

1A Low Dropout Positive Voltage Regulator

GENERAL DESCRIPTION

The EC50117 Series are available in fixed and adjustable output voltage versions. Over current and thermal overload protection are integrated onto the chip. Output current will decrease while it reaches the preset current or temperature limit. The dropout voltage is specified at 1.2V Maximum at full rated output current. EC50117 Series provide excellent regulation over variations due to changes in line, load and temperature. EC50117 Series are three terminal regulators and available in popular packages.

FEATURES

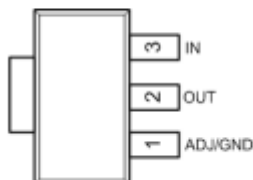
- Low Dropout Voltage 1.2V at 1A
- Adjustable or Fixed Voltage (1.8V, 2.5V, 3.3V, 5V)
- Over Current Protection
- Thermal Overload Protection
- Maximum Line Regulation 0.45%
- Maximum Load Regulation 0.4%
- Adjust Pin Current Less Than 90 uA

Applications

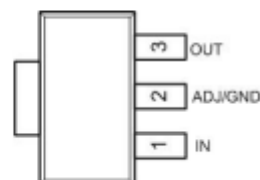
- SCSI-2 Active Termination
- High Efficiency Linear Regulators
- 5V to 3.3V Voltage Converter
- Battery Charger
- Battery Management Circuits For Notebook And Palmtop PCs
- Core Voltage Supply: FPGA, PLD, DSP, CPU

PIN ASSIGNMENT

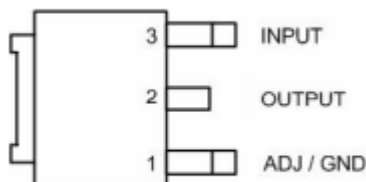
Package: SOT-223



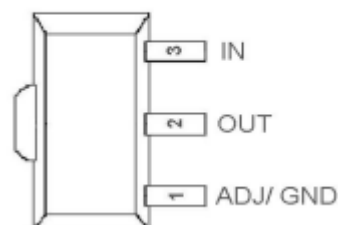
Package: SOT-223 (B1)



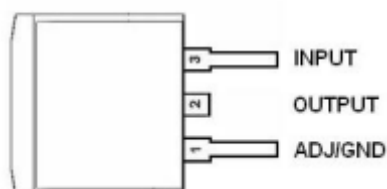
Package: TO-252



Package: SOT-89

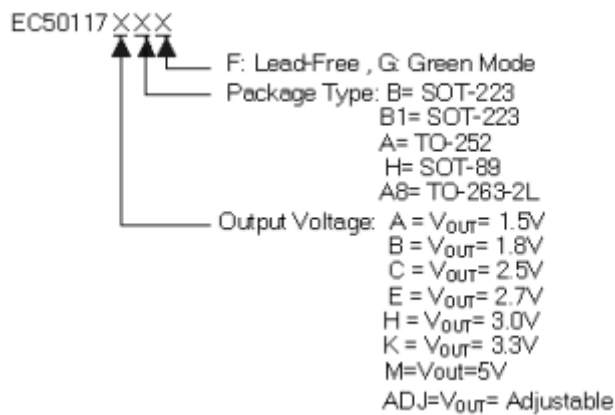


Package: TO-263-2L



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Ordering Information



Part Number	Marking ID	Package	VOUT Voltage
EC50117MBG	SE8117T50 YYWW-HF	SOT-223	output voltages; B Type, voltage options (5.5V). Green Package
EC50117KBF	50117K-F	SOT-223	output voltages; B Type , voltage options (3.3V). Lead Free
EC50117KB1F	50117K1-F	SOT-223	output voltages; B1 Type, voltage options (3.3V). Lead Free
EC50117KBG	50117K-G	SOT-223	output voltages; B Type, voltage options (3.3V). Green Package
EC50117KB1G	50117K1-G	SOT-223	output voltages; B1 Type, voltage options (3.3V). Green Package
EC50117KAF	50117 K-F XXXXX	TO-252	output voltages; A Type, voltage options (3.3V). Lead Free
EC50117KAG	50117 K-G XXXXX	TO-252	output voltages; A Type, voltage options (3.3V). Green Package
EC50117KHF	117K-F	SOT-89	output voltages; H Type, voltage options (3.3V). Lead Free
EC50117KHG	117K-G	SOT-89	output voltages; H Type, voltage options (3.3V). Green Package
EC50117EBG	50117E-G	SOT-223	output voltages; B Type, voltage options (2.7V). Green Package
EC50117CAG	50117 C-G XXXXX	TO-252	output voltages; A Type, voltage options (2.5V). Green Package
EC50117CBG	50117C-G	SOT-223	output voltages; B Type, voltage options (2.5V). Green Package
EC50117CB1G	50117C1G	SOT-223	output voltages; B1 Type, voltage options (2.5V). Green Package
EC50117CHF	117C-F	SOT-89	output voltages; H Type, voltage options (2.5V). Lead Free
EC50117CHG	117C-G	SOT-89	output voltages; H Type, voltage options (2.5V). Green Package
EC50117BAG	50117 B-G XXXXX	TO-252	output voltages; A Type, voltage options (1.8V). Green Package
EC50117BBG	50117B-G	SOT-223	output voltages; B Type, voltage options (1.8V). Green Package
EC50117BB1G	50117B1G	SOT-223	output voltages; B1 Type, voltage options (1.8V). Green Package
EC50117ABG	50117A-G	SOT-223	output voltages; B Type, voltage options (1.5V). Green Package

