GPL1117VxxAKE

1A Low Dropout Voltage Regulator

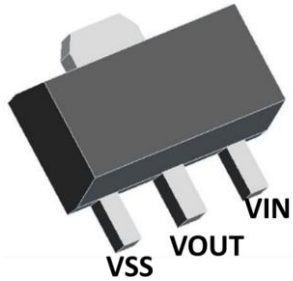
Introduction

The GPL1117A series is a series of low dropout three-terminal regulators with a dropout of 1.3V(typ.) at 1A output current.

The GPL1117A series provides current limiting and thermal shutdown. Its circuit includes a trimmed bandgap. Reference to assure output voltage accuracy to be within 2%. Current limit is trimmed to ensure specified. Output current and controlled short-circuit current. On-chip thermal shutdown provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The GPL1117A series has an adjustable version, that can provide the output voltage from 1.2V to 12V with only 2 external resistors.

SOT-89-3L



Features

- Low Dropout Voltage: 1.3V(typ.) at 1A Output Curren
- Trimmed Current Limit
- On-Chip Thermal Shutdown
- Three-Terminal Adjustable or Fixed 1.2V,1.5V,1.8V, 2.5V,2.8V, 3.3V, 5V
- Standby current: 2mA (typ.)

Applications

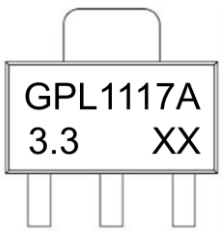
- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-Video Player
- NIC/Switch
- Telecom Modem
- ADSL Modem
- Printer and Other Peripheral Equipment

Order Information

GPL1117①②③A④

Designator	Symbol	Description
①②③	Integer	Output Voltage e.g.1.8V=①:V, ②:1,③:8 ADJ=①②③:ADJ
④	KE	Package:SOT-89-3L

Marking



GPL1117A : Product Code

3.3 :Voltage Code

XX : Data Code

Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Ratings	Units
Input Voltage	V_{IN}	20	V
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	250	°C /W
Operating Ambient Temperature Range	T_A	-40~85	°C
Operating Junction Temperature Range	T_j	-40~150	°C
Storage Temperature	T_{stg}	-40~150	°C
Lead Temperature(Soldering, 10 sec)	T_{solder}	260	°C
ESD rating	Human Body Model -(HBM)	8	kV

Note: Stresses greater than those listed under ”Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

Recommended Operating Conditions

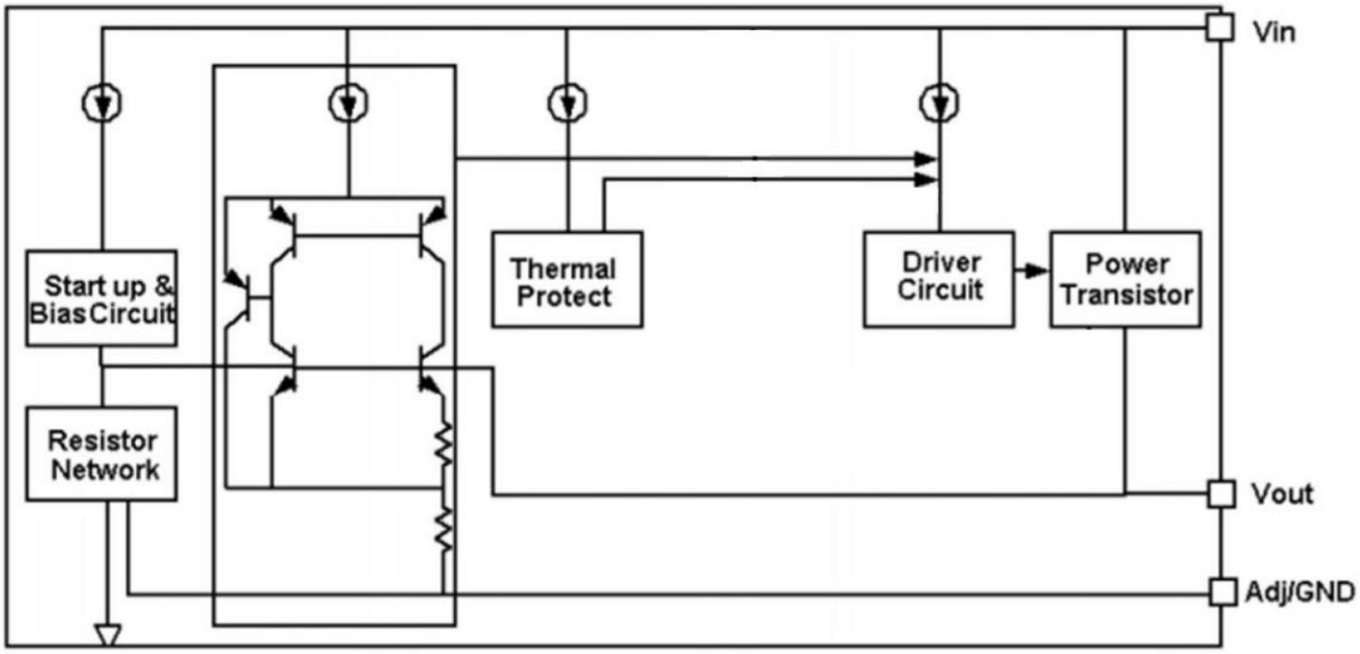
Parameter	Min.	Nom.	Max.	Units
Supply voltage at V_{IN}			15	V
Operating junction temperature range, T_j	-25		125	°C

