

■ General Description

The AME8848 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 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 AME8848 is stable with an output capacitance of 2.2 μ F or greater.

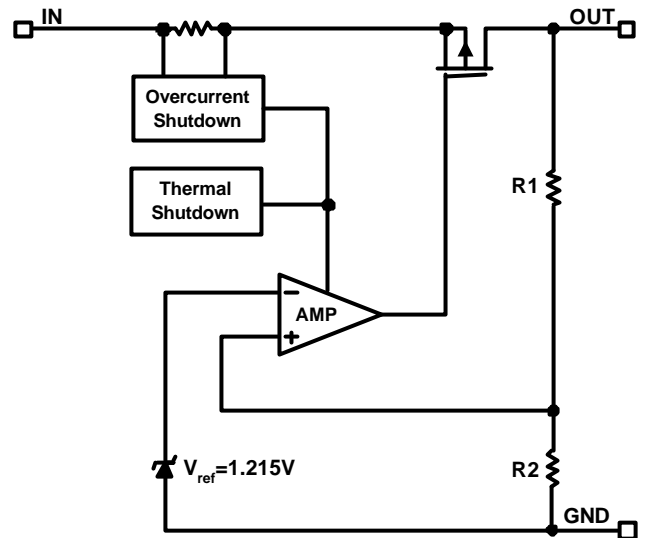
■ Features

- Very Low Dropout Voltage
- Guaranteed 1A Output
- Accurate to within $\pm 1.5\%$
- 30 μ A Quiescent Current
- Over-Temperature Shutdown
- Current Limiting
- Short Circuit Current Fold-back
- Space-Saving SOT-223 Packages
- Factory Pre-set Output Voltages
- Low Temperature Coefficient
- All AME's Lead Free Products Meet RoHS Standards

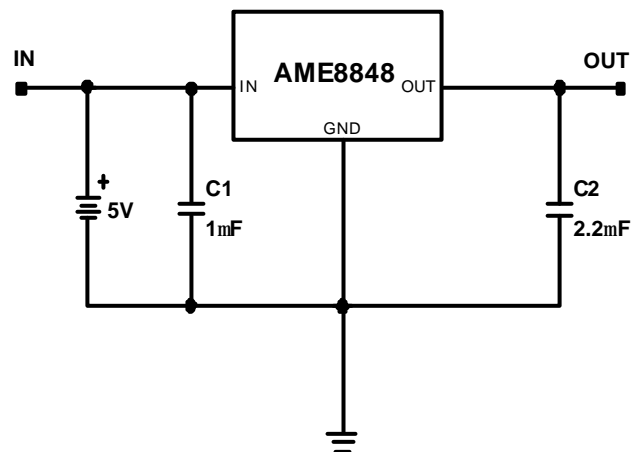
■ Applications

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

■ Functional Block Diagram



■ Typical Application

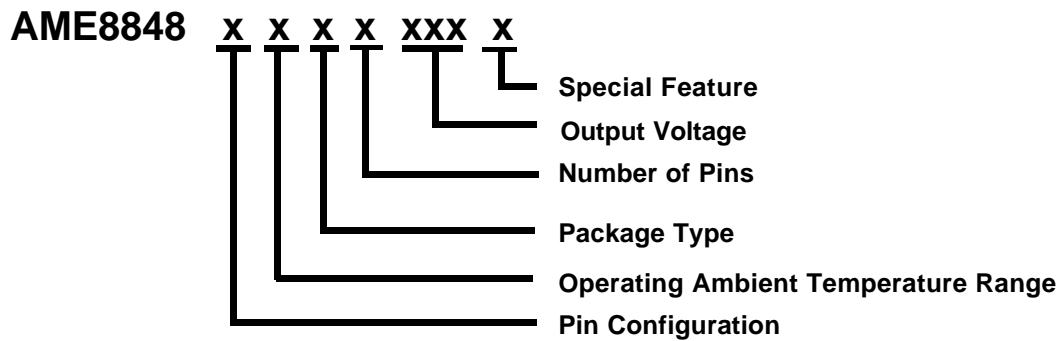


■ Pin Configuration

AME8848AEGT

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

* Die Attach:
Conductive Epoxy

■ 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 330: V=3.3V | Z: Lead Free |



AME8848

1A CMOS LDO

■ Ordering Information

| Part Number | Marking* | Output Voltage | Package | Operating Ambient Temperature Range |
|-----------------|----------|----------------|---------|-------------------------------------|
| AME8848AEGT180Z | BLlyww | 1.8V | SOT-223 | - 40°C to +85°C |
| AME8848AEGT250Z | BLJyww | 2.5V | SOT-223 | - 40°C to +85°C |
| AME8848AEGT330Z | BLKyww | 3.3V | SOT-223 | - 40°C to +85°C |

Note: ww & yww represents the date code pls refer to Date Code Rule on Package Dimension.

