

1A Bipolar Linear Regulator

DESCRIPTION

The AMS1117 is a series of low dropout three-terminal regulators with a dropout of 1.8 V at 1 A load current. AMS1117 features a very low standby current 5 mA compared to 10 mA of competitor. Other than a fixed version, $V_{OUT} = 3.3\text{ V}$ and 5.0 V, AMS1117 has an adjustable version, which can provide an output voltage from 1.25 V to 12 V with only two external resistors.

The 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 is available in SOT-223 and SOT89-3 packages.

FEATURES

- Maximum output current is 1 A
- Range of operation input voltage: Max 18 V
- Available Fixed Output Voltages: 3.3 V, 5.0 V
- Adjustable Output Voltage Range: 1.25 V ~ 12 V
- Standby current: 5 mA (typ.)
- Line regulation: 0.03%/V (typ.)
- Load regulation: 0.2%/A (typ.)
- Environment Temperature: -40°C ~ 85°C
- Package: SOT-223, SOT89-3

APPLICATIONS

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

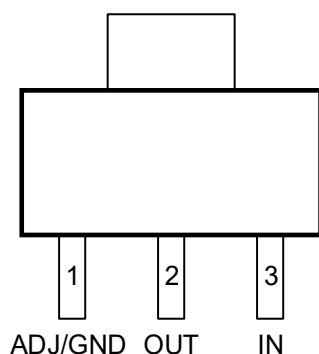
ORDER INFORMATION

Model	Package	Ordering Number	Packing Option
AMS1117	SOT-223	AMS1117-XXKD	Tape and Reel, 2500
	SOT-223	AMS1117-ADJKD	
	SOT89-3	AMS1117-XXP	Tape and Reel, 1000
	SOT89-3	AMS1117-ADJP	

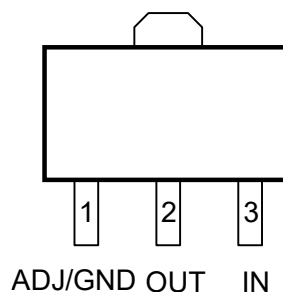
* XX: When expressed as 33, the output voltage is 3.3 V;

ADJ = Output adjustable

PIN CONFIGURATION (TOP VIEW)



SOT-223



SOT89-3

PIN DESCRIPTIONS

Pin	Symbol	Description
SOT-223 / SOT89-3		
1	ADJ / GND	Adjustable Pin / Ground Pin
2	OUT	Supply Voltage Input
3	IN	Output Voltage

RECOMMENDED WORK CONDITIONS

Parameter	Value
Input Voltage Range	Max. 18V
Operating Junction Temperature(Tj)	-40°C ~ 85°C

ABSOLUTE MAXIMUM RATING⁽¹⁾

Parameter		Value
Max Input Voltage		18 V
Junction Temperature(Tj)		150°C
Ambient Temperature(Ta)		-40°C ~ 85°C
Junction to Ambient Thermal Resistance (θ_{JA}) ⁽²⁾	SOT-223	70°C/ W
	SOT89-3	135°C/ W
Storage Temperature(Ts)		-40°C ~ 150°C
Lead Temperature & Time		260°C, 10 S

NOTES:

- (1) Stresses beyond those listed under “ABSOLUTE MAXIMUM RATINGS” may 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 in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.
- (2) This particular frame decreases the total thermal resistance of the package and increases its ability to dissipate power when an appropriate area of copper on the printed circuit board is available for heat-sinking.

CAUTION

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SUMSEMI recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications. SUMSEMI reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time. Please contact SUMSEMI sales office to get the latest datasheet.

