General Description

LR1117CSxxX is a series of low dropout three-terminal regulators with a dropout of 1.1 V at 1A load current.LR1117CSxxX features a very low standby current 2mA compared to 5mA of competitor.

Other than a fixed version, Vout = 1.2V, 1.5V,1.8V,2.5V,2.85V,3.3V,and 5V.LR1117CSxxX has an adjustable version,which can provide an output voltage from 1.25 to 12V with only two external resistors.

LR1117CSxxX offers thermal shut down function, to assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within 2%. Other output voltage accuracy can be customized on demand,such as 1%.

LR1117CSxxX is available in SOT-223 package.

Features

- Output current is 1A
- Range of operation input voltage: 15V
- Line regulation: 0.03%/V (typ.)
- Standby current: 2mA (typ.)
- Load regulation: 0.2%/A (typ.)
- Environment Temperature: -40℃ ~125℃

Application

- Power Management for Computer Mother Board, Graphic Card
- LCD Monitor and LCD TV
- DVD Decode Board
- ADSL Modem
- Post Regulators for Switching Supplies

Order Information

Orderable Device	Package	Output Voltage	Packing Option
LR1117CSxxX	SOT-223	1.2V 1.5V 1.8V 2.5V 2.85V 3.3V 5.0V adj	2500/Reel

xx:12,15,18,25,285,33,50,ADJ

Pin Configuration And Descriptions

SOT-223

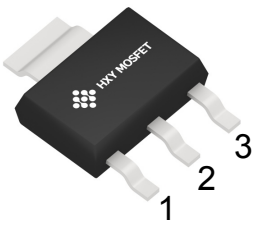


Table1: LR1117CSxxX series (SOT-223 PKG)

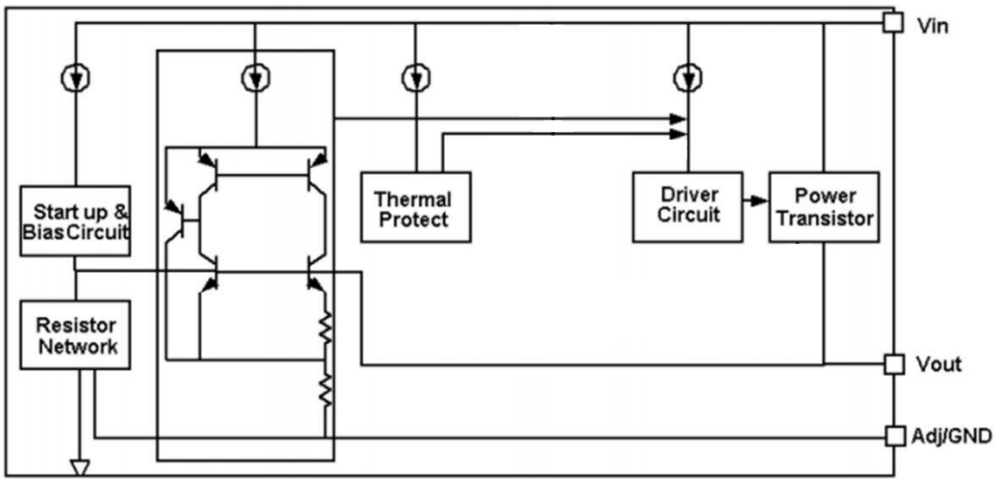
PIN NO.	PIN NAME	FUNCTION
1	VSS/ADJ	VSS/ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin
4	VOUT	Output voltage pin

Absolute Maximum Ratings

Description	Symbol	Value Range	Unit
MAX Input Voltage	V_{IN}	18	V
Max Operating Junction Temperature	T_j	150	°C
Storage Temperature	T_S	-55～+150	°C
Lead Temperature & Time(10S)		260	°C