* A line on top of the first letter represents lead free plating such as BLlyww.

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 | 1.2 | A |
| Input, Output Voltage | GND - 0.3 to $V_{IN} + 0.3$ | V |
| 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) | SOT-223 | | θ_{JA} | 120 | °C / W |
| Internal Power Dissipation | SOT-223 | | P_D | 900 | mW |
| 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_{OUT} | $I_{OUT}=1\text{mA}$ | -1.5 | | 1.5 | % | |
| Dropout Voltage | V_{DROP} | $I_{OUT}=1\text{A}$ $V_{OUT}=V_{OUT(NOM)} - 2.0\%$ | $1.8\text{V} \leq V_{OUT(NOM)} \leq 2.0\text{V}$ | See chart | 1700 | mV | |
| | | | $2.0\text{V} < V_{OUT(NOM)} \leq 2.8\text{V}$ | | 1200 | | |
| | | | $2.8\text{V} < V_{OUT(NOM)}$ | | 1000 | | |
| Output Current | I_{OUT} | $V_{OUT} \geq 1.8\text{V}$ | 1000 | | | mA | |
| Output Current Limit | I_{LIM} | $V_{OUT} \geq 1.8\text{V}$ | 1100 | | | mA | |
| Output Short Circuit Current | I_{SC} | $V_{OUT} < 0.8\text{V}$ | | 400 | 800 | mA | |
| Quiescent Current | I_Q | $I_{OUT}=0\text{mA}$ | | 30 | 50 | μA | |
| Ground Pin Current | I_{GND} | $I_{OUT}=1\text{mA}$ to 1000mA | | 35 | | μA | |
| Output Voltage Line Regulation | REG_{LINE} | $I_{OUT}=1\text{mA}$ $V_{IN}=V_{OUT}+1$ to $V_{OUT}+2$ | $1.8\text{V} \leq V_{OUT} \leq 2.0\text{V}$ | -0.15 | | 0.15 | % |
| | | | $2.0\text{V} < V_{OUT} < 4.0\text{V}$ | -0.1 | 0.02 | 0.1 | |
| | | | $V_{OUT} \geq 4.0\text{V}$ | -0.4 | 0.2 | 0.4 | |
| Output Voltage Load Regulation | REG_{LOAD} | $I_{OUT} = 1\text{mA}$ to 1000mA | | 0.4 | 1.2 | % | |
| Thermal Shutdown Temperature | T_{SHDN} | | | 150 | | $^\circ\text{C}$ | |
| Temperature Hysteresis | T_{HYS} | | | 30 | | $^\circ\text{C}$ | |
| Output Voltage Temperature Coefficient | T_C | | | 30 | | ppm/ $^\circ\text{C}$ | |
| Power Supply Ripple Rejection | PSRR | $I_{OUT}=100\text{mA}$ $C_{OUT}=2.2\mu\text{F}$ | $f = 100\text{Hz}$ | | 60 | dB | |
| | | | $f = 1\text{KHz}$ | | 50 | | |
| | | | $f = 10\text{KHz}$ | | 20 | | |
| Output Voltage Noise | e_N | $f = 10\text{Hz}$ to 100KHz $I_{OUT}=10\text{mA}$ | $C_{OUT}=2.2\mu\text{F}$ | | 30 | μVrms | |

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

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 AME8848 of CMOS regulators contains a PMOS pass transistor, voltage reference, error amplifier, over-current protection, and thermal shutdown.

The P-channel MOSFET 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 1100mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120°C.