Electrical Characteristics

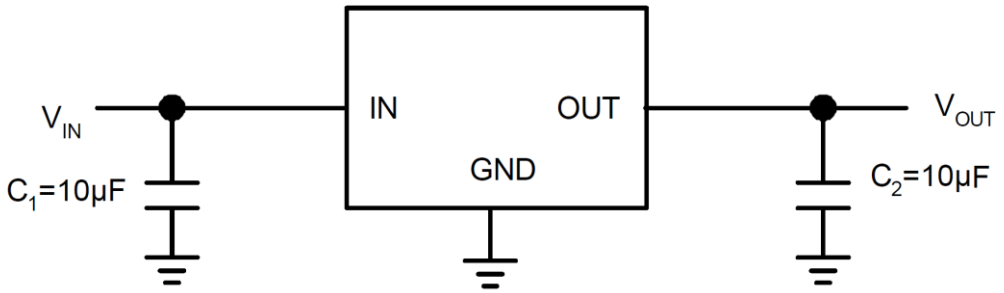
GPL1117A Series (V_{IN}≤10V, T_A=25℃, unless otherwise specified)

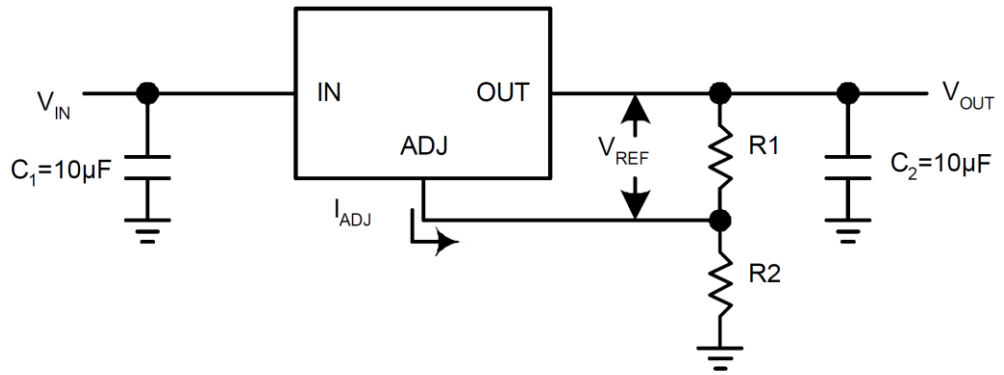
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reference Voltage	V_{IROC}	I_{OUT}=10mA, V_{IN} =3.23V(ADJ)	1.225	1.25	1.275	V
		10mA≤I_{OUT}≤1A, 2.75V≤V_{IN} -V_{OUT}≤12V(ADJ)	1.219	1.25	1.281	V
Output Voltage Range	V_{OUT}	I_{OUT}=10mA, V_{IN}=3.2V(1.2)	1.176	1.2	1.224	V
		10mA≤I_{OUT}≤1A, 2.7V≤V_{IN} ≤12V(1.2V)	1.170	1.2	1.230	
		I_{OUT}=10mA, V_{IN}=3.5V(1.5)	1.470	1.5	1.530	
		10mA≤I_{OUT}≤1A, 3.0V≤V_{IN} ≤12V(1.5V)	1.463	1.5	1.537	
		I_{OUT}=10mA, V_{IN}=3.8V(1.8)	1.764	1.8	1.836	
		10mA≤I_{OUT}≤1A, 3.3V≤V_{IN} ≤12V(1.8V)	1.755	1.8	1.845	
		I_{OUT}=10mA, V_{IN}=4.5V(2.5V)	2.450	2.5	2.550	
		10mA≤I_{OUT}≤1A, 4V≤V_{IN} ≤12V(2.5V)	2.438	2.5	2.562	
		I_{OUT}=10mA, V_{IN}=5.3V(3.3V)	3.234	3.3	3.366	
		10mA≤I_{OUT}≤1A, 4.8V≤V_{IN} ≤12V(3.3V)	3.218	3.3	3.382	
		I_{OUT}=10mA, V_{IN}=7.0V(5.0V)	4.900	5.0	5.100	
		10mA≤I_{OUT}≤1A, 6.5V≤V_{IN} ≤12V(5.0V)	4.875	5.0	5.125	
Line Regulation	LNR	I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤10.75V(ADJ)		0.03	0.2	%/V
		I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤8.8V(1.2V)		0.03	0.2	
		I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤8.5V(1.5V)		0.03	0.2	
		I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤10.2V(1.8V)		0.03	0.2	