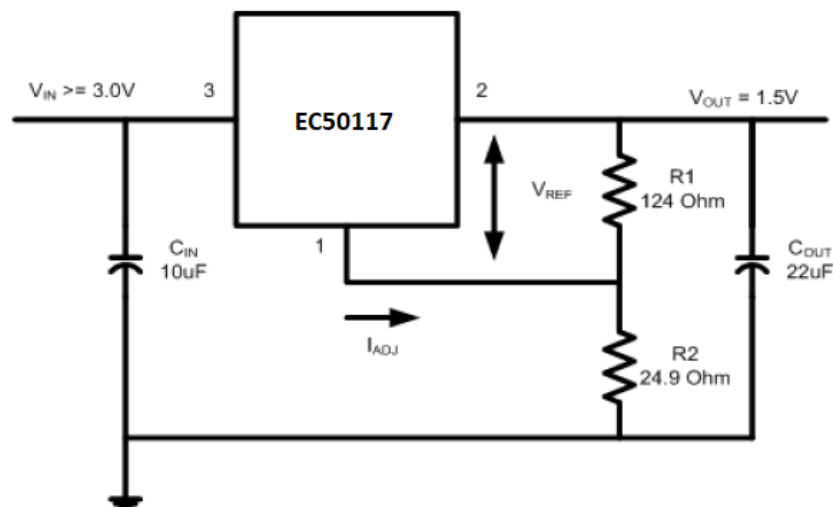
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Ordering Information(Continued)

Part Number	Marking ID	Package	VOUT Voltage
EC50117ADJAG	50117 ADJ-G XXXXX	TO-252	output voltages; A Type , voltage options (ADJ). Green Package
EC50117ADJBF	50117ADJ-F	SOT-223	output voltages; B Type , voltage options (ADJ). Lead Free
EC50117ADJBG	50117ADJ-G	SOT-223	output voltages; B Type , voltage options (ADJ). Green Package
EC50117KA8G	50117 K-G XXXXX	TO-263-2L	output voltages; A8 Type, voltage options (3.3V). Green Package
EC50117CA8G	50117 C-G XXXXX	TO-263-2L	output voltages; A8 Type, voltage options (2.5V). Green Package
EC50117BA8G	50117 B-G XXXXX	TO-263-2L	output voltages; A8 Type, voltage options (1.8V). Green Package

Typical Application

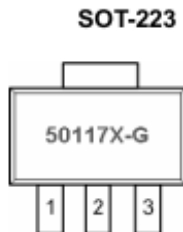
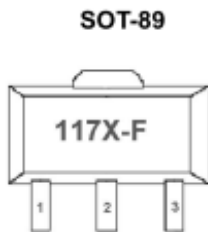
Adjustable Voltage Regulator



