

■ General Description

The AME8843 family of positive, linear regulators feature low quiescent current (30 μ A typ.) with low dropout voltage, making them ideal for battery applications. The space-saving SOT-223 package is 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 AME8843 is stable with an output capacitance of 2.2 μ F or greater.

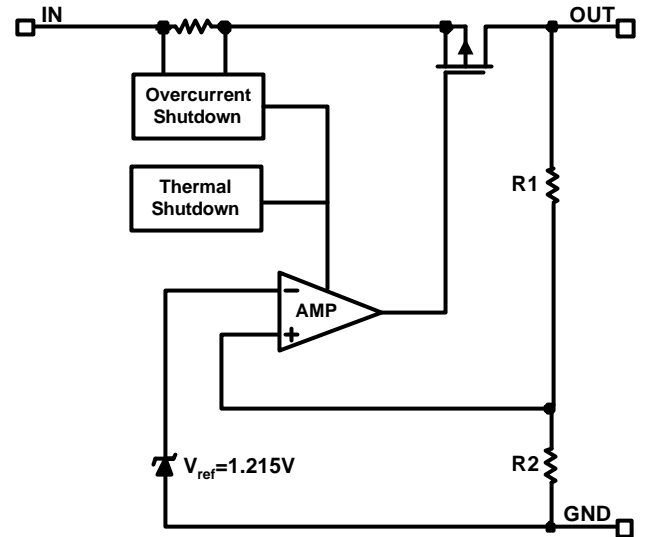
■ Features

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

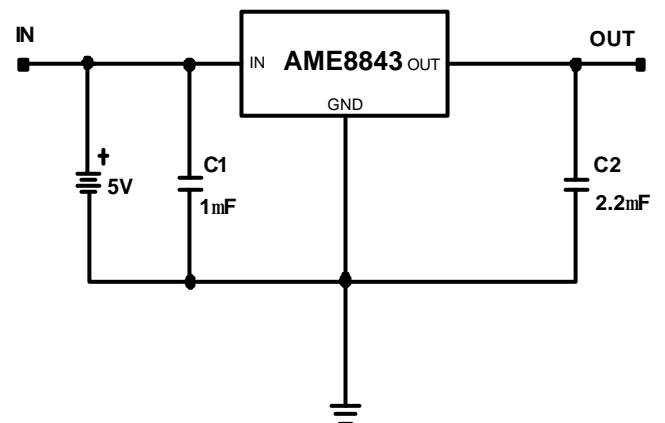
■ Applications

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

■ Functional Block Diagram



■ Typical Application



■ Pin Configuration

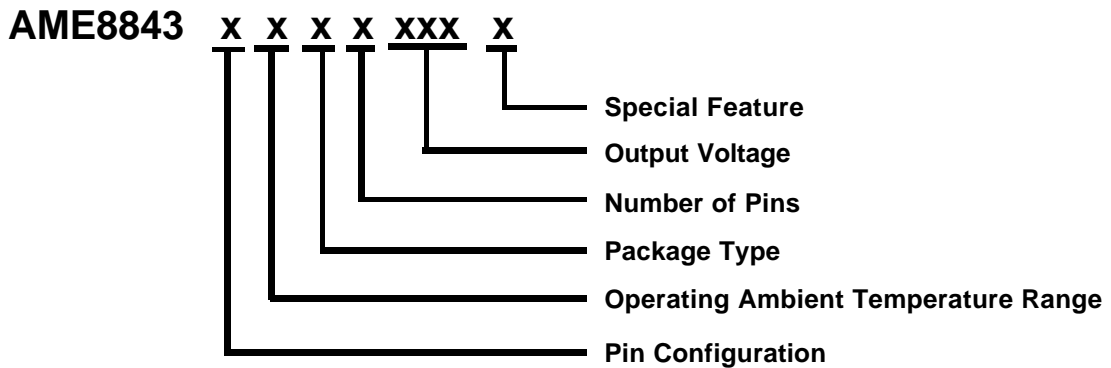
AME8843

1. IN
2. GND(TAB)
3. OUT

* **Die Attach:**
Conductive Epoxy

■ Pin Description

Pin Number	Pin Name	Pin Description
1	IN	Input voltage pin. It should be decoupled with 1 μ F or greater capacitor.
2	GND	Ground connection pin.
3	OUT	LDO voltage regulator output pin. It should be decoupled with a 2.2 μ F or greater value low ESR ceramic capacitor.