		I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤9.5V(2.5V)		0.03	0.2	
		I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤8.7V(3.3V)		0.03	0.2	
		I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤7V(5.0V)		0.03	0.2	
Load Regulation	LDR	V_{IN}-V_{OUT}=1.5V, 10mA≤I_{OUT} ≤1A(ADJ)		2	8	mV
		V_{IN}-V_{OUT}=1.5V, 10mA≤I_{OUT} ≤1A(1.2V)		2	8	
		V_{IN}-V_{OUT}=1.5V, 10mA≤I_{OUT} ≤1A(1.5V)		2	8	
		V_{IN}-V_{OUT}=1.5V, 10mA≤I_{OUT} ≤1A(1.8V)		3	12	
		V_{IN}-V_{OUT}=1.5V, 10mA≤I_{OUT} ≤1A(2.5V)		4	16	
		V_{IN}-V_{OUT}=1.5V, 10mA≤I_{OUT} ≤1A(3.3V)		6	24	
		V_{IN}-V_{OUT}=1.5V, 10mA≤I_{OUT} ≤1A(5.0V)		9	36	
Adjust Pin Current		V_{IN}=5V,I_{OUT}=1A		55	120	μA
Dropout Voltage	V_{dif}	ΔV_{REF}=1%, I_{OUT}=1.0A		1.3	1.5	V
I_{adj} change	I_{change}	V_{IN}=5V,10mA≤I_{OUT}≤1A		0.2	10	uA
Minimum Load Current	I_L	1.5V≤V_{IN} -V_{OUT} ≤12V (ADJ only)		2	10	mA
Quiescent Current	I_q	V_{IN}=10V(1.2V)		2	5	mA
		V_{IN}=10V(1.5V)		2	5	mA
		V_{IN}=12V(1.8V)		2	5	mA
		V_{IN}=12V(2.5V)		2	5	mA
		V_{IN}=12V(3.3V)		2	5	mA
		V_{IN}=12V(5.0V)		2	5	mA
Power Supply Rejection	PSRR	f=120Hz,C_{OUT}=22μFTantalum, V_{IN}-V_{OUT}=3V, I_{OUT}=1A		60		dB

Functional Block Diagram



Typical Application Circuit

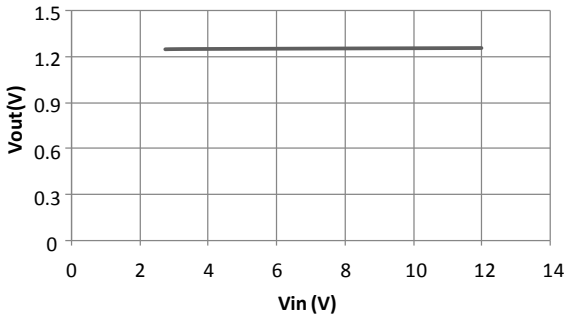




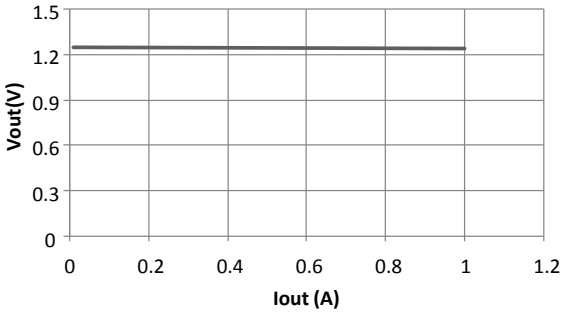
$V_{OUT} = V_{REF} \times (1 + R2/R1) + I_{ADJ} \times R2$

Typical Characteristics(T=25℃，unless otherwise noted.)

