

■ General Description

The AME8800/8811 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-23, SOT-25, SOT-89 and TO-92 packages are attractive for "Pocket" and "Hand Held" applications.

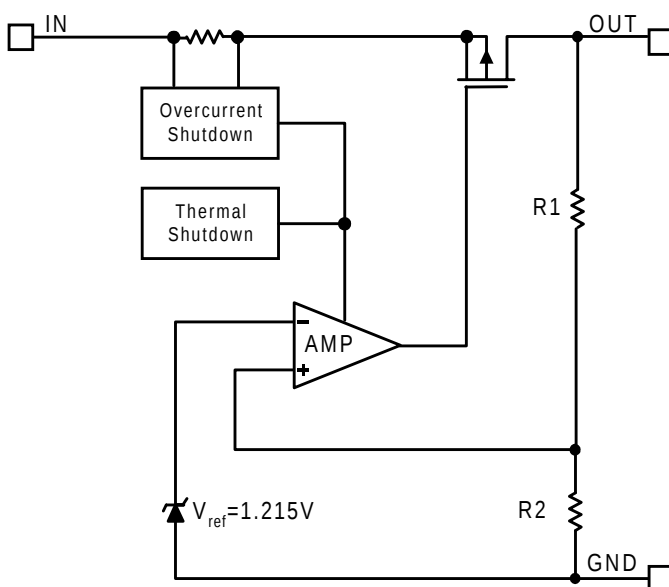
These rugged devices have both Thermal Shutdown, and Current Fold-back to prevent device failure under the "Worst" of operating conditions.

The AME8800/8811 is stable with an output capacitance of 2.2 μ F or greater.

■ Features

- Very Low Dropout Voltage
- Guaranteed 300mA Output
- Accurate to within 1.5%
- 30 μ A Quiescent Current
- Over-Temperature Shutdown
- Current Limiting
- Short Circuit Current Fold-back
- Space-Saving SOT-23, SOT-25, SOT-89 and TO-92 Package
- Factory Pre-set Output Voltages
- Low Temperature Coefficient

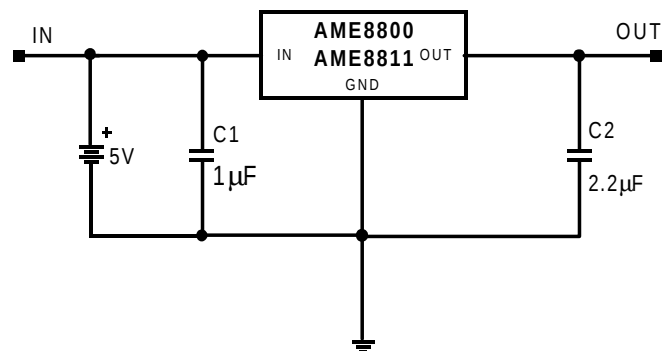
■ Functional Block Diagram



■ Applications

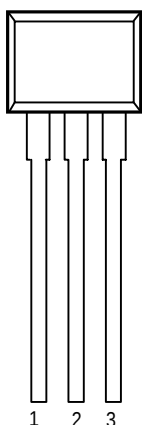
- Instrumentation
- Portable Electronics
- Wireless Devices
- Cordless Phones
- PC Peripherals
- Battery Powered Widgets
- Electronic Scales

■ Typical Application



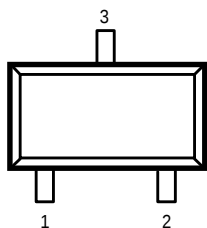
Pin Configuration

TO-92
Front View



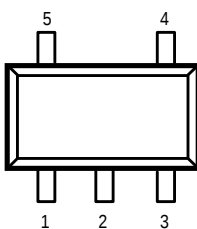
AME8800	AME8811
1. GND	1. V_{OUT}
2. V_{IN}	2. GND
3. V_{OUT}	3. V_{IN}

SOT-23
Top View



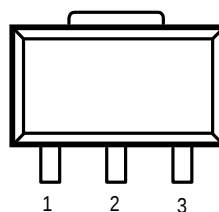
1. GND
2. V_{OUT}
3. V_{IN}

SOT-25
Top View



- | | |
|--------------|-------|
| 1. GND | 4. NC |
| 2. V_{IN} | 5. NC |
| 3. V_{OUT} | |

SOT-89
Top View



AME8800	AME8811
1. GND	1. V_{OUT}
2. V_{IN}	2. GND
3. V_{OUT}	3. V_{IN}

■ Ordering Information (contd.)

