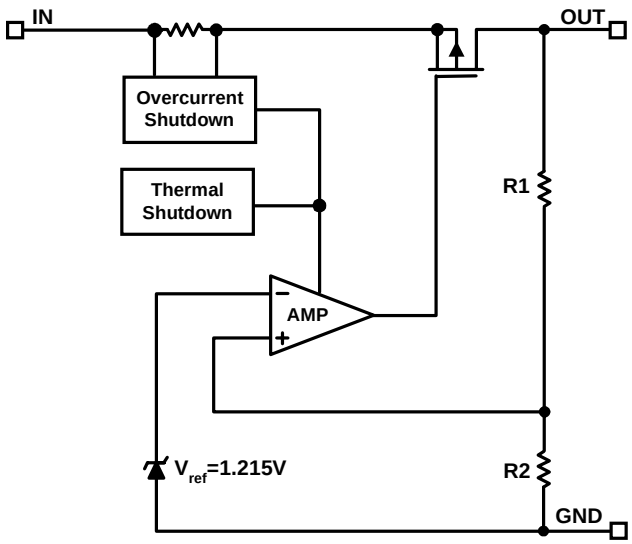
■ General Description

The AME8805/8810 family of positive, linear regulators feature low quiescent current (30μA typ.) with low dropout voltage, making them ideal for battery applications. The space-saving SOT-89 and 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" of operating conditions.

The AME8805/8810 is stable with an output capacitance of 2.2μF or greater.

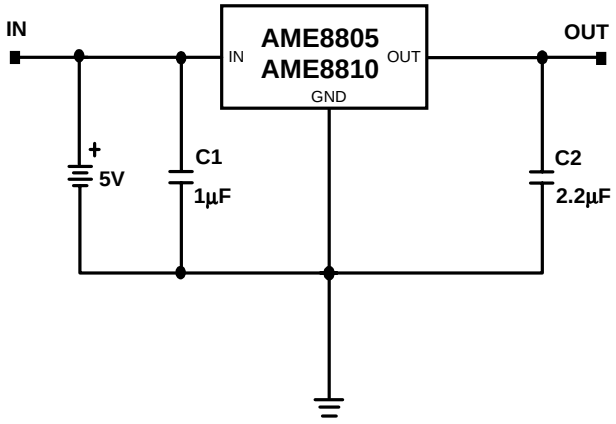
■ Functional Block Diagram



■ Features

- Very Low Dropout Voltage
- Guaranteed 600mA Output
- Accurate to within 1.5%
- 30μA Quiescent Current
- Over-Temperature Shutdown
- Current Limiting
- Short Circuit Current Fold-back
- Space-Saving SOT-89, SOT-223
- Factory Pre-set Output Voltages
- Low Temperature Coefficient