$$V_{OUT} = V_{REF} \left(1 + \frac{R_2}{R_1} \right) + I_{ADJ} R_2$$

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Marking Information



Package	Part Number	Marking	Marking Information
SOT-89	EC50117XHF	117X-F	1. X is the output voltage of production. A:1.5V B:1.8V C:2.5V E:2.7V H:3.0V K:3.3V ADJ: Adjustable 2. F is for Lead-free package. G is for Green package 1 is for SOT223 (B1) package. 3. XXXXX: Lot Number of production.
	EC50117XHGG	117X-G	
	EC50117ADJHF	117ADJ-F	
	EC50117ADJHGG	117ADJ-G	
SOT-223	EC50117XBF	50117X-F	
	EC50117XB1F	50117X1-F	
	EC50117XBG	50117X-G	
	EC50117XB1G	50117X1-G	
	EC50117ADJBF	50117ADJ-F	
	EC50117ADJB1F	50117ADJ1-F	
	EC50117ADJBG	50117ADJ-G	
	EC50117ADJB1G	50117ADJ1-G	
SOT-223	EC50117MBG	SE8117T50 YYWW-HF	YYWW : Date Code HF : Halogen Free
TO-252	EC50117XAF	50117 X-F XXXXX	
	EC50117XAG	50117 X-G XXXXX	
	EC50117ADJAF	50117 ADJ-F XXXXX	
	EC50117ADJAG	50117 ADJ-G XXXXX	
TO-263-2L	EC50117XA8F	50117 X-F XXXXX	
	EC50117XA8G	50117 X-G XXXXX	
	EC50117ADJA8F	50117 ADJ-F XXXXX	
	EC50117ADJA8G	50117 ADJ-G XXXXX	

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ABSOLUTE MAXIMUM RATINGS

Characteristics		Symbol	Maximum	Unit
DC Supply Voltage		V_{IN}	20V	V
Operating Temperature Range		T_{OPR}	-45 to +125	°C
Storage Temperature Range		T_{STG}	-65 to 150	°C
Lead Temperature (Soldering) 5 Sec		T_{LEAD}	260	°C
Electrostatic Discharge Sensitivity			2	KV/Min
Thermal Resistance Junction to Ambient	SOT89-3L	θ_{JA}	175	°C/W
	SOT223-3L		135	
	TO252-3L		100	
	TO263-2L		60	
Thermal Resistance Junction to Case	SOT89-3L	θ_{JC}	58	°C/W
	SOT223-3L		15	
	TO252-3L		12	
	TO263-2L		4	
Internal Power Dissipation	SOT89-3L	P_D	0.57	W
	SOT223-3L		0.74	
	TO252-3L		1	
	TO263-2L		1.67	



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ELECTRICAL CHARACTERISTICS(C_i=10uF, C_o=100uF, unless otherwise noted.)

Parameter	Test Conditions		Min	Typ	Max	Units
Output Voltage	EC50117-1.8V	I _o = 0mA, V _{IN} =3.3V	1.764	1.800	1.836	V
	EC50117-2.5V	I _o = 0mA, V _{IN} =4V	2.450	2.500	2.550	V
	EC50117-3.3V	I _o = 0mA, V _{IN} =4.8V	3.234	3.300	3.366	V
	EC50117-5.0V	I _o = 0mA, V _{IN} =6.5V	4.900	5.000	5.10	V
Reference Voltage	EC50117-ADJ	I _o =10mA, V _{IN} -V _o =3V	1.232	1.25	1.268	
Line Regulation	EC50117-1.8V	I _o = 0mA, V _{IN} =3.3~10V	---	1	6	mV
	EC50117-2.5V	I _o = 0mA, V _{IN} =4~10V	---	1	7	mV
	EC50117-3.3V	I _o = 0mA, V _{IN} =4.8~10V	---	2	7	mV
	EC50117-5.0V	I _o = 0mA, V _{IN} =6.5~10V	---	3	10	mV
	EC50117-ADJ	I _o = 10mA, V _{IN} -V _o =1.5~10V	---	0.1	0.4	%
Load Regulation	EC50117-1.8V	I _o =0~800mA, V _{IN} =3.3V, T _J =25°C	---	---	0.4	%
		I _o =0~1000mA, V _{IN} =3.3V, ^{NOTE1}	---	---	1	
	EC50117-2.5V	I _o =0~800mA, V _{IN} =4V, T _J =25°C	---	---	0.4	%
		I _o =0~1000mA, V _{IN} =4V, ^{NOTE1}	---	---	1	
	EC50117-3.3V	I _o =0~800mA, V _{IN} =4.8V, T _J =25°C	---	---	0.4	%
		I _o =0~1000mA, V _{IN} =4.8V, ^{NOTE1}	---	---	1	
	EC50117-5.0V	I _o =0~800mA, V _{IN} =6.5V, T _J =25°C	---	---	0.4	%
		I _o =0~1000mA, V _{IN} =6.5V, ^{NOTE1}	---	---	1	
	EC50117-ADJ	I _o =0~800mA, V _{IN} =2.75V, T _J =25°C	---	---	0.4	%
		I _o =0~1000mA, V _{IN} =2.75V, ^{NOTE1}	---	---	1	
Dropout Voltage (^{NOTE3})	EC50117-ADJ /1.8/2.5/3.3/5.0	I _o =100mA, T _J =25°C	---	1.05	1.15	V
		I _o =500mA, T _J =25°C	---	1.1	1.15	
		I _o =1000mA, T _J =25°C	---	1.2	1.3	
		I _o =1000mA,	---	1.2	1.55	
Current Limit	EC50117-ADJ /1.8/2.5/3.3/5.0	V _{IN} -V _o = 1.5V	2000	2600	3200	mA
Minimum Load Current	EC50117-ADJ (^{NOTE1} & ^{NOTE2})	V _{IN} -V _o = 13.75V ^{NOTE1} & ^{NOTE2}	---	1.7	5	mA
Quiescent Current	EC50117-1.8/2.5/ 3.3/5.0(^{NOTE1})	V _{IN} -V _o = 5V ^{NOTE1}	---	6	10	mA
Adjust pin current (^{NOTE1} & ^{NOTE2})	---	I _o =10mA, V _{IN} -V _o = 1.5V ^{NOTE1} & ^{NOTE2}	---	50	120	μA
Adjust pin current change	---	I _o =10mA, V _{IN} -V _o = 1.4~10V	---	0.5	5	uA
Ripple Rejection	EC50117-ADJ /1.8/2.5/3.3/5.0	f=120Hz, V _{IN} -V _o =3V+1.5V _{pp} , Co=22uF	---	62	---	dB
Temperature Drift	EC50117-1.8/2.5 /3.3/5.0	T _J =0~25°C	---	0.5	---	%
	EC50117-ADJ	T _J =0~25°C	---	2	---	%

