1A Adjustable Low-Dropout Regulator

FEATURES

- Dropout voltage typically 1.2V @ I_O = 800mA
- Output current in excess of 1A
- Adjustable output voltage
- Space-saving SOT-223 package
- Internal short circuit current limit
- Internal over temperature protection

APPLICATIONS

- Post-regulation for switching DC/DC converters.
- High-efficiency linear regulator
- Battery charger
- Battery-powered instrumentation
- Motherboards

DESCRIPTION

The SS8117G is a low dropout linear regulator with a max. dropout voltage of 1.4V at a load current of 1A. Available only in adjustable form, the output voltage can be set from 1.25V to 5V with only two external resistors.

The SS8117G provides over-temperature and over-current protection circuits to prevent it from being damaged by abnormal operating conditions.

The SS8117G is available in a SOT-223 package. A tantalum electrolytic capacitor of at least 10µF is required at the output to improve the transient response and stability.

ORDERING INFORMATION

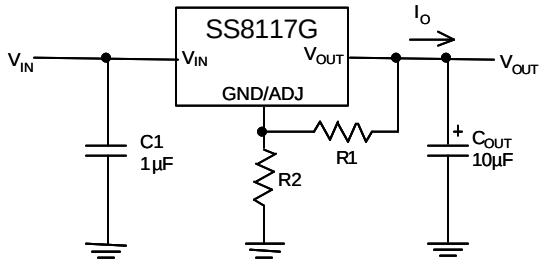
SS8117GT63XX

- Packing
- Pin Option
- Package Type

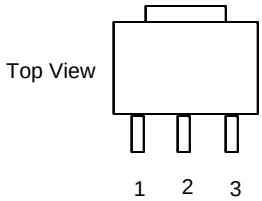
PACKAGE TYPE	PIN OPTION			PACKING
GT6 : SOT-223 Pb-free	1	2	3	TR : Tape & Reel
	3 : GND/ADJ	Vout	Vin	TB: Tubes

Pb-free, RoHS compliant

TYPICAL APPLICATION



PIN CONFIGURATION



SOT 223

ABSOLUTE MAXIMUM RATINGS (Note 1)

Input Voltage.....7V
Power Dissipation Internally Limited (Note 2)
Maximum Junction Temperature.....150°C
Storage Temperature Range.....-65°C ≤ T_J ≤+150°C
Reflow Temperature (soldering, 10secs)
SOT 223 Package.....260°C
Continuous Power Dissipation (T_A = +25°C)
SOT 223[(1)].....0.8W

Note [(1)]: See Recommended Minimum Footprint

OPERATING CONDITIONS (Note 1)

(V_{IN}-V_{ADJ}) Voltage.....2.5V~6.5V
Temperature Range.....-40°C ≤ T_J ≤85°C

ELECTRICAL CHARACTERISTICS

Operating Conditions: V_{IN} ≤ 6.5V, TJ = 25°C unless otherwise specified. [Note3]

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Reference Voltage	V_{IN} - V_{OUT} = 2V, I_{OUT} = 10mA	1.225	1.250	1.275	V
Line Regulation	(V_{OUT} + 1.5V) < V_{IN} < 6.5V, I_{OUT} = 10mA		1.32		%
Load Regulation	(V_{IN} - V_{OUT}) = 2V, 10mA < I_{OUT} < 800mA		0.04		%
Dropout Voltage	ΔV_{OUT} = 2%, I_{OUT} = 800mA		1.2	1.3	V
	ΔV_{OUT} = 2%, I_{OUT} = 1A		1.3	1.4	V
Current Limit	(V_{IN} - V_{OUT}) = 2V	1000	1200		mA
Adjust Pin Current Change	V_{IN} - V_{OUT} = 2V, 10mA < I_{OUT} < 1mA		0.15		µA
Minimum Load Current	1.5V < (V_{IN} - V_{OUT}) < 5.25V	10			mA
Quiescent Current	V_{IN} - V_{OUT} = 2V		80		µA
Ripple Rejection	f = 120Hz, C_{OUT} = 10µF Tantalum, (V_{IN} - V_{OUT}) = 3V, I_{OUT} = 800mA		50		dB
Thermal Regulation	T_A = 25°C, 30ms pulse		0.004	0.02	%/W
Temperature Stability	V_{IN} = 4V, Io =10mA		0.3		%
RMS Output Noise (% of V_{OUT})	T_A = 25°C, 10Hz < f < 10kHz, I_{LOAD} = 10mA		0.007		%
Thermal Resistance,Junction-to-Ambient (No heat sink; No air flow)	SOT-223; Recommended Minimum Footprint		156		°C/W
Thermal Shutdown	Junction Temperature		150		°C
Thermal Shutdown Hysteresis			10		°C

Note 1: Absolute Maximum Ratings are limits beyond which damage to the device may occur. Operating Conditions are conditions under which the device functions but the specifications might not be guaranteed. For guaranteed specifications and test conditions see the Electrical Characteristics.