■ Typical Application

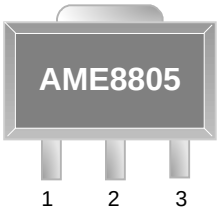


■ Applications

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

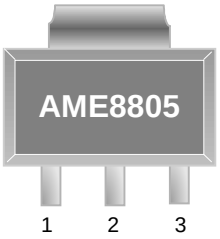
■ Pin Configuration

SOT-89
Top View



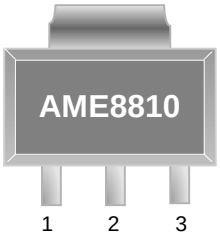
AME8805
1. GND
2. V_{IN}
3. V_{OUT}

SOT-223
Top View



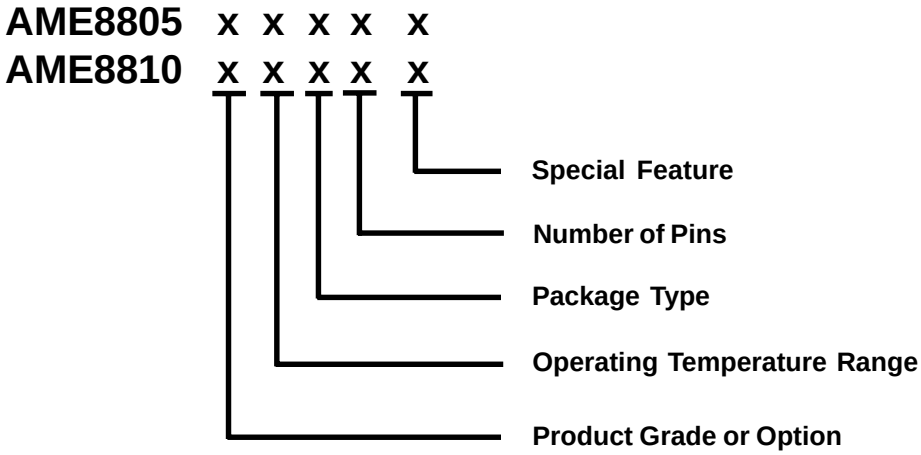
AME8805
1. V_{IN}
2. GND
3. V_{OUT}

SOT-223
Top View



AME8810
1. GND
2. V_{OUT}
3. V_{IN}

■ Ordering Information



Product Grade or Option	Operating Temperature Range	Package Type	Number of Pins	Special Feature
A: 3.3V B: 3.0V C: 2.8V D: 2.5V E: 3.8V F: 3.6V G: 3.5V H: 2.7V I: 3.4V J: 2.85V K: 3.7V L: 1.5V M: 1.8V N: 2.9V O: 3.1V Y: 1.9V 1: 1.3V 2: 2.0V	E: -40^{O}C to 85^{O}C	F: SOT-89 G: SOT-223	T: 3	Z: Lead Free

■ Ordering Information

Part Number	Marking	Output Voltage	Package	Operating Temp. Range
AME8805AEFT	A8805 AEFww	3.3V	SOT-89	- 40°C to + 85°C
AME8805AEFTZ	A8805 AEFww	3.3V	SOT-89	- 40°C to + 85°C
AME8805BEFT	A8805 BEFww	3.0V	SOT-89	- 40°C to + 85°C
AME8805CEFT	A8805 CEFww	2.8V	SOT-89	- 40°C to + 85°C
AME8805DEFT	A8805 DEFww	2.5V	SOT-89	- 40°C to + 85°C
AME8805DEFTZ	A8805 DEFww	2.5V	SOT-89	- 40°C to + 85°C
AME8805EEFT	A8805 EEFww	3.8V	SOT-89	- 40°C to + 85°C
AME8805FEFT	A8805 FEFww	3.6V	SOT-89	- 40°C to + 85°C
AME8805GEFT	A8805 GEFww	3.5V	SOT-89	- 40°C to + 85°C
AME8805HEFT	A8805 HEFww	2.7V	SOT-89	- 40°C to + 85°C
AME8805IEFT	A8805 IEFww	3.4V	SOT-89	- 40°C to + 85°C
AME8805JEFT	A8805 JEFww	2.85V	SOT-89	- 40°C to + 85°C
AME8805KEFT	A8805 KEFww	3.7V	SOT-89	- 40°C to + 85°C
AME8805LEFT	A8805 LEFww	1.5V	SOT-89	- 40°C to + 85°C
AME8805MEFT	A8805 MEFww	1.8V	SOT-89	- 40°C to + 85°C
AME8805MEFTZ	A8805 MEFww	1.8V	SOT-89	- 40°C to + 85°C
AME8805NEFT	A8805 NEFww	2.9V	SOT-89	- 40°C to + 85°C
AME8805OEFT	A8805 OEFww	3.1V	SOT-89	- 40°C to + 85°C
AME8805YEFT	A8805 YEFww	1.9V	SOT-89	- 40°C to + 85°C
AME88052EFT	A8805 2EFww	2.0V	SOT-89	- 40°C to + 85°C
AME8805AEGT	ADByww	3.3V	SOT-223	- 40°C to + 85°C
AME8805AEGTZ	ADByww	3.3V	SOT-223	- 40°C to + 85°C
AME8805BEGT	ADCyww	3.0V	SOT-223	- 40°C to + 85°C
AME8805CEGT	ADDyww	2.8V	SOT-223	- 40°C to + 85°C

■ Ordering Information (contd.)

