

## ■ General Description

The AME8808 family of positive, linear regulators feature low quiescent current (30 $\mu$ A typ.) with low dropout voltage, making them ideal for battery applications. The space-saving SOT-223 and TO-252-2 packages are attractive for "Pocket" and "Hand Held" applications.

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

The AME8808 is stable with an output capacitance of 2.2 $\mu$ F or greater.

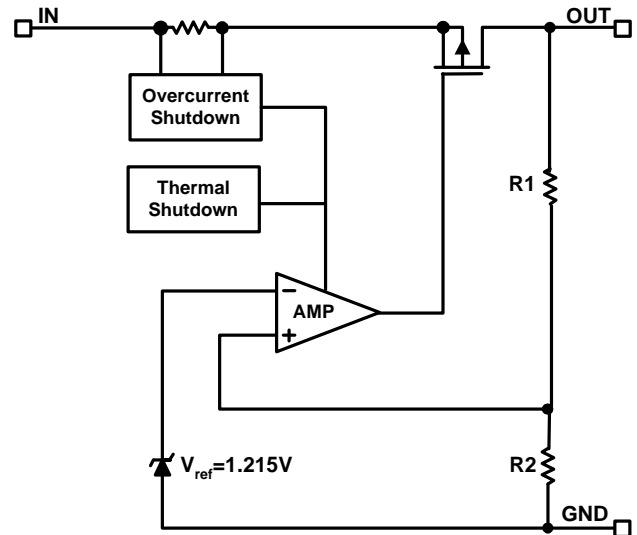
## ■ Features

- Very Low Dropout Voltage
- Guaranteed 750mA Output
- Accurate to within 1.5%
- 30 $\mu$ A Quiescent Current
- Over-Temperature Shutdown
- Current Limiting
- Short Circuit Current Fold-back
- Space-Saving SOT-223 and TO-252-2 Packages
- Factory Pre-set Output Voltages
- Low Temperature Coefficient
- All AME's Lead Free Products Meet RoHS Standards

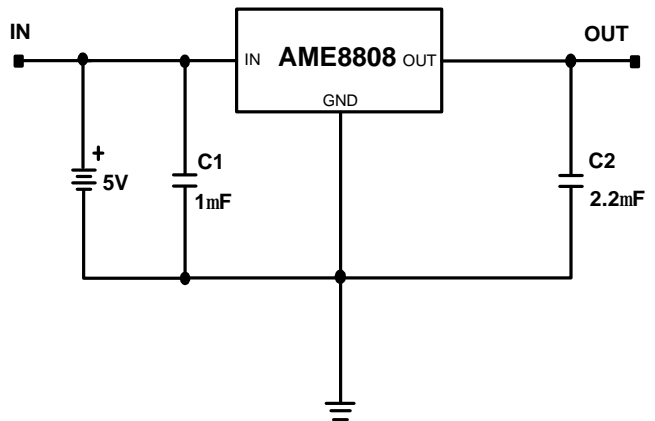
## ■ Applications

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

## ■ Functional Block Diagram



## ■ Typical Application



**■ Pin Configuration**


- AME8808**
1. GND
  2. OUT (TAB)
  3. IN

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

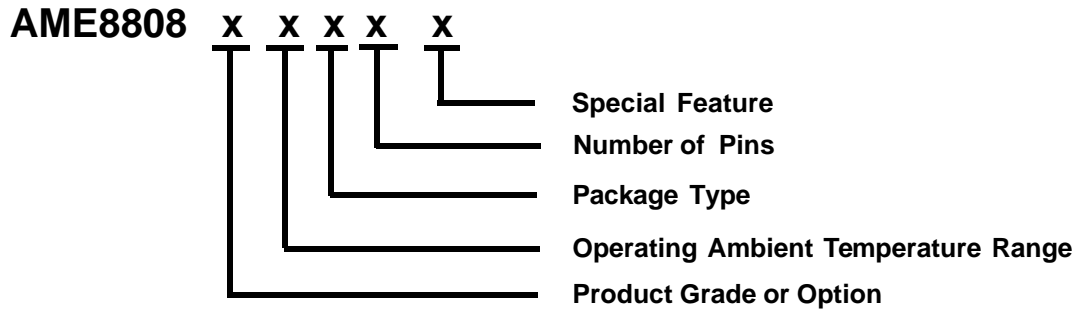


- AME8808**
1. GND
  2. OUT (TAB)
  3. IN

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

**■ Pin Description**

Pin Number	Pin Name	Pin Description
1	GND	Ground connection pin.
2	OUT	LDO voltage regulator output pin. It should be decoupled with a 1 $\mu$ F or greater value low ESR ceramic capacitor.
3	IN	Input voltage pin. It should be decoupled with 1 $\mu$ F or greater capacitor.