Note 2: The maximum power dissipation is a function of the maximum junction temperature, T_{Jmax}, total thermal resistance, θ_{JA}, and ambient temperature T_A. The maximum allowable power dissipation at any ambient temperature is T_{jmax}-T_A / θ_{JA}. If this dissipation is exceeded, the die temperature will rise above 150°C and the IC will go into thermal shutdown. For the SS8117G in SOT 223 package, θ_{JA} is 156°C/W (See recommended minimum footprint). For safe operation in SOT 223 package, see "Typical Performance Characteristics" (Safe Operating Area).

Note3: Low duty cycle pulse techniques are used during test to maintain junction temperature as close to ambient temperature as possible.

Note4: The output capacitor should be tantalum or aluminum.

DEFINITIONS

Output Voltage

The SS8117G provides an adjustable output voltage from 1.25V to 5V with two external resistors. It can be calculated from:

$$V_{OUT} = 1.25V \times \left(1+\frac{R_2}{R_1}\right) + I_{ADJ} \times R_2$$

I_{ADJ} = 80μA (typ.)

Dropout Voltage

The input/output voltage differential at which the regulator output no longer maintains regulation against further reductions in input voltage. It is measured when the output drops 20% below its nominal value. Dropout voltage is affected by junction temperature, load current and minimum input supply requirements.

Line Regulation

The change in output voltage for a change in input voltage. The measurement is made under conditions of low dissipation or by using pulse techniques such that the average chip temperature is not significantly affected.

Load Regulation

The change in output voltage for a change in load current at constant chip temperature. The measurement is made under conditions of low dissipation or by using pulse techniques such that the average chip temperature is not significantly affected.

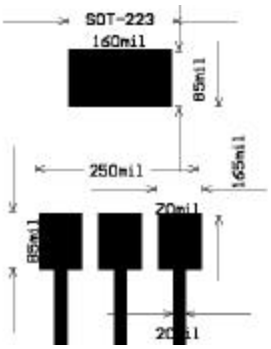
Maximum Power Dissipation

The maximum total device dissipation with which the regulator will still operate within specifications.

Quiescent Bias Current

Current which is used to operate the regulator chip and is not delivered to the load.

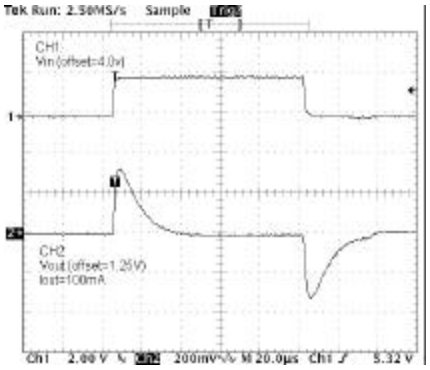
Recommended Minimum Footprint



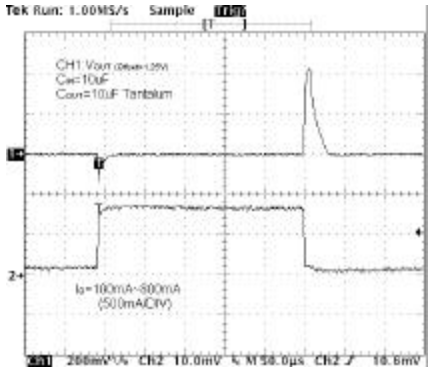
TYPICAL PERFORMANCE CHARACTERISTICS

(V_{IN}= 4V, C_{IN}=10µF, C_{OUT}=10µF, T_A=25°C, unless otherwise noted.