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

Block Diagram



DC Characteristics (unless otherwise noted T_A= 25°C)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Vin	Input voltage		--	15	18	V
Vref	Reference voltage	LR1117CSADJX 10mA≤Iout≤1A , Vin=2.55V	1.225	1.25	1.275	V
Vout	Output voltage	LR1117CS12X 0≤Iout≤1A , Vin=2.5V	1.176	1.2	1.224	V
		LR1117CS15X 0≤Iout≤1A , Vin=2.8V	1.47	1.5	1.53	V
		LR1117CS18X 0≤Iout≤1A , Vin=3.1V	1.764	1.8	1.836	V
		LR1117CS25X 0≤Iout≤1A , Vin=3.8V	2.45	2.5	2.55	V
		LR1117CS285X 0≤Iout≤1A , Vin=4.15V	2.793	2.85	2.907	V
		LR1117CS33X 0≤Iout≤1A , Vin=4.6V	3.234	3.3	3.366	V
		LR1117CS50X 0≤Iout≤1A , Vin=6.3V	4.9	5	5.1	V
△Vout	Line regulation	LR1117CS12X Iout=10mA, 2.5V≤Vin≤10V		4	19	mV
		LR1117CS15X Iout=10mA, 2.8V≤Vin≤10V		5	26	mV
		LR1117CSADJX Iout=10mA, 2.55V≤Vin≤12V		5	24	mV
		LR1117CS18X Iout=10mA, 3.1V≤Vin≤12V		5	32	mV
		LR1117CS25X Iout=10mA, 3.8V≤Vin≤12V		8	41	mV
		LR1117CS285X Iout=10mA, 4.15V≤Vin≤12V		8	46	mV
		LR1117CS33X Iout=10mA, 4.6V≤Vin≤12V		9	49	mV
		LR1117CS50X Iout=10mA, 6.3V≤Vin≤12V		10	56	mV

△Vout	Load regulation	LR1117CS12X Vin =2.5V, 10mA≤Iout≤1A		10	40	mV
		LR1117CS15X Vin =2.8V, 10mA≤Iout≤1A		10	40	mV
		LR1117CSADJX Vin =2.55V, 10mA≤Iout≤1A		10	40	mV
		LR1117CS18X Vin =3.1V, 10mA≤Iout≤1A		10	40	mV
		LR1117CS25X Vin =2.8V, 10mA≤Iout≤1A		10	40	mV
		LR1117CS285X Vin =4.15V, 10mA≤Iout≤1A		10	40	mV
		LR1117CS33X Vin =4.6V, 10mA≤Iout≤1A		10	40	mV
		LR1117CS50X Vin =6.3V, 10mA≤Iout≤1A		10	40	mV
Vdrop	Dropout voltage	Iout =100mA		1.05	1.2	V
		Iout=1A		1.1	1.3	V
Imin	Minimum load current	LR1117CSADJX		2	10	mA
Iq	Quiescent Current	LR1117CS12X, Vin=10V		2	5	mA
		LR1117CS15X, Vin=10V		2	5	mA
		LR1117CS18X, Vin=12V		2	5	mA
		LR1117CS25X, Vin=12V		2	5	mA
		LR1117CS285X, Vin=12V		2	5	mA
		LR1117CS33X, Vin=12V		2	5	mA
		LR1117CS50X, Vin=12V		2	5	mA
Iadj	Adjust pin current	LR1117CSADJX Vin=5V,10mA≤Iout≤1A		55	120	uA
Ichange	Iadj change	LR1117CSADJX Vin=5V,10mA≤Iout≤1A		0.2	10	uA
Δ Vout	Temperature coefficient	Vin=4.5V, Iout=10mA VOUT=3.3V 20℃≤Ta≤120℃		30		mV
θ_{JC}	Thermal resistance	SOT-223		20		℃/W

Note1: All test are conducted under ambient temperature 25°C and within a short period of time 20ms.

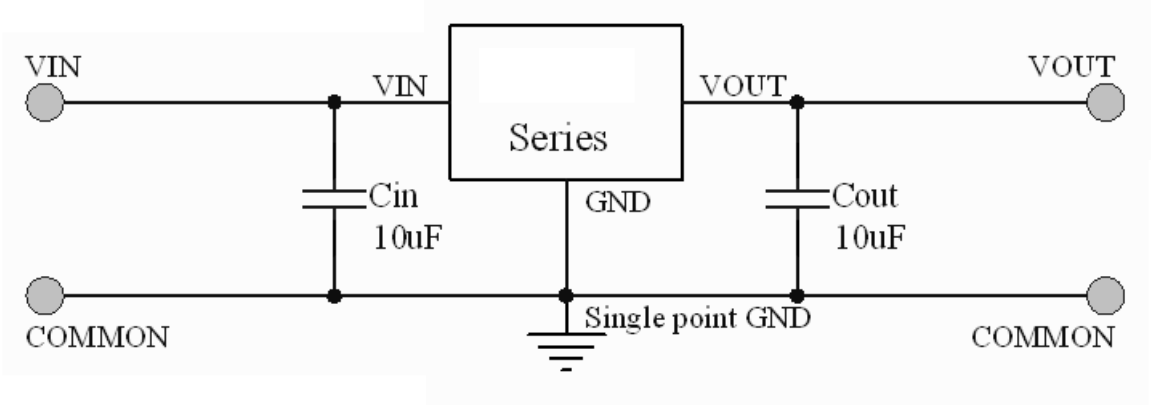
Note2: Load current smaller than minimum load current of LR1117CSADJX will lead to unstable or oscillation output.

