

■ 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.

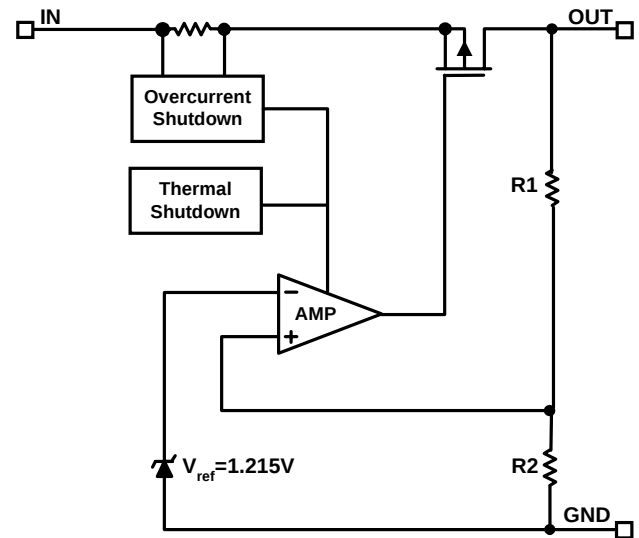
■ Features

- 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

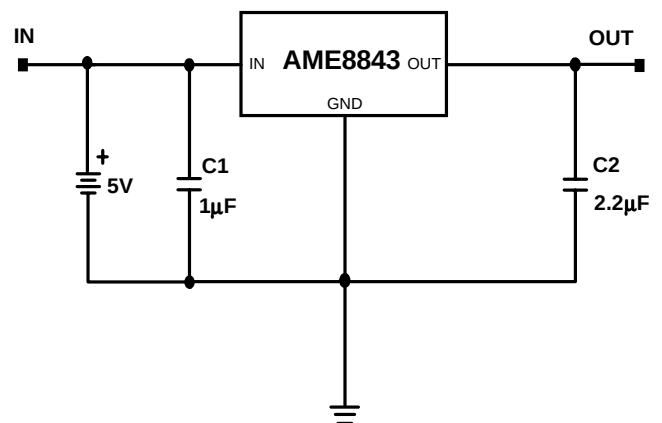
■ Applications

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

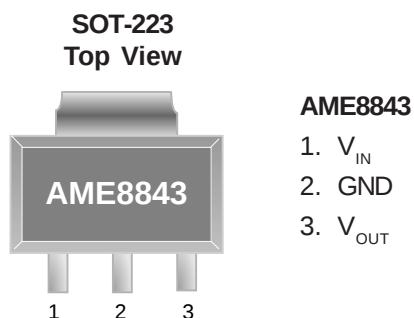
■ Functional Block Diagram



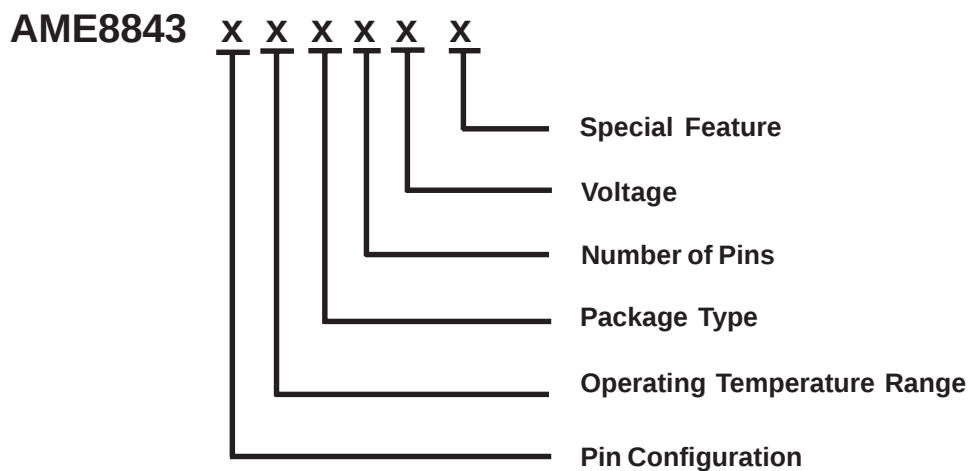
■ Typical Application



■ Pin Configuration



■ 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: $V=1.8V$ 250: $V=2.5V$	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 $I_O=10mA, C_{BYP}=0\mu F$	$C_O=2.2\mu F$		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