Part Number	Marking	Output	Package	Operating Temp.
AME8800AEET	AAAwW	3.3V	SOT-23	-40°C to +85°C
AME8800BEET	AABwW	3.0V	SOT-23	-40°C to +85°C
AME8800CEET	AACwW	2.8V	SOT-23	-40°C to +85°C
AME8800DEET	AADwW	2.5V	SOT-23	-40°C to +85°C
AME8800EEET	AAEwW	3.8V	SOT-23	-40°C to +85°C
AME8800FEET	ABNwW	3.6V	SOT-23	-40°C to +85°C
AME8800GEET	ACDwW	3.5V	SOT-23	-40°C to +85°C
AME8800HEET	AEDwW	2.7V	SOT-23	-40°C to +85°C
AME8800IEET	AELwW	3.4V	SOT-23	-40°C to +85°C
AME8800JEET	AGNwW	2.85V	SOT-23	-40°C to +85°C
AME8800KEET	AHPwW	3.7V	SOT-23	-40°C to +85°C
AME8800LEET	AJWwW	1.5V	SOT-23	-40°C to +85°C
AME8800MEET	AJXwW	1.8V	SOT-23	-40°C to +85°C
AME8800NEET	AKGwW	2.9V	SOT-23	-40°C to +85°C
AME8800OEET	AKHwW	3.1V	SOT-23	-40°C to +85°C
AME8800AEEV	ABRwW	3.3V	SOT-25	-40°C to +85°C
AME8800BEEV	ABSwW	3.0V	SOT-25	-40°C to +85°C
AME8800CEEV	ABTwW	2.8V	SOT-25	-40°C to +85°C
AME8800DEEV	ABUwW	2.5V	SOT-25	-40°C to +85°C
AME8800EEEV	ABVwW	3.8V	SOT-25	-40°C to +85°C
AME8800FEEV	ABWwW	3.6V	SOT-25	-40°C to +85°C
AME8800GEEV	ACEwW	3.5V	SOT-25	-40°C to +85°C
AME8800HEEV	AEEwW	2.7V	SOT-25	-40°C to +85°C

■ Ordering Information (contd.)

Part Number	Marking	Output	Package	Operating Temp.
AME8800IEEV	AEMww	3.4V	SOT-25	-40°C to +85°C
AME8800JEEV	AGOWw	2.85V	SOT-25	-40°C to +85°C
AME8800KEEV	AHQww	3.7V	SOT-25	-40°C to +85°C
AME8800LEEV	AJUww	1.5V	SOT-25	-40°C to +85°C
AME8800MEEV	AJVww	1.8V	SOT-25	-40°C to +85°C
AME8800NEEV	AKlww	2.9V	SOT-25	-40°C to +85°C
AME8800OEEV	AKJww	3.1V	SOT-25	-40°C to +85°C
AME8800AEFT	A8800 AEFww	3.3V	SOT-89	-40°C to +85°C
AME8800BEFT	A8800 BEFww	3.0V	SOT-89	-40°C to +85°C
AME8800CEFT	A8800 CEFww	2.8V	SOT-89	-40°C to +85°C
AME8800DEFT	A8800 DEFww	2.5V	SOT-89	-40°C to +85°C
AME8800EEFT	A8800 EEFww	3.8V	SOT-89	-40°C to +85°C
AME8800FEFT	A8800 FEFww	3.6V	SOT-89	-40°C to +85°C
AME8800GEFT	A8800 GEFww	3.5V	SOT-89	-40°C to +85°C
AME8800HEFT	A8800 HEFww	2.7V	SOT-89	-40°C to +85°C
AME8800IEFT	A8800 IEFww	3.4V	SOT-89	-40°C to +85°C
AME8800JEFT	A8800 JEFww	2.85V	SOT-89	-40°C to +85°C
AME8800KEFT	A8800 KEFww	3.7V	SOT-89	-40°C to +85°C
AME8800LEFT	A8800 LEFww	1.5V	SOT-89	-40°C to +85°C
AME8800MEFT	A8800 MEFww	1.8V	SOT-89	-40°C to +85°C
AME8800NEFT	A8800 NEFww	2.9V	SOT-89	-40°C to +85°C
AME8800OEFT	A8800 OEFww	3.1V	SOT-89	-40°C to +85°C
AME8800SEFT	A8800 SEFww	5.0V	SOT-89	-40°C to +85°C

■ Ordering Information (contd.)

Part Number	Marking	Output	Package	Operating Temp.
AME8800AEAT	AME 8800 AEAT yyww	3.3V	TO-92	-40°C to +85°C
AME8800BEAT	AME 8800 BEAT yyww	3.0V	TO-92	-40°C to +85°C
AME8800CEAT	AME 8800 CEAT yyww	2.8V	TO-92	-40°C to +85°C
AME8800DEAT	AME 8800 DEAT yyww	2.5V	TO-92	-40°C to +85°C
AME8800EEAT	AME 8800 EEAT yyww	3.8V	TO-92	-40°C to +85°C
AME8800FEAT	AME 8800 FEAT yyww	3.6V	TO-92	-40°C to +85°C
AME8800GEAT	AME 8800 GEAT yyww	3.5V	TO-92	-40°C to +85°C
AME8800HEAT	AME 8800 HEAT yyww	2.7V	TO-92	-40°C to +85°C

■ Ordering Information (contd.)