**■ Ordering Information**


Product Grade or Option	Operating Ambient Temperature Range	Package Type	Number of Pins	Special Feature
A: 3.3V    1: 1.3V B: 3.0V    2: 2.0V C: 2.8V    3: 4.2V D: 2.5V    4: 4.0V E: 3.8V F: 3.6V G: 3.5V H: 2.7V I: 3.4V J: 2.85V K: 3.7V L: 1.5V M: 1.8V N: 2.9V O: 3.1V P: 4.1V Q: 4.75V R: 2.65V S: 5.0V U: 3.2V V: 3.15V W: 2.3V Y: 1.9V Z: 1.7V	E: -40°C to +85°C	C: TO-252 G: SOT-223	S: 2 T: 3	Z: Lead Free

**■ Ordering Information**

Part Number	Marking*	Output Voltage	Package	Operating Ambient Temperature Range
AME8808AEGT	AETyww	3.3V	SOT-223	- 40°C to +85°C
AME8808AEGTZ	AETyww	3.3V	SOT-223	- 40°C to +85°C
AME8808BEGTZ	AEUyww	3.0V	SOT-223	- 40°C to +85°C
AME8808CEGTZ	AEVyww	2.8V	SOT-223	- 40°C to +85°C
AME8808DEGTZ	AEWyww	2.5V	SOT-223	- 40°C to +85°C
AME8808EEGTZ	AEXyww	3.8V	SOT-223	- 40°C to +85°C
AME8808FEGTZ	AEYyww	3.6V	SOT-223	- 40°C to +85°C
AME8808GEGTZ	AEZyww	3.5V	SOT-223	- 40°C to +85°C
AME8808HEGTZ	AFAyww	2.7V	SOT-223	- 40°C to +85°C
AME8808IEGTZ	AFByww	3.4V	SOT-223	- 40°C to +85°C
AME8808JEGTZ	AGUyww	2.85V	SOT-223	- 40°C to +85°C
AME8808KEGTZ	AHWyww	3.7V	SOT-223	- 40°C to +85°C
AME8808LEGTZ	AJGyww	1.5V	SOT-223	- 40°C to +85°C
AME8808MEGTZ	AJHyww	1.8V	SOT-223	- 40°C to +85°C
AME8808NEGTZ	AKUyww	2.9V	SOT-223	- 40°C to +85°C
AME8808OEGTZ	AKVyww	3.1V	SOT-223	- 40°C to +85°C
AME8808AECSZ	AME8808 AECS yyww	3.3V	TO-252-2	- 40°C to +85°C
AME8808BECSZ	AME8808 BECS yyww	3.0V	TO-252-2	- 40°C to +85°C
AME8808CECSZ	AME8808 CECS yyww	2.8V	TO-252-2	- 40°C to +85°C

Note: yww & yyww represents the date code

\* A line on top of the first letter represents lead free plating such as  $\bar{A}ET$

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

**■ Ordering Information (contd.)**

Part Number	Marking*	Output Voltage	Package	Operating Ambient Temperature Range
AME8808DECSZ	AME8808 DECS yyww	2.5V	TO-252-2	- 40°C to +85°C
AME8808EECSZ	AME8808 EECS yyww	3.8V	TO-252-2	- 40°C to +85°C
AME8808FECSZ	AME8808 FECS yyww	3.6V	TO-252-2	- 40°C to +85°C
AME8808GECSZ	AME8808 GECS yyww	3.5V	TO-252-2	- 40°C to +85°C
AME8808HECSZ	AME8808 HECS yyww	2.7V	TO-252-2	- 40°C to +85°C
AME8808IECSZ	AME8808 IECS yyww	3.4V	TO-252-2	- 40°C to +85°C
AME8808JECSZ	AME8808 JECS yyww	2.85V	TO-252-2	- 40°C to +85°C
AME8808KECSZ	AME8808 KECS yyww	3.7V	TO-252-2	- 40°C to +85°C
AME8808LECSZ	AME8808 LECS yyww	1.5V	TO-252-2	- 40°C to +85°C
AME8808MECSZ	AME8808 MECS yyww	1.8V	TO-252-2	- 40°C to +85°C
AME8808NECSZ	AME8808 NECS yyww	2.9V	TO-252-2	- 40°C to +85°C
AME8808OECSZ	AME8808 OECS yyww	3.1V	TO-252-2	- 40°C to +85°C

