

■ 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" of operating conditions.

The AME8843 is stable with an output capacitance of 2.2 μ F or greater.

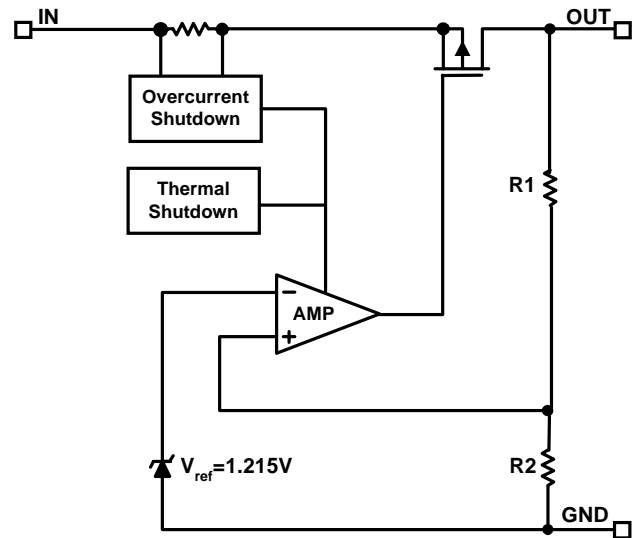
■ Features

- 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

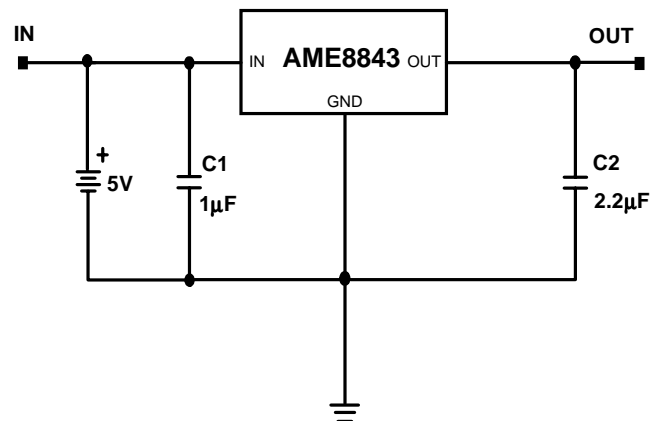
■ Applications

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

■ Functional Block Diagram



■ Typical Application





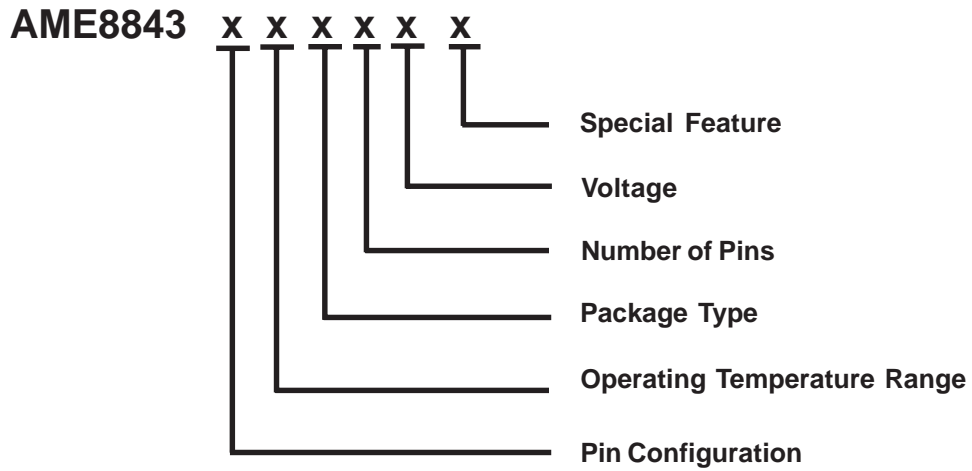
■ Pin Configuration



AME8843

1. V_{IN}
2. GND
3. V_{OUT}

■ Ordering Information



Pin Configuration	Operating Temperature Range	Package Type	Number of Pins	Voltage	Special Feature
A: 1. V_{IN} 2. GND 3. V_{OUT}	E: -40°C to 85°C	G: SOT-223	T: 3	180: $V=1.8\text{V}$ 250: $V=2.5\text{V}$	Z: Lead Free

■ Ordering Information (contd.)

