ZHEJIANG UNIU-NE Technology CO.,LTD

浙 江 宇 力 微 新 能 源 科 技 有 限 公 司

U1117 Data Sheet

V 1.1

版权归浙江宇力微新能源科技有限公司

Features

- Maximum output current is 1.1A
- Range of operation input voltage: Max 18V
- Line regulation: 0.03%/V (typ.)
- Standby current: 1.8mA (typ.)
- Load regulation: 0.2%/A (typ.)
- Environment Temperature: -20℃~85℃

Applications

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

General Description

U1117 is a series of low dropout three-terminal regulators with a dropout of 1.3V at 1A load current. U1117 features a very low standby current 1.8mA compared to 5mA of competitor.

Other than a fixed version, Vout = 1.2V, 1.8V, 2.5V, 2.85V, 3.3V, and 5V, U11117 has an adjustable version, which can provide an output voltage from 1.25 to 12V with only two external resistors.

U1117 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%.
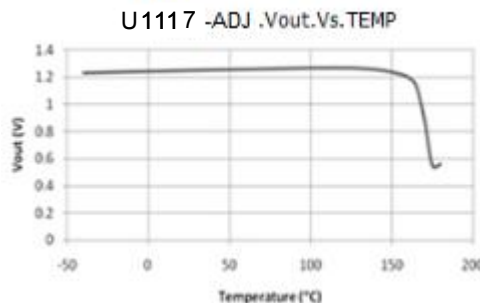
U1117 is available in SOT89 power package.

Typical Application
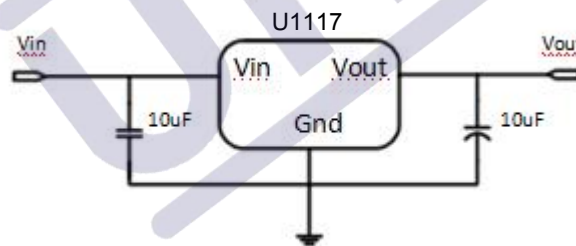
Application circuit of U1117 fixed version
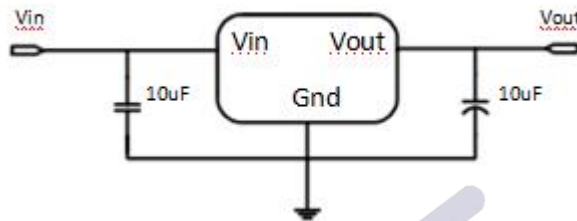
Typical Electrical Characteristic

Ordering Information

Marking	Designator	Description
7110 XX XXXX	7110	Product code
	XX	Output Voltage 3.3V/5.0V /ADJ
	XXXX	LOT

Note:"XX" stands for output voltages. "XX" stands for LOT.

Typical Application

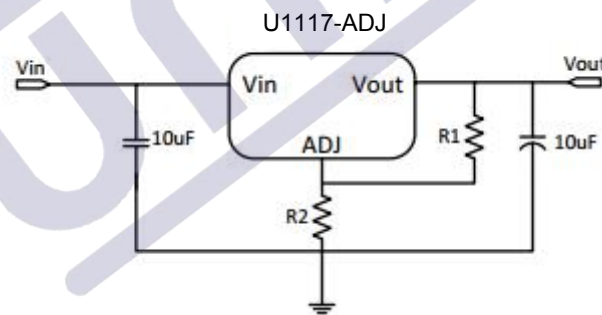U1117 has an adjustable version and six fixed versions (1.2V, 1.8V, 2.5V, 2.85V , 3.3V and 5V)

Fixed Output Voltage Version

Application circuit of U1117 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.

### Adjustable Output Voltage Version

Application Circuit of U1117-ADJ

The output voltage of adjustable version follows the equation: $Vout=1.25\times(1+R2/R1)+IAdj\times R2$. We can ignore IAdj because IAdj (about 50uA) is much less than the current of R1 (about 2~10mA).

1) To meet the minimum load current (>10mA) requirement, R1 is recommended to be 125ohm or lower. As U1117-ADJ can keep itself stable at load current about 2mA, R1 is not allowed to be higher than 625ohm.