■ Ordering Information


Pin Configuration	Operating Ambient Temperature Range	Package Type	Number of Pins	Output Voltage	Special Feature
A: 1. IN (SOT-223) 2. GND 3. OUT	E: -40°C to +85°C	G: SOT-223	T: 3	180: V=1.8V 250: V=2.5V	Z: Lead Free

■ Ordering Information

Part Number	Marking*	Output Voltage	Package	Operating Ambient Temperature Range
AME8843AEGT180	AWZyww	1.8V	SOT-223	- 40°C to +85°C
AME8843AEGT180Z	AWZyww	1.8V	SOT-223	- 40°C to +85°C
AME8843AEGT250	AWFyww	2.5V	SOT-223	- 40°C to +85°C
AME8843AEGT250Z	AWFyww	2.5V	SOT-223	- 40°C to +85°C

Note: yww represents the date code

* A line on top of the first character represents lead free plating such as $\overline{AW}Zww$.

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

■ 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:2000V~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	Conductive Epoxy	θ_{JC}	25	°C / W
Thermal Resistance (Junction to Ambient)			θ_{JA}	120	
Internal Power Dissipation			P_D	900	mW
Maximum Junction Temperature				150	°C
Solder Iron (10 Sec)**				350	°C

* Measure θ_{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		
			$2.0\text{V} < V_{O(NOM)} \leq 2.8\text{V}$		1000		
			$2.8\text{V} < V_{O(NOM)}$		750		
Output Current	I_O	$V_O > 1.2\text{V}$	750			mA	
Current Limit	I_{LIM}	$V_O > 1.2\text{V}$	1500	2000		mA	
Short Circuit Current	I_{SC}	$V_O < 0.8\text{V}$		750		mA	
Quiescent Current	I_Q	$I_O=0\text{mA}$		30	50	μA	
Ground Pin Current	I_{GND}	$I_O=1\text{mA}$ to 750mA		35		μA	
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	$I_O=100\text{mA}$ $C_O=2.2\mu\text{F}$	$f=100\text{Hz}$		60	dB	
			$f=1\text{kHz}$		50		
			$f=10\text{kHz}$		20		
Output Voltage Noise	eN	$f=10\text{Hz}$ to 100kHz $I_O=10\text{mA}, C_{BYP}=0\mu\text{F}$			30	μVrms	

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

Note2: To prevent the Short Circuit Current protection feature from being prematurely activated, the input voltage must be applied before a current source load is applied.

■ Detailed Description

The AME8843 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.

