



PRODUCT DATA SHEET



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Datasheet



Resources



Samples

Please note: Please check the JINGAO Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.jg-semi.cn. Please email any questions regarding the system integration to JINGAO_questions@jgsemi.com.

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: -20°C~85°C

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

AMS1117 is a series of low dropout three-terminal regulators with a dropout of 1.3V at 1A load current. AMS1117 features a very low standby current 2mA compared to 5mA of competitor.

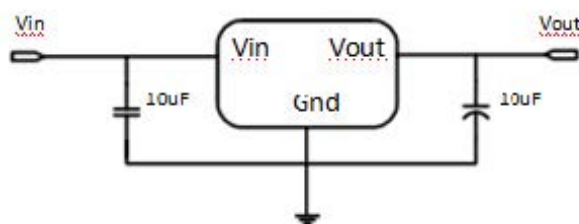
Other than a fixed version, $V_{out} = 1.2V, 1.5V, 1.8V, 2.5V, 2.85V, 3.3V$, and 5V, AMS1117 has an adjustable version, which can provide an output voltage from 1.25 to 12V with

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%.

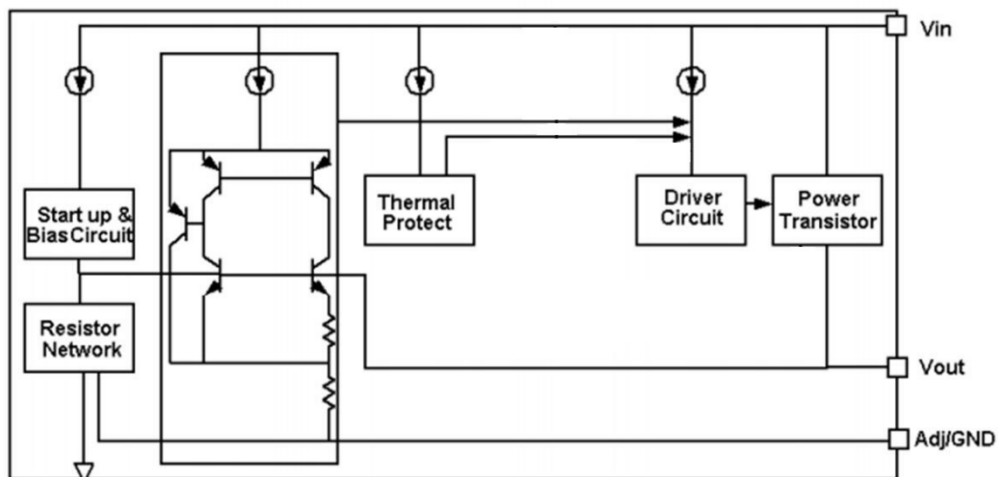
AMS1117 is available in SOT-223, SOT-89 power package.

Typical Application



Application circuit of AMS1117 fixed version

Block Diagram



Pin Configuration

SOT223 (Top View)

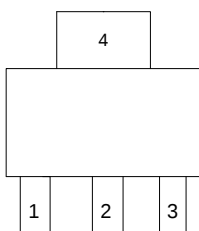


Table1: AMS1117 series (SOT223 PKG)

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

SOT-89 (Top View)

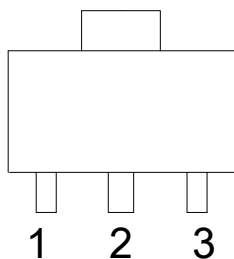


Table2: AMS1117 series (SOT-89 PKG)

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

Absolute Maximum Ratings

Max Input Voltage 18V
 Max Operating Junction Temperature(T_j) 150°C
 Ambient Temperature(T_a) -20°C~125°C
 Storage Temperature(T_s) -40°C~150°C
 Lead Temperature & Time 260°C 10S
 Caution: Exceed these limits to damage to the device. Exposure to absolute maximum rating conditions may affect device reliability.

