



### General Description

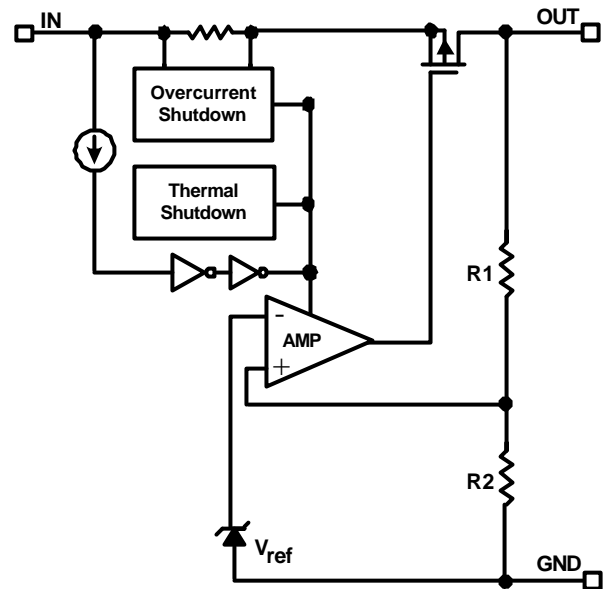
The AME8845 family of linear regulators feature low quiescent current (300µA typ.) with low dropout voltage, making them ideal for battery applications. It is available in TO-252, SOT-223, TO-263 and TO-220 packages. The space-efficient TO-252, SOT-223 packages are attractive for "Pocket" and "Hand Held" applications.

Output voltages are set at the factory and trimmed to 1.5% accuracy.

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

The AME8845 is stable with an output capacitance of 2.2µF or greater.

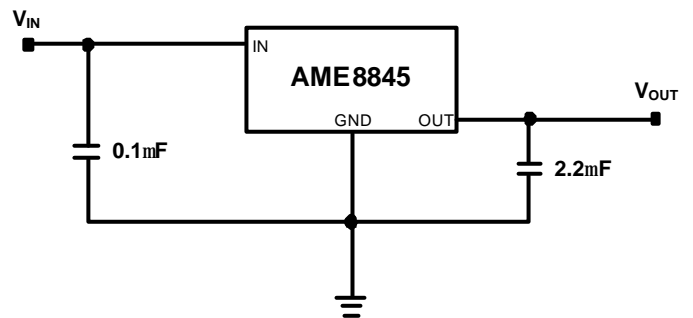
### Functional Block Diagram



### Features

- Very Low Dropout Voltage
- Guaranteed 3A Output
- Accurate to within 1.5%
- 300µA Quiescent Current Typically
- Over-Temperature Shutdown
- Current Limiting
- Short Circuit Current Fold-back
- Low Temperature Coefficient
- All AME' s Lead Free Products Meet RoHS Standards

### Typical Application



### Applications

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

**■ Pin Configuration**


**AME 8845AECsxxx**

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

**\* Die Attach:  
Conductive Epoxy**



**AME 8845BECsxxx**

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

**\* Die Attach:  
Non-Conductive Epoxy**



**AME8845AEGTxxx**

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

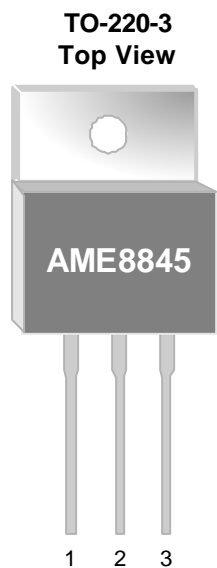
**\* Die Attach:  
Conductive Epoxy**



**AME8845BEGTxxx**

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

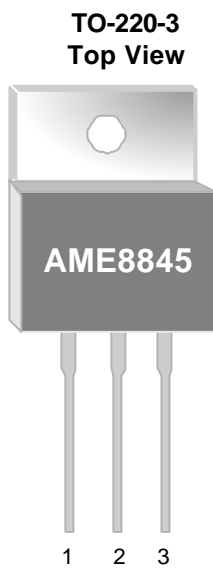
**\* Die Attach:  
Non-Conductive Epoxy**