Part Number	Marking	Output Voltage	Package	Operating Temp. Range
AME8805DEGT	ADEyww	2.5V	SOT-223	- 40°C to + 85°C
AME8805DEGTZ	ADEyww	2.5V	SOT-223	- 40°C to + 85°C
AME8805EEGT	ADFyww	3.8V	SOT-223	- 40°C to + 85°C
AME8805FEGT	ADGyww	3.6V	SOT-223	- 40°C to + 85°C
AME8805GEGT	ADHyww	3.5V	SOT-223	- 40°C to + 85°C
AME8805HEGT	AEJyww	2.7V	SOT-223	- 40°C to + 85°C
AME8805IEGT	AERyww	3.4V	SOT-223	- 40°C to + 85°C
AME8805JEGT	AGTyww	2.85V	SOT-223	- 40°C to + 85°C
AME8805KEGT	AHVyww	3.7V	SOT-223	- 40°C to + 85°C
AME8805MEGT	AJJyww	1.8V	SOT-223	- 40°C to + 85°C
AME8805NEGT	AKSyww	2.9V	SOT-223	- 40°C to + 85°C
AME8805OEGT	AKTyww	3.1V	SOT-223	- 40°C to + 85°C
AME88051EGT	AWLww	1.3V	SOT-223	- 40°C to + 85°C
AME8810AEGT	ADIyww	3.3V	SOT-223	- 40°C to + 85°C
AME8810AEGTZ	ADIyww	3.3V	SOT-223	- 40°C to + 85°C
AME8810BEGT	ADJyww	3.0V	SOT-223	- 40°C to + 85°C
AME8810BEGTZ	ADJyww	3.0V	SOT-223	- 40°C to + 85°C
AME8810CEGT	ADKyww	2.8V	SOT-223	- 40°C to + 85°C
AME8810DEGT	ADLyww	2.5V	SOT-223	- 40°C to + 85°C
AME8810EEGT	ADMyww	3.8V	SOT-223	- 40°C to + 85°C
AME8810FEGT	ADNyww	3.6V	SOT-223	- 40°C to + 85°C
AME8810GEGT	ADOyww	3.5V	SOT-223	- 40°C to + 85°C
AME8810HEGT	AEKyww	2.7V	SOT-223	- 40°C to + 85°C
AME8810IEGT	AESyww	3.4V	SOT-223	- 40°C to + 85°C
AME8810JEGT	AGVyww	2.85V	SOT-223	- 40°C to + 85°C
AME8810KEGT	AHXyww	3.7V	SOT-223	- 40°C to + 85°C
AME8810LEGT	AJFyww	1.5V	SOT-223	- 40°C to + 85°C
AME8810MEGT	AJGyww	1.8V	SOT-223	- 40°C to + 85°C
AME8810NEGT	AKWyww	2.9V	SOT-223	- 40°C to + 85°C
AME8810OEGT	AKXyww	3.1V	SOT-223	- 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	1	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

■ Recommended Operating Conditions

Parameter	Rating	Unit
Supply Voltage	4.5 to 5.5	V
Ambient Temperature Range	- 40 to + 85	^oC
Junction Temperature	- 40 to + 125	^oC

■ Thermal Information

Parameter		Maximum	Unit
Thermal Resistance (θ_{ja})	SOT-89	180	^oC / W
	SOT-223	160	
Thermal Resistance (θ_{jc})	SOT-89	18	^oC / W
	SOT-223	15	
Internal Power Dissipation (P_D) ($\Delta T = 100^oC$, No Heat Sink)	SOT-89	550	mW
	SOT-223	625	
Internal Power Dissipation (P_D) ($\Delta T = 100^oC$, With Heat Sink)	SOT-89	2750*	mW
	SOT-223	3300*	
Maximum Junction Temperature		150	^oC
Maximum Lead Temperature (10 Sec)		300	^oC

* Using twice the θjc for this calculation.

