

■ General Description

The AME1200 is a 600mA low-dropout positive voltage regulator. It is available in adjustable output voltage versions. Overcurrent and thermal protection are integrated onto the chip. Output current will limit as while it reaches the pre-set current or temperature limit. The dropout voltage is specified at 1.5V Maximum at full rated output current. The AME1200 series provides excellent regulation over line, load and temperature variations.

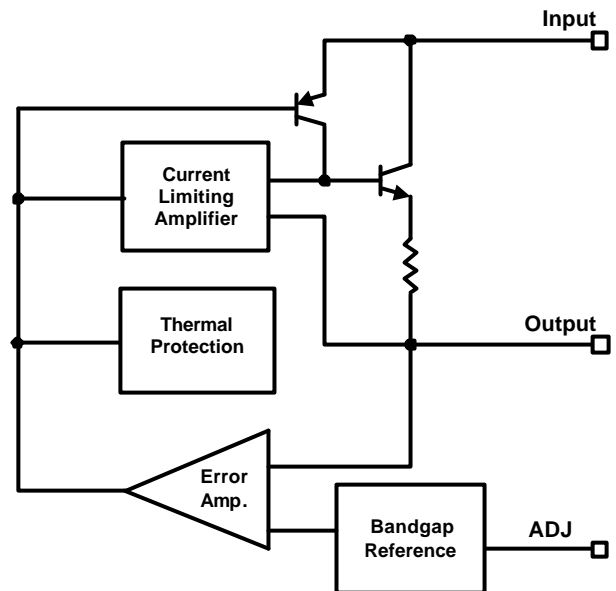
■ Features

- Low Dropout Voltage ----- 1.5V at 600mA
- Adjust Pin Current Less than 120 μ A
- Overcurrent Protection
- Thermal Protection
- Available in SOT-223
- All AME's Lead Free Products Meet RoHS Standards

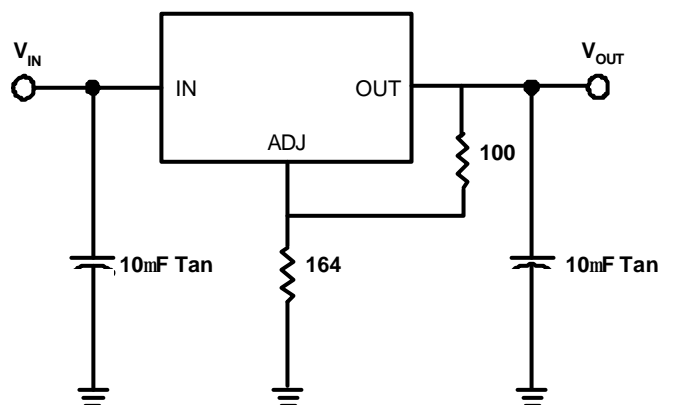
■ Applications

- High Efficiency Linear Regulators
- Post Regulators for Switching Supplies
- Battery Charger