Electrical Characteristics

T_A=25°C, unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{in}	Input voltage		--	15	18	V
V _{ref}	Reference voltage	AMS1117-Adj 10mA ≤ I _{out} ≤ 1A, V _{in} =3.25V	1.225	1.25	1.275	V
V _{out}	Output voltage	AMS1117-1.2V 0 ≤ I _{out} ≤ 1A, V _{in} =2.7V	1.176	1.2	1.224	V
		AMS1117-1.5V 0 ≤ I _{out} ≤ 1A, V _{in} =3.0V	1.47	1.5	1.53	V
		AMS1117-1.8V 0 ≤ I _{out} ≤ 1A, V _{in} =3.3V	1.764	1.8	1.836	V
		AMS1117-2.5V 0 ≤ I _{out} ≤ 1A, V _{in} =4.0V	2.45	2.5	2.55	V
		AMS1117-2.85V 0 ≤ I _{out} ≤ 1A, V _{in} =4.35V	2.793	2.85	2.907	V
		AMS1117-3.3V 0 ≤ I _{out} ≤ 1A, V _{in} =4.8V	3.234	3.3	3.366	V
		AMS1117-5.0V 0 ≤ I _{out} ≤ 1A, V _{in} =6.5V	4.9	5	5.1	V

ΔV _{out}	Line regulation	AMS1117-1.2V I _{out} =10mA, 2.7V ≤ V _{in} ≤ 10V		4	19	mV
		AMS1117-1.5V I _{out} =10mA, 3.0V ≤ V _{in} ≤ 10V		5	26	mV
		AMS1117-ADJ I _{out} =10mA, 2.75V ≤ V _{in} ≤ 12V		5	24	mV
		AMS1117-1.8V I _{out} =10mA, 3.3V ≤ V _{in} ≤ 12V		5	32	mV

		AMS1117-2.5V $I_{out}=10mA, 4.0V \leq V_{in} \leq 12V$		8	41	mV
		AMS1117-2.85V $I_{out}=10mA, 4.35V \leq V_{in} \leq 12V$		8	46	mV
		AMS1117-3.3V $I_{out}=10mA, 4.8V \leq V_{in} \leq 12V$		9	49	mV
		AMS1117-5.0V $I_{out}=10mA, 6.5V \leq V_{in} \leq 12V$		10	56	mV

ΔV_{out}	Load regulation	AMS1117-1.2V $V_{in} = 2.7V, 10mA \leq I_{out} \leq 1A$		3	8	mV
		AMS1117-1.5V $V_{in} = 3.0V, 10mA \leq I_{out} \leq 1A$		3	8	mV
		AMS1117-ADJ $V_{in} = 2.75V, 10mA \leq I_{out} \leq 1A$		4	8	mV
		AMS1117-1.8V $V_{in} = 3.3V, 10mA \leq I_{out} \leq 1A$		4	12	mV
		AMS1117-2.5V $V_{in} = 4.0V, 10mA \leq I_{out} \leq 1A$		5	16	mV
		AMS1117-2.85V $V_{in} = 4.35V, 10mA \leq I_{out} \leq 1A$		6	20	mV
		AMS1117-3.3 $V_{in} = 4.8V, 10mA \leq I_{out} \leq 1A$		7	24	mV
		AMS1117-5.0 $V_{in} = 6.5V, 10mA \leq I_{out} \leq 1A$		10	36	mV
Vdrop	Dropout voltage	$I_{out} = 100mA$		1.15	1.3	V
		$I_{out} = 1A$		1.3	1.5	V
Imin	Minimum load current	AMS1117-ADJ		2	10	mA
Iq	Quiescent Current	AMS1117-1.2V, $V_{in}=10V$		2	5	mA
		AMS1117-1.5V, $V_{in}=10V$		2	5	mA
		AMS1117-1.8V, $V_{in}=12V$		2	5	mA
		AMS1117-2.5V, $V_{in}=12V$		2	5	mA
		AMS1117-2.85V, $V_{in}=12V$		2	5	mA
		AMS1117-3.3V, $V_{in}=12V$		2	5	mA
		AMS1117-5.0V, $V_{in}=12V$		2	5	mA
Iadj	Adjust pin current	AMS1117-ADJ $V_{in}=5V, 10mA \leq I_{out} \leq 1A$		55	120	uA
Ichange	Iadj change	AMS1117-ADJ		0.2	10	uA

		$V_{in}=5V, 10mA \leq I_{out} \leq 1A$				
OTP	Thermal Shutdown	Junction Temperature		+200		°C
	Thermal Shutdown Hysteresis	Junction Temperature		+30		°C
ΔV_{out}	Temperature coefficient	$V_{in}=4.5V, I_{out}=10mA$ $V_{OUT}=3.3V$ $20^{\circ}C \leq T_a \leq 120^{\circ}C$		30		mV
θ_{JC}	Thermal resistance	SOT-223		20		°C/W
		SOT-89		10		

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.