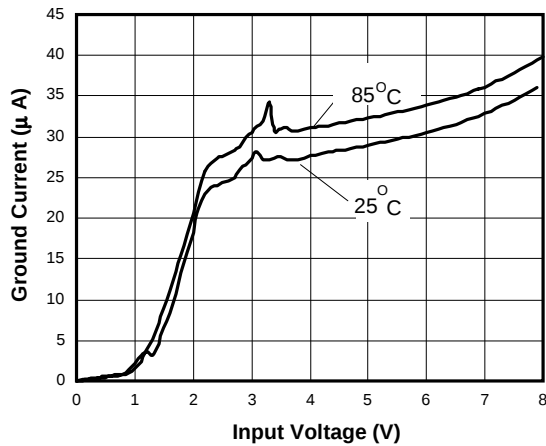
The AME8843 is stable with an output capacitor to ground of 2.2μF or greater. Ceramic capacitors have the lowest ESR, and will offer the best AC performance. Conversely, Aluminum Electrolytic capacitors exhibit the highest ESR, resulting in the poorest AC response. Unfortunately, large value ceramic 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 V_{in} . The input capacitor should be at least 0.1μF to have a beneficial effect.

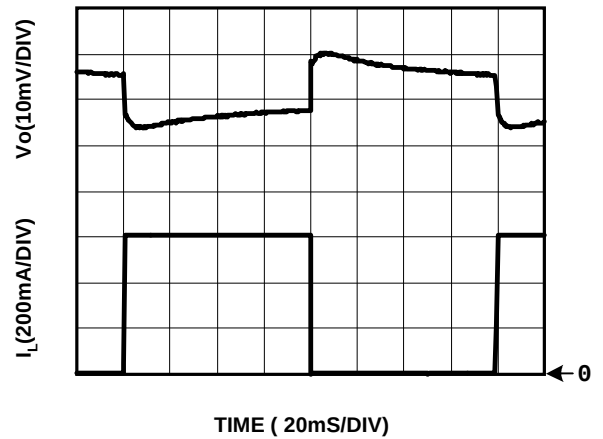
All capacitors should be placed in close proximity to the pins. A "Quiet" ground termination is desirable. This can be achieved with a "Star" connection.



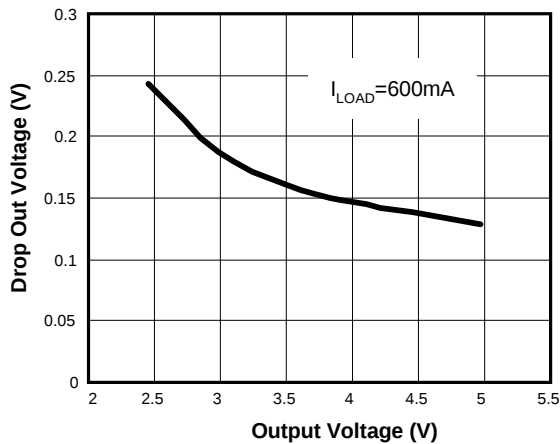
Ground Current vs. Input Voltage



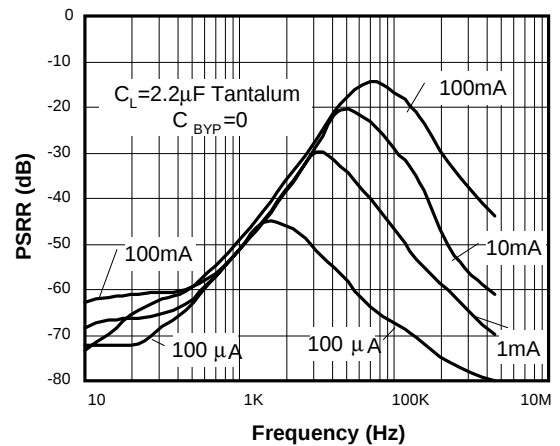
Load Step (1mA-600mA)



