1A Low Dropout Positive Regulator

Linear Voltage Regulator

■DESCRIPTION

The ST1117 is a positive low dropout voltage regulators with 1A output current capability.

In order to obtain lower dropout voltage and fast transient response, which is critical for low voltage application. The ST1117 has been optimized. The device is available in an adjustable version and fixed output voltage of 1.8V, 2.5V, 3.3V and 5V. Dropout voltage is guaranteed at a maximum of 1.3V at 1A.

Current limit is trimmed to ensure specified output current and controlled short circuit current. On-chip thermal limiting provides protection against any combination of overload that would creat excessive junction temperatures.

The ST1117 is aviliable in the SOT-223 and surface mount packages.

ST1117XXA-TRG ROHS Compliant This is Halogen Free

■FEATURE

◆ Low Dropout Performance
◆ Ajustable or Fixed Output
◆ Over-temperature and Over-current Protection
◆ Current Limiting and Thermal Protection
◆ Output Current of 1A
◆ Rugged 2KV ESD withstand capability
◆ Full RoHS compliance

■APPLICATIONS

◆ Battery Chargers.
◆ Post Regulator for Switching Power Supply
◆ Low Voltage Logic Suppliers
◆ High Efficiency Linear Regulators
◆ Motherboard Clock Supplies

■PIN CONFIGURATION

VIN
VOUT
GND/ADJ

SOT-223
Top View

■PART NUMBER INFORMATION

ST 1117 XX A – TR G	

a b c d e f	**a : Company name.**
	b : Product Serial number.
	c : Voltage Code.
	    XX
	    18 : 1.8V, 25 : 2.5V, 33 : 3.3V
	    ADJ : ADJ
	d : Package Code
	e : Handling Code
	f : Lead Plating Code
	       G : Lead-free product

■ORDERING INFORMATION

Part Number	Package Code	Package	VOUT Voltage	Shipping
ST1117-XXA-TRG	A	SOT-223	ADJ 1.8 2.5 3.3	2500/Tape&Reel

※"XX"stands for output voltages.
※ Year Code : 0 ~ 9, 2010 : 0
※ Week Code : A(1~2) ~ Z(53~54)
※ SOT-223 : Only available in tape and reel packaging.

■ABSOLUTE MAXIMUM RATINGS $(T_A$ = 25°C Unless otherwise noted)

Symbol	Parameter	Maximum	Unit
P_D	Power Dissipation	Internally Limited	W
V_{IN}	Input Voltage	12	V
T_J	Operating Junction Temperature Range	0~+125	°C
T_{STG}	Storage Temperature Range	-65~+150	°C
T_{LEAD}	Lead Soldering Temperature (Soldering, 10 sec)	260	°C

Note: Exceeding these raitings could cause damage to the device. All voltages are with respect to Ground. Current are positive into, negative out of the specified terminal.

■POWER DISSPATION

Package	θJA (℃/W)	Df(mW/℃) TA≧25℃	TA≦25℃ Power rating (mW)	TA＝70℃ Power rating (mW)	TA＝80℃ Power rating (mW)
A	136	7.35	919	588	478

Note：$θ_{JA}$：Thermal Resistance-Junction to Ambient, D_F：Derating factor, P_C：Power consumption
Junction Temperature Calculation:
T_J= TA + (P_D × $θ_{JA}$), P_O = D_F × (T_J－T_A)
The $θ_{JA}$ numbers are guidelines for the thermal performance of the device/PC-board system.
All of the above assume no ambient airflow.
$θ_{JT}$：Thermal Resistance-Junction to Tab, TC：case(Tab) temperature, T_J= T_C + (P_D × $θ_{JT}$)
For A package, $θ_{JT}$ = 15.0 ℃/W

■ELECTRICAL CHARACTERISTICS(T_A = 25℃ Unless otherwise noted)