Part Number	Marking	Output	Package	Operating Temp.
AME8800IEAT	AME 8800 IEAT yyww	3.4V	TO-92	-40°C to +85°C
AME8800JEAT	AME 8800 JEAT yyww	2.85V	TO-92	-40°C to +85°C
AME8800KEAT	AME 8800 KEAT yyww	3.7V	TO-92	-40°C to +85°C
AME8800LEAT	AME 8800 LEAT yyww	1.5V	TO-92	-40°C to +85°C
AME8800MEAT	AME 8800 MEAT yyww	1.8V	TO-92	-40°C to +85°C
AME8800NEAT	AME 8800 NEAT yyww	2.9V	TO-92	-40°C to +85°C
AME8800OEAT	AME 8800 OEAT yyww	3.1V	TO-92	-40°C to +85°C

■ Ordering Information (contd.)

Part Number	Marking	Output	Package	Operating Temp.
AME8811AEAT	AME 8811 AEAT yyww	3.3V	TO-92	-40°C to +85°C
AME8811BEAT	AME 8811 BEAT yyww	3.0V	TO-92	-40°C to +85°C
AME8811CEAT	AME 8811 CEAT yyww	2.8V	TO-92	-40°C to +85°C
AME8811DEAT	AME 8811 DEAT yyww	2.5V	TO-92	-40°C to +85°C
AME8811EEAT	AME 8811 EEAT yyww	3.8V	TO-92	-40°C to +85°C
AME8811FEAT	AME 8811 FEAT yyww	3.6V	TO-92	-40°C to +85°C
AME8811GEAT	AME 8811 GEAT yyww	3.5V	TO-92	-40°C to +85°C
AME8811HEAT	AME 8811 HEAT yyww	2.7V	TO-92	-40°C to +85°C

■ Ordering Information (contd.)

Part Number	Marking	Output	Package	Operating Temp.
AME8811IEAT	AME 8811 IEAT yyww	3.4V	TO-92	-40°C to +85°C
AME8811JEAT	AME 8811 JEAT yyww	2.85V	TO-92	-40°C to +85°C
AME8811KEAT	AME 8811 KEAT yyww	3.7V	TO-92	-40°C to +85°C
AME8811LEAT	AME 8811 LEAT yyww	1.5V	TO-92	-40°C to +85°C
AME8811MEAT	AME 8811 MEAT yyww	1.8V	TO-92	-40°C to +85°C
AME8811NEAT	AME 8811 NEAT yyww	2.9V	TO-92	-40°C to +85°C
AME8811OEAT	AME 8811 OEAT yyww	3.1V	TO-92	-40°C to +85°C

■ Ordering Information

Part Number	Marking	Output	Package	Operating Temp.
AME8811AEFT	A8811 AEF _{WW}	3.3V	SOT-89	-40°C to +85°C
AME8811BEFT	A8811 BEF _{WW}	3.0V	SOT-89	-40°C to +85°C
AME8811CEFT	A8811 CEF _{WW}	2.8V	SOT-89	-40°C to +85°C
AME8811DEFT	A8811 DEF _{WW}	2.5V	SOT-89	-40°C to +85°C
AME8811EEFT	A8811 EEF _{WW}	3.8V	SOT-89	-40°C to +85°C
AME8811FEFT	A8811 FEF _{WW}	3.6V	SOT-89	-40°C to +85°C
AME8811GEFT	A8811 GEF _{WW}	3.5V	SOT-89	-40°C to +85°C
AME8811HEFT	A8811 HEF _{WW}	2.7V	SOT-89	-40°C to +85°C
AME8811IEFT	A8811 IEF _{WW}	3.4V	SOT-89	-40°C to +85°C
AME8811JEFT	A8811 JEF _{WW}	2.85V	SOT-89	-40°C to +85°C
AME8811KEFT	A8811 KEF _{WW}	3.7V	SOT-89	-40°C to +85°C
AME8811LEFT	A8811 LEF _{WW}	1.5V	SOT-89	-40°C to +85°C
AME8811MEFT	A8811 MEF _{WW}	1.8V	SOT-89	-40°C to +85°C
AME8811NEFT	A8811 NEF _{WW}	2.9V	SOT-89	-40°C to +85°C
AME8811OEFT	A8811 OEF _{WW}	3.1V	SOT-89	-40°C to +85°C

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

■ 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	

■ Recommended Operating Conditions:

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

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

■ Thermal Information

Parameter		Maximum	Unit
Thermal Resistance (θ_{jc})	SOT-23	110	$^{\circ}\text{C} / \text{W}$
	SOT-25	81	
	SOT-89	38	
	TO-92	80	
Thermal Resistance (θ_{ja})	SOT-23	325	$^{\circ}\text{C} / \text{W}$
	SOT-25	260	
	SOT-89	180	
	TO-92	180	
Internal Power Dissipation (P_D) ($\Delta T = 100^{\circ}\text{C}$)	SOT-23	300	mW
	SOT-25	380	
	SOT-89	550	
	SOT-89	2750*	
	TO-92	625	
Maximum Junction Temperature		150	$^{\circ}\text{C}$
Maximum Lead Temperature (10 Sec)		300	$^{\circ}\text{C}$