2) Using a bypass capacitor (CADJ) between the ADJ pin and ground can improve ripple rejection. This bypass capacitor prevents ripple from being amplified as the output voltage is increased. The impedance of CADJ should be less than R1 to prevent ripple from being amplified. As R1 is normally in the range of 100Ω~500Ω, the value of CADJ should satisfy this equation: $1/(2\pi\times fripple\times CADJ)<R1$

Block Diagram

Pin Configuration

SOT89 (Top view)

| 1 | 2 | 3 |
| GND | VOUT | VIN |
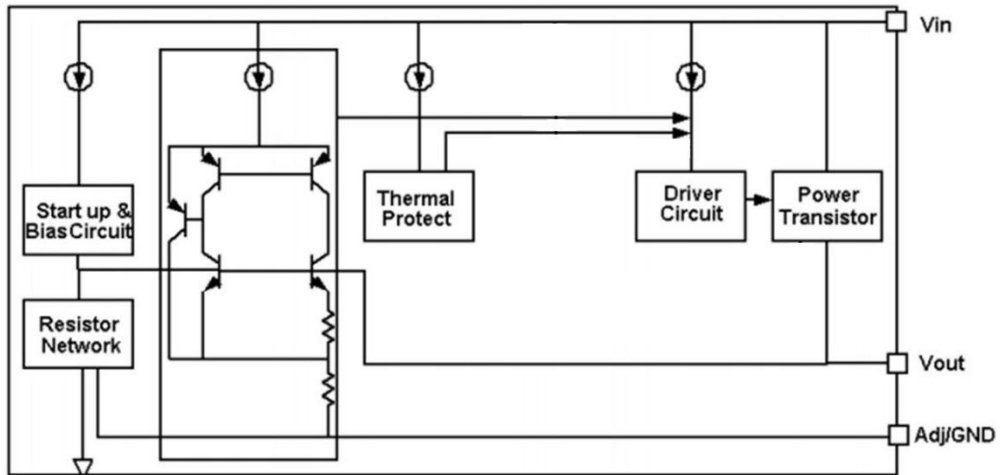
GND   VOUT   VIN
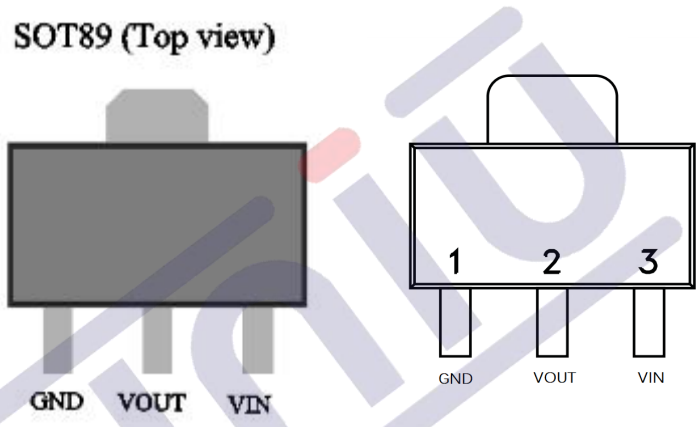
Absolute Maximum Ratings

Max Input Voltage·· 18V

Max Operating Junction Temperature(Tj)·· 150℃

Ambient Temperature(Ta)··-40℃~ 85℃

Storage Temperature(Ts)·· -40℃~150℃

Lead Temperature & Time···260℃ 10S

Caution: Exceed these limits to damage to the device. Exposure to absolute maximum rating conditions may affect device reliability.

Recommended Work Conditions

Recommended maximum input voltage·· 15V

Recommended operating junction temperature(Tj)·································· -20~125℃

Thermal Information

Symbol	Parameter	Package	Max.	Unit
θ JA	Thermal Resistance (Junction to Ambient) (Assume no ambient airflow, no heat sink)	SOT89	200	℃/W
P_D	Power Dissipation	SOT89	0.50	W

Electrical Characteristics

T$_A$=25℃，unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Vref	Reference voltage	U1117-Adj 10mA≤Iout≤1A , Vin=3.25V	1.225	1.25	1.275	V
Vout	Output voltage	U1117-1.2V 0≤Iout≤1A , Vin=3.2V	1.176	1.2	1.224	V
		U1117-1.8V 0≤Iout≤1A , Vin=3.8V	1.764	1.8	1.836	V
		U1117-2.5V 0≤Iout≤1A , Vin=4.5V	2.45	2.5	2.55	V
		U1117-2.85V 0≤Iout≤1A , Vin=4.85V	2.793	2.85	2.907	V
		U1117-3.3V 0≤Iout≤1A , Vin=5.3V	3.234	3.3	3.366	V
		U1117-5.0V 0≤Iout≤1A , Vin=7.0V	4.9	5	5.1	V

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
△Vout	Line regulation	U1117-1.2V Iout=10mA, 2.7V≤Vin≤10V		0.03	0.2	%/V
		U1117-ADJ Iout=10mA, 2.75V≤Vin≤12V		0.03	0.2	%/V
		U1117-1.8V Iout=10mA, 3.3V≤Vin≤12V		0.03	0.2	%/V
		U1117-2.5V Iout=10mA, 4.0V≤Vin≤12V		0.03	0.2	%/V
		U1117-2.85V Iout=10mA, 4.35V≤Vin≤12V		0.03	0.2	%/V
		U1117-3.3V Iout=10mA, 4.8V≤Vin≤12V		0.03	0.2	%/V
		U1117-5.0V Iout=10mA, 6.5V≤Vin≤12V		0.03	0.2	%/V