ELECTRICAL CHARACTERISTICS

 $T_J = 25^{\circ}\text{C}$

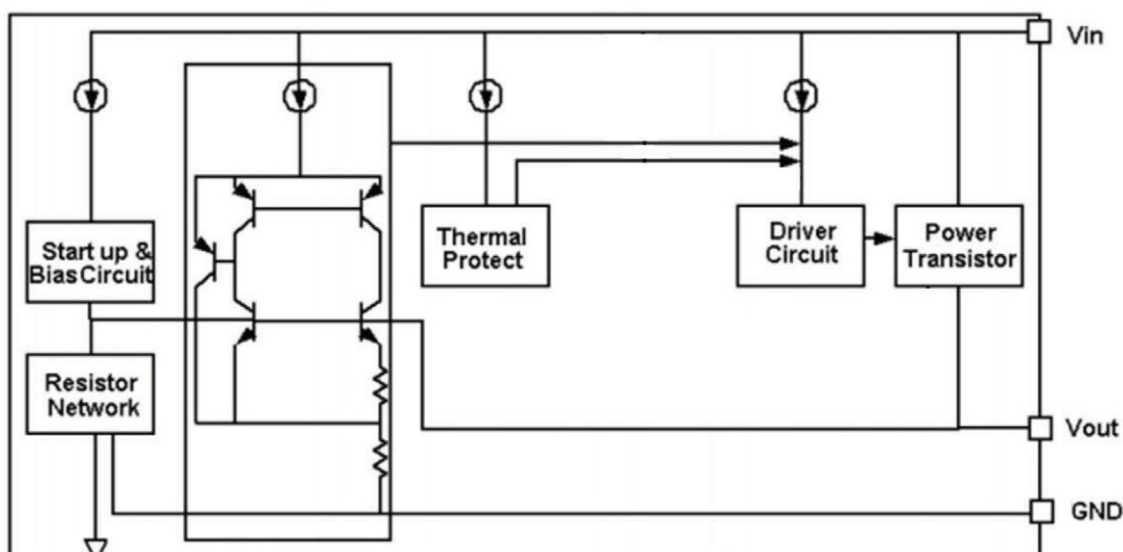
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{REF}	Reference Voltage	AMS1117-ADJ $10\text{ mA} \leq I_{\text{OUT}} \leq 1\text{ A}$, $V_{\text{IN}} = 3.25\text{ V}$	1.225	1.25	1.275	V
V_{OUT}	Output Voltage	AMS1117-1.2 V $0 \leq I_{\text{OUT}} \leq 1\text{ A}$, $V_{\text{IN}} = 3.2\text{ V}$	1.176	1.2	1.224	V
		AMS1117-1.8 V $0 \leq I_{\text{OUT}} \leq 1\text{ A}$, $V_{\text{IN}} = 3.8\text{ V}$	1.764	1.8	1.836	V
		AMS1117-2.5 V $0 \leq I_{\text{OUT}} \leq 1\text{ A}$, $V_{\text{IN}} = 4.5\text{ V}$	2.45	2.5	2.55	V
		AMS1117-2.85 V $0 \leq I_{\text{OUT}} \leq 1\text{ A}$, $V_{\text{IN}} = 4.85\text{ V}$	2.793	2.85	2.907	V
		AMS1117-3.3 V $0 \leq I_{\text{OUT}} \leq 1\text{ A}$, $V_{\text{IN}} = 5.3\text{ V}$	3.234	3.3	3.366	V
		AMS1117-5.0 V $0 \leq I_{\text{OUT}} \leq 1\text{ A}$, $V_{\text{IN}} = 7.0\text{ V}$	4.9	5	5.1	V
ΔV_{OUT}	Line Regulation	AMS1117-1.2 V $I_{\text{OUT}} = 10\text{ mA}$, $2.7\text{ V} \leq V_{\text{IN}} \leq 10\text{ V}$		0.03	0.2	%/V
		AMS1117-ADJ $I_{\text{OUT}} = 10\text{ mA}$, $2.75\text{ V} \leq V_{\text{IN}} \leq 12\text{ V}$		0.03	0.2	%/V
		AMS1117-1.8 V $I_{\text{OUT}} = 10\text{ mA}$, $3.3\text{ V} \leq V_{\text{IN}} \leq 12\text{ V}$		0.03	0.2	%/V
		AMS1117-2.5 V $I_{\text{OUT}} = 10\text{ mA}$, $4.0\text{ V} \leq V_{\text{IN}} \leq 12\text{ V}$		0.03	0.2	%/V
		AMS1117-2.85 V $I_{\text{OUT}} = 10\text{ mA}$, $4.35\text{ V} \leq V_{\text{IN}} \leq 12\text{ V}$		0.03	0.2	%/V
		AMS1117-3.3 V $I_{\text{OUT}} = 10\text{ mA}$, $4.8\text{ V} \leq V_{\text{IN}} \leq 12\text{ V}$		0.03	0.2	%/V
		AMS1117-5.0 V $I_{\text{OUT}} = 10\text{ mA}$, $6.5\text{ V} \leq V_{\text{IN}} \leq 12\text{ V}$		0.03	0.2	%/V
ΔV_{OUT}	Load Regulation	AMS1117-1.2 V $V_{\text{IN}} = 2.7\text{ V}$, $10\text{ mA} \leq I_{\text{OUT}} \leq 1\text{ A}$		2	8	mV
		AMS1117-ADJ $V_{\text{IN}} = 2.75\text{ V}$, $10\text{ mA} \leq I_{\text{OUT}} \leq 1\text{ A}$		2	8	mV
		AMS1117-1.8 V $V_{\text{IN}} = 3.3\text{ V}$, $10\text{ mA} \leq I_{\text{OUT}} \leq 1\text{ A}$		3	12	mV
		AMS1117-2.5 V $V_{\text{IN}} = 4.0\text{ V}$, $10\text{ mA} \leq I_{\text{OUT}} \leq 1\text{ A}$		4	16	mV
		AMS1117-2.85 V $V_{\text{IN}} = 4.35\text{ V}$, $10\text{ mA} \leq I_{\text{OUT}} \leq 1\text{ A}$		5	20	mV