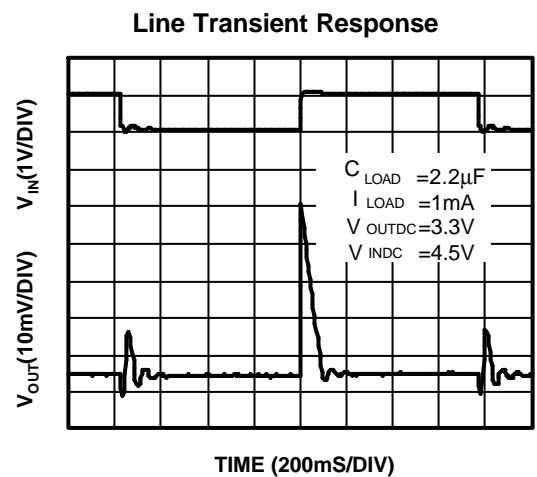
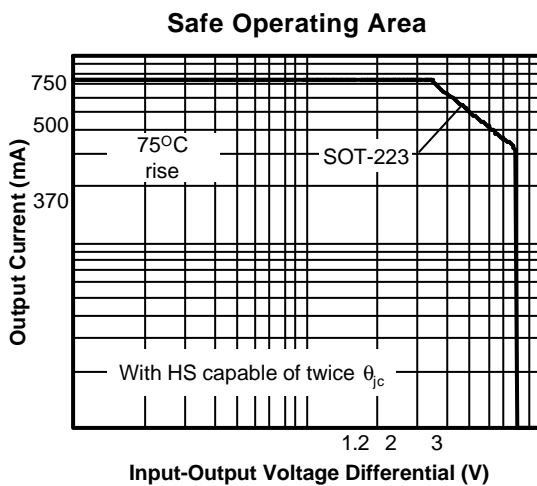
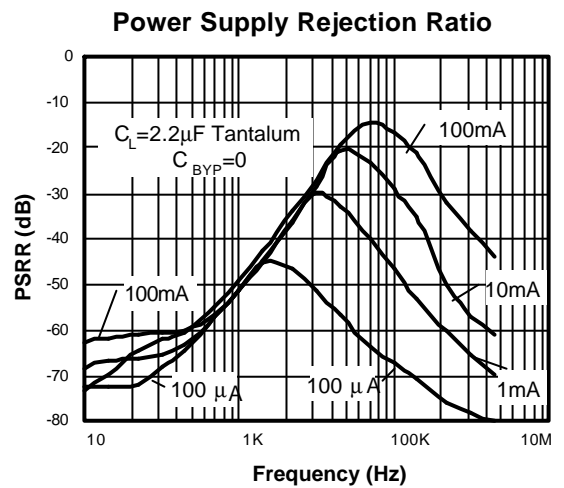
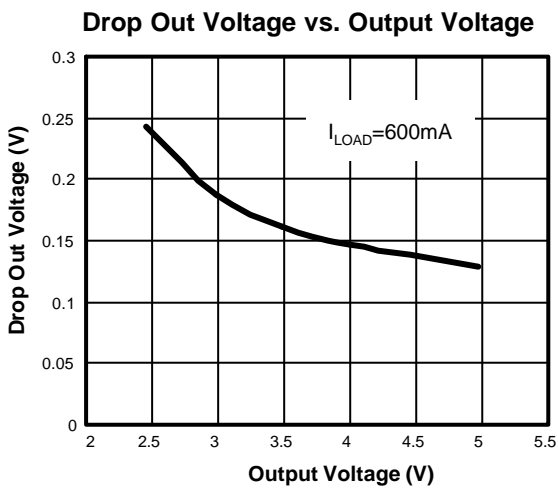
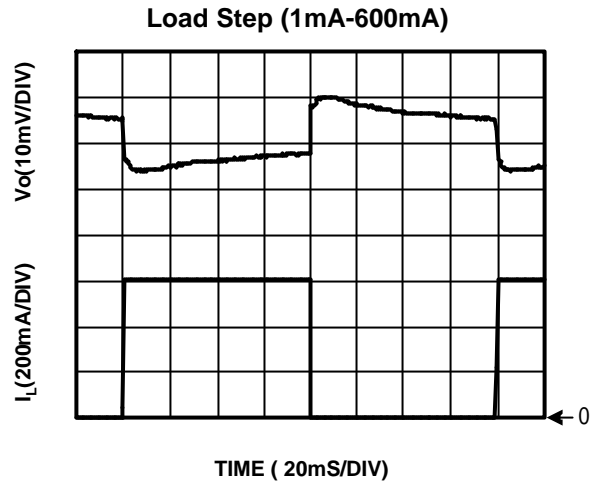
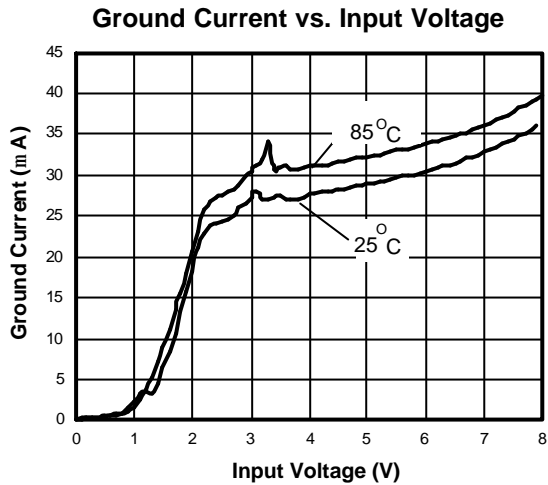
The AME8843 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress. The AME8843 also incorporates current foldback to reduce power dissipation when the output is short circuited. This feature becomes active when the output drops below 0.8 volts, and reduces the current flow by 65%. Full current is restored when the voltage exceeds 0.8 volts.

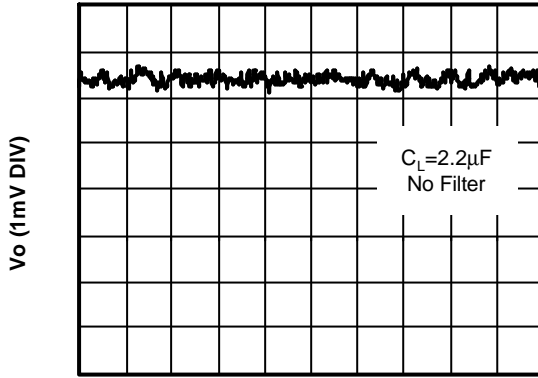
■ External Capacitors

The AME8843 is stable with an output capacitor to ground of 2.2 μ 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 μ F ceramic capacitor with a 10 μ F Aluminum Electrolytic. The benefit is low ESR, high capacitance, and low overall cost.