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		U1117-1.2V Vin =2.7V, 10mA≤Iout≤1A		2	8	mV
		U1117-ADJ Vin =2.75V, 10mA≤Iout≤1A		2	8	mV
		U1117-1.8V Vin =3.3V, 10mA≤Iout≤1A		3	12	mV

△Vout	Load regulation	U1117-2.5V Vin =4.0V, 10mA≤Iout≤1A		4	16	mV
		U1117-2.85V Vin =4.35V, 10mA≤Iout≤1A		5	20	mV
		U1117-3.3 Vin =4.8V, 10mA≤Iout≤1A		6	24	mV
		U1117-5.0 Vin =6.5V, 10mA≤Iout≤1A		9	36	mV
Vdrop	Dropout voltage	Iout =100mA		1.15	1.3	V
		Iout=1A		1.3	1.5	V
Imin	Minimum load current	U1117-ADJ		1.8	10	mA
Iq	Quiescent Current	U1117-1.2V,Vin=10V		1.8	5	mA
		U1117-1.8V,Vin=12V		1.8	5	mA
		U1117-2.5V,Vin=12V		1.8	5	mA
		U1117-2.85V,Vin=12V		1.8	5	mA
		U1117-3.3V,Vin=12V		1.8	5	mA
		U1117-5.0V,Vin=12V		1.8	5	mA
IAdj	Adjust pin current	U1117-ADJ Vin=5V,10mA≤Iout≤1A		55	120	uA
Ichange	Iadj change	U1117-ADJ Vin=5V,10mA≤Iout≤1A		0.2	10	uA
ΔV/ΔT	Temperature coefficien			±100		ppm

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 U1117-ADJ will lead to unstable or oscillation output.

Detailed Description

U1117 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 junction temperature is larger than 140°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.

Thermal Considerations

We have to take heat dissipation into great consideration when output current or differential voltage of input and output voltage is large. Because in such cases, the power dissipation consumed by U1117 is very large. U1117 series uses SOT-89 package type and its thermal resistance is about 20°C/W. And the copper area of application board can affect the total thermal resistance. If copper area is 5cm*5cm (two sides), the resistance is about 30°C/W. So the total thermal resistance is about 20°C/W + 30°C/W. We can decrease total thermal resistance by increasing copper area in application board. When there is no good heat dissipation copper are in PCB, the total thermal resistance will be as high as 120°C/W, then the power dissipation of U1117 could allow on itself is less than 1W. And furthermore, U1117 will work at junction temperature higher than 125°C under such condition and no lifetime is guaranteed.
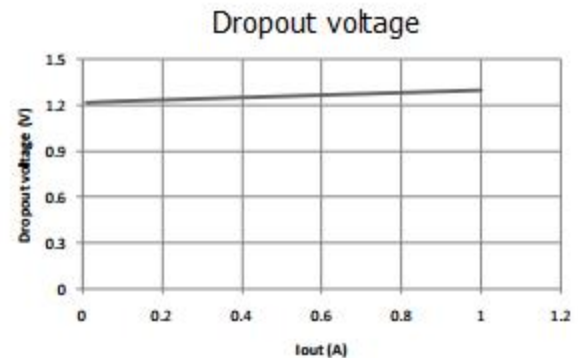
Typical Performance Characteristics
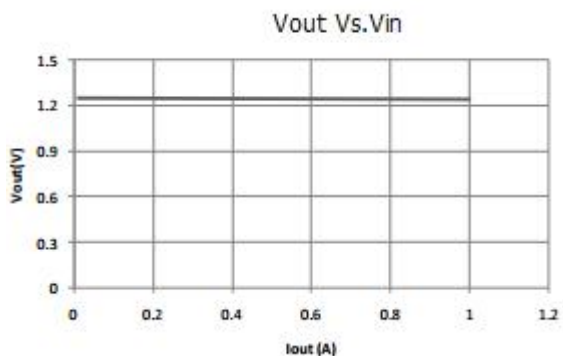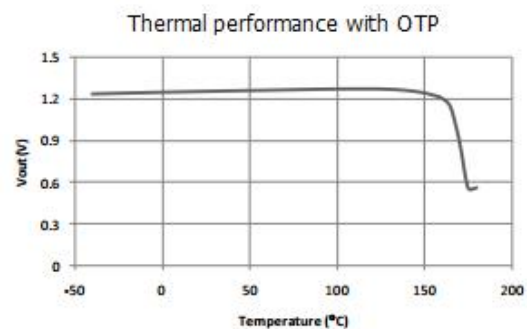
T_A=25℃，unless otherwise noted.