**AME 8845AEBTxxx**

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

**\* Die Attach:  
Conductive Epoxy**



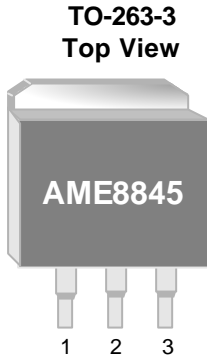
**AME 8845BEBTxxx**

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

**\* Die Attach:  
Non-Conductive Epoxy**



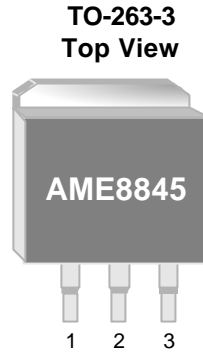
■ Pin Configuration



**AME 8845AEDTxxx**

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

\* Die Attach:  
Conductive Epoxy



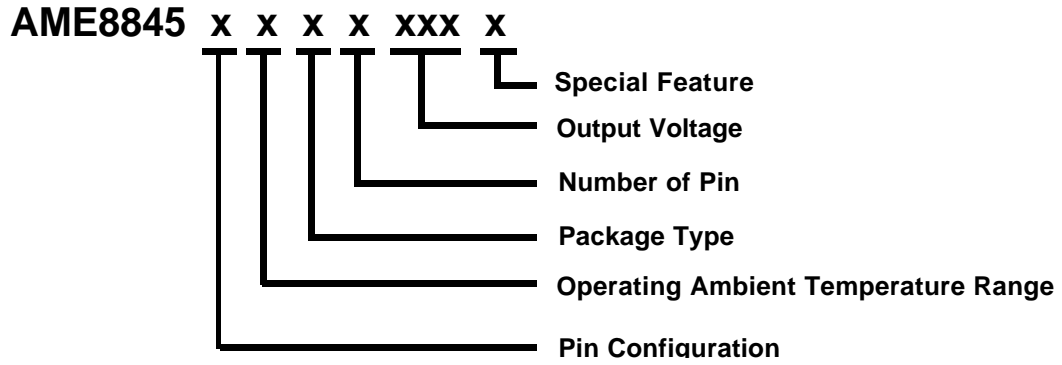
**AME 8845BEDTxxx**

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

\* Die Attach:  
Non-Conductive Epoxy



■ Ordering Information



Pin Configuration	Operating Ambient Temperature Range	Package Type	Number of Pins	Output Voltage	Special Feature
A: 1. IN (TO-252-2) 2. GND 3. OUT  B: 1. GND (TO-252-2) 2. OUT 3. IN  A: 1. IN (TO-263-3) 2. GND 3. OUT  B: 1. GND (TO-263-3) 2. OUT 3. IN  A: 1. IN (TO-220-3) 2. GND 3. OUT  B: 1. GND (TO-220-3) 2. OUT 3. IN  A: 1. IN (SOT-223) 2. GND 3. OUT  B: 1. GND (SOT-223) 2. OUT 3. IN	E: -40°C to 85°C	B: TO-220 C: TO-252 D: TO-263 G: SOT-223	S: 2 T: 3	150: V=1.5V 180: V=1.8V 250: V=2.5V 330: V=3.3V	Z: Lead Free

**■ Ordering Information(contd.)**

Part Number	Marking*	Output Voltage	Package	Operating Ambient Temperature Range
AME8845AEBT150Z	AME8845 AEBT150 yyww	1.50	TO-220-3	- 40°C to 85°C
AME8845AEBT180Z	AME8845 AEBT180 yyww	1.80	TO-220-3	- 40°C to 85°C
AME8845AEBT250Z	AME8845 AEBT250 yyww	2.50	TO-220-3	- 40°C to 85°C
AME8845AEBT330Z	AME8845 AEBT330 yyww	3.30	TO-220-3	- 40°C to 85°C
AME8845BEBT150Z	AME8845 BEBT150 yyww	1.50	TO-220-3	- 40°C to 85°C
AME8845BEBT180Z	AME8845 BEBT180 yyww	1.80	TO-220-3	- 40°C to 85°C
AME8845BEBT250Z	AME8845 BEBT250 yyww	2.50	TO-220-3	- 40°C to 85°C
AME8845BEBT330Z	AME8845 BEBT330 yyww	3.30	TO-220-3	- 40°C to 85°C
AME8845AECS150Z	AME8845 AECS150 yyww	1.50	TO-252-2	- 40°C to 85°C
AME8845AECS180Z	AME8845 AECS180 yyww	1.80	TO-252-2	- 40°C to 85°C
AME8845AECS250Z	AME8845 AECS250 yyww	2.50	TO-252-2	- 40°C to 85°C
AME8845AECS330Z	AME8845 AECS330 yyww	3.30	TO-252-2	- 40°C to 85°C

Note: yyww/ yww represents the date code

\* A line on top of the first letter represents lead free plating such as  $\overline{\text{AME8845}}$