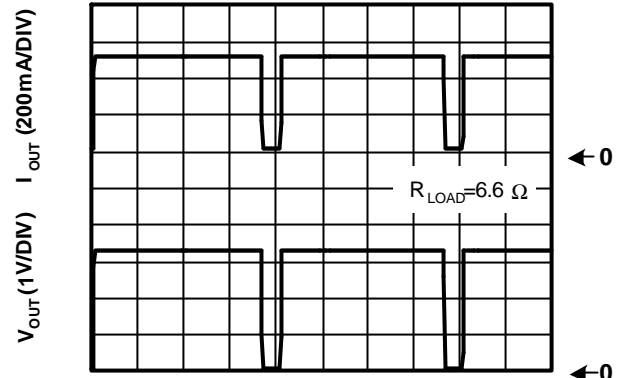
A second capacitor is recommended between the input and ground to stabilize V_{in} . The input capacitor should be at least 0.1 μ F to have a beneficial effect.

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.

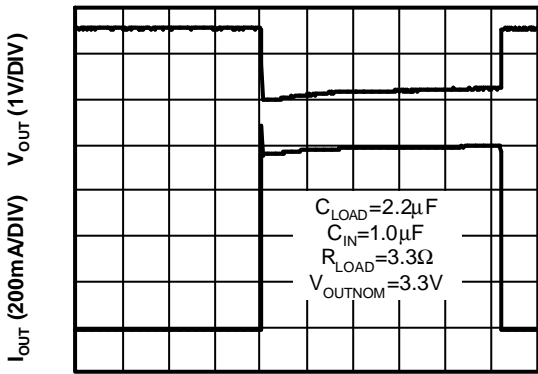


Noise Measurement


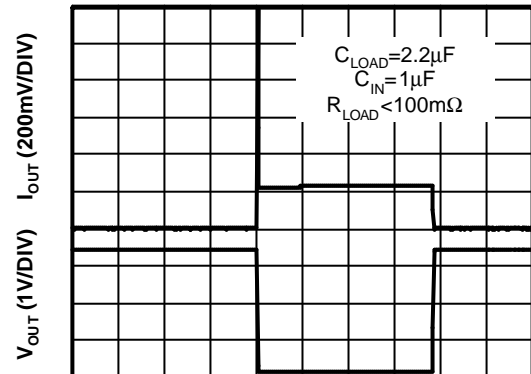
TIME (20ms/DIV)

Overtemperature Shutdown


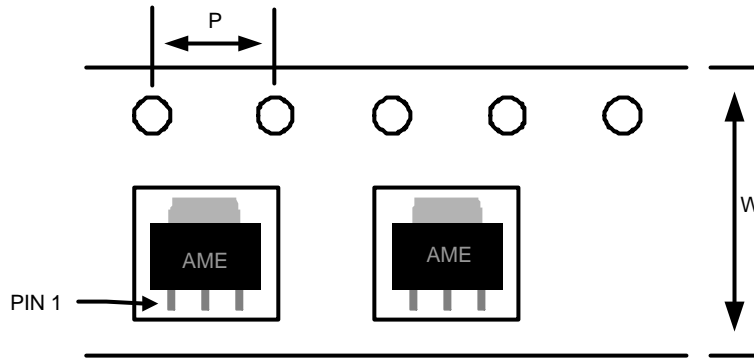
TIME (0.5Sec/DIV)

Current Limit Response


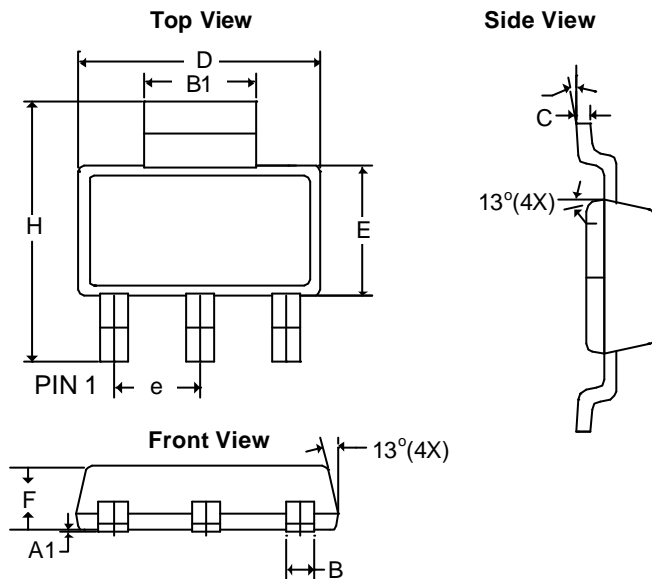
TIME (2mS/DIV)

Short Circuit Response


TIME (2mS/DIV)

■ Tape and 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

■ Package Dimension
SOT-223


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A ₁	0.01	0.10	0.0004	0.0039
B	0.60	0.84	0.0236	0.0330
B ₁	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
F	1.40	1.80	0.0551	0.0709
e	2.30 BSC		0.0906 BSC	
H	6.70	7.30	0.2638	0.2874
q	0°	10°	0°	10°



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