Part Number	Marking	Output Voltage	Package	Operating Temp. 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

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

■ Absolute Maximum Ratings

Parameter	Maximum	Unit
Input Voltage	8	V
Output Current	1	A
Input, Output Voltage	GND - 0.3 to $V_{DD} + 0.3$	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
Supply Voltage	4.5 to 5.5	V
Ambient Temperature Range	- 40 to + 85	°C
Junction Temperature	- 40 to + 125	°C

■ Thermal Information

Parameter	Maximum	Unit	
Thermal Resistance (θ_{jc})	SOT-223	15	°C / W
Internal Power Dissipation (P_D) ($\Delta T = 100^\circ\text{C}$)	SOT-223	625	mW
Maximum Junction Temperature		150	°C
Maximum Lead Temperature (10 Sec)		300	°C

■ Electrical Specifications

TA = 25°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	$V_{DROPOUT}$	$I_O=750mA$ $V_O=V_{O(NOM)}-2.0\%$	$1.3V \leq V_{O(NOM)} \leq 1.4V$	See chart	1900	mV	
			$1.4V < V_{O(NOM)} \leq 2.0V$		1400		
			$2.0V < V_{O(NOM)} \leq 2.8V$		1000		
			$2.8V < V_{O(NOM)}$		750		
Output Current	I_O	$V_O > 1.2V$	750			mA	
Current Limit	I_{LIM}	$V_O > 1.2V$	1500	2000		mA	
Short Circuit Current	I_{SC}	$V_O < 0.8V$		750		mA	
Quiescent Current	I_Q	$I_O=0mA$		30	50	μA	
Ground Pin Current	I_{GND}	$I_O=1mA$ to 750mA		35		μA	
Line Regulation	REG_{LINE}	$I_O=1mA$ $V_{IN}=V_O+1$ to V_O+2	$1.3V \leq V_O \leq 1.4V$	-0.2		0.2	%
			$1.4V < V_O \leq 2.0V$	-0.15		0.15	
			$2.0V < V_O < 4.0V$	-0.1	0.02	0.1	
			$4.0V \leq V_O$	-0.4	0.2	0.4	
Load Regulation	REG_{LOAD}	$I_O=1mA$ to 750mA		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	$I_O=100mA$ $C_O=2.2\mu F$	$f=1kHz$		50	dB	
			$f=10kHz$		20		
			$f=100kHz$		15		
Output Voltage Noise	eN	$f=10Hz$ to 100kHz $I_O=10mA, C_{BYP}=0\mu F$			30	μV_{rms}	

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.