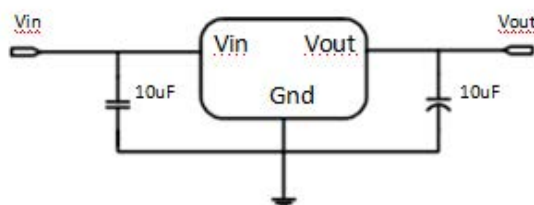
The thermal shut down modules can assure chip and its application system working safety when the junction temperature is larger than 140°C.

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 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

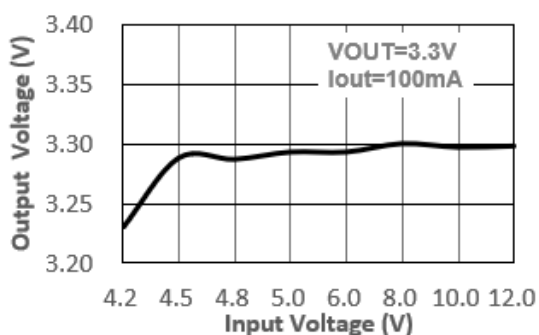


Application circuit of AMS1117 fixed version

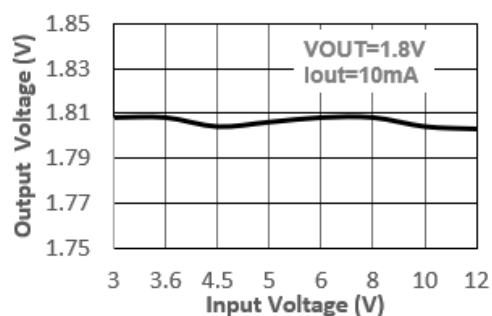
- 1) Recommend using 10uF tan capacitor as bypass capacitor (C1) for all application circuit.
- 2) Recommend using 10uF tan capacitor to assure circuit stability.

Typical Performance Characteristics $T_A=25^{\circ}\text{C}$, unless otherwise noted

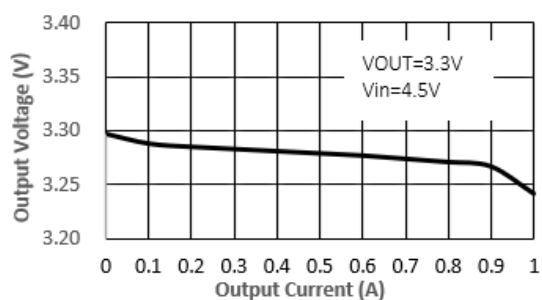
Output Voltage vs. Input Voltage ($V_{OUT}=3.3\text{V}$)



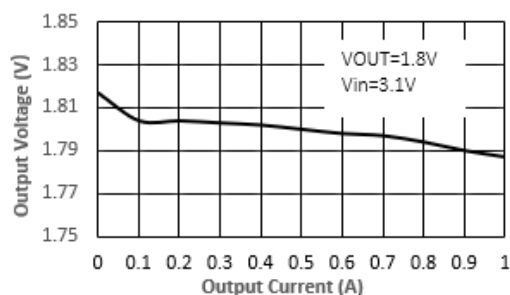
Output Voltage vs. Input Voltage ($V_{OUT}=1.8\text{V}$)



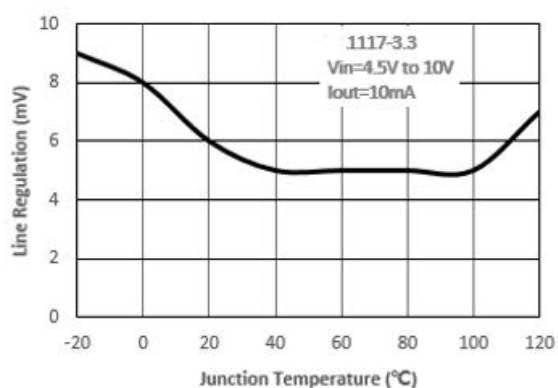
Output Voltage vs. Output Current ($V_{OUT}=3.3\text{V}$)