■ 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=600mA V_O=$V_{O(NOM)}$-2.0%	1.3V<=$V_{O(NOM)}$<=1.4V		See chart	1900	mV
			1.4V<$V_{O(NOM)}$<=2.0V			1400	
			2.0V<$V_{O(NOM)}$<=2.8V			800	
			2.8V<$V_{O(NOM)}$			600	
Output Current	I_O	V_O>1.2V		600			mA
Current Limit	I_{LIM}	V_O>1.2V		600	800		mA
Short Circuit Current	I_{SC}	V_O<0.8V			300	600	mA
Quiescent Current	I_Q	I_O=0mA			30	50	µA
Ground Pin Current	I_{GND}	I_O=1mA to 600mA			35		µA
Line Regulation	REG_{LINE}	I_O=1mA V_{IN}=V_O+1 to V_O+2	1.3V <= V_O <= 1.4V	-0.2		0.2	%
			1.4V < V_O <= 2.0V	-0.15		0.15	
			2.0V < V_O < 4.0V	-0.1	0.02	0.1	
			V_O >= 4.0V	-0.4	0.2	0.4	
Load Regulation	REG_{LOAD}	I_O=1mA to 600mA			0.2	1	%
Over Temperature Shutdown	OTS				150		°C
Over Temperature Hysterisis	OTH				30		°C
V_O Temperature Coefficient	TC				30		ppm/°C
Power Supply Rejection	PSRR	I_O=100mA C_O=2.2µF	f=1kHz		50		dB
			f=10kHz		20		
			f=100kHz		15		
Output Voltage Noise	eN	f=10Hz to 100kHz I_O=10mA,C_{BYP}=0µF	Co=2.2µF		30		µVrms

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 AME8805/8810 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^{o}C, or the current exceeds 600mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120^{o}C.

The AME8805/8810 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress. The AME8805/8810 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.

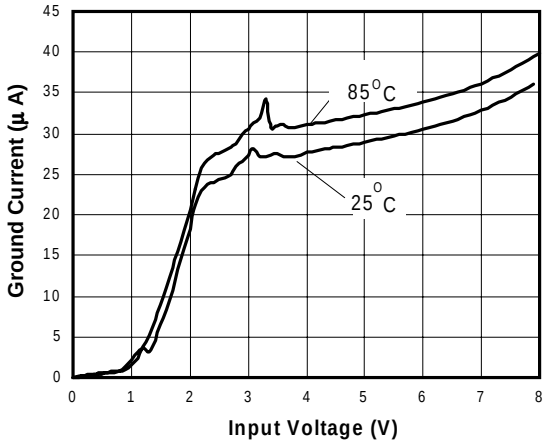
■ External Capacitors

The AME8805/8810 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.

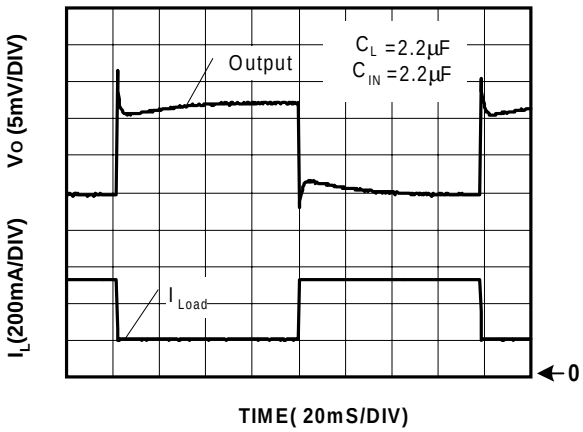
A second capacitor is recommended between the input and ground to stabilize Vin. The input capacitor should be at least 0.1µF to have a beneficial effect.

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.