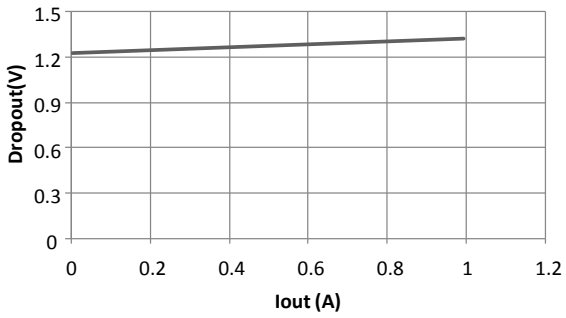
Line regulation



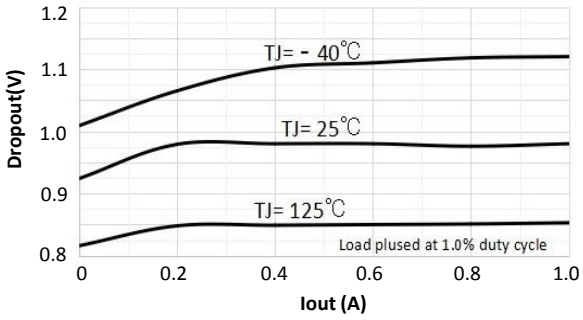
Load regulation



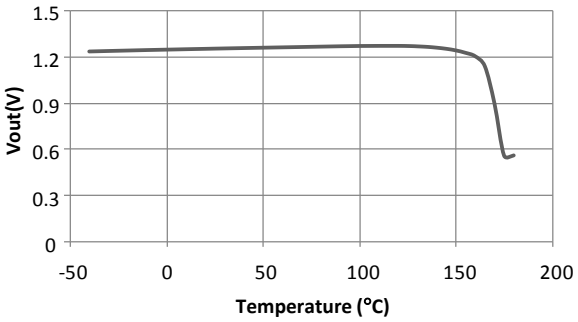
Dropout Voltage (ADJ Except)



Dropout Voltage (ADJ Only)

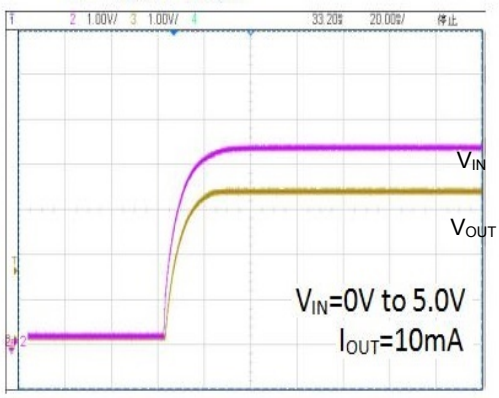


Thermal performance with OTP

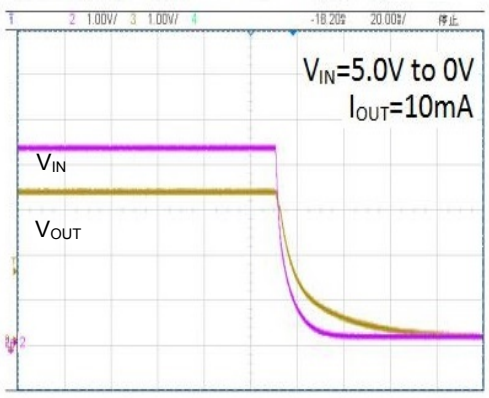


Typical Characteristics(T=25℃，unless otherwise noted.)