Line regulation
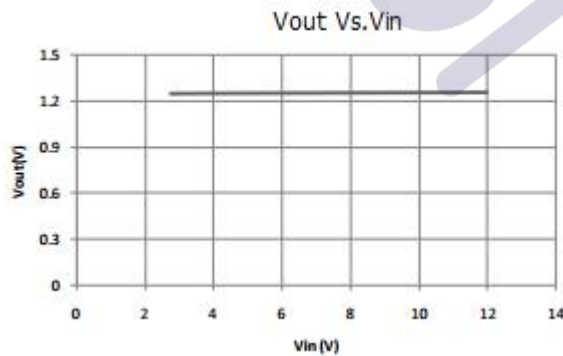
Dropout voltage
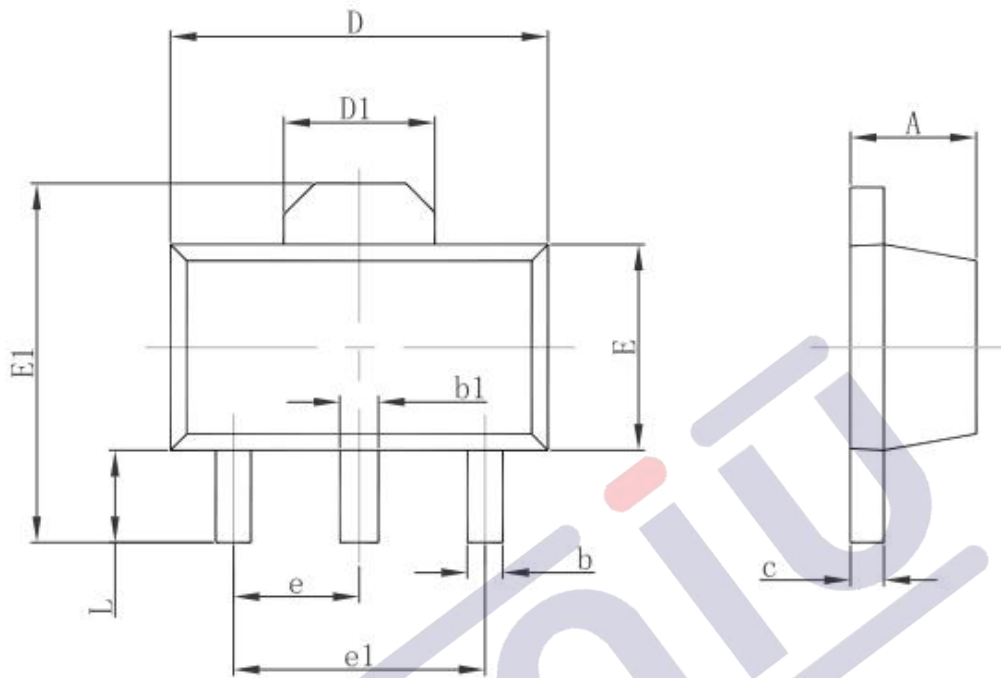

Load regulation

Thermal performance with OTP

Package Information
3-pin SOT89 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	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

1.版本记录

DATE	REV.	DESCRIPTION
2018/04/19	1.0	First Release
2021/12/11	1.1	Layout adjustment

2.免责声明

浙江宇力微新能源科技有限公司保留对本文档的更改和解释权力，不另行通知！客户

我司 新版本 ，并验证 新和 。量产方案需使用方自行验证并自担所有批量风险责任。未经我司授权，该文件不得私自复制和修改。产品不断提升，以追求高品质、稳定性强、可靠性高、环保、节能、高效为目标，我司将竭诚为客户提供性价比高的系统开发方案、技术支持等更优秀的服务。

版权所有 浙江宇力微新能源科技有限公司/绍兴宇力半导体有限公司

3.联系我们

浙江宇力微新能源科技有限公司

总部地址：绍兴市越城区斗门街道袍渎路25号中节能科创园45幢4/5楼

电话：0575-85087896（研发部）

传真：0575-88125157

E-mail: htw@uni-semic.com

无锡地址:江　　无锡市锡　区　　中路6号中　电　（无锡）　　城1#　　楼503

电　话：0510-85297939

E-mail: zh@uni-semic.com

深圳地址:深圳市宝安区西乡街道　　区宝源路　　　务大　410

电　话：0755-84510976

E-mail: htw@uni-semic.com