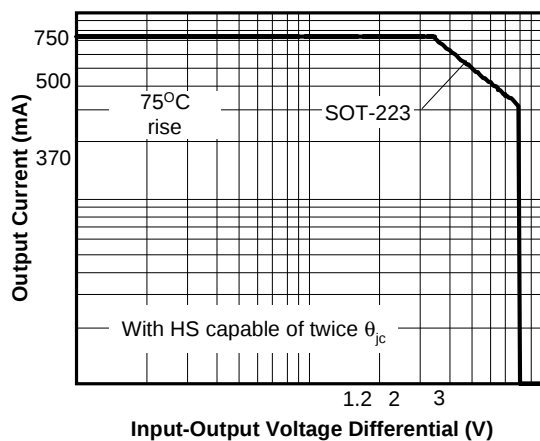
Drop Out Voltage vs. Output Voltage



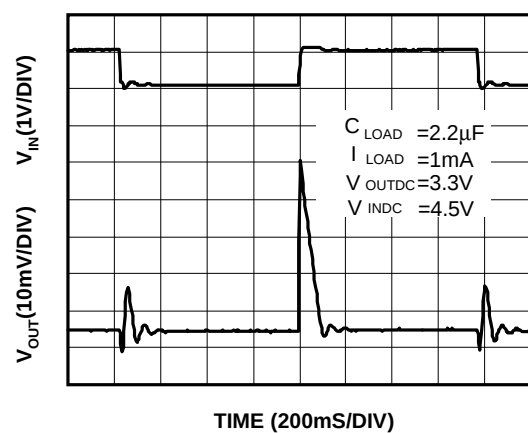
Power Supply Rejection Ratio



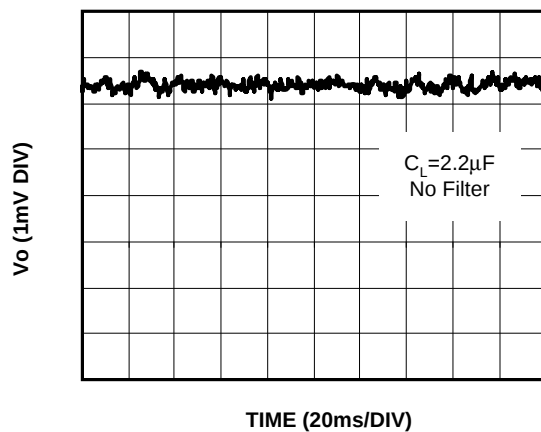
Safe Operating Area



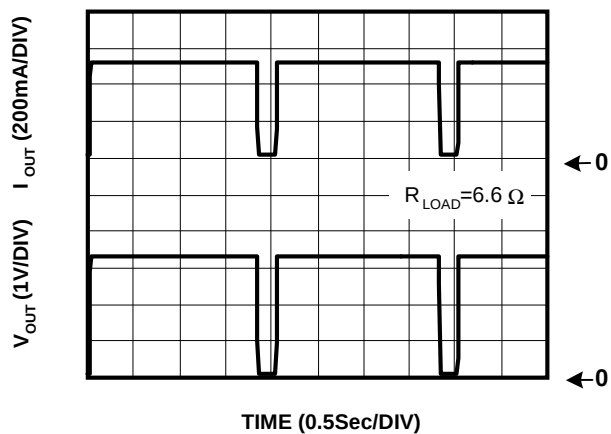
Line Transient Response



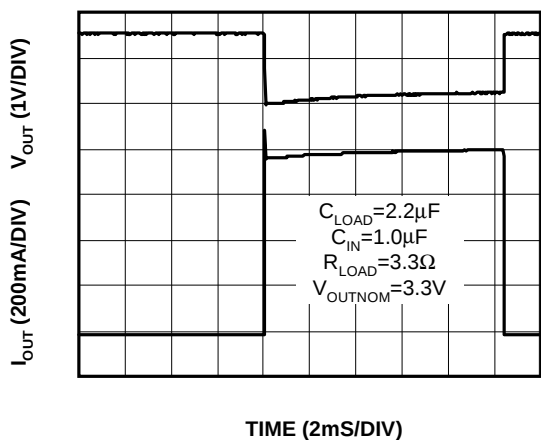
Noise Measurement



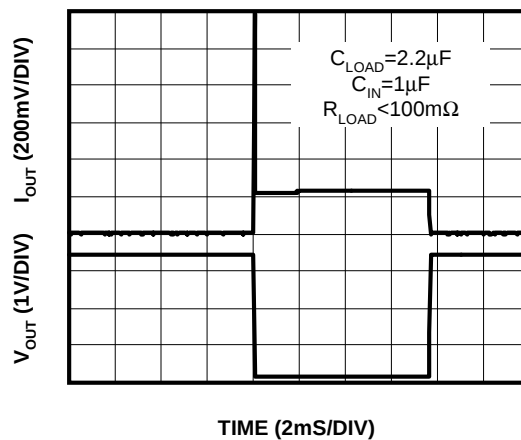
Overtemperature Shutdown



Current Limit Response

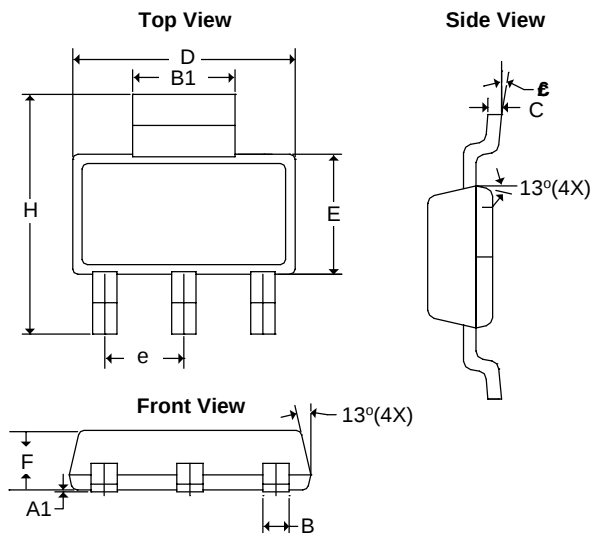


Short Circuit Response



■ 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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