

Features

- Maximum output current is 1.2A
- Range of operation input voltage: Max 15V
- Line regulation: 0.03%/V (typ.)

Applications

- Power Management for Computer Mother Board, Graphic Card
- LCD Monitor and LCD TV

- Standby current: 2mA (typ.)
- Load regulation: 0.2%/A (typ.)
- Environment Temperature: -20°C~85°C
- DVD Decode Board
- ADSL Modem
- Post Regulators For Switching Supplies

General Description

AMS1117 is a series of low dropout three-terminal regulators with a dropout of 1.3V at 800mA load current. AMS1117 features a very low standby current 2mA compared to 5mA of competitor.

Other than a fixed version, Vout = 1.2V, 1.8V, 2.5V, 2.85V, 3.3V, and 5V, AMS1117 has an adjustable version, which can provide an output voltage from 1.25 to 12V with only two external resistors.

AMS1117 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%

AMS1117 Series is available in SOT-223 power package.

Typical Application



Application circuit of AMS1117 fixed version

Typical Electrical Characteristic





Selection Table

Marking	Part No.	Output Voltage	Package
	XX=12	1.2V	
	XX=18	1.8V	
AMS1117	XX=28	2.85V	
XX YYWW	XX=25	2.5V	SOT-223
	XX=33	3.3V	
	XX=50	5.0V	
	XX=AD	Adj	

Ordering Information

Marking	Designator	Description
AMS1117	AMS1117	Product code
XX YYWW	XX	Output Voltage(1.2~12.0V)
	YYWW	DATE CODE

Note: "XX" stands for output voltages. Other voltages can be specially customized

Parameters	eters Description	
Temperature & Rohs	C:-40∼85℃, Pb Free Rohs Std.	
Package type	L:SOT-223	
Packing type:	TR: Tape & Reel (Standard)	
Voltage accuracy	2%(Customized)	

Block Diagram





Pin Configuration



Absolute Maximum Ratings

Max Input Voltage ····································
Max Operating Junction Temperature(Tj) ······
Ambient Temperature(Ta) ····································
Storage Temperature(Ts)
Lead Temperature & Time ····································
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

Parameter	Package	Rating	Unit
Package thermal resistance	SOT-223	20	°C/W



Electrical Characteristics TA=25°C, unless otherwise noted.

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Vref	Reference	ADJ	1.225	1.25	1.275	V
	voltage	10mA \leqslant lout \leqslant 800mA , Vin=3.25V				
		1.2V	1.176	1.2	1.224	V
		0≤lout≤800mA , Vin=3.2V				
		1.8V	1.764	1.8	1.836	V
		0≤lout≤800mA , Vin=3.8V				
		2.5V	2.45	2.5	2.55	V
Vout	Output voltage	0≤lout≤800mA , Vin=4.5V				
		2.85V	2.793	2.85	2.907	V
		0≤lout≤800mA , Vin=4.85V				
		3.3V	3.234	3.3	3.366	V
		0≤lout≤800mA , Vin=5.3V				
		5.0V	4.9	5	5.1	V
		0≤lout≤800mA , Vin=7.0V				

		1.2V	0.03	0.2	%/V
		lout=10mA, 2.7V≪Vin≪10V			
		ADJ	0.03	0.2	%/V
		lout=10mA, 2.75V≪Vin≪12V			
		1.8V	0.03	0.2	%/V
		lout=10mA, 3.3V≤Vin≤12V			
riangleVout	Line	2.5V	0.03	0.2	%/V
	regulation	lout=10mA, 4.0V≤Vin≤12V			
		2.85V	0.03	0.2	%/V
		lout=10mA, 4.35V≪Vin≪12V			
		3.3V	0.03	0.2	%/V
		lout=10mA, 4.8V≪Vin≪12V			
		5.0V	0.03	0.2	%/V
		lout=10mA, 6.5V≪Vin≪12V			

		1.2V	2	8	mV
		Vin =2.7V, 10mA≤lout≤800mA			
		ADJ	2	8	mV
∆ \/out	Load	Vin =2.75V, 10mA≤lout≤800mA			
∆Vout	regulation	1.8V	3	12	mV
		Vin =3.3V, 10mA≤lout≤800mA			
		2.5V	4	16	mV
		Vin =4.0V, 10mA≤lout≤800mA			



800mA Bipolar Linear Regulator

		2.85V	5	20	mV
		Vin =4.35V, 10mA≤lout≤800mA			
<u></u>	Load	3.3V	6	24	mV
riangleVout	regulation	Vin =4.8V, 10mA≤lout≤800mA			
		5.0V	9	36	mV
		Vin =6.5V, 10mA≤lout≤800mA			
Vdrop	Dropout voltage	lout =100mA	1.2	1.3	V
		lout=800mA	1.3	1.5	V
	Minimum load			10	
Imin	current	ADJ	2	10	mA
		1.2V,Vin=10V	2	5	mA
		1.8V,Vin=12V	2	5	mA
lq	Quiescent	2.5V,Vin=12V	2	5	mA
	Current	2.85V,Vin=12V	2	5	mA
		3.3V,Vin=12V	2	5	mA
		5.0V,Vin=12V	2	5	mA
IAdj	Adjust pin	ADJ	55	120	uA
	current	Vin=5V,10mA≤Iout≤800mA			
Ichange	ladj change	ADJ	0.2	10	uA
		Vin=5V,10mA≤lout≤800mA			
Δ V/ Δ T	Temperature		±100		ppm
	coefficien				
0	Thermal	SOT 222	20		°C AA(
θ ၂၄	resistance	SOT-223	20		CW

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 AMS1117-ADJ will lead to unstable or oscillation output.



Detailed Description

AMS1117 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.

Typical Application

AMS1117 Series 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 AMS1117 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 AMS1117-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 AMS1117-ADJ can keep itself stable at load current about 2mA, R1 is not allowed to be higher than 625ohm.

2) Using a bypass capacitor (C_{ADJ}) 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 C_{ADJ} should be less than R1 to prevent ripple from being amplified. As R1 is normally in the range of 100Ω ~500 Ω , the value of C_{ADJ} should satisfy this equation: $1/(2\pi \times f_{ripple} \times C_{ADJ})$ <R1.



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 AMS1117 is very large. AMS1117 Series uses SOT-223 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. 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 AMS1117 could allow on itself is less than 1W. And furthermore, AMS1117 Series will work at junction temperature higher than 125°C under such condition and no lifetime is guaranteed.

Typical Performance Charcteristics

TA=25°C, unless otherwise noted.

Line regulation



Dropout voltage



Load regulation



Thermal performance with OTP





800mA Bipolar Linear Regulator

Package Information

SOT-223 PACKAGE OUTLINE DIMENSIONS







0	Dimensions In	Millimeters	Dimensions	In Inches
Symbol	Min	Max	Min	Max
Α	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	6.200	6.400	0.244	0.252
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
е	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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