ELECTRICAL CHARACTERISTICS

 $T_J = 25^{\circ}\text{C}$

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
ΔV_{OUT}	Load Regulation	AMS1117-3.3 V $V_{\text{IN}} = 4.8 \text{ V}, 10 \text{ mA} \leq I_{\text{OUT}} \leq 1 \text{ A}$		6	24	mV
		AMS1117-5.0 V $V_{\text{IN}} = 6.5 \text{ V}, 10 \text{ mA} \leq I_{\text{OUT}} \leq 1 \text{ A}$		9	36	mV
V_{DROP}	Dropout Voltage	$I_{\text{OUT}} = 100 \text{ mA}$		1.5	1.8	V
		$I_{\text{OUT}} = 1 \text{ A}$		1.8	2	V
I_{MIN}	Minimum Load Current	AMS1117-ADJ		2	10	mA
I_{Q}	Quiescent Current	AMS1117-1.2 V, $V_{\text{IN}} = 10 \text{ V}$		5	10	mA
		AMS1117-1.8 V, $V_{\text{IN}} = 12 \text{ V}$		5	10	mA
		AMS1117-2.5 V, $V_{\text{IN}} = 12 \text{ V}$		5	10	mA
		AMS1117-2.85 V, $V_{\text{IN}} = 12 \text{ V}$		5	10	mA
		AMS1117-3.3 V, $V_{\text{IN}} = 12 \text{ V}$		5	10	mA
		AMS1117-5.0 V, $V_{\text{IN}} = 12 \text{ V}$		5	10	mA
I_{ADJ}	Adjust Pin Current	AMS1117-ADJ $V_{\text{IN}} = 5 \text{ V}, 10 \text{ mA} \leq I_{\text{OUT}} \leq 1 \text{ A}$		55	120	μA
I_{change}	I_{ADJ} change	AMS1117-ADJ $V_{\text{IN}} = 5 \text{ V}, 10 \text{ mA} \leq I_{\text{OUT}} \leq 1 \text{ A}$		0.2	10	μA
$\Delta V/\Delta T$	Temperature coefficient			± 100		ppm