■ Functional Block Diagram



■ Typical Application

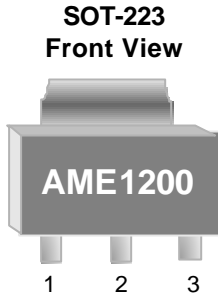




AME1200

600mA Low Dropout Positive Voltage Regulator

■ Pin Configuration

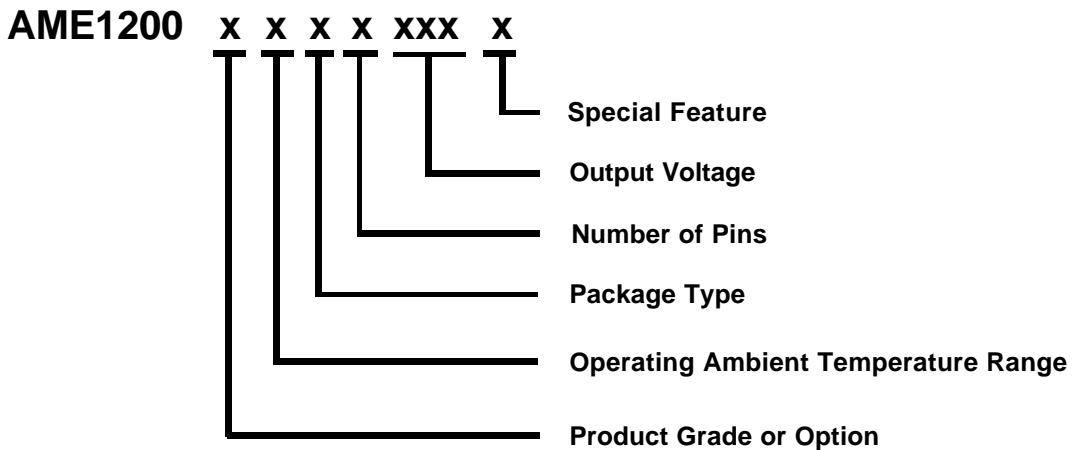


AME1200ACGT

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

* Die Attach:
Conductive Epoxy

■ Ordering Information



Product Grade or Option	Operating Ambient Temperature Range	Package Type	Number of Pins	Output Voltage	Special Feature
A: 1. ADJ (SOT-223) 2. OUT(TAB) 3. IN	C: 0°C to 70°C	G: SOT-223	T: 3	ADJ: Adjustable	Z: Lead Free

■ Ordering Information

Part Number	Marking*	Output Voltage	Package	Operating Ambient Temperature Range
AME1200ACGTADJZ	BQZyww	ADJ	SOT-223	0°C to 70°C

Note: yyww & yww represent the date code

* A line on top of the first letter represents lead free plating such as $\overline{\text{BQZ}}$.

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

■ Absolute Maximum Ratings

Parameter	Symbol	Maximum	Unit
Input Supply Voltage	V_{IN}	18	V

■ Recommended Operating Conditions

Parameter	Symbol	Rating	Unit
Ambient Temperature Range	T_A	0 to 70	°C
Junction Temperature Range	T_J	0 to 125	
Storage Temperature Range	T_{STG}	-65 to 150	



■ 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	Conductive Epoxy	θ_{JA}	120	
Internal Power Dissipation	SOT-223	Conductive Epoxy	P_D	900	mW
Solder Iron (10 Sec)**				350	°C

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

* Measure θ_{JC} on backside center of tab.

** MIL-STD-202G 210F

■ Electrical Specifications

AME1200ACGTADJZ

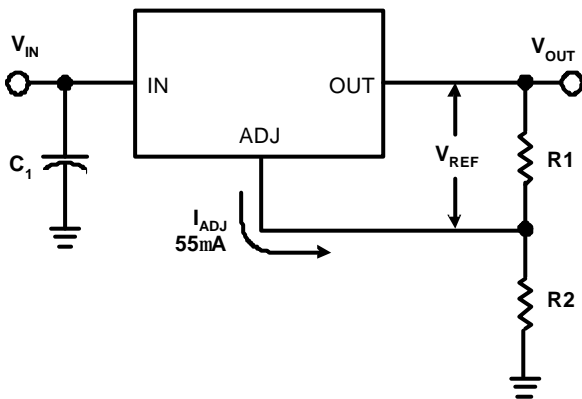
Parameter	Symbol	Test Condition	Min	Typ	Max	Units	
Reference Voltage	V_{REF}	$V_{IN} = 5V,$ $I_O = 10mA$	$T_J = 25^\circ C$	1.238	1.250	1.262	V
			$T_J = 0^\circ C \text{ to } 70^\circ C$	1.225	1.250	1.275	
Line Regulation *	REG_{LINE}	$V_{IN} = 4.75V \text{ to } 7V,$ $I_O = 10mA$	$T_J = 0^\circ C \text{ to } 70^\circ C$	-	-	0.2	%
Load Regulation	REG_{LOAD}	$V_{IN} = 5V,$ $I_O = 10mA \text{ to } 600mA$	$T_J = 0^\circ C \text{ to } 70^\circ C$	-	0.1	1.0	
Dropout Voltage	$V_{DROPOUT}$	$I_O = 10mA \text{ to } 600mA,$ $\Delta V_O = \pm 1\%$	$T_J = 0^\circ C \text{ to } 70^\circ C$	-	1.2	1.5	V
Current Limit	I_S	$V_{IN} = 2.7V \text{ to } 7V$	$T_J = 0^\circ C \text{ to } 70^\circ C$	0.6	1.0	-	A
Temp. Coefficient	T_C	$V_{IN} = 2.75V \text{ to } 7V, I_O = 10mA \text{ to } 600mA$		-	0.005	-	%/°C
Adjust Pin Current	I_{ADJ}	$V_{IN} = 2.75V \text{ to } 7V,$ $I_O = 10mA \text{ to } 600mA$	$T_J = 0^\circ C \text{ to } 70^\circ C$	-	55	120	μA
Adjust Pin Current Change	ΔI_{ADJ}	$V_{IN} = 2.75V \text{ to } 7V,$ $I_O = 10mA \text{ to } 600mA$	$T_J = 0^\circ C \text{ to } 70^\circ C$	-	0.2	5.0	
Temperature Stability	T_S	$V_{IN} = 5V, I_O = 100mA$	$T_J = 0^\circ C \text{ to } 70^\circ C$	-	0.5		%
Minimum Load Current	I_O	$V_{IN} = 5V$		-	5.0	10	mA
RMS Output Noise	V_N	$10Hz \leq f \leq 10KHz$	$T_J = 25^\circ C$	-	0.003	-	% V_O
Ripple Rejection Ratio	R_A	$V_{IN} = 5V, I_O = 600mA$	$T_J = 0^\circ C \text{ to } 70^\circ C$	60	72	-	dB