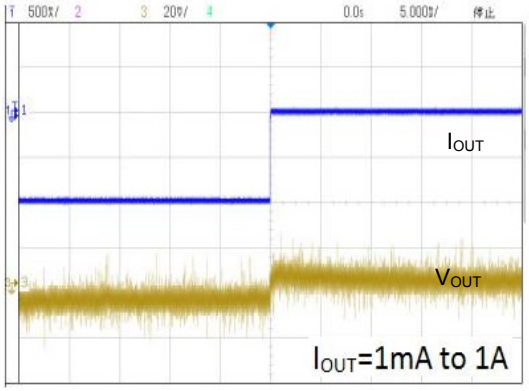
Power ON / OFF



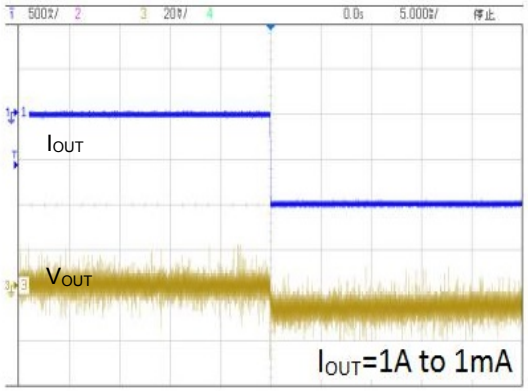
Power ON / OFF



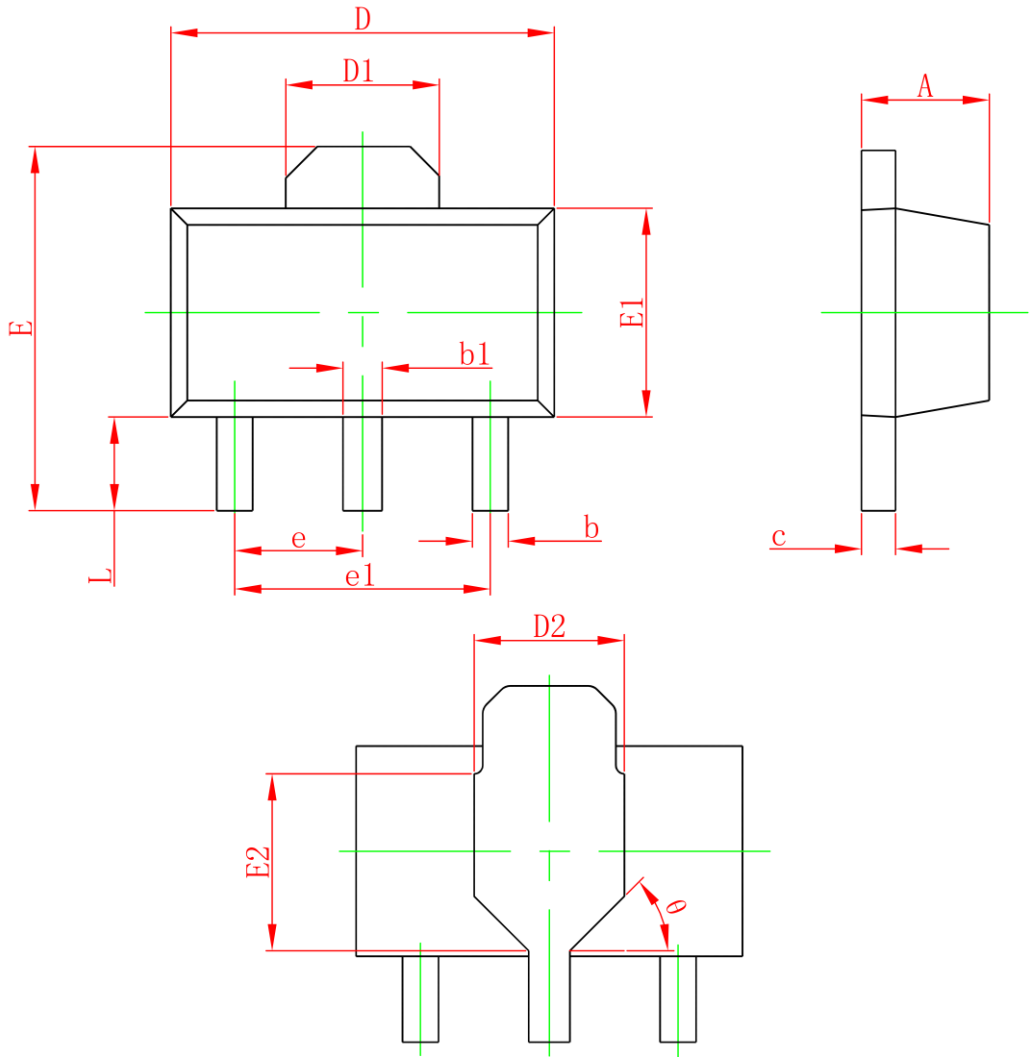
Load Transient Response



Load Transient Response



SOT-89-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.380	0.580	0.015	0.023
c	0.350	0.500	0.014	0.020
D	4.400	4.600	0.173	0.181
D1	1.650REF		0.065REF	
D2	1.650	1.850	0.065	0.073
E	3.900	4.400	0.154	0.173
E1	2.300	2.600	0.091	0.102
E2	1.900REF		0.075REF	
e	1.500TYP		0.059TYP	
e1	3.000TYP		0.118TYP	
L	0.900	1.200	0.035	0.047
θ	45°		45°	