**■ Absolute Maximum Ratings**

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

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

\* HBM B: 2000~3999V

**■ 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

**■ Thermal Information**

Parameter	Package	Die Attach	Symbol	Maximum	Unit
Thermal Resistance* ( Junction to Case)	SOT-223	Non Conductive Epoxy	$\theta_{JC}$	31	°C / W
	TO-252-2			30	
Thermal Resistance ( Junction to Ambient)	SOT-223		$\theta_{JA}$	135	
	TO-252-2			140	
Internal Power Dissipation	SOT-223		$P_D$	800	mW
	TO-252-2			1000	
Maximum Junction Temperature				150	°C
Solder Iron (10 Sec)**				350	°C

\* Measure  $\theta_{JC}$  on backside center of tab.

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

**■ Electrical Specifications**
 $T_A = 25^\circ\text{C}$  unless otherwise noted

Parameter	Symbol	Test Condition	Min	Typ	Max	Units	
Input Voltage	$V_{IN}$		Note 1		7	V	
Output Voltage Accuracy	$V_O$	$I_O=1\text{mA}$	-1.5		1.5	%	
Dropout Voltage	$V_{DROPOUT}$	$I_O=750\text{mA}$ $V_O=V_{O(NOM)}-2.0\%$	$1.3\text{V} \leq V_{O(NOM)} \leq 1.4\text{V}$		See chart	1900	mV
			$1.4\text{V} < V_{O(NOM)} \leq 2.0\text{V}$			1400	
			$2.0\text{V} < V_{O(NOM)} \leq 2.8\text{V}$			800	
			$2.8\text{V} < V_{O(NOM)}$			600	
Output Current	$I_O$	$V_O > 1.2\text{V}$	750			mA	
Current Limit	$I_{LIM}$	$V_O > 1.2\text{V}$	750	850		mA	
Short Circuit Current	$I_{SC}$	$V_O < 0.8\text{V}$		300	600	mA	
Quiescent Current	$I_Q$	$I_O=0\text{mA}$		30	50	$\mu\text{A}$	
Ground Pin Current	$I_{GND}$	$I_O=1\text{mA}$ to 750mA		35		$\mu\text{A}$	
Line Regulation	$REG_{LINE}$	$I_O=1\text{mA}$ $V_{IN}=V_O+1$ to $V_O+2$	$1.3\text{V} \leq V_O \leq 1.4\text{V}$	-0.2		0.2	%
			$1.4\text{V} < V_O \leq 2.0\text{V}$	-0.15		0.15	
			$2.0\text{V} < V_O < 4.0\text{V}$	-0.1	0.02	0.1	
			$4.0\text{V} \leq V_O$	-0.4	0.2	0.4	
Load Regulation	$REG_{LOAD}$	$I_O=1\text{mA}$ to 750mA		0.2	1	%	
Over Temperature Shutdown	OTS			150		$^\circ\text{C}$	
Over Temperature Hysteresis	OTH			30		$^\circ\text{C}$	
$V_O$ Temperature Coefficient	TC			30		ppm/ $^\circ\text{C}$	
Power Supply Rejection	PSRR	$I_O=100\text{mA}$ $C_O=2.2\text{mF}$	$f=100\text{Hz}$		60		dB
			$f=1\text{kHz}$		50		
			$f=10\text{kHz}$		20		
Output Voltage Noise	eN	$f=10\text{Hz}$ to 100kHz $I_O=10\text{mA}, C_{BYP}=0\text{mF}$		30		mVrms	

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

## ■ Detailed Description

The AME8808 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 750mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120°C.

The AME8808 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress. The AME8808 also incorporates current foldback to reduce power dissipation when the output is short circuited. This feature becomes active when the output drops below 0.8 volts, and reduces the current flow by 65%. Full current is restored when the voltage exceeds 0.8 volts.