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



**AME8845**

**3A CMOS LDO**

■ **Ordering Information(contd.)**

Part Number	Marking*	Output Voltage	Package	Operating Ambient Temperature Range
AME8845BECS150Z	AME8845 BECS150 yyww	1.50	TO-252-2	- 40°C to 85°C
AME8845BECS180Z	AME8845 BECS180 yyww	1.80	TO-252-2	- 40°C to 85°C
AME8845BECS250Z	AME8845 BECS250 yyww	2.50	TO-252-2	- 40°C to 85°C
AME8845BECS330Z	AME8845 BECS330 yyww	3.30	TO-252-2	- 40°C to 85°C
AME8845AEDT150Z	AME8845 AEDT150 yyww	1.50	TO-263-3	- 40°C to 85°C
AME8845AEDT180	AME8845 AEDT180 yyww	1.80	TO-263-3	- 40°C to 85°C
AME8845AEDT180Z	AME8845 AEDT180 yyww	1.80	TO-263-3	- 40°C to 85°C
AME8845AEDT250	AME8845 AEDT250 yyww	2.50	TO-263-3	- 40°C to 85°C
AME8845AEDT250Z	AME8845 AEDT250 yyww	2.50	TO-263-3	- 40°C to 85°C
AME8845AEDT330Z	AME8845 AEDT330 yyww	3.30	TO-263-3	- 40°C to 85°C
AME8845BEDT150Z	AME8845 BEDT150 yyww	1.50	TO-263-3	- 40°C to 85°C
AME8845BEDT180Z	AME8845 BEDT180 yyww	1.80	TO-263-3	- 40°C to 85°C
AME8845BEDT250Z	AME8845 BEDT250 yyww	2.50	TO-263-3	- 40°C to 85°C
AME8845BEDT330Z	AME8845 BEDT330 yyww	3.30	TO-263-3	- 40°C to 85°C

**■ Ordering Information**

<b>Part Number</b>	<b>Marking*</b>	<b>Output Voltage</b>	<b>Package</b>	<b>Operating Ambient Temperature Range</b>
AME8845AEGT150Z	BGLyww	1.50	SOT-223	- 40°C to 85°C
AME8845AEGT180	BAZyww	1.80	SOT-223	- 40°C to 85°C
AME8845AEGT180Z	BAZyww	1.80	SOT-223	- 40°C to 85°C
AME8845AEGT250	AZSyww	2.50	SOT-223	- 40°C to 85°C
AME8845AEGT250Z	AZSyww	2.50	SOT-223	- 40°C to 85°C
AME8845AEGT330Z	BDFyww	3.30	SOT-223	- 40°C to 85°C



■ Absolute Maximum Ratings

Parameter	Maximum	Unit
Input Voltage	-0.3 to 7	V
Output Voltage	-0.3 to $V_{IN} + 0.3$	V
Output Current	$P_D / (V_{IN} - V_{OUT})$	mA
ESD Classification	B*	

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

\* HBM B:2000~3999V

■ 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(contd.)

Parameter	Package	Die Attach	Symbol	Maximum	Unit
Thermal Resistance* (Junction to Case)	TO-220-3	Conductive Epoxy	$\theta_{JC}$	6	°C / W
		Non-Conductive Epoxy		24	
	TO-252-2	Conductive Epoxy		5	
		Non-Conductive Epoxy		30	
	TO-263-3	Conductive Epoxy		5	
		Non-Conductive Epoxy		27	
	SOT-223	Conductive Epoxy		25	
		Non-Conductive Epoxy		31	

\* Measure  $\theta_{JC}$  on backside center of tab.



**■ Thermal Information**

Parameter	Package	Die Attach	Symbol	Maximum	Unit
Thermal Resistance (Junction to Ambient)	TO-220-3	Conductive Epoxy	$\theta_{JA}$	55	°C / W
		Non-Conductive Epoxy		80	
	TO-252-2	Conductive Epoxy		90	
		Non-Conductive Epoxy		140	
	TO-263-3	Conductive Epoxy		80	
		Non-Conductive Epoxy		100	
	SOT-223	Conductive Epoxy		120	
		Non-Conductive Epoxy		135	
Internal Power Dissipation	TO-220-3	Conductive Epoxy	$P_D$	2200	mW
		Non-Conductive Epoxy		1600	
	TO-252-2	Conductive Epoxy		1200	
		Non-Conductive Epoxy		1000	
	TO-263-3	Conductive Epoxy		1700	
		Non-Conductive Epoxy		1400	
	SOT-223	Conductive Epoxy		900	
		Non-Conductive Epoxy		800	
Maximum Junction Temperature				150	°C
Solder Iron(10 Sec)**				350	°C

\*\* MIL-STD-202G 210F

**■ Electrical Specifications**
 $V_{IN} = V_{O(Nom)} + 1V$ ,  $C_{IN}=0.1\mu F$ ,  $C_{OUT}=2.2\mu F$ ,  $T_A = 25^\circ C$  unless otherwise noted