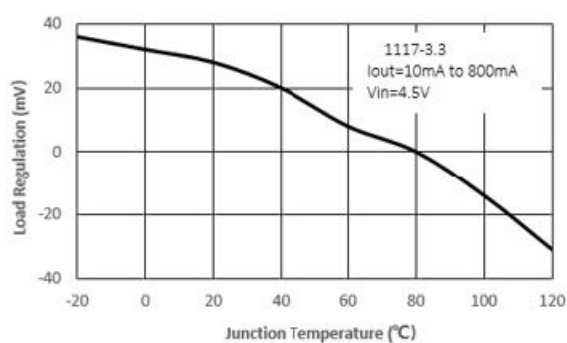
Output Voltage vs. Output Current ($V_{OUT}=1.8\text{V}$)

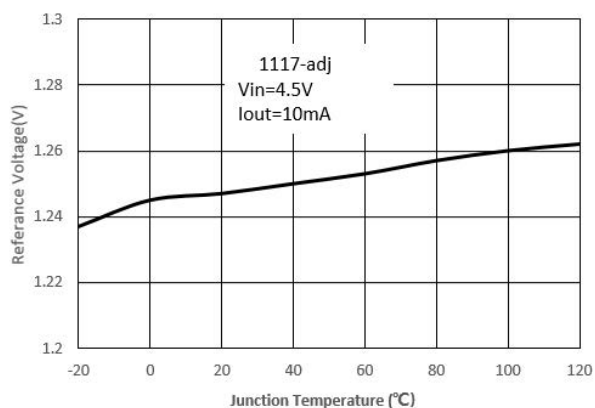
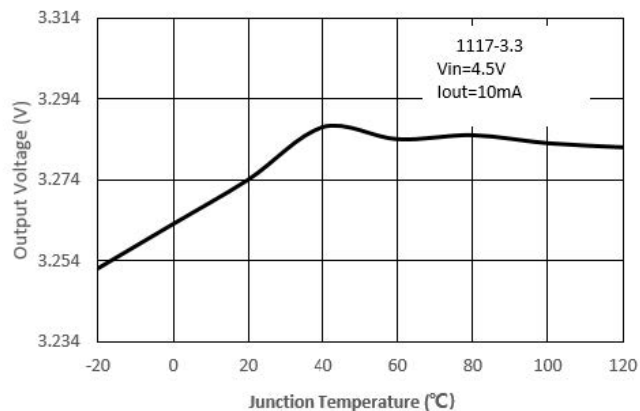
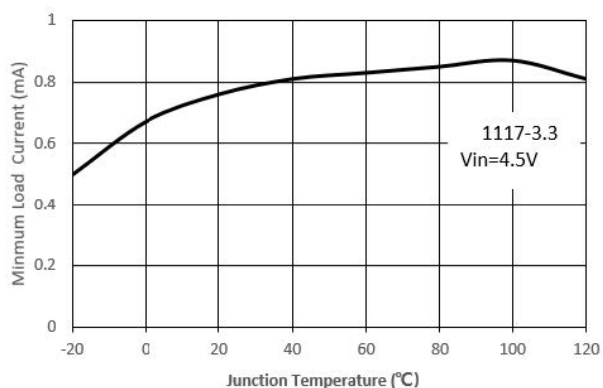
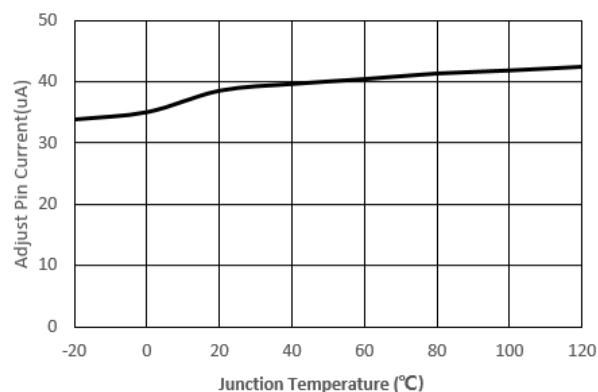
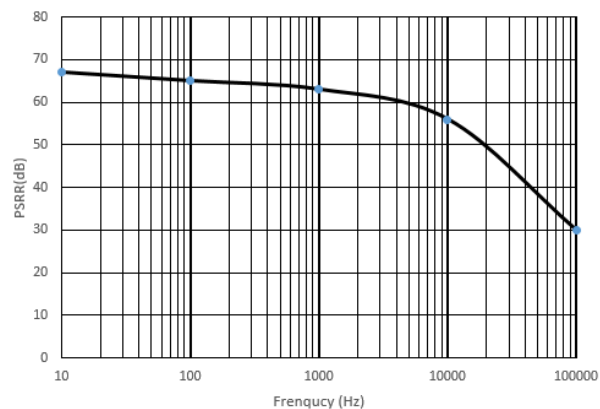
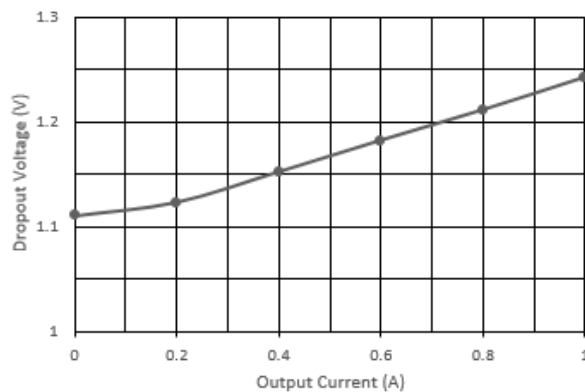