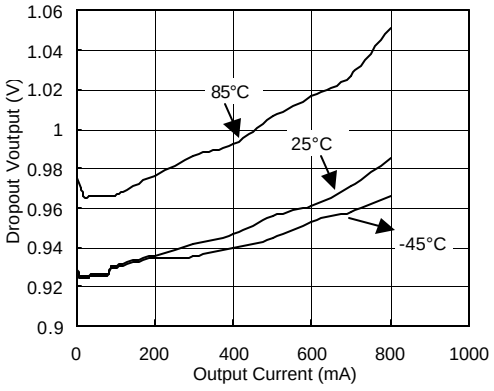
Line transient



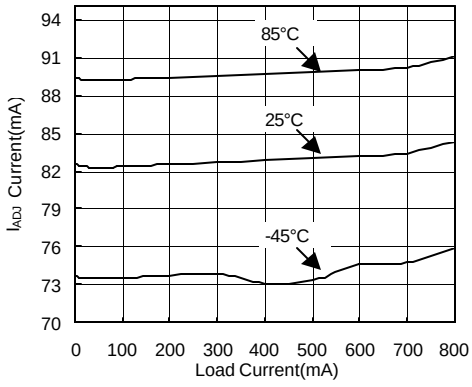
Load Transient



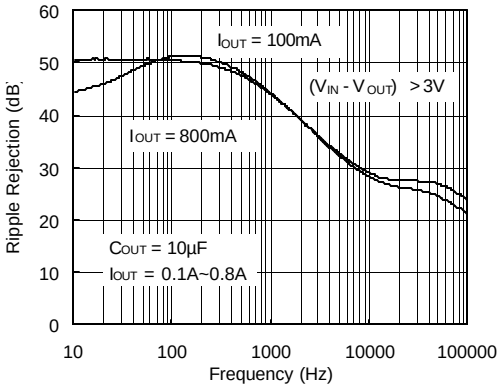
Dropout Voltage vs. Load Current



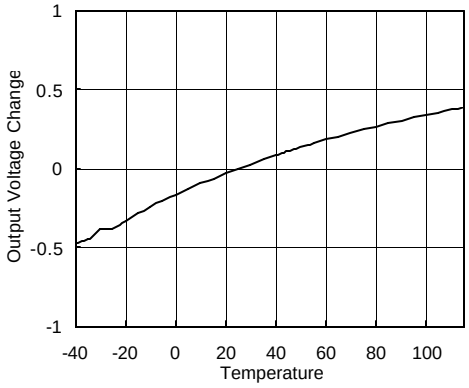
I_{ADJ} Current vs. Load Current



Ripple Rejection

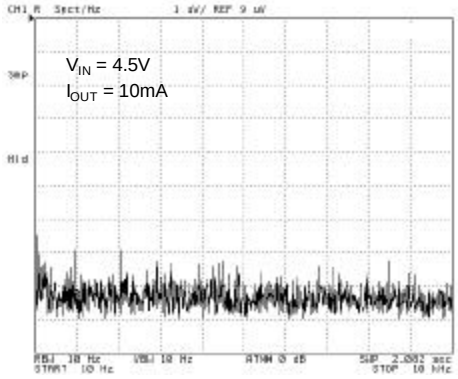


Temperature Stability

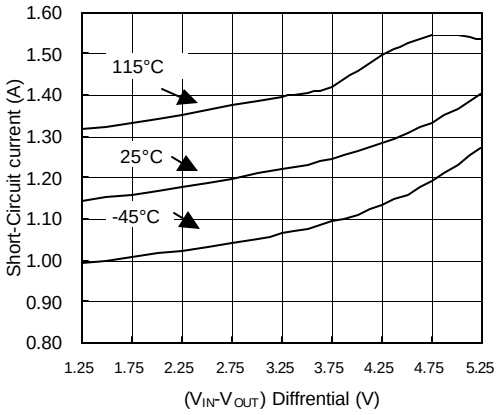


TYPICAL PERFORMANCE CHARACTERISTICS (continued)