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Input Voltage	$V_{IN}$		Note 1		6	V
Output Voltage Accuracy	$V_O$	$I_O=1mA$	-1.5		1.5	%
Dropout Voltage	$V_{DROPOUT}$	$I_O=3A$ $V_O=V_{O(NOM)} - 2.0\%$	$1.5V \leq V_{O(NOM)} \leq 1.8V$		1200	mV
			$1.8V < V_{O(NOM)} < 2.5V$		700	
			$2.5V \leq V_{O(NOM)}$	300	450	
Output Current	$I_O$	$V_O > 1.2V$		3000		mA
Current Limit	$I_{LIM}$	$V_O > 1.2V$		3		A
Short Circuit Current	$I_{SC}$	$V_{IN} = V_{O(NOM)} + 1V$ , $V_O < 0.4V$		1.7		A
Quiescent Current	$I_Q$	$I_O=0mA$		300	400	$\mu A$
Ground Pin Current	$I_{GND}$	$I_O=1mA$ to 3A		300		$\mu A$
Line Regulation	$REG_{LINE}$	$I_O=1mA$ , $V_{IN}=V_O+1$ to $V_O+2$	-0.2	0.1	0.2	%
Load Regulation	$REG_{LOAD}$	$I_O=1mA$ to 3A	-1		1	%
Over Temperature Shutdown	OTS			140		$^\circ C$
Over Temperature Hysteresis	OTH			30		$^\circ C$
$V_O$ Temperature Coefficient	TC			30		ppm/ $^\circ C$
Power Supply Rejection	PSRR	$I_O=100mA$ $C_O=10\mu F$	$f=100Hz$		70	dB
			$f=1kHz$		50	
Output Voltage Noise	eN	$f=10Hz$ to 100kHz $I_O=10mA$			30	$\mu V_{rms}$
EN Input Threshold	$V_{EH}$	$V_{IN}=V_{IN,MIN}$ to $V_{IN,MAX}$	$V_{IN} * 0.8$		$V_{IN}$	V
	$V_{EL}$		0		0.4	
EN Input Leakage	$I_{EH}$	$V_{EN}=V_{IN}=5V$			2	$\mu A$
	$I_{EL}$	$V_{EN}=0V$ , $V_{IN}=5V$			2	
Shutdown Current	$I_{SD}$	$V_{EN}=0V$ , $V_{IN}=5V$			10	$\mu A$

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

## ■ Detailed Description

The AME8845 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 140°C, or the current exceeds 4.5A. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 110°C.

The AME8845 behaves like a current source when the load reaches 4.5A. However, if the load impedance drops below 0.3 ohms, the current drops back to 600mA to prevent excessive power dissipation. Normal operation is restored when the load resistance exceeds 0.75 ohms.

## ■ External Capacitors

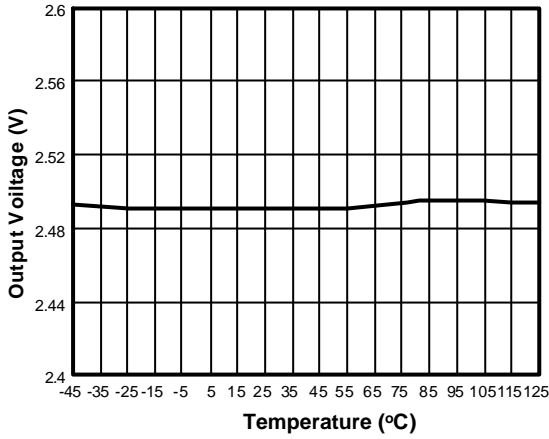
The AME8845 is stable with an output capacitor to ground of 2.2 $\mu$ F or greater. Ceramic capacitors have the lowest ESR, and will offer the best AC performance. Conversely, Aluminum Electrolytic capacitors exhibit the highest ESR, resulting in the poorest AC response. Unfortunately, large value ceramic capacitors are comparatively expensive. One option is to parallel a 0.1 $\mu$ F ceramic capacitor with a 10 $\mu$ 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 $\mu$ F to have a beneficial effect.

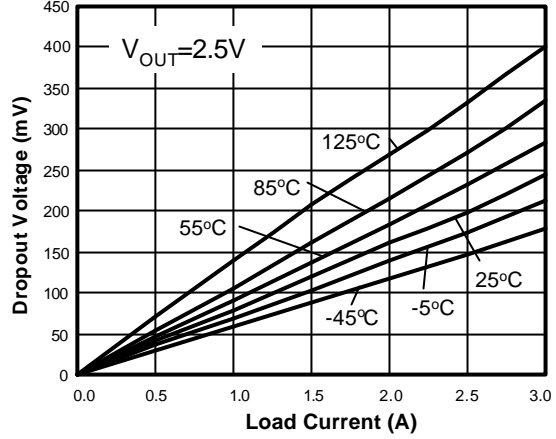
All capacitors should be placed in close proximity to the pins. A "Quiet" ground termination is desirable. This can be achieved with a "Star" connection.