## ■ External Capacitors

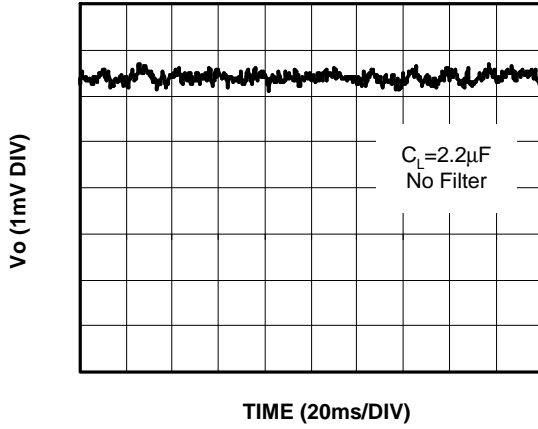
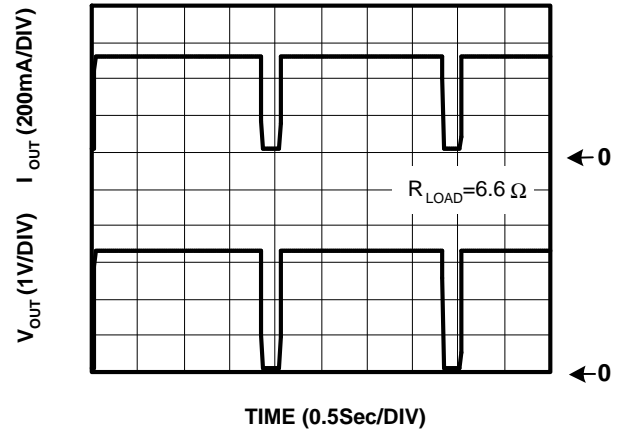
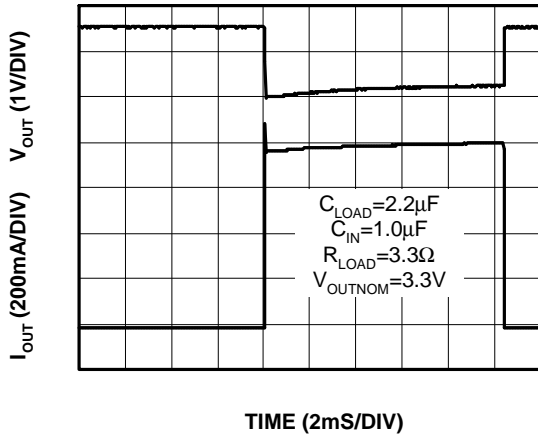
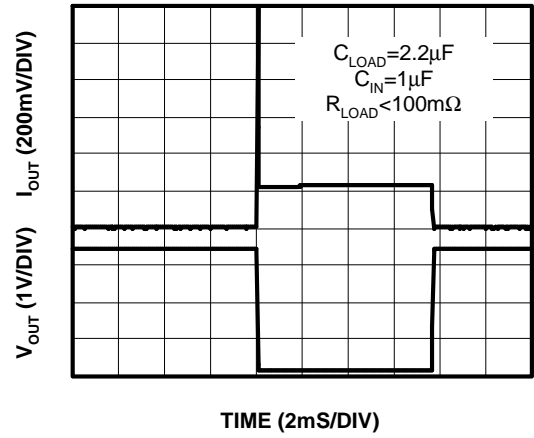
The AME8808 is stable with an output capacitor to ground of 2.2 $\mu$ F or greater. Ceramic capacitors have the lowest ESR, and will offer the best AC performance. Conversely, Aluminum Electrolytic capacitors exhibit the highest ESR, resulting in the poorest AC response. Unfortunately, large value ceramic capacitors are comparatively expensive. One option is to parallel a 0.1 $\mu$ F ceramic capacitor with a 10 $\mu$ F Aluminum Electrolytic. The benefit is low ESR, high capacitance, and low overall cost.

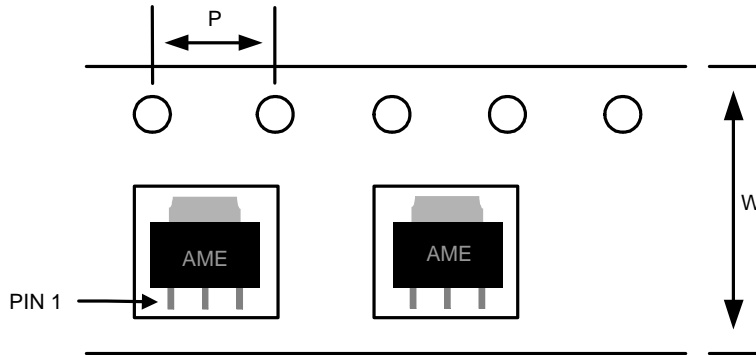
A second capacitor is recommended between the input and ground to stabilize  $V_{in}$ . The input capacitor should be at least 0.1 $\mu$ F to have a beneficial effect.

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.