Application Circuit

Basic Circuits

LR1117CSxxX has an adjustable version and six fixed versions (1.2V, 1.5V,1.8V, 2.5V, 2.85V, 3.3V and 5V)

Fixed Output Voltage Version



Application circuit of LR1117CSxxX fixed version

1) Recommend using 10uF tan capacitor as bypass capacitor (C1) for all application circuit.
2) Recommend using 10uF tan capacitor to assure circuit stability.

Function Description

LR1117CSxxX is a series of low dropout voltage, three terminal regulators. Its application circuit is very simple: the fixed version only needs two capacitors and the adjustable version only needs two resistors and two capacitors to work. It is composed of some modules including start-up circuit, bias circuit, bandgap, thermal shutdown, power transistors and its driver circuit and so on.

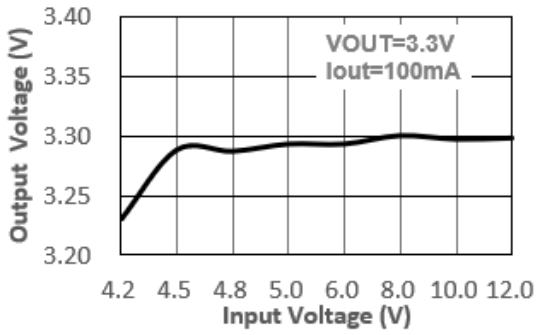
The thermal shut down modules can assure chip and its application system working safety when the temperature is larger than 200°C.

The bandgap module provides stable reference voltage, whose temperature coefficient is compensated by careful design considerations. The temperature coefficient is under 100 ppm/°C. And the accuracy of output voltage is guaranteed by trimming technique.

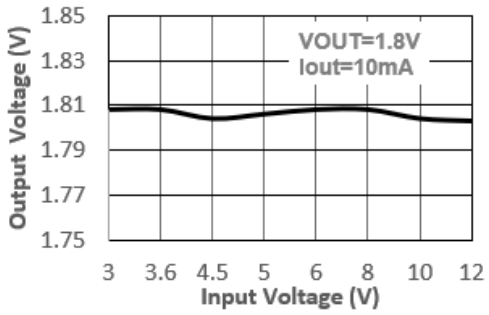
Typical Characteristics

T_A=25℃, unless otherwise noted

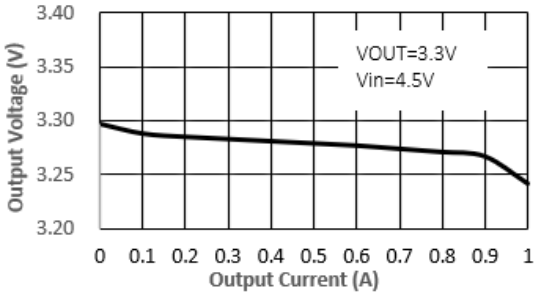
Output Voltage vs. Input Voltage (VOUT=3.3V)



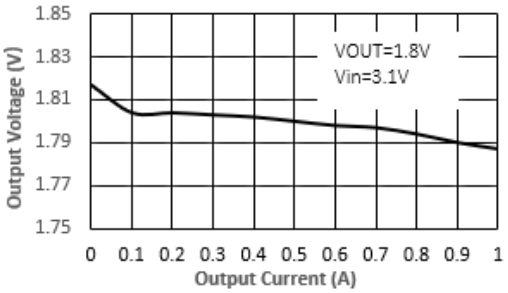
Output Voltage vs. Input Voltage (VOUT=1.8V)