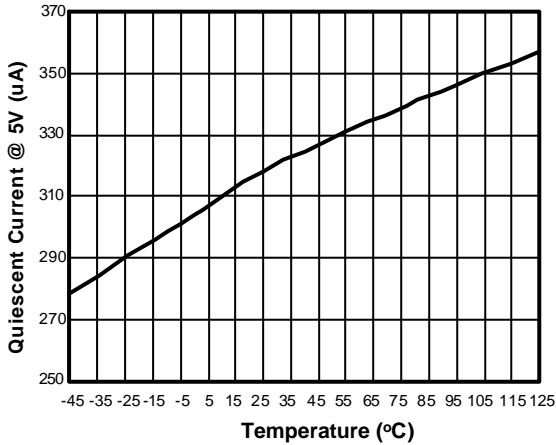
Temperature Stability



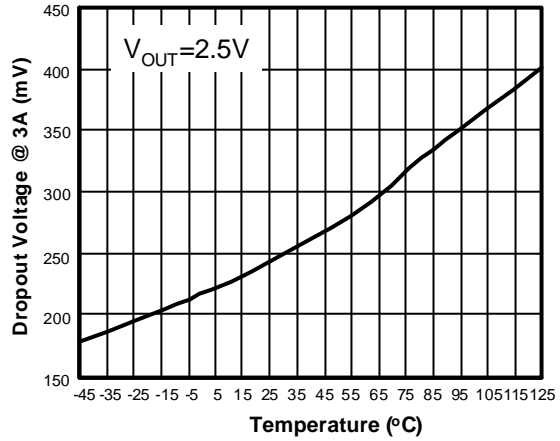
Dropout Voltage vs. Load Current



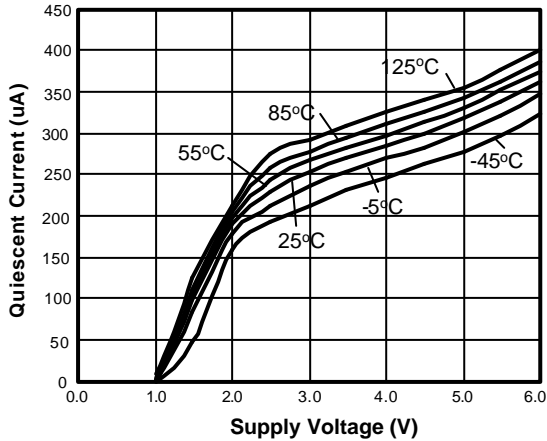
Quiescent Current vs. Temperature



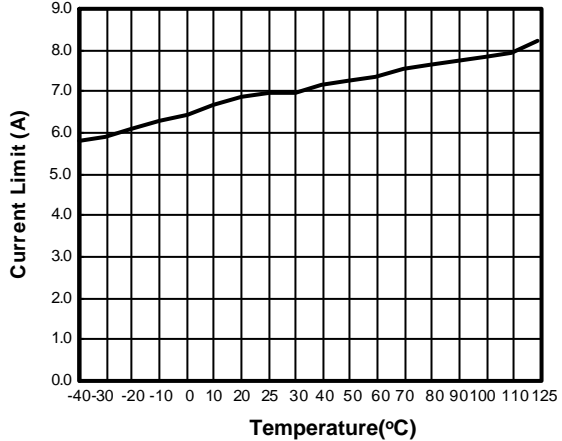
Dropout Voltage vs. Temperature



Quiescent Current vs. Supply Voltage

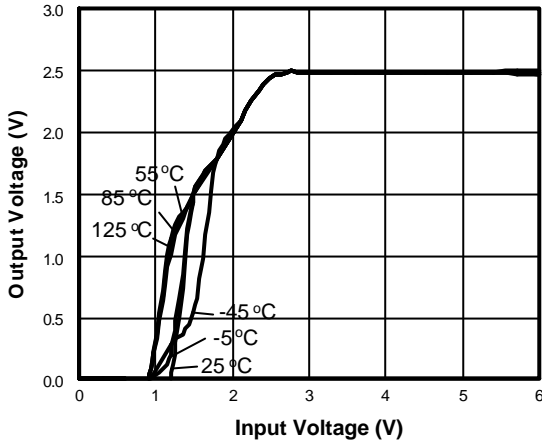


Current Limit vs. Temperature

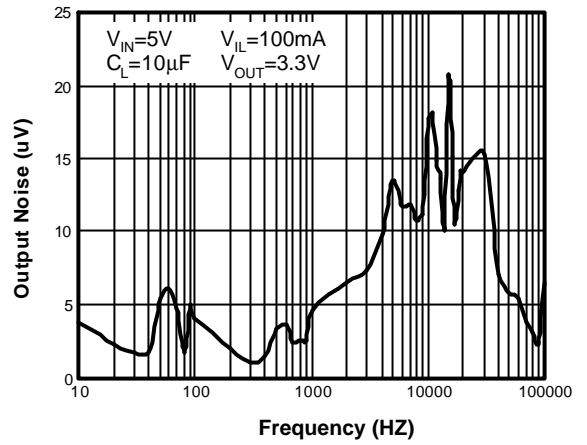




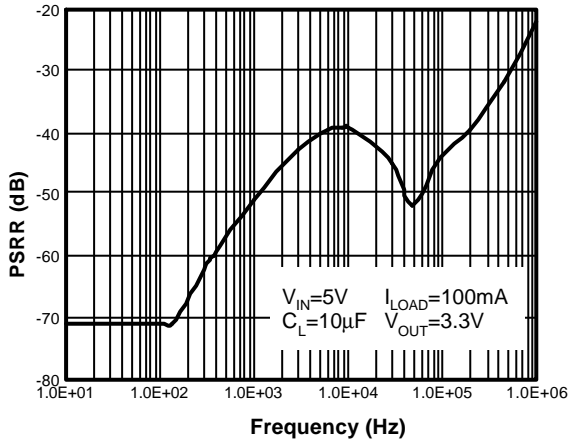
Output Voltage(2.5V) vs. Input Voltage



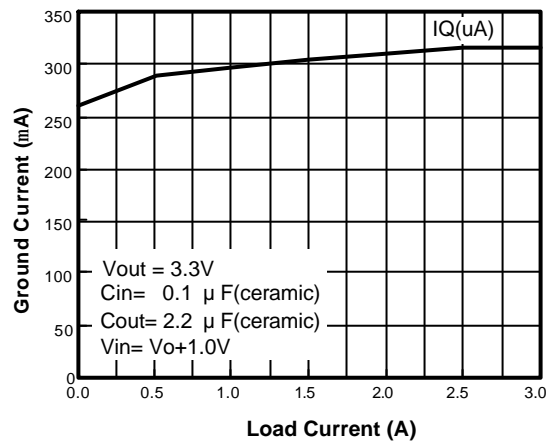
Output Noise vs. Frequency



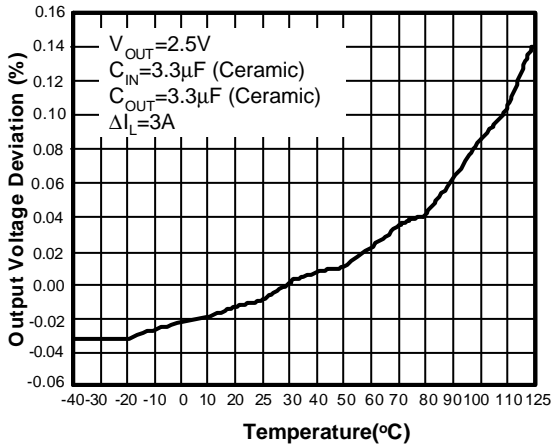
PSRR vs. Frequency



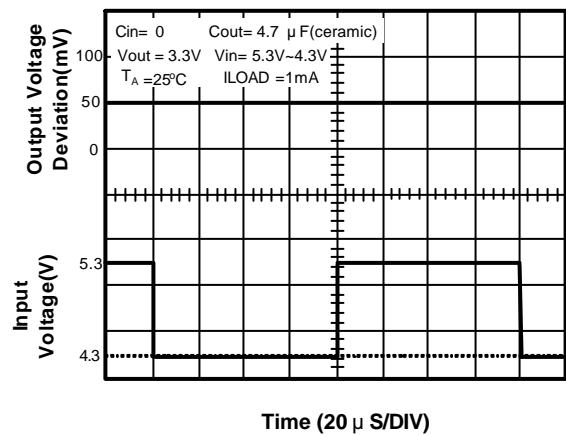
Ground Current vs. Load Current