■ Application Description

1. Output Voltage Adjustment

Like most regulators, the AME1200 regulates the output by comparing the output voltage to an internally generated reference voltage. On the adjustable version, the V_{REF} is available externally as 1.25V between V_{OUT} and ADJ. The voltage ratio formed by R1 and R2 should be set to conduct 10mA (minimum output load). The output voltage is given by the following equation:

$$V_{OUT} = V_{REF} \left(1 + \frac{R2}{R1} \right) + I_{ADJ} \times R2$$



$$V_{OUT} = V_{REF} \left(1 + \frac{R2}{R1} \right) + I_{ADJ} \times R2$$

2. Thermal Protection

AME1200 has thermal protection which limits junction temperature to 150°C. However, device functionality is only guaranteed to a maximum junction temperature of +125°C.

The power dissipation and junction temperature for AME1200 is given by

$$P_D = (V_{IN} - V_{OUT}) \times I_{OUT}$$

$$T_{JUNCTION} = T_{AMBIENT} + (P_D \times \theta_{JA})$$

Note: $T_{JUNCTION}$ must not exceed 125°C

3. Current Limit Protection

AME1200 is protected against overload conditions. Current protection is triggered at typically 1A.

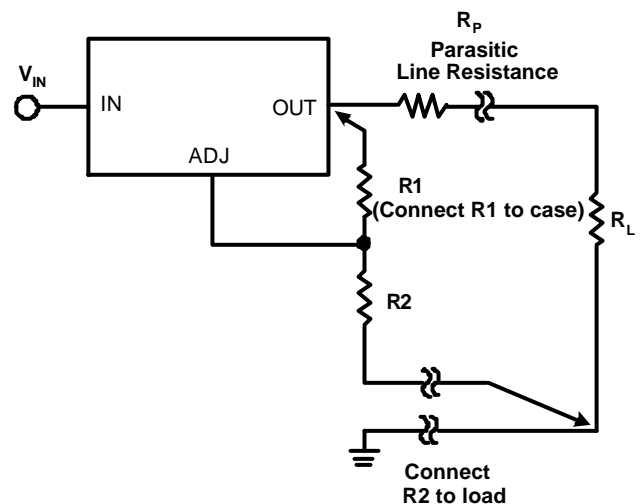
4. Stability and Load Regulation

AME1200 requires a capacitor from V_{OUT} to GND to provide compensation feedback to the internal gain stage. This is to ensure stability at the output terminal. Typically, a 10µF tantalum or 50µF aluminum electrolytic is sufficient.

(Note: It is important that the ESR for this capacitor does not exceed 0.5W.)

The output capacitor does not have a theoretical upper limit and increasing its value will increase stability. $C_{OUT} = 100\mu\text{F}$ or more is typical for high current regulator design.

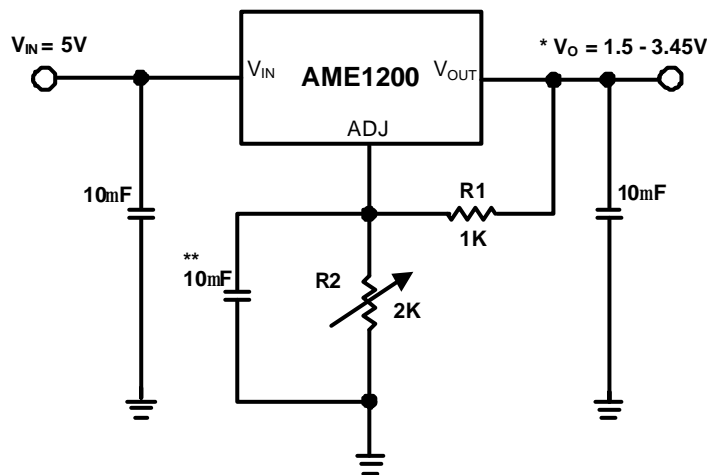
For the adjustable version, the best load regulation is accomplished when the top of the resistor divider (R1) is connected directly to the output pin of the AME1200. When so connected, R_p is not multiplied by the divider ratio.