Line Regulation vs. Junction Temperature

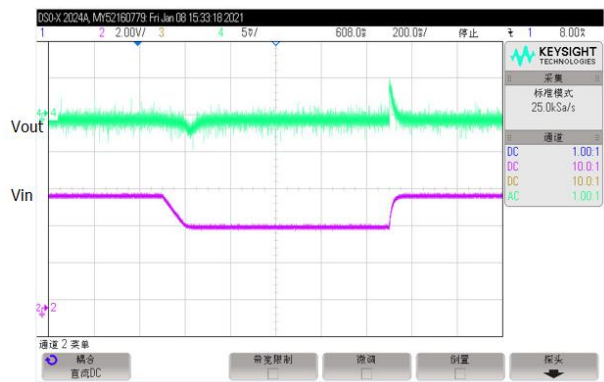


Load Regulation vs. Junction Temperature

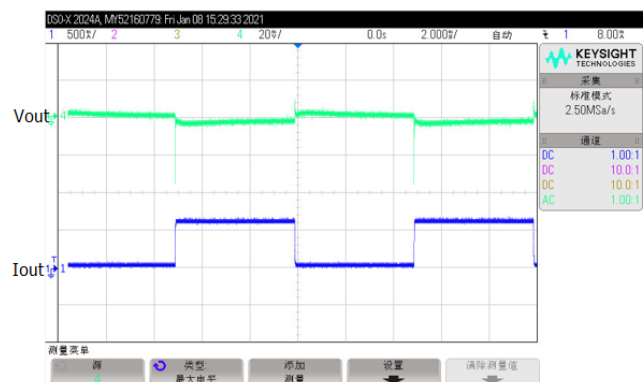


Reference Voltage vs. Junction Temperature

Output Voltage vs. Junction Temperature

Minimum Load Current vs. Junction Temperature

Adjust Pin Current vs. Junction Temperature

PSRR vs. Frequency