Load Regulation Deviation

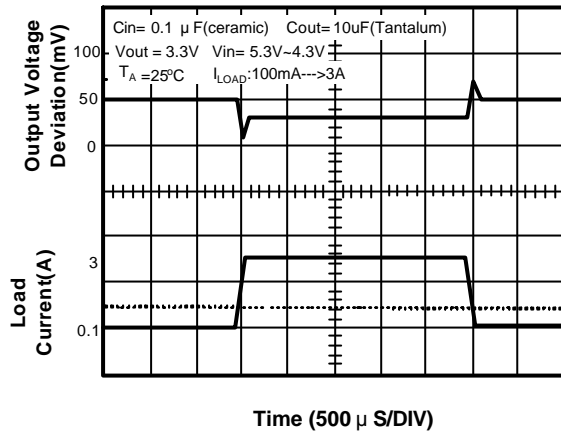


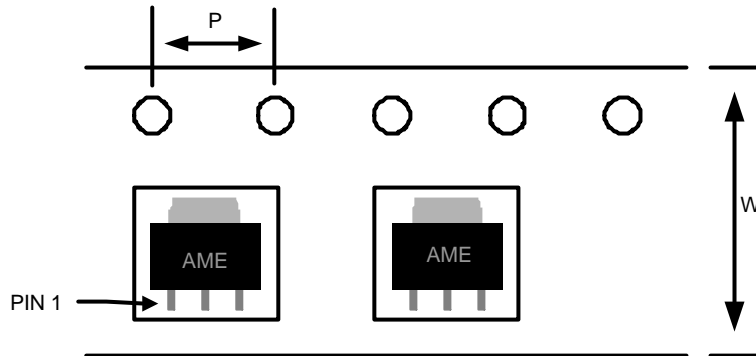
Line Transient Response



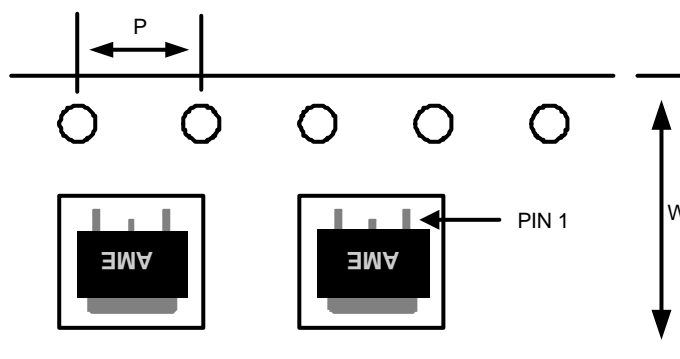


Load Transient Response



**■ Tape and Reel Dimension**
**SOT-223**

**Carrier Tape, Number of Components Per Reel and Reel Size**

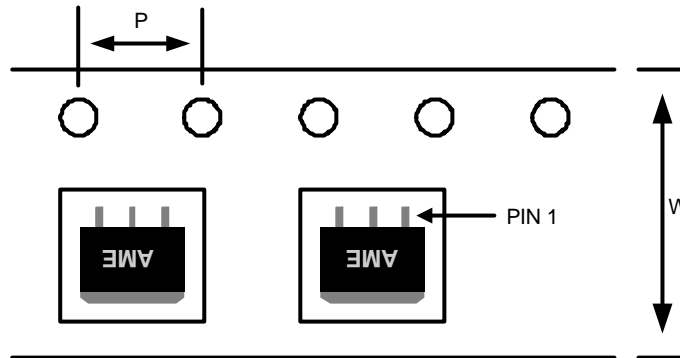
Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
SOT-223	12.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

**TO-252-2**

**Carrier Tape, Number of Components Per Reel and Reel Size**

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
TO-252-2	16.0±0.1 mm	4.0±0.1 mm	2500pcs	330±1 mm

**■ Tape and Reel Dimension**

TO-263-3


**Carrier Tape, Number of Components Per Reel and Reel Size**

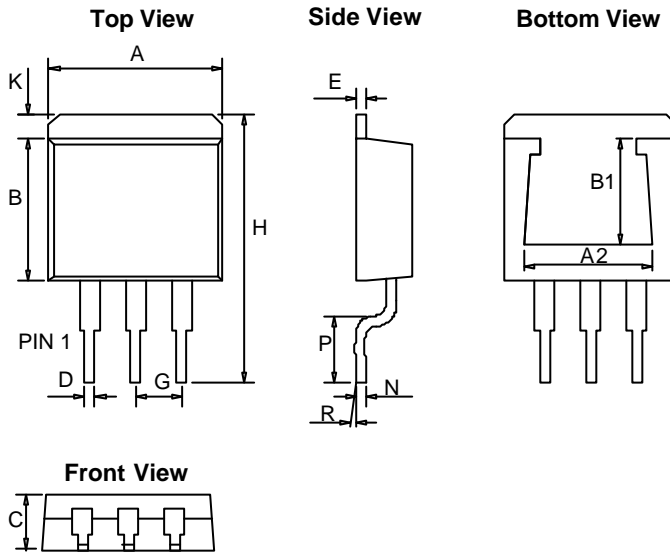
Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
TO-263-3	24.0±0.1 mm	4.0±0.1 mm	800pcs	330±1 mm





■ Package Dimension

TO-263-3



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.65	10.67	0.380	0.420
B	8.28	9.66	0.326	0.380
C	4.06	4.83	0.160	0.190
D	0.50	1.36	0.020	0.054
E	1.14	1.45	0.045	0.057
G	*2.54		*0.100	
H	14.60	15.875	0.5748	0.625
K	0.99	2.93	0.03898	0.11535
N	0.31		0.012	
P	2.28	2.80	0.08976	0.11024
R	0°	8°	0°	8°
B1	5.00	5.70	0.197	0.224
A2	7.30	8.05	0.287	0.317

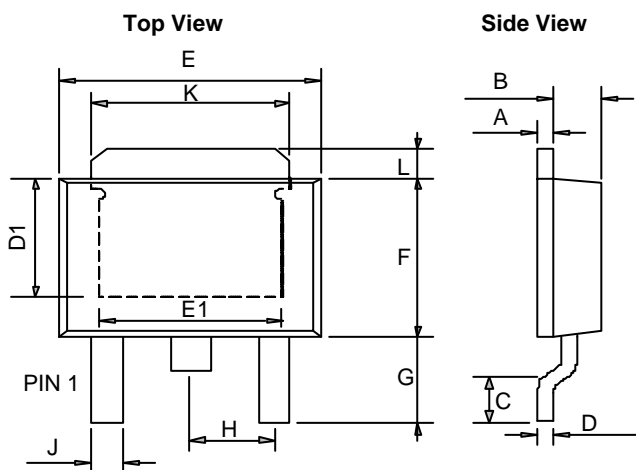
\*: Typical Value

Notes:

1. Controlling dimension: Millimeters.

2. Maximum lead thickness includes lead finish thickness Minimum lead thickness is the minimum thickness of base material.