5. Thermal Consideration

The AME1200 series contain thermal limiting circuitry designed to protect itself from over-temperature conditions. Even for normal load conditions, maximum junction temperature ratings must not be exceeded. As mentioned in thermal protection section, we need to consider all sources of thermal resistance between junction and ambient. It includes junction-to-case, case-to-heat-sink interface and heat sink thermal resistance itself.

Junction-to-case thermal resistance is specified from the IC junction to the bottom of the case directly below the die. Proper mounting is required to ensure the best possible thermal flow from this area of the package to the heat sink. The case of all devices in this product series is electrically connected to the output. Therefore, if the case of the device must be electrically isolated, a thermally conductive spacer is recommended.

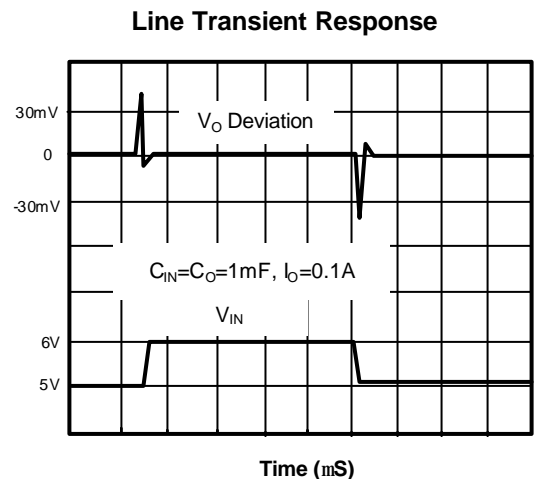
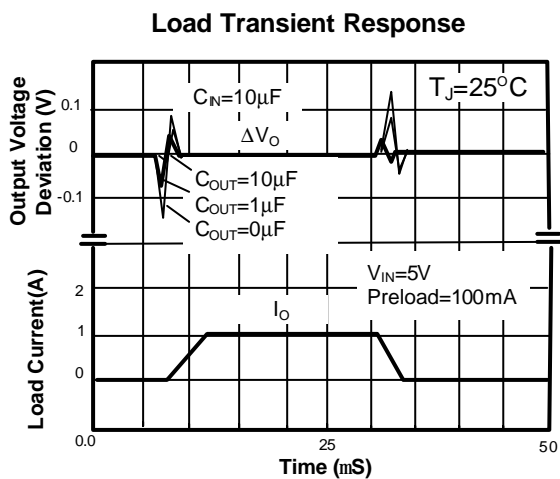
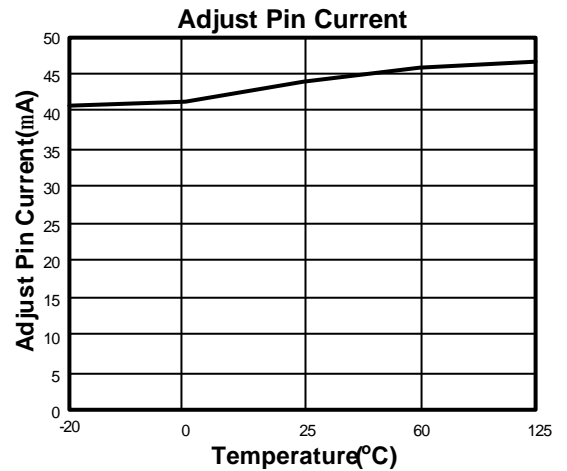
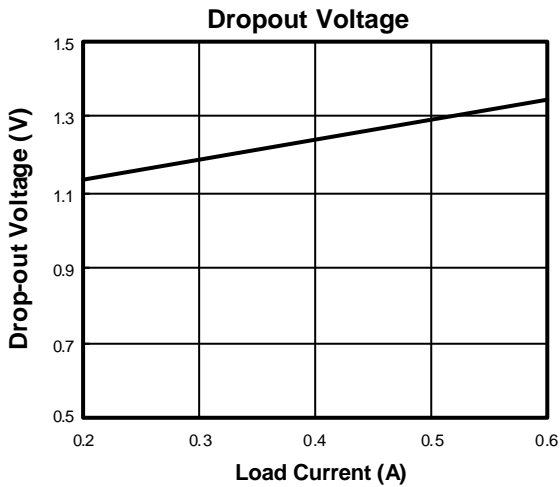
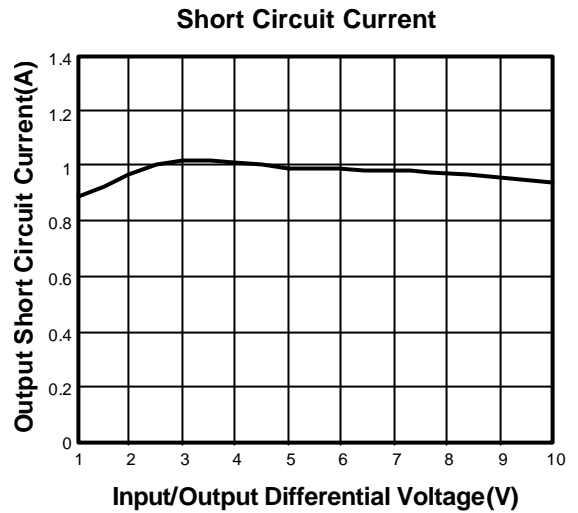
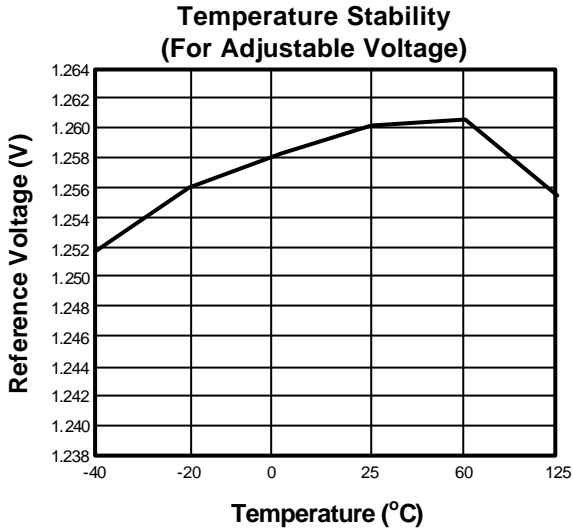
Adjustable Output Voltage