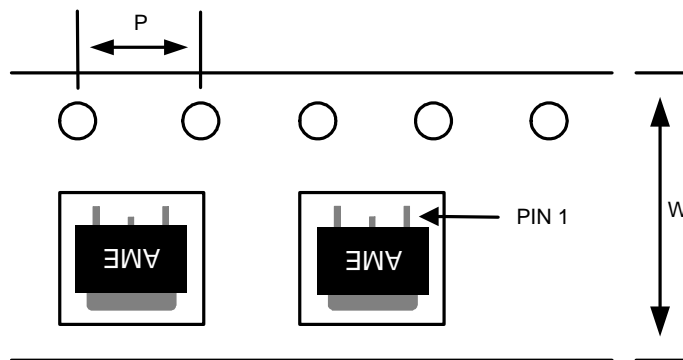




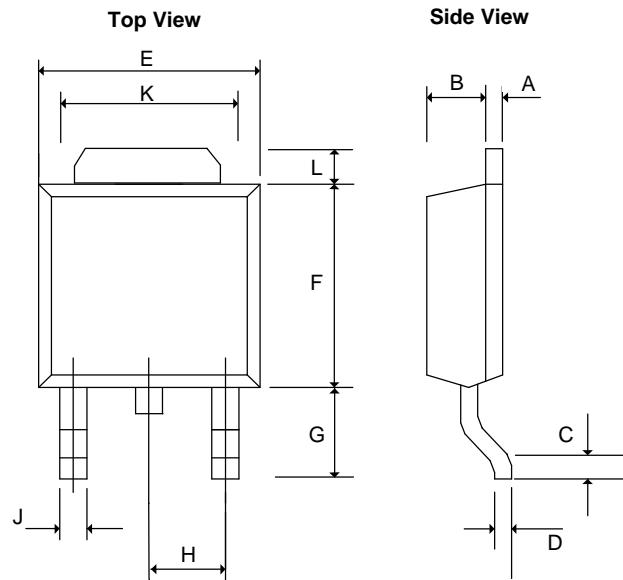
**Noise Measurement**

**Overtemperature Shutdown**

**Current Limit Response**

**Short Circuit Response**


**■ Tape & Reel Dimension**
**SOT-223**

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

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOT-223	12.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

**TO-252-2**

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

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
TO-252-2	16.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

**■ Package Dimension**
**TO-252-2(DPAK)-EIAJ**


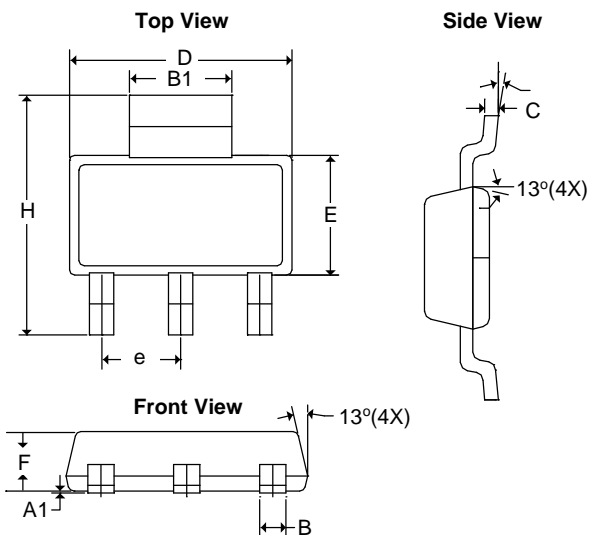
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
<b>A</b>	0.43	0.58	0.0169	0.0230
<b>B</b>	1.60	1.95	0.0630	0.0768
<b>C</b>	0.51	1.78	0.0200	0.0701
<b>D</b>	0.43	0.60	0.0169	0.0236
<b>E</b>	6.35	6.80	0.2500	0.2677
<b>F</b>	5.36	7.20	0.2110	0.2835
<b>G</b>	2.20	3.00	0.0866	0.1181
<b>H</b>	-	* 2.30	-	*0.0906
<b>J</b>	-	0.97	-	0.0380
<b>K</b>	5.20	5.50	0.2047	0.2165
<b>L</b>	1.40REF		0.055REF	

\*: 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.

**SOT-223**


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
<b>A<sub>1</sub></b>	0.01	0.10	0.0004	0.0039
<b>B</b>	0.60	0.84	0.0236	0.0330
<b>B<sub>1</sub></b>	2.90	3.15	0.1140	0.1240
<b>C</b>	0.24	0.38	0.0094	0.0150
<b>D</b>	6.30	6.71	0.2480	0.2640
<b>E</b>	3.30	3.71	0.1299	0.1460
<b>F</b>	1.40	1.80	0.0551	0.0709
<b>e</b>	2.30 BSC		0.0906 BSC	
<b>H</b>	6.70	7.30	0.2638	0.2874
<b>q</b>	0°	10°	0°	10°



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