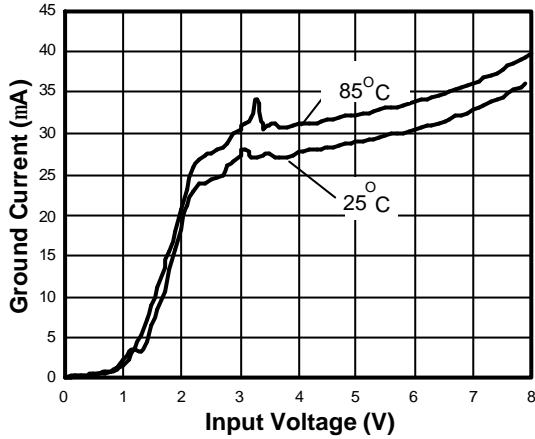
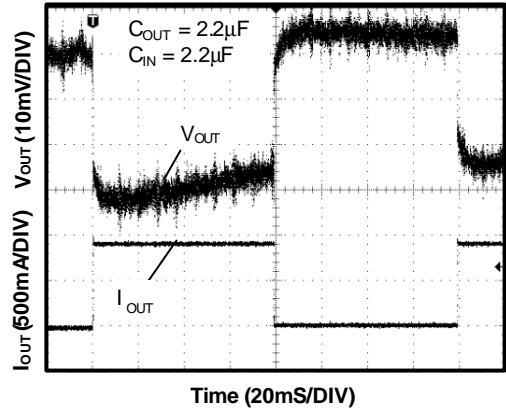
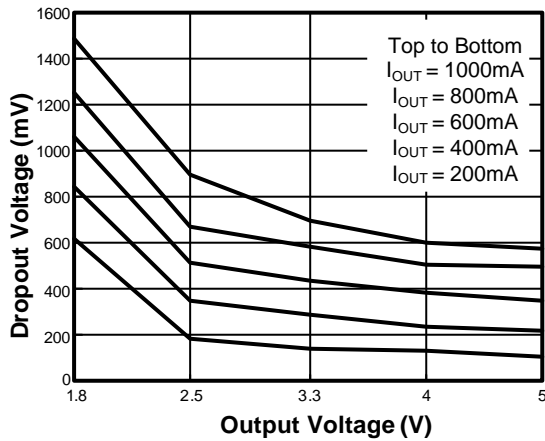
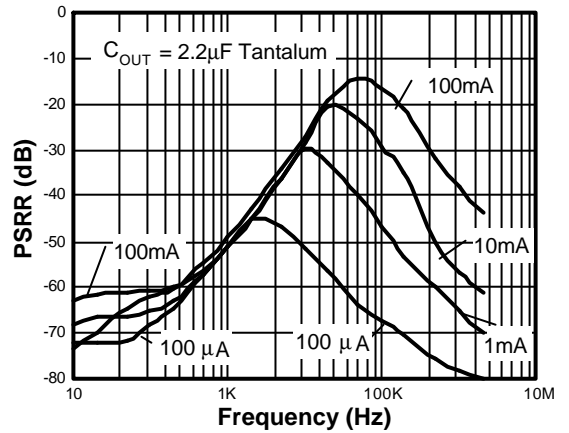
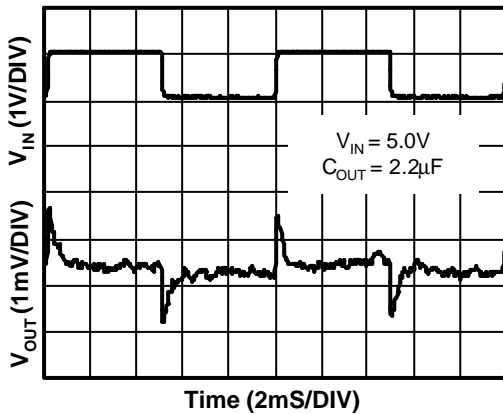
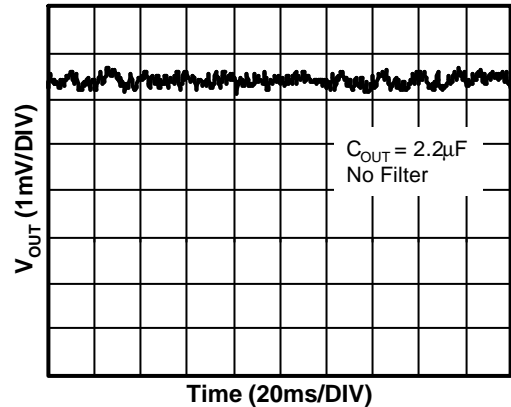
The AME8848 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress. The AME8848 also incorporates current foldback to reduce power dissipation when the output is short circuited. This feature becomes active when the output drops below 0.8 volts, and reduces the current flow by 65%. Full current is restored when the voltage exceeds 0.8 volts.

■ External Capacitors

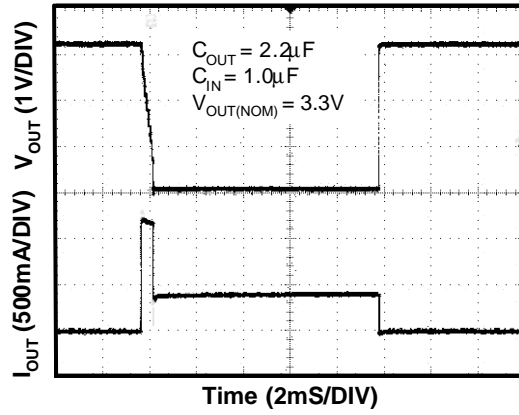
The AME8848 is stable with an output capacitor to ground of 2.2 μ F or greater. Ceramic capacitors have the lowest ESR, and will offer the best AC performance. Conversely, Aluminum Electrolytic capacitors exhibit the highest ESR, resulting in the poorest AC response. Unfortunately, large value ceramic 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.