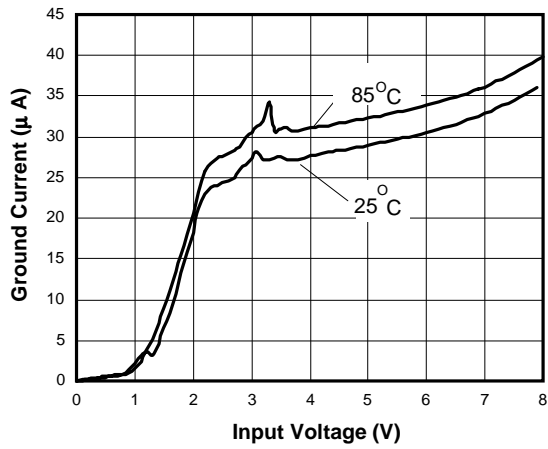
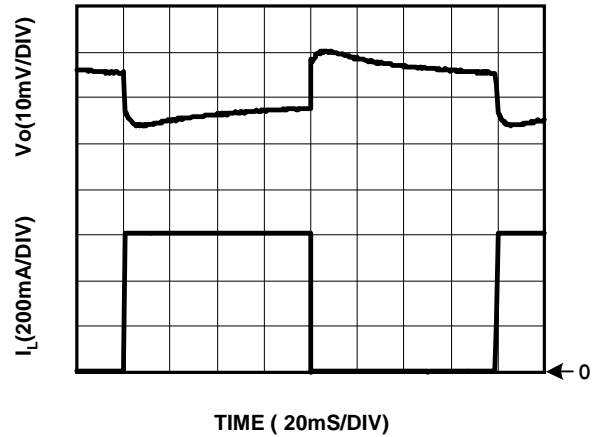
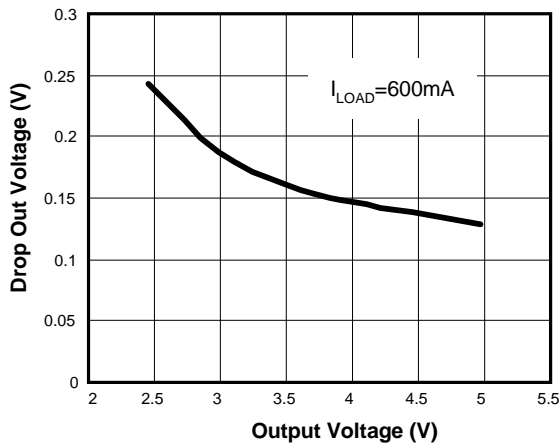
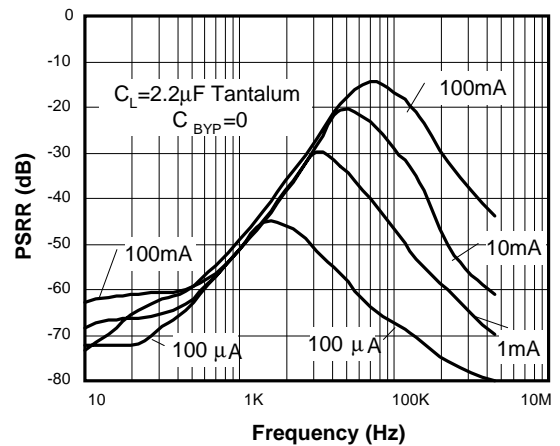
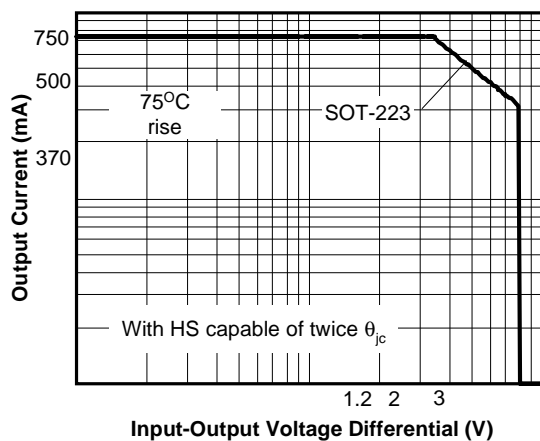
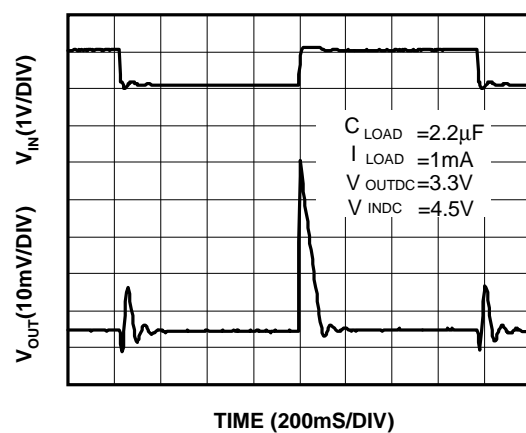
The AME8843 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress. The AME8808 also incorporates current foldback to reduce power dissipation when the output is short circuited. This feature becomes active when the output drops below 0.8 volts, and reduces the current flow by 65%. Full current is restored when the voltage exceeds 0.8 volts.

■ External Capacitors

The 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.

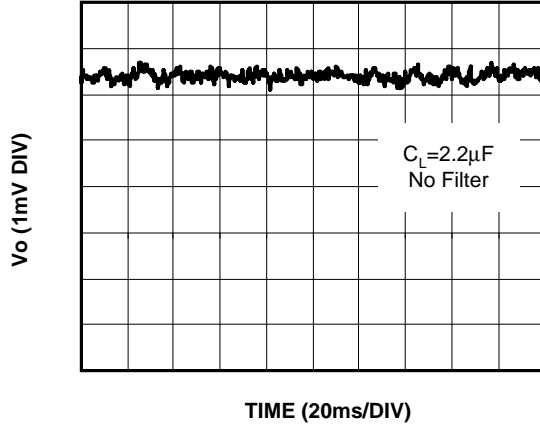
A second capacitor is recommended between the input and ground to stabilize V_{in} . The input capacitor should be at least 0.1 μ F to have a beneficial effect.