* With heat sink capable of twice times the θ_{jc}

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

■ 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	$V_{DROPOUT}$	$I_O=300mA$ $V_O=V_{ONOM}-2.0\%$	$1.4V < V_{O(NOM)} \leq 2.0V$		See chart	1300	mV
			$2.0V < V_{O(NOM)} \leq 2.8V$			400	
			$2.8V < V_{O(NOM)}$			300	
Output Current	I_O	$V_O > 1.2V$		300			mA
Current Limit	I_{LIM}	$V_O > 1.2V$		300	450		mA
Short Circuit Current	I_{SC}	$V_O < 0.8V$			150	300	mA
Quiescent Current	I_Q	$I_O=0mA$			30	50	μA
Ground Pin Current	I_{GND}	$I_O=1mA$ to 300mA			35		μA
Line Regulation	REG_{LINE}	$I_O=1mA$ $V_{IN}=V_O+1$ to V_O+2	$V_O < 2.0V$	-0.15		0.15	%
			$2.0V \leq V_O < 4.0V$	-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 300mA		-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	$I_O=100mA$ $C_O=2.2\mu F$	$f=1kHz$		50		dB
			$f=10kHz$		20		
			$f=100kHz$		15		
Output Voltage Noise	eN	$f=10Hz$ to 100kHz $I_O=10mA$	$C_O=2.2\mu F$		30		μV_{rms}

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

■ Detailed Description

The AME8800/8811 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 300mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120°C.

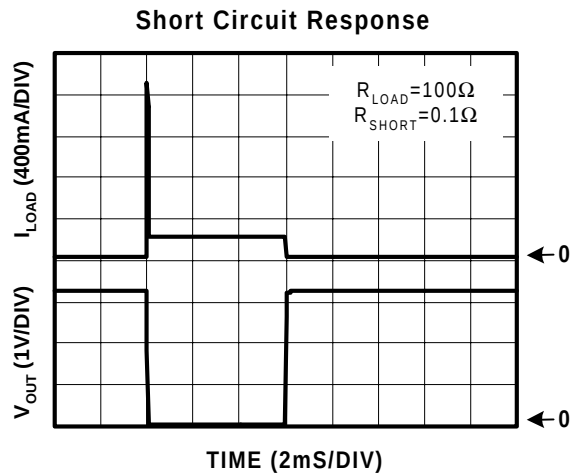
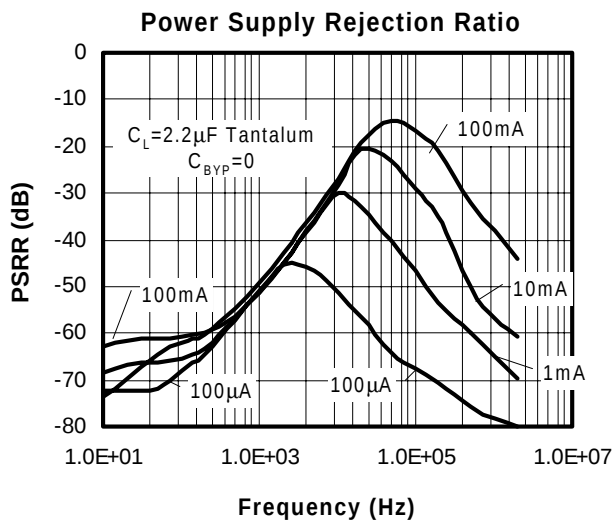
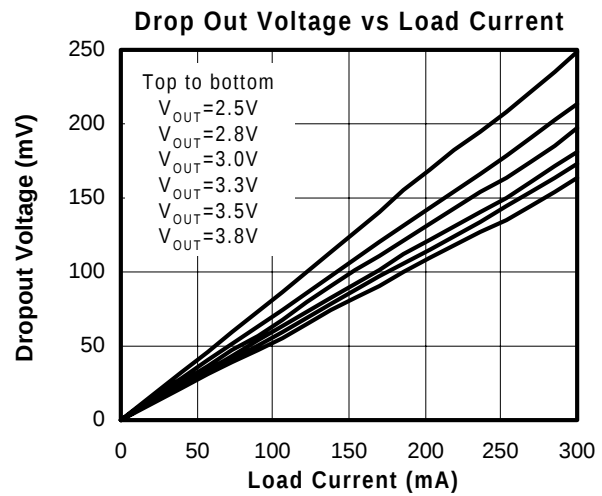
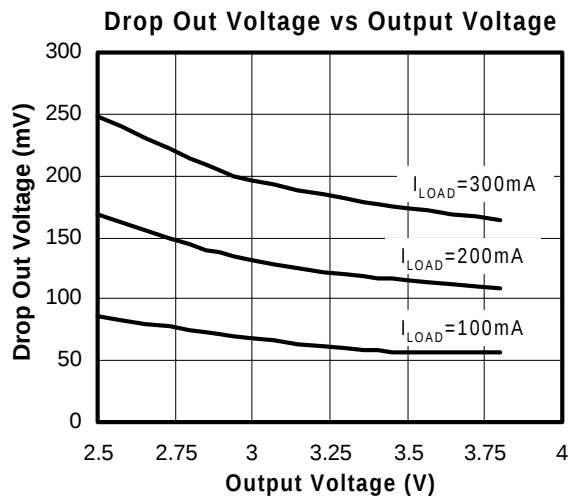
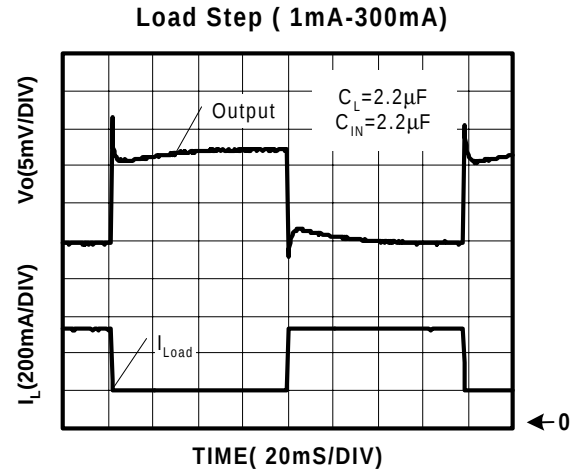
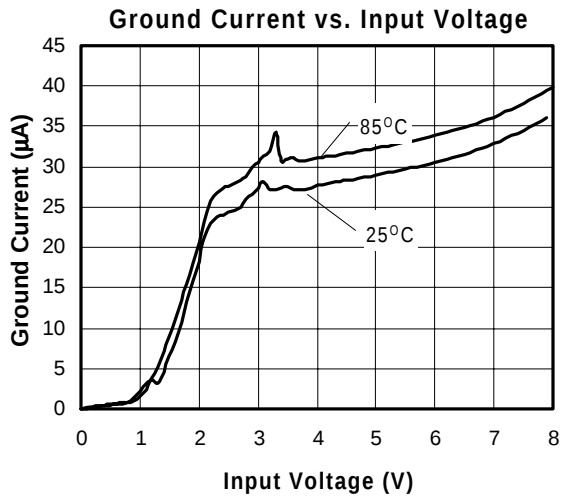
The AME8800/8811 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress. The AME8800/8811 also incorporates current foldback to reduce power dissipation when the output is short circuited. This feature becomes active when the output drops below 0.8 volts, and reduces the current flow by 65%. Full current is restored when the voltage exceeds 0.8 volts.