T =25°C , V =3.6V unless otherwise noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage (1)	I_{OUT} = 10mA, T_A = 25°C ST1117-18, 3.3V≦V_{IN}≦8.0V ST1117-25, 4.0V≦V_{IN}≦8.0V ST1117-33, 4.8V≦V_{IN}≦8.0V	1.764 2.450 3.234	1.80 2.50 3.30	1.863 2.550 3.366	V
V_{REF}	Reference Voltage (1) (Adj. Version)	V_{IN} = V_{OUT}＋1.5V, I_{OUT} = 10mA	1.238	1.250	1.262	V
		V_{IN} = V_{OUT}＋1.5V to 8V I_{OUT} =10mA to 1A	1.225	1.250	1.275	
V_{SR}	Line Regulation (1)	(V_{OUT}＋1.5V)≦V_{IN}≦8.0V I_{OUT} =10mA to 1A	-	0.1	0.5	%
V_{LR}	Load Regulation (1)	10mA≦I_{OUT}≦1A V_{IN} – V_{OUT} =1.5V	-	-	1	%
V_D	Dropout Voltage	I_{OUT} =1A	-	1.3	1.4	V
I_{CL}	Current Limit	V_{IN} – V_{OUT} =1.5V	1.1	-	-	A
I_Q	Quiescent Current	V_{IN}≦7V	-	3	5	mA
I_{ADJ}	Ajust Pin Current	I_{OUT} =10mA, V_{IN} – V_{OUT} =2V	-	50	120	µA
T_C	Temperature Coefficient		-	0.5	-	%/℃
I_{OUT}	Minimum Load Current	1.5V≦(V_{IN} – V_{OUT})≦5.75V	-	5	10	mA
R_A	Ripple Rejection Ratio (3)	f = 120Hz, 1V_{RMS}, I_{OUT} =400mA, V_{IN} – V_{OUT} =3V	-	60	70	dB

NOTES: (1) Low duty cycle pulse testing with which TJ remain unchanged.
(2) ST1117-XX.
(3) These parameters, although guaranteed, are not tested in production.

■RECOMMEND OPERATING CONDITIONS

Symbol	Parameter	Operating Conditions			Unit
		Min	Typ	Max	
V_{IN}	Input Voltage	2.75	-	12	V
I_{OUT}	Load Current (With adequate heat sinking)	5	-	-	mA
C_{IN}	Input Capacitor(V_{IN} to GND)	1.0	-	-	µF
C_{OUT}	Output Capacitor with ESR of 10Ω Max(V_{OUT} to GND)	4.7			µF
T_J	Junction Temperature	-	-	150	℃

■*APPLICATION NOTE*

Maximum Power Dissipation Calculation:

$$P_D \text{ (max)} = [(V_{IN} \text{ (max)} - V_O \text{ (nom)}] \times I_O \text{ (nom)} + V_{IN} \text{ (max)} \times I_Q$$

Where: V_{OUT} (nom) : The nominal output voltage
   I_{OUT} (nom) : The nominal output current, and
   I_Q : The quiescent current the regulator consumes at I_O (max)
 V_{IN} (max) : The maximum input voltage. Then θ_{JA} = (150℃ $-$ T_A) / P_D