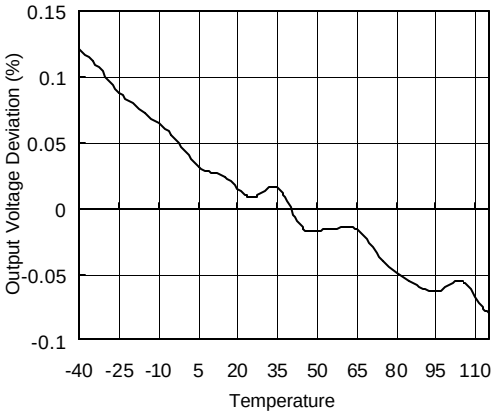
Output Noise



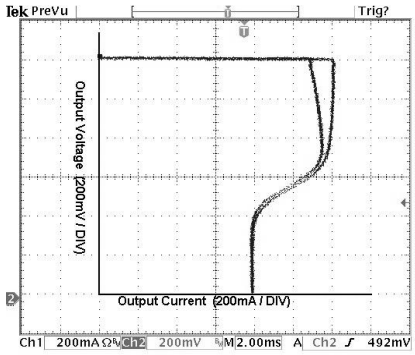
Short-Circuit Current



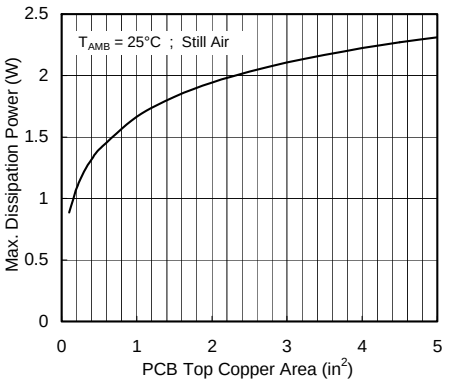
Load Regulation



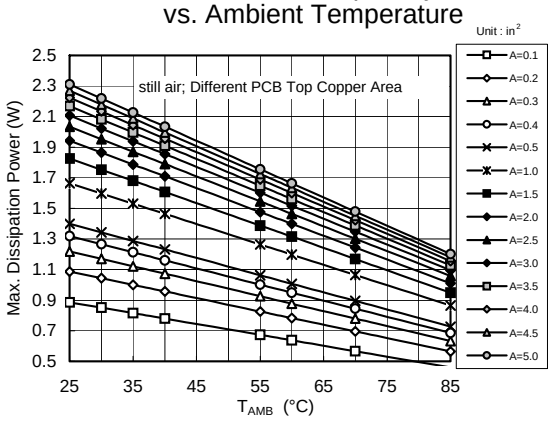
Overcurrent Protection Characteristics

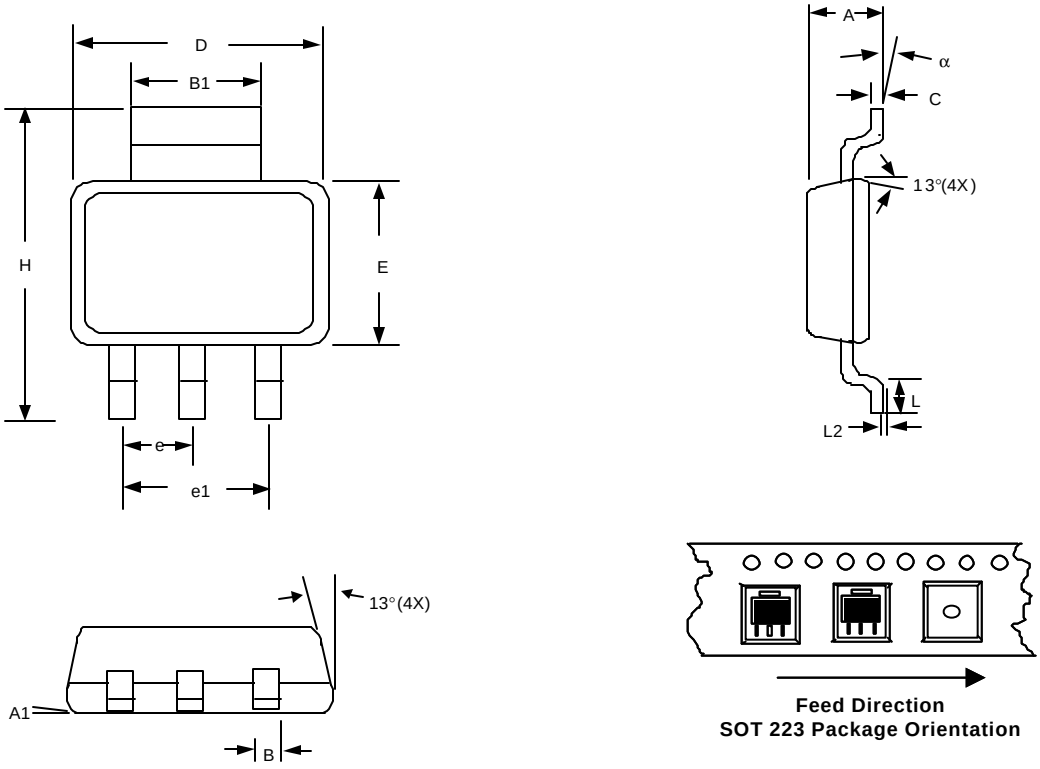


Max. Power Dissipation
vs. PCB Top Copper Area



Max. Power Dissipationj
vs. Ambient Temperature





SOT-223 (GT6) Package

SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.55	1.80	0.061	0.071
A1	0.02	0.12	0.0008	0.0047
B	0.60	0.80	0.024	0.031
B1	2.90	3.10	0.114	0.122
C	0.24	0.32	0.009	0.013
D	6.30	6.70	0.248	0.264
E	3.30	3.70	0.130	0.146
e	2.30 BSC		0.090 BSC	
e1	4.60 BSC		0.181 BSC	
H	6.70	7.30	0.264	0.287
L	0.90 MIN		0.036 MIN	
L2	0.06 BSC		0.0024 BSC	
a	0º	10º	0º	10º