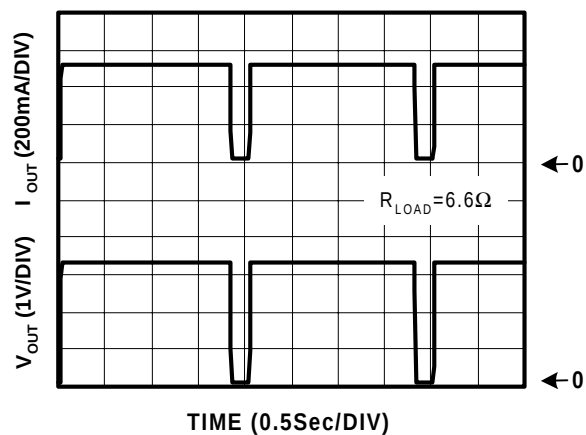
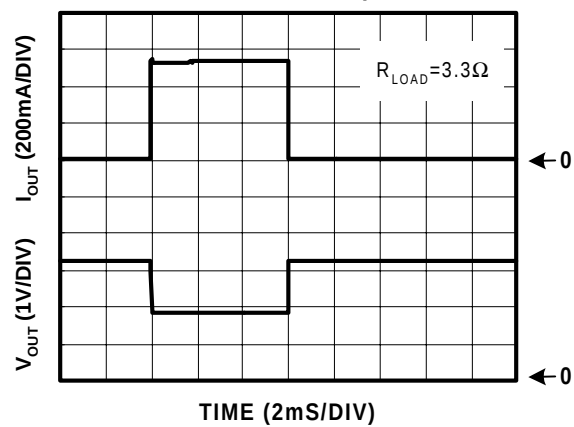
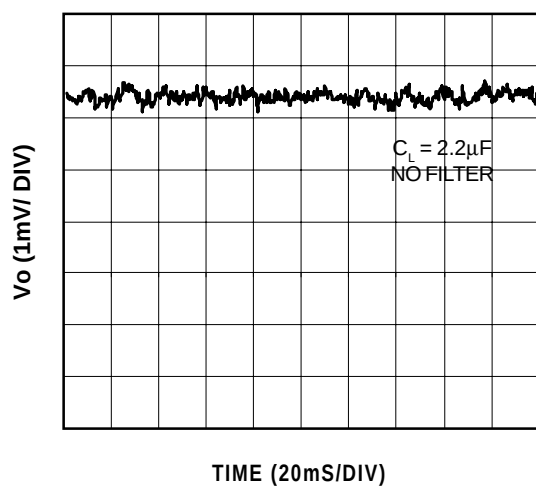
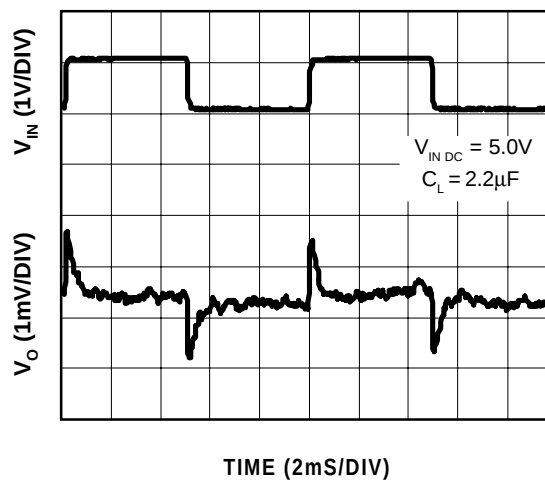
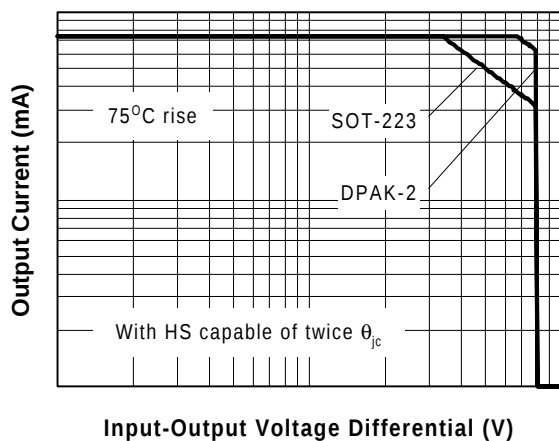
■ External Capacitors