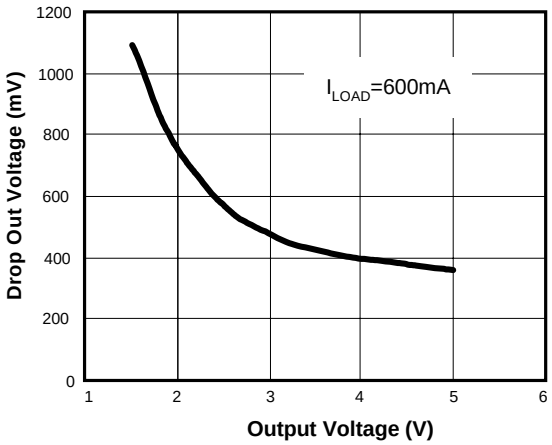
Ground Current vs. Input Voltage



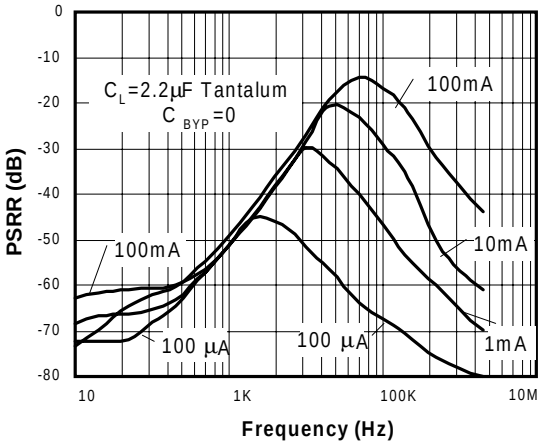
Load Step (1mA-600mA)