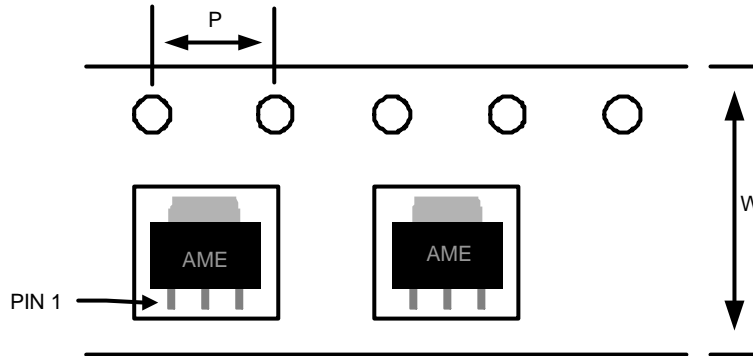
Note: $* V_{OUT} = V_{REF} \left(1 + \frac{R2}{R1} \right) + I_{ADJ} \times R2$

** Optional for improved ripple rejection

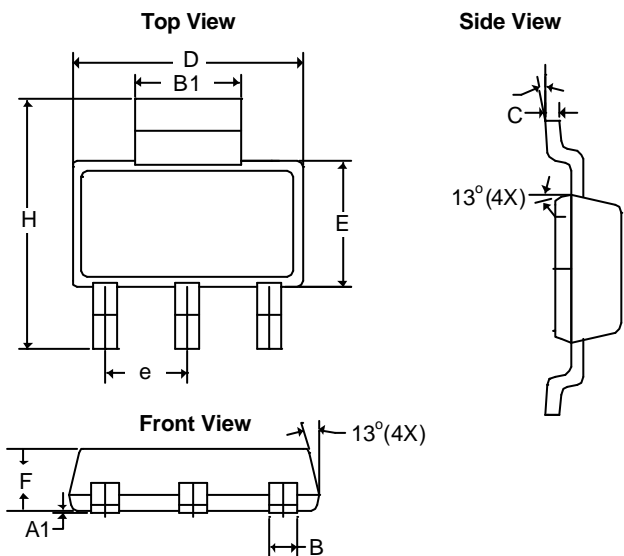


■ Characterization Curve(For reference only)



■ 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°



www.ame.com.tw
E-Mail: sales@ame.com.tw

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Corporate Headquarter
AME, Inc.

2F, 302 Rui-Guang Road, Nei-Hu District
Taipei 114, Taiwan.
Tel: 886 2 2627-8687
Fax: 886 2 2659-2989

U.S.A.(Subsidiary)
Analog Microelectronics, Inc.

3100 De La Cruz Blvd., Suite 201
Santa Clara, CA. 95054-2438
Tel : (408) 988-2388
Fax: (408) 988-2489