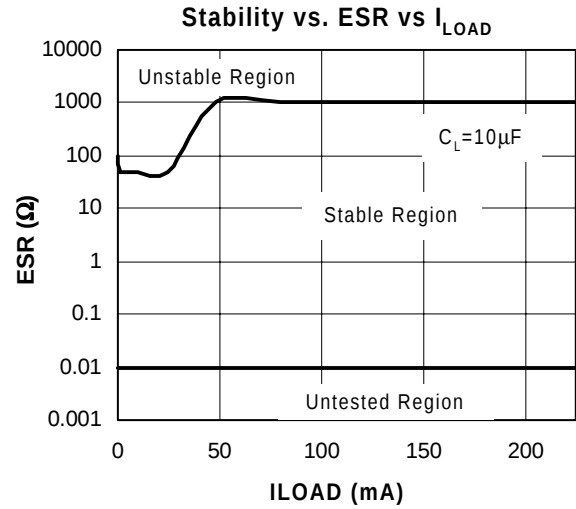
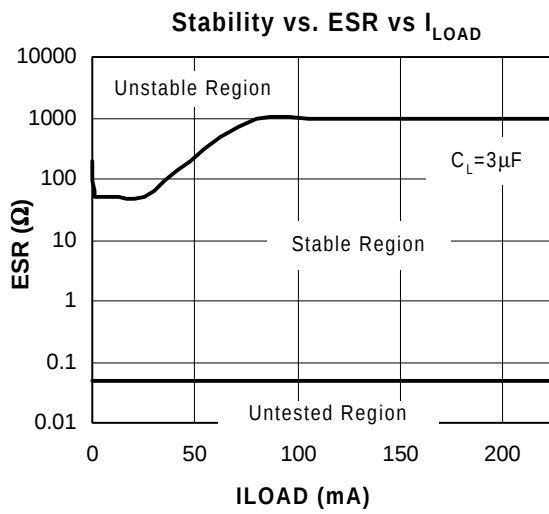
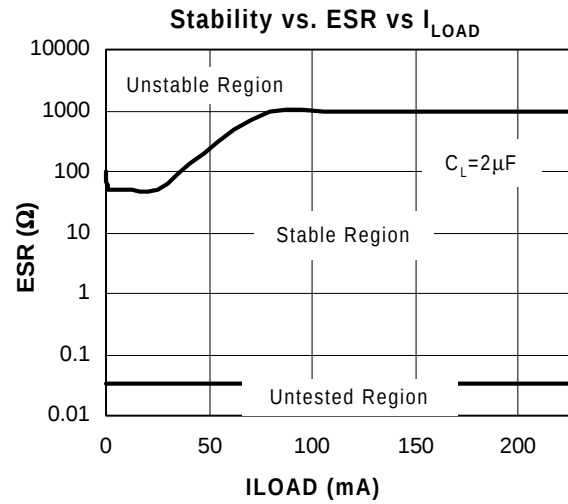
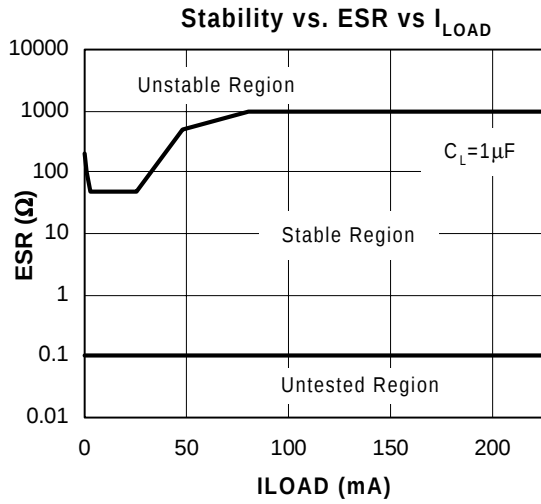
The AME8800/8811 is stable with an output capacitor to ground of 2.2μF or greater. Ceramic capacitors have the lowest ESR, and will offer the best AC performance. Conversely, Aluminum Electrolytic capacitors exhibit the highest ESR, resulting in the poorest AC response. Unfortunately, large value ceramic 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.