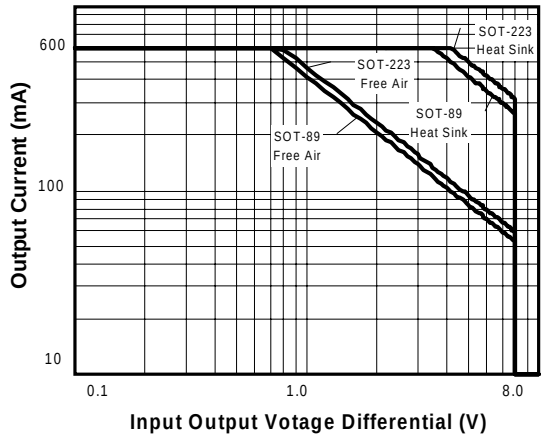
Drop Out Voltage vs. Output Voltage



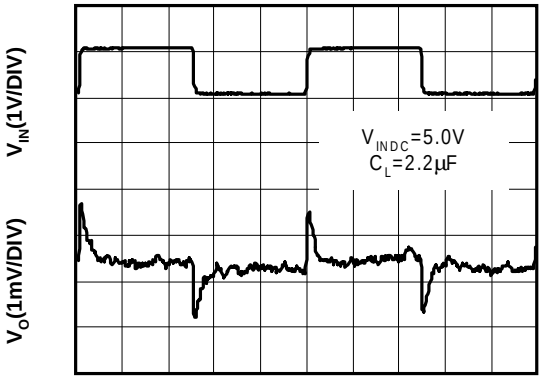
Power Supply Rejection Ratio



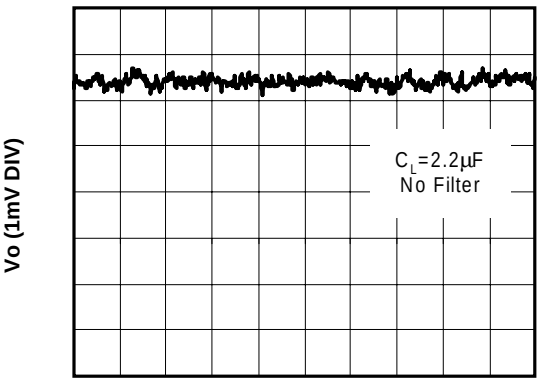
Safe Operating Area



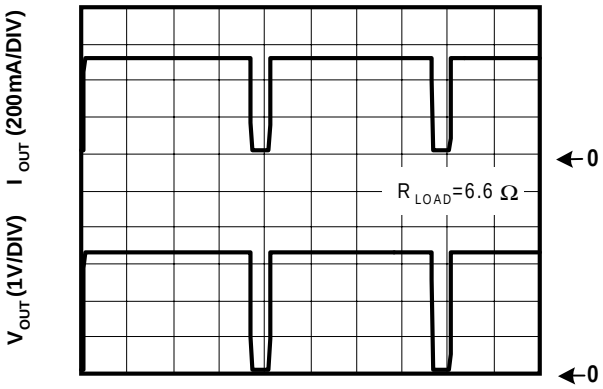
Line Transient Response



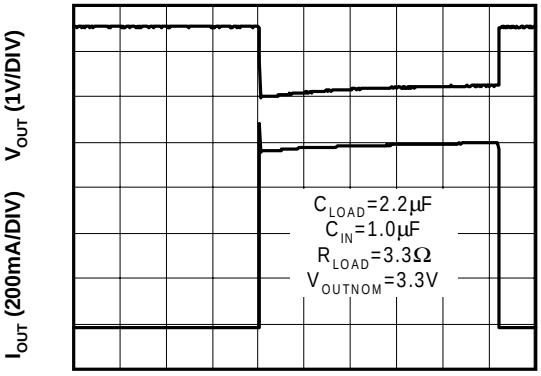
Noise Measurement



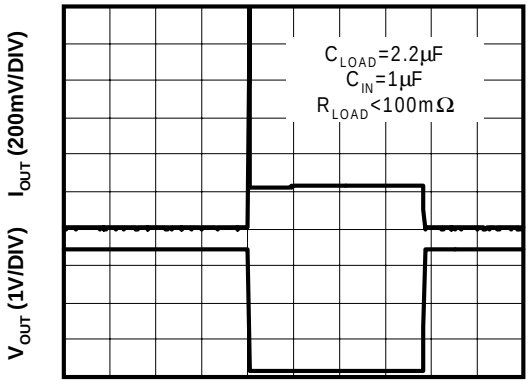
Overtemperature Shutdown



Current Limit Response

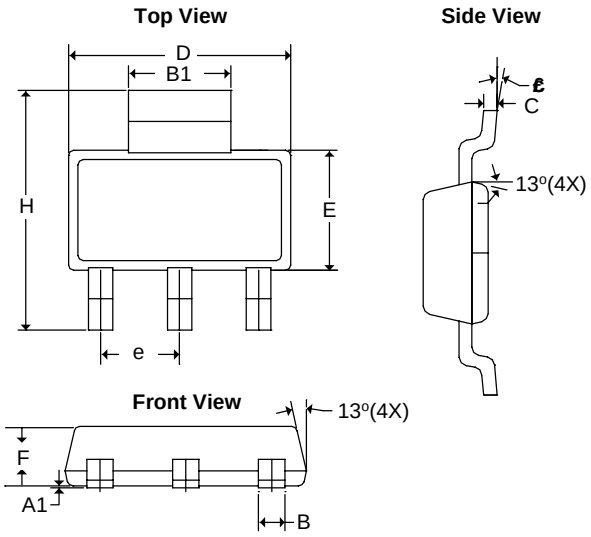


Short Circuit Response



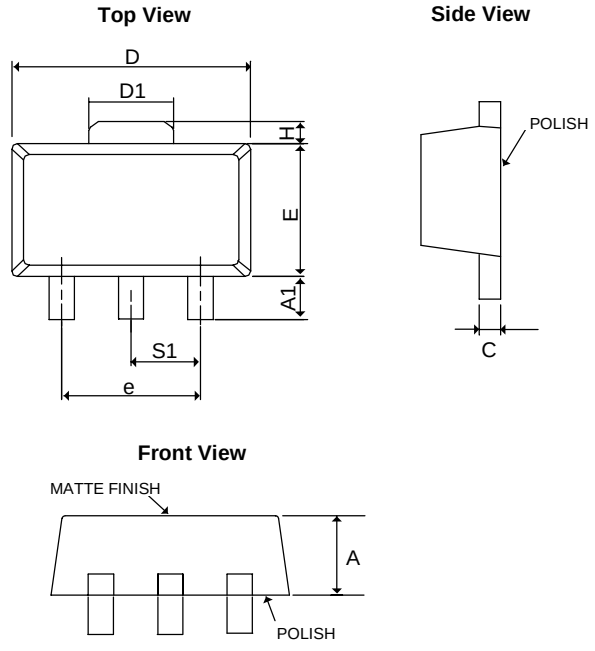
■ Package Dimension

SOT-223



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A_1	0.02	0.10	0.0008	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	0.0560	0.0702
H	6.70	7.30	0.2638	0.2874
θ	0°	10°	0°	10°

SOT-89



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.39	1.60	0.05472	0.06299
A_1	0.8REF		0.0315REF	
C	0.35	0.44	0.01378	0.01732
D	4.39	4.60	0.17283	0.1811
D_1	1.35	1.83	0.05315	0.07205
E	2.28	3.60	0.08976	0.14173
e	3.00REF		0.1181REF	
H	0.70REF		0.0276REF	
S1	1.50REF		0.0590REF	

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