## ■*TYPICAL APPLICATION*

◆**Adjustable Voltage Regulator**
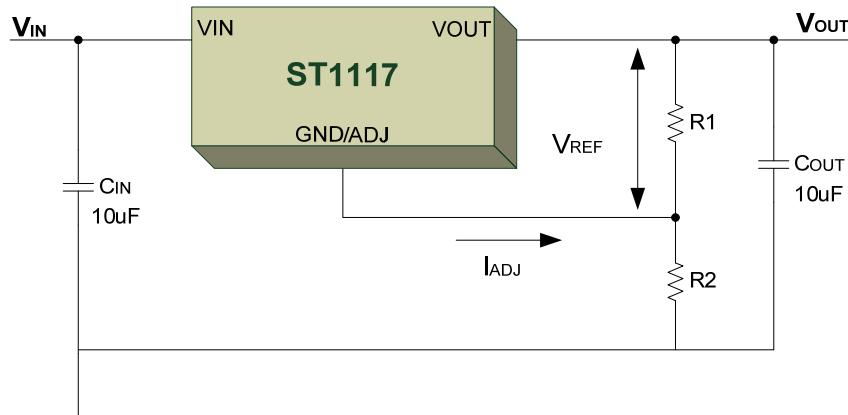

$$V_{OUT} = 1.25V \times (1 + \frac{R2}{R1})$$

◆**Fixed Voltage Regulator**

■ *TYPICAL CHARACTERISTICS(25℃ Unless Note)*

Dropout Voltage VS Output Current

Load Regulator VS Temprature

Precent Change in Output Voltage VS Temperature

Line Regulation

Line Transient Response
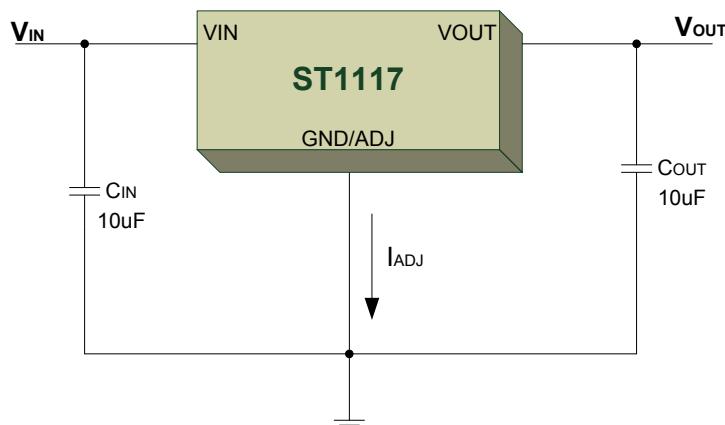
Load Transient Response
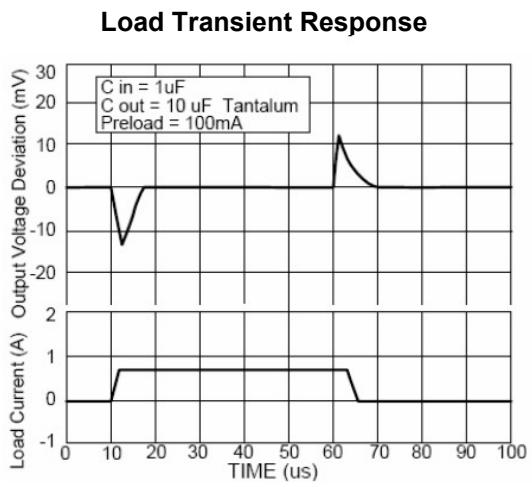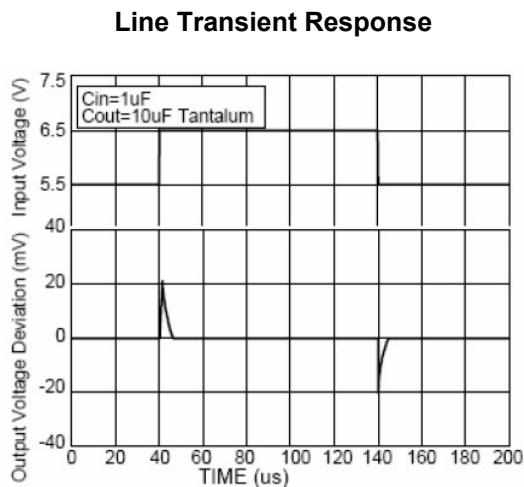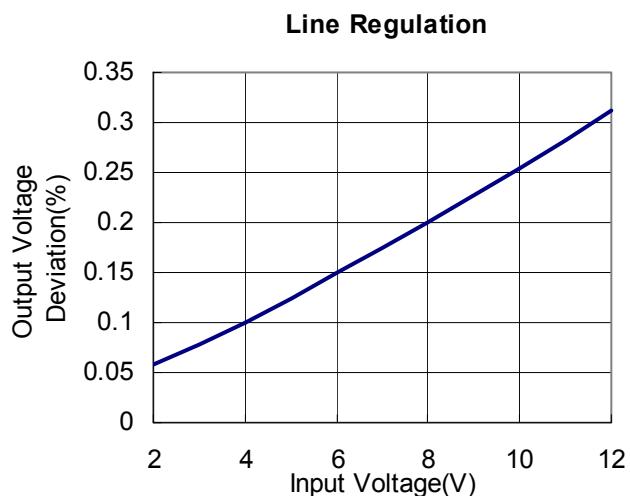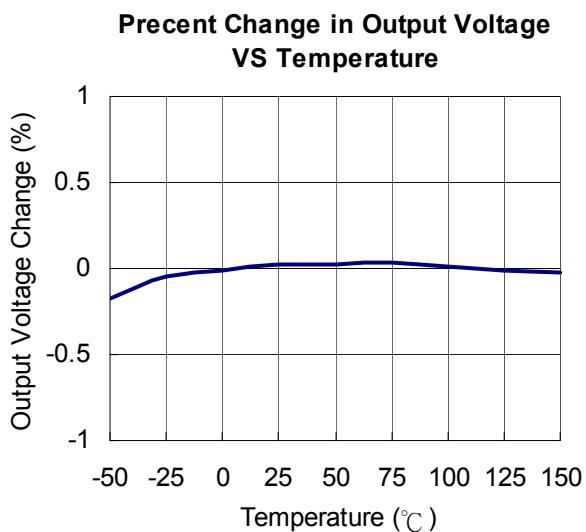