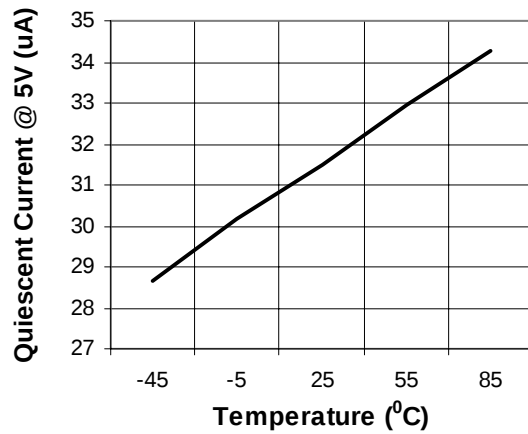


Overtemperature Shutdown

Current Limit Response

Noise Measurement

Transient Line Response

Safe Operating Area


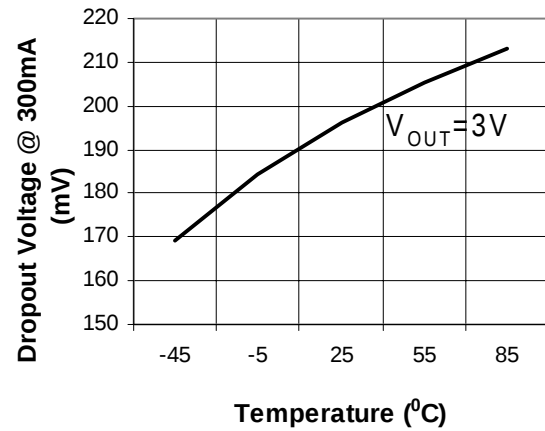




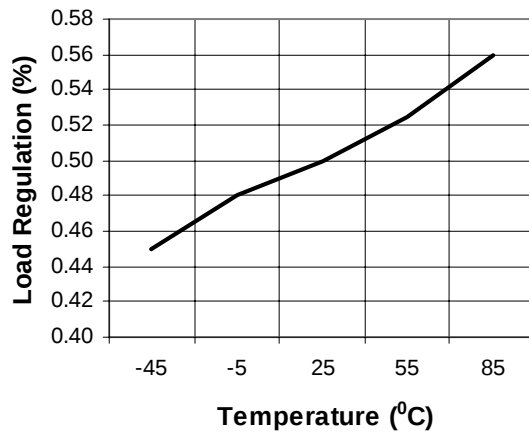
Quiescent Current vs. Temp.



Dropout Voltage vs. Temp.

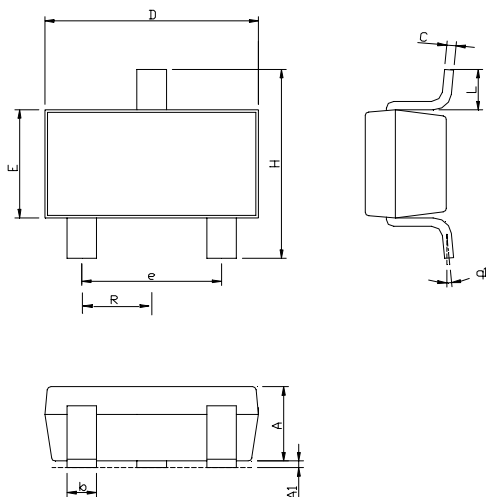


Load Regulation vs. Temp.