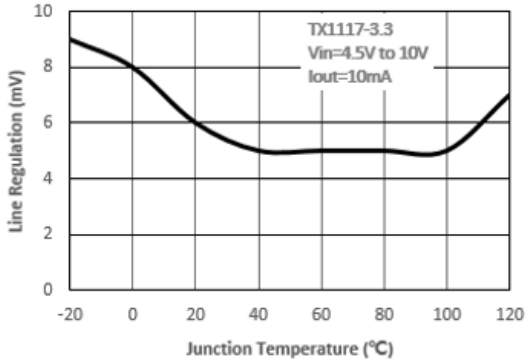
Output Voltage vs. Output Current (VOUT=3.3V)



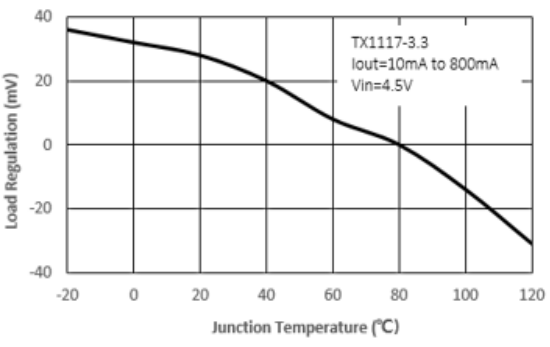
Output Voltage vs. Output Current (VOUT=1.8V)



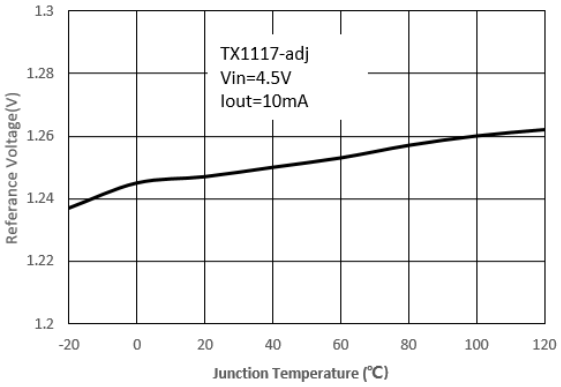
Line Regulation vs. Junction Temperature



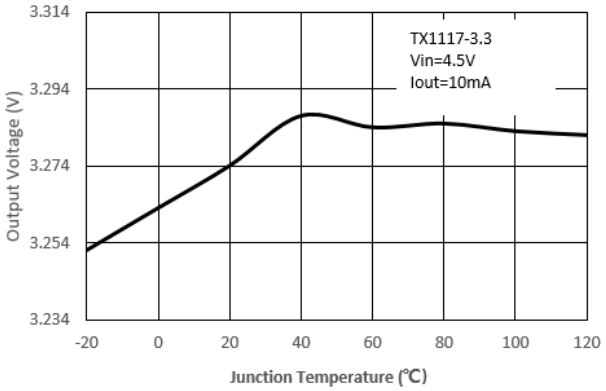
Load Regulation vs. Junction Temperature



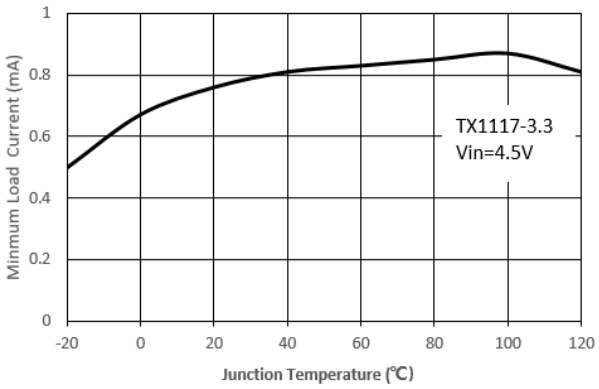
Reference Voltage vs. Junction Temperature