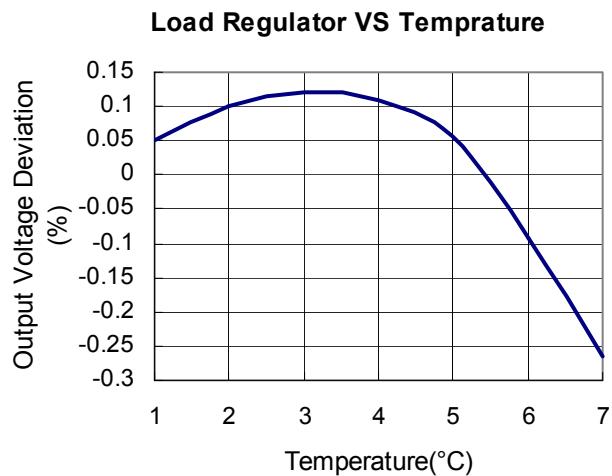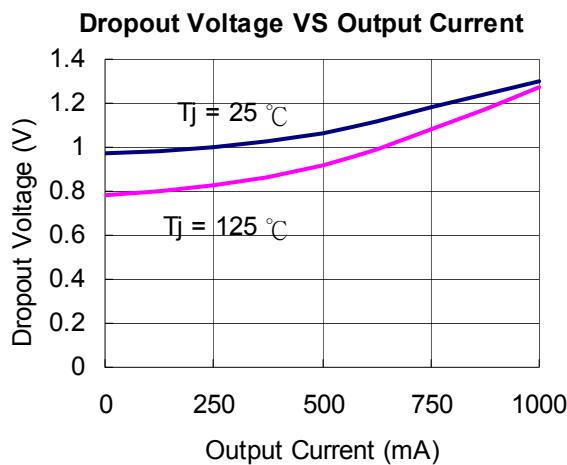
■SOT-223 PACKAGE DIMENSIONS

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.500	1.800	0.059	0.071
A1	0.030	0.090	0.001	0.004
A2	1.450	1.750	0.057	0.069
A3	0.800	1.000	0.031	0.039
b	0.690	0.780	0.027	0.031
b1	0.680	0.740	0.027	0.029
c	0.300	0.350	0.012	0.014
c1	0.290	0.310	0.011	0.012
D	0.630	6.700	0.025	0.264
D1	3.000 REF		0.118 REF	
E	6.800	7.200	0.268	0.283
E1	3.400	3.600	0.134	0.142
e	2.300 BSC		0.091 BSC	
L	0.900	-	0.035	-
L1	1.750 BSC		0.069 BSC	
θ	0°	7°	0°	7°
θ 1	37.500 REF		1.476 BSC	