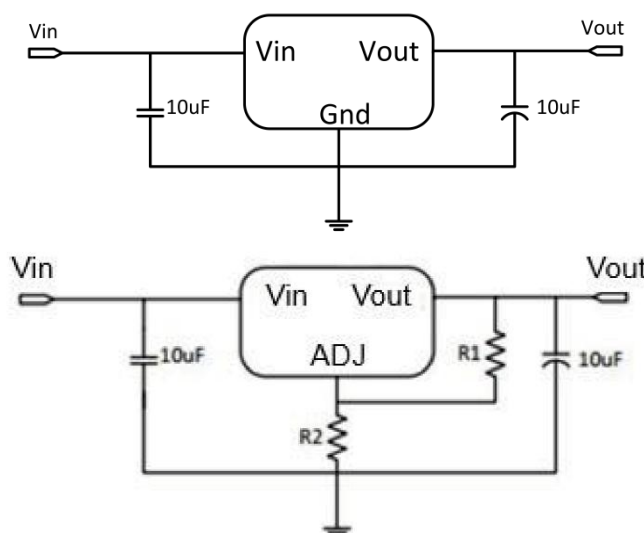
BLOCK DIAGRAM



DETAILED DESCRIPTION

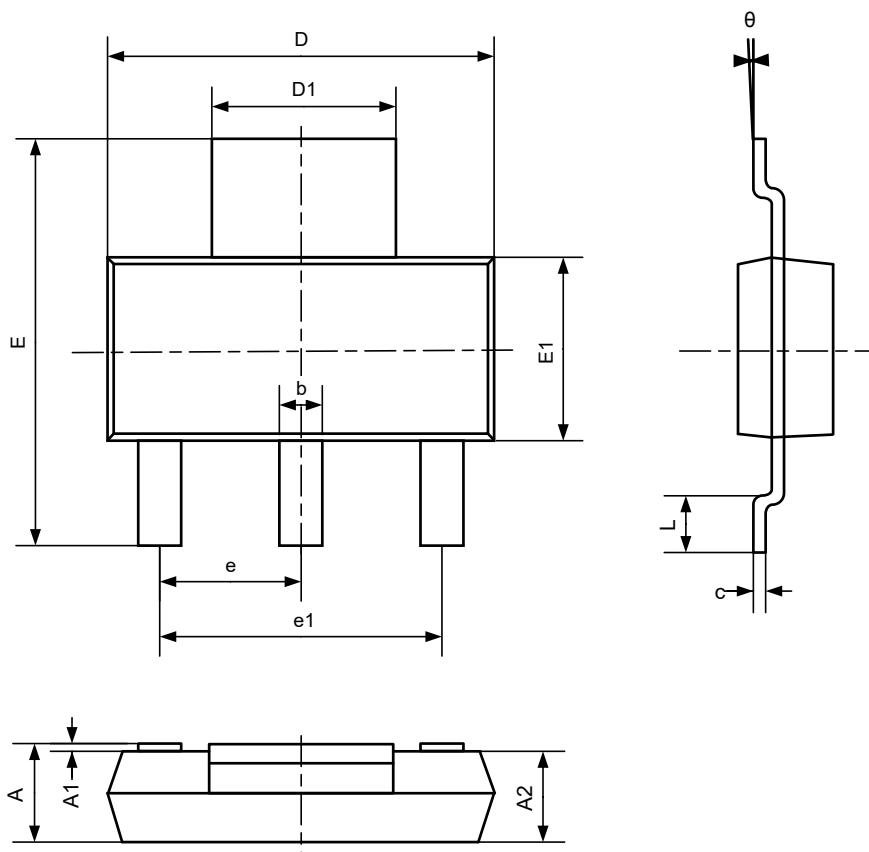
AMS1117 is a series of low dropout voltage, three terminal regulators. Its application circuit is very simple: the fixed version only needs two capacitors and the adjustable version only needs two resistors and two capacitors to work. It is composed of some modules including start-up circuit, bias circuit, 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



PACKAGE OUTLINE

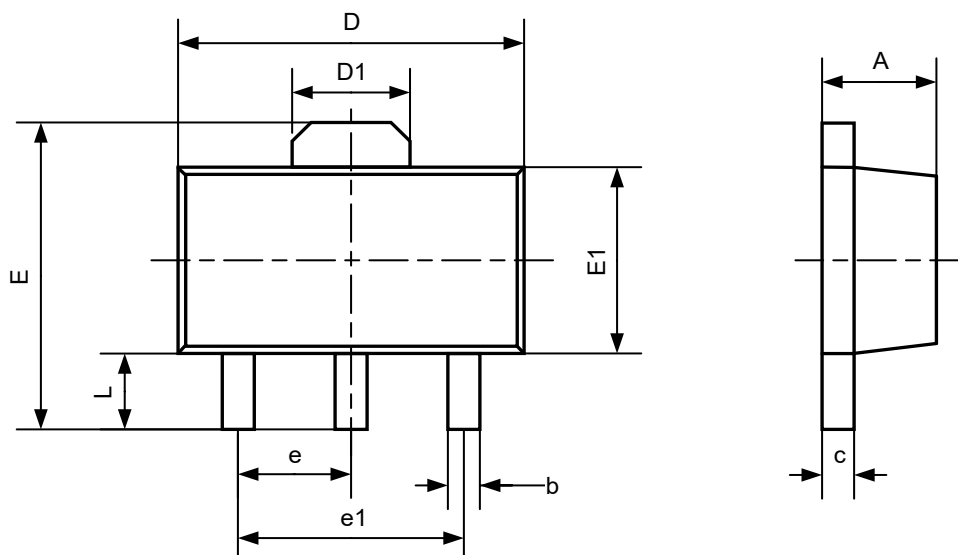
SOT-223



Symbol	Dimensions In Millimeters	
	Min	Max
A		1.800
A1	0.020	0.100
A2	1.500	1.700
b	0.670	0.800
c	0.300	0.350
D	6.480	6.580
D1	2.950	3.050
E	6.800	7.200
E1	3.400	3.600
e	2.300BSC	
e1	4.500	4.700
L	0.800	1.200
θ	0°	8°

PACKAGE OUTLINE

SOT89-3



Symbol	Dimensions In Millimeters	
	Min	Max
A	1.400	1.600
b	0.320	0.520
c	0.350	0.440
D	4.400	4.600
D1	1.550REF	
E	3.940	4.250
E1	2.300	2.600
e	1.500BSC	
e1	3.000BSC	
L	0.900	1.200