TO-252-2(DPAK)-EIAJ



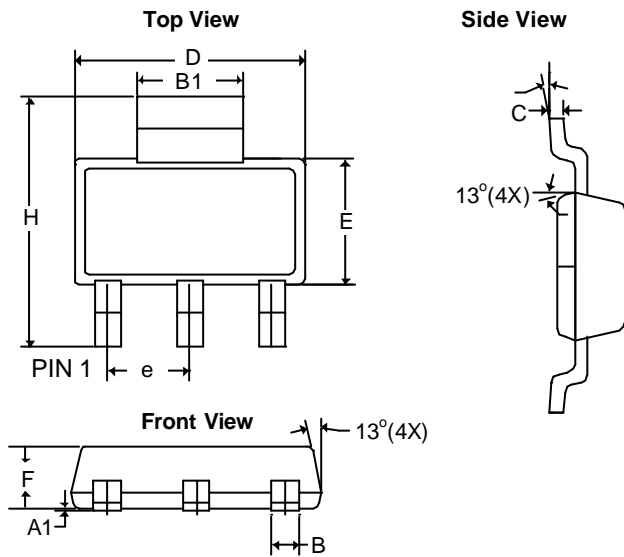
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.43	0.58	0.0169	0.0230
B	1.60	1.95	0.0630	0.0768
C	0.51	1.78	0.0200	0.0701
D	0.43	0.60	0.0169	0.0236
E	6.35	6.80	0.2500	0.2677
F	5.36	7.20	0.2110	0.2835
G	2.20	3.00	0.0866	0.1181
H	-	* 2.30	-	*0.0906
J	-	0.97	-	0.0380
K	5.20	5.50	0.2047	0.2165
L	1.40 REF		0.0551 REF	
D1	3.80 REF		0.1496 REF	
E1	3.81	5.10	0.1500	0.2008

\*: Typical Value

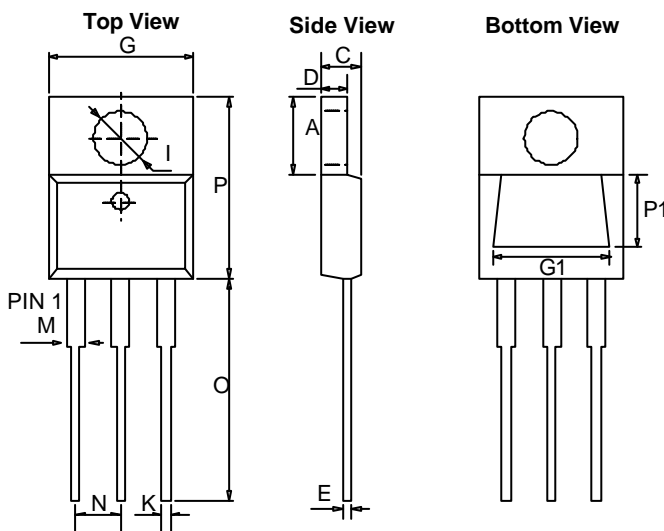
Notes:

1. Controlling dimension: Millimeters.

2. Maximum lead thickness includes lead finish thickness Minimum lead thickness is the minimum thickness of base material.

**■ Package Dimension**
**SOT-223**


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A <sub>1</sub>	0.01	0.10	0.0004	0.0039
B	0.60	0.84	0.0236	0.0330
B <sub>1</sub>	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°

**TO-220-3**


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.58	7.49	0.2197	0.2949
C	2.03	4.83	0.0799	0.1902
D	0.50	1.40	0.0197	0.0551
E	0.30	1.15	0.0118	0.0453
G	9.65	10.67	0.3799	0.4201
I	3.53	4.09	0.1390	0.1610
K	0.50	1.15	0.0197	0.0453
M	1.14	1.78	0.0449	0.0701
N	2.28	2.80	0.0898	0.1102
O	12.70	14.74	0.5000	0.5803
P	14.22	16.51	0.5598	0.6500
P <sub>1</sub>	5.00	5.70	0.1969	0.2244
G <sub>1</sub>	7.30	8.05	0.2874	0.3169



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Life Support Policy:

These products of AME, Inc. are not authorized for use as critical components in life-support devices or systems, without the express written approval of the president of AME, Inc.

AME, Inc. reserves the right to make changes in the circuitry and specifications of its devices and advises its customers to obtain the latest version of relevant information.

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