236
B	1.60	2.00	0.0630	0.0787
C	0.50	-	0.0197	-
D	0.40	0.60	0.0157	0.0236
E	6.35	6.80	0.2500	0.2677
F	5.33	6.30	0.2098	0.2480
G	2.20	3.00	0.0866	0.1181
H	1.98	2.50	0.0780	0.0984
J	0.61	0.97	0.0240	0.0382
K	5.04	5.64	0.1984	0.2220
L	0.40	2.03	0.0157	0.0799

\* : Typical value

NOTES :

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MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.



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**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.

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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