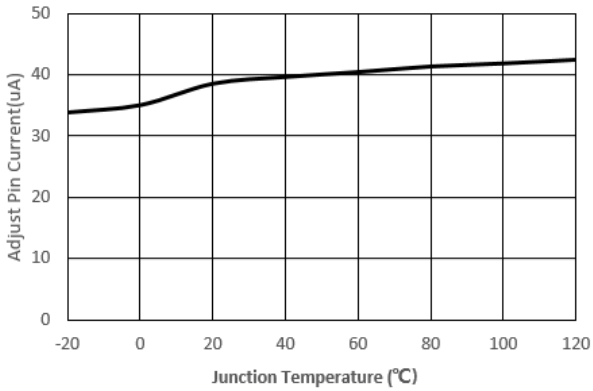
Output Voltage vs. Junction Temperature



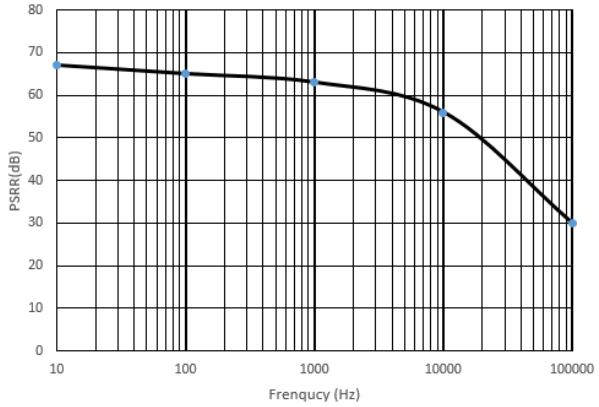
Minimum Load Current vs. Junction Temperature



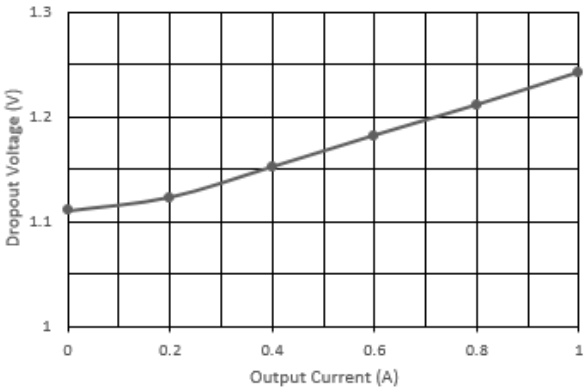
Adjust Pin Current vs. Junction Temperature



PSRR vs. Frequency

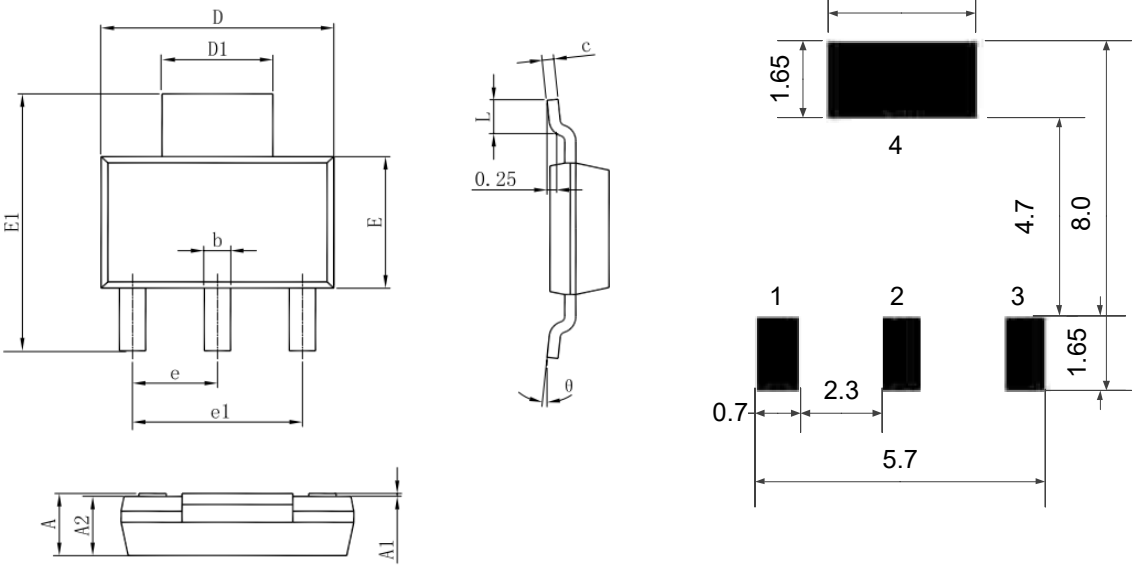


Dropout Voltage vs. Ouput Current



Package Outline Dimensions

SOT-223



PCB Board

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.400	6.600	0.252	0.260
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300(BSC)		0.091(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°

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