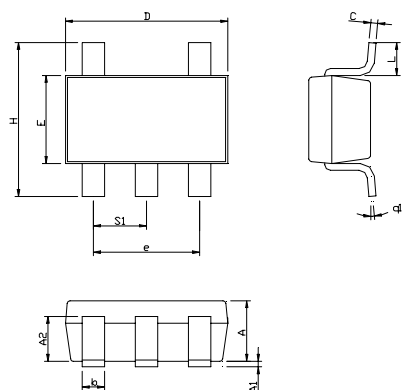
Package Dimension

SOT-23



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.00	1.40	0.0394	0.0551
A ₁	0.00	0.15	0.0000	0.0059
A ₂	0.70	1.25	0.0276	0.0492
b	0.35	0.50	0.0138	0.0197
C	0.09	0.25	0.0035	0.0098
D	2.70	3.10	0.1063	0.1220
E	1.40	1.80	0.0551	0.0709
e	1.90 BSC		0.0748 BSC	
H	2.60	3.00	0.1024	0.1181
L	0.35	0.55	0.0138	0.0197
θ1	0°	9°	0°	9°
R	0.95(TYP)		0.0374(TYP)	

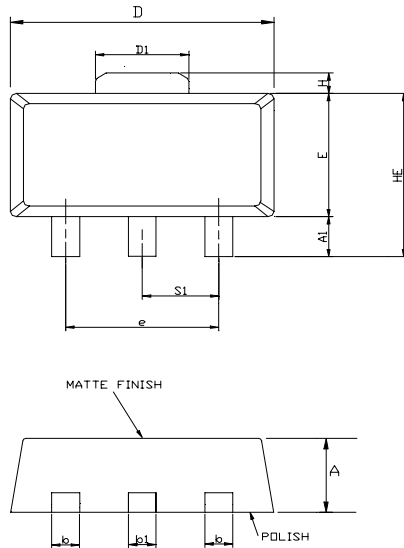
SOT-25



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.00	1.45	0.0394	0.0571
A ₁	0.00	0.15	0.0000	0.0591
A ₂	0.70	1.25	0.0276	0.0492
b	0.35	0.55	0.0138	0.0217
C	0.08	0.25	0.0031	0.0098
D	2.70	3.10	0.1063	0.1220
E	1.40	1.80	0.0551	0.0709
e	1.90 BSC		0.07480 BSC	
H	2.60	3.00	0.1024	0.1181
L	0.30	-	0.0118	-
θ1	0°	10°	0°	10°
S ₁	0.85	1.05	0.0335	0.0413

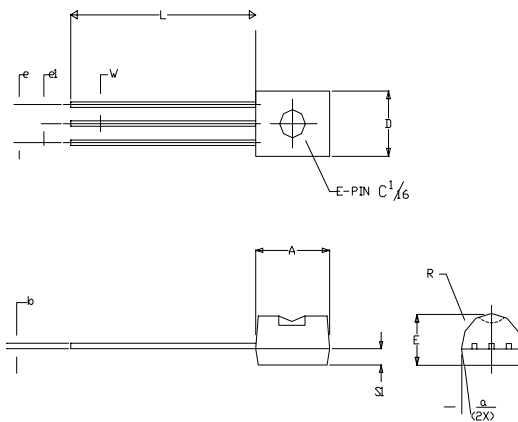
■ Package Dimension

SOT-89



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.40	1.60	0.0551	0.0630
A1	0.89	-	0.0350	-
b	0.36	0.52	0.0142	0.0205
b1	0.41	0.56	0.0161	0.0220
C	0.35	0.44	0.0138	0.0173
D	4.40	4.60	0.1732	0.1811
D1	1.35	1.83	0.0531	0.0720
HE	-	4.25	-	0.1673
E	2.29	2.60	0.0902	0.1024
e	2.90	3.10	0.1142	0.1220
H	0.35	0.70	0.0138	0.0276
S1	1.40	1.60	0.0551	0.0630

TO-92



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	4.95	0.170	0.195
b	0.36	0.51	0.014	0.020
E	3.30	3.94	0.130	0.155
e	2.41	2.67	0.095	0.105
e1	1.14	1.40	0.045	0.055
L	12.70	15.49	0.500	0.610
R	2.16	2.41	0.085	0.095
S1	1.14	1.52	0.045	0.060
W	0.41	0.56	0.016	0.022
D	4.45	4.95	0.175	0.195
a	4°	6°	4°	6°

NOTE:

1. PACKAGE OUTLINE EXCLUSIVE OF ANY MOLD FLASHES DIMENSION
2. PACKAGE OUTLINE EXCLUSIVE OF BURR DIMENSION



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