Dropout Voltage vs. Output Current


Line Transient Response

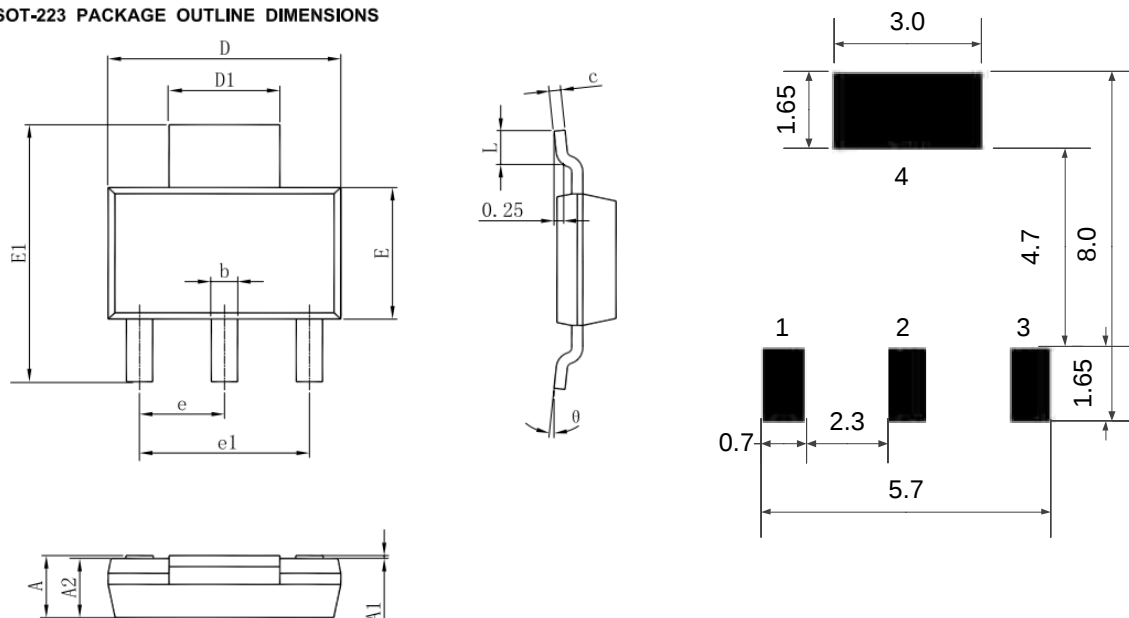


Load Transient Response



Package Information

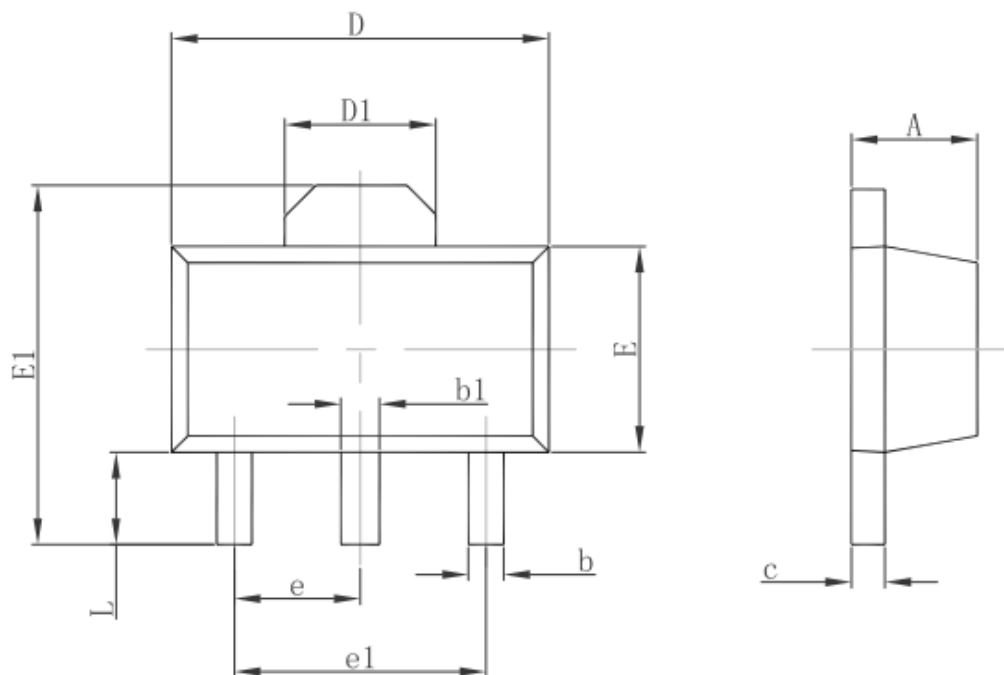
SOT-223 PACKAGE OUTLINE DIMENSIONS



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°

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

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