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.

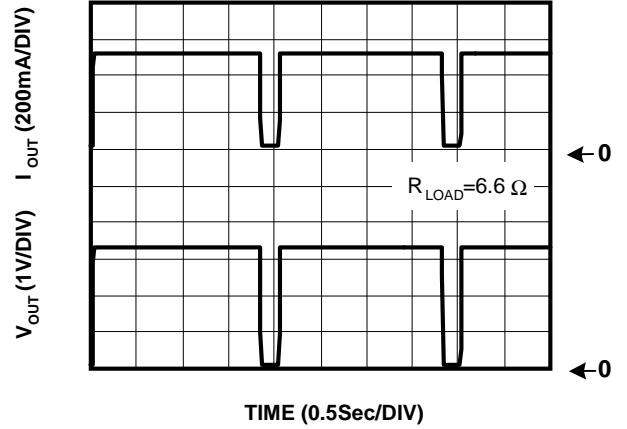
Ground Current vs. Input Voltage

Load Step (1mA-600mA)

Drop Out Voltage vs. Output Voltage

Power Supply Rejection Ratio

Safe Operating Area

Line Transient Response




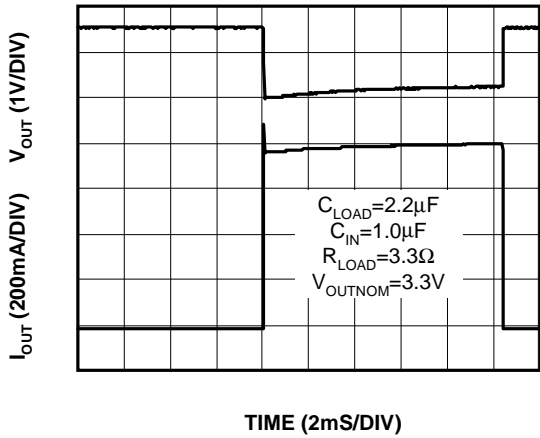
Noise Measurement



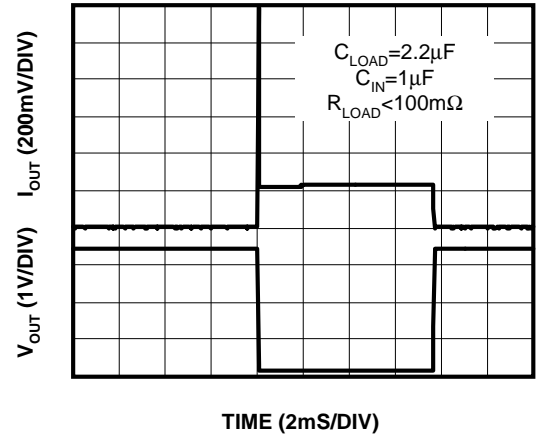
Overtemperature Shutdown

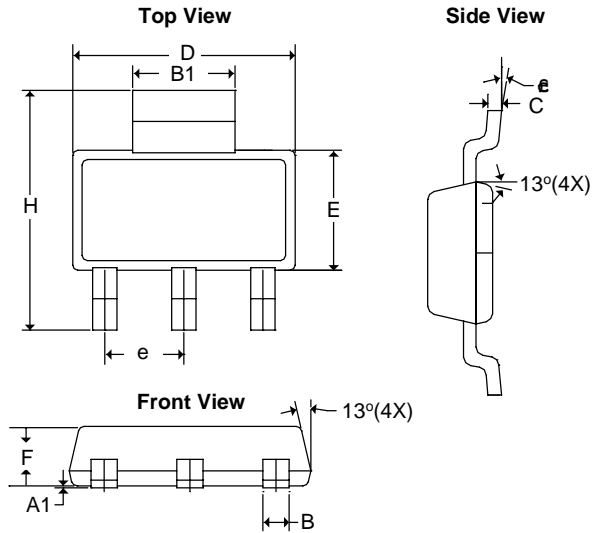


Current Limit Response



Short Circuit Response



■ 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	5.00	0.1140	0.1969
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	
H	6.70	7.30	0.2638	0.2874
θ	0°	10°	0°	10°



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