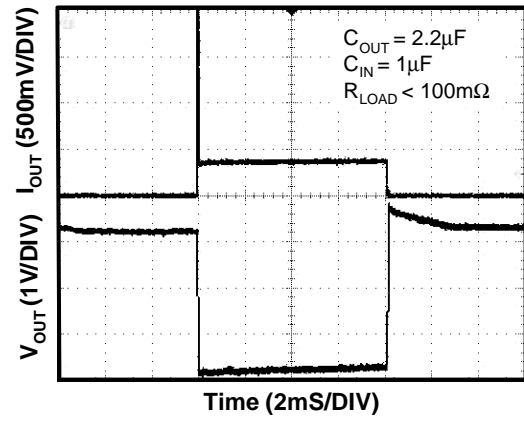
All capacitors should be placed in close proximity to the pins. A "Quiet" ground termination is desirable. This can be achieved with a "Star" connection.

Ground Current vs. Input Voltage

Load Step (1mA-1000mA)

Dropout Voltage vs. Output Voltage

Power Supply Ripple Rejection Ratio

Line Transient Response

Noise Measurement


Current Limit Response

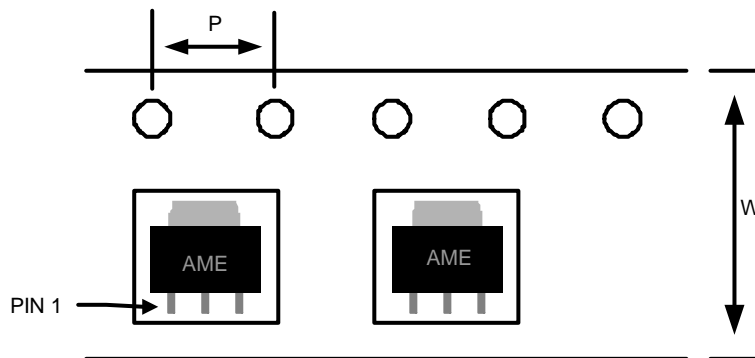


Short Circuit Response

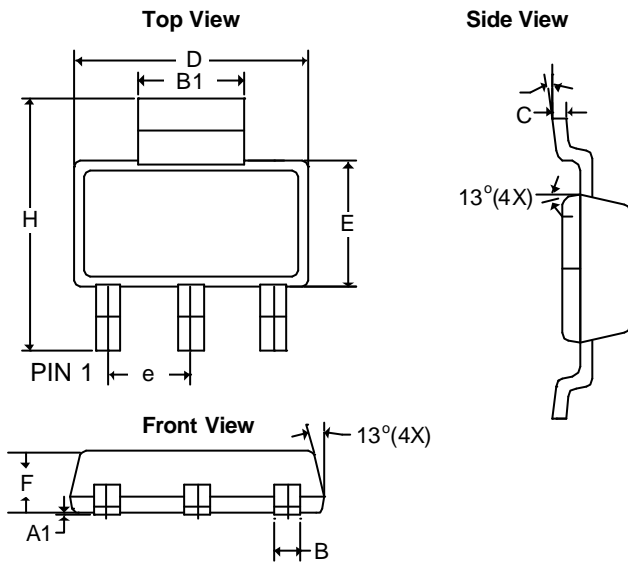


■ Date Code Rule

| Marking | | | Date Code | | Year |
|---------|----------|----------|-----------|----------|------|
| A | A | A | W | W | xxx0 |
| A | A | A | W | <u>W</u> | xxx1 |
| A | A | A | <u>W</u> | W | xxx2 |
| A | A | A | <u>W</u> | <u>W</u> | xxx3 |
| A | A | <u>A</u> | W | W | xxx4 |
| A | A | <u>A</u> | W | <u>W</u> | xxx5 |
| A | A | <u>A</u> | <u>W</u> | W | xxx6 |
| A | A | <u>A</u> | <u>W</u> | <u>W</u> | xxx7 |
| A | <u>A</u> | A | W | W | xxx8 |
| A | <u>A</u> | A | W | <u>W</u> | xxx9 |

■ 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 |
| e | 2.30 BSC | | 0.0906 BSC | |
| F | 1.40 | 1.80 | 0.0551 | 0.0709 |
| H | 6.70 | 7.30 | 0.2638 | 0.2874 |
| q | 0° | 10° | 0° | 10° |



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Document: 2095-DS8848-A.04

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