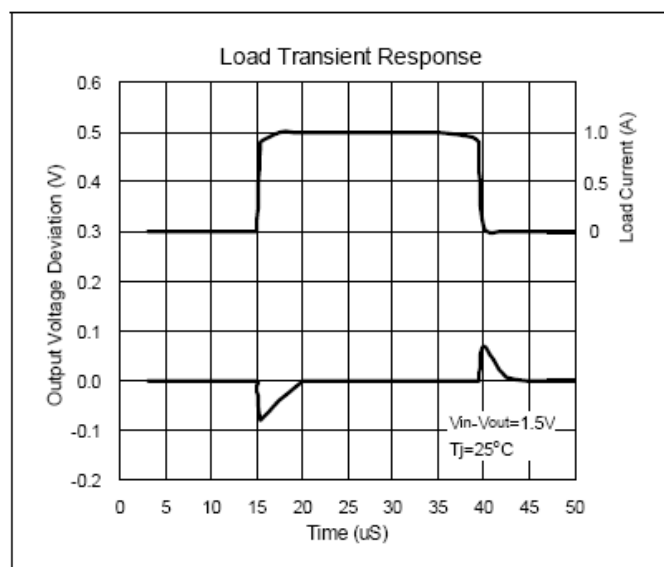
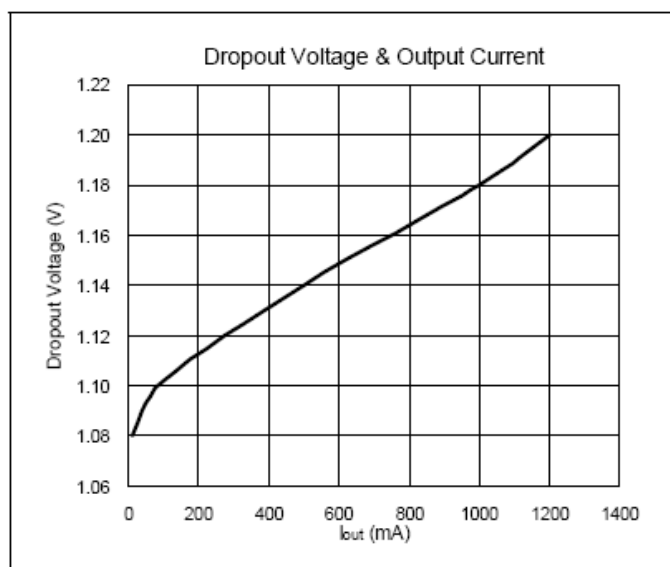
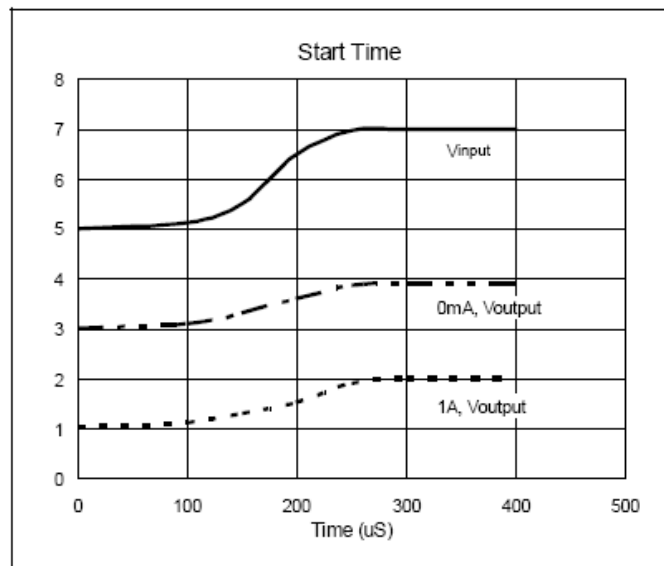
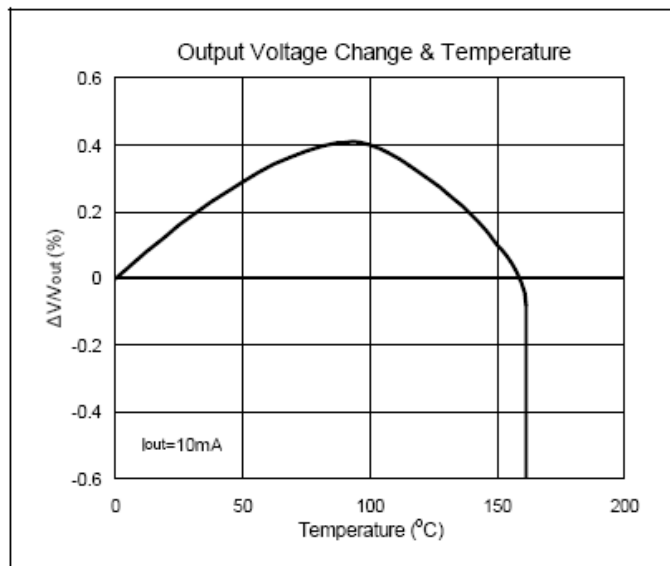
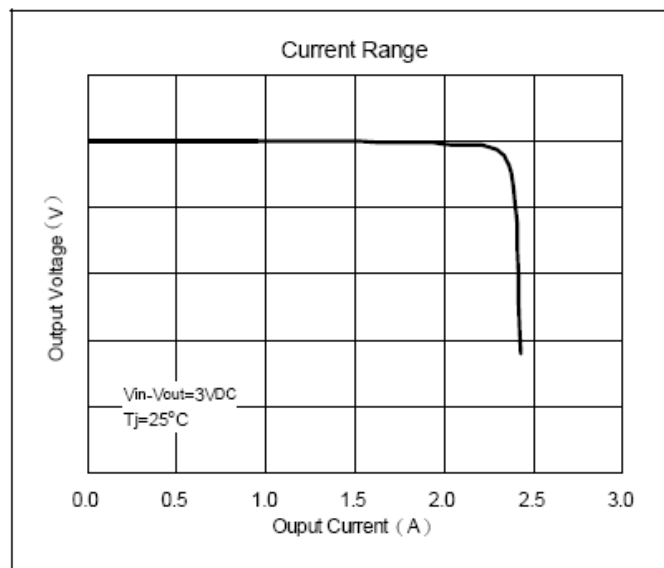
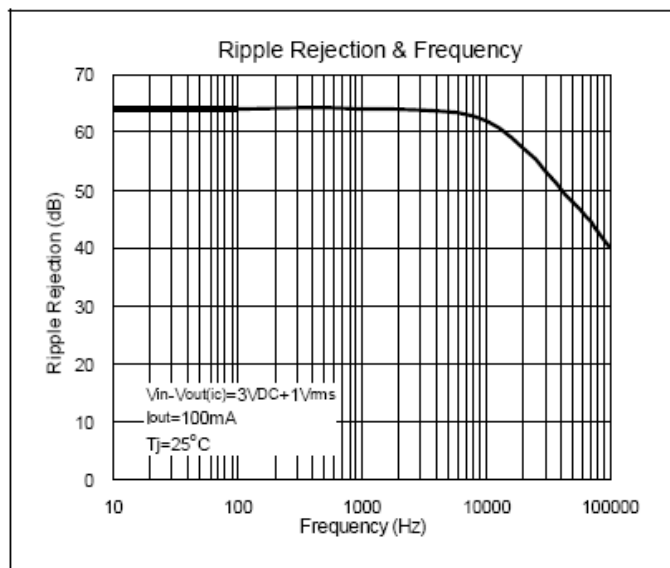
Note: 1. Specification applies over the full operating junction temperature range, 0~125°C

2. EC50117-ADJ require a minimum load current for ±3% regulation

3. Dropout voltage is the input voltage minus output voltage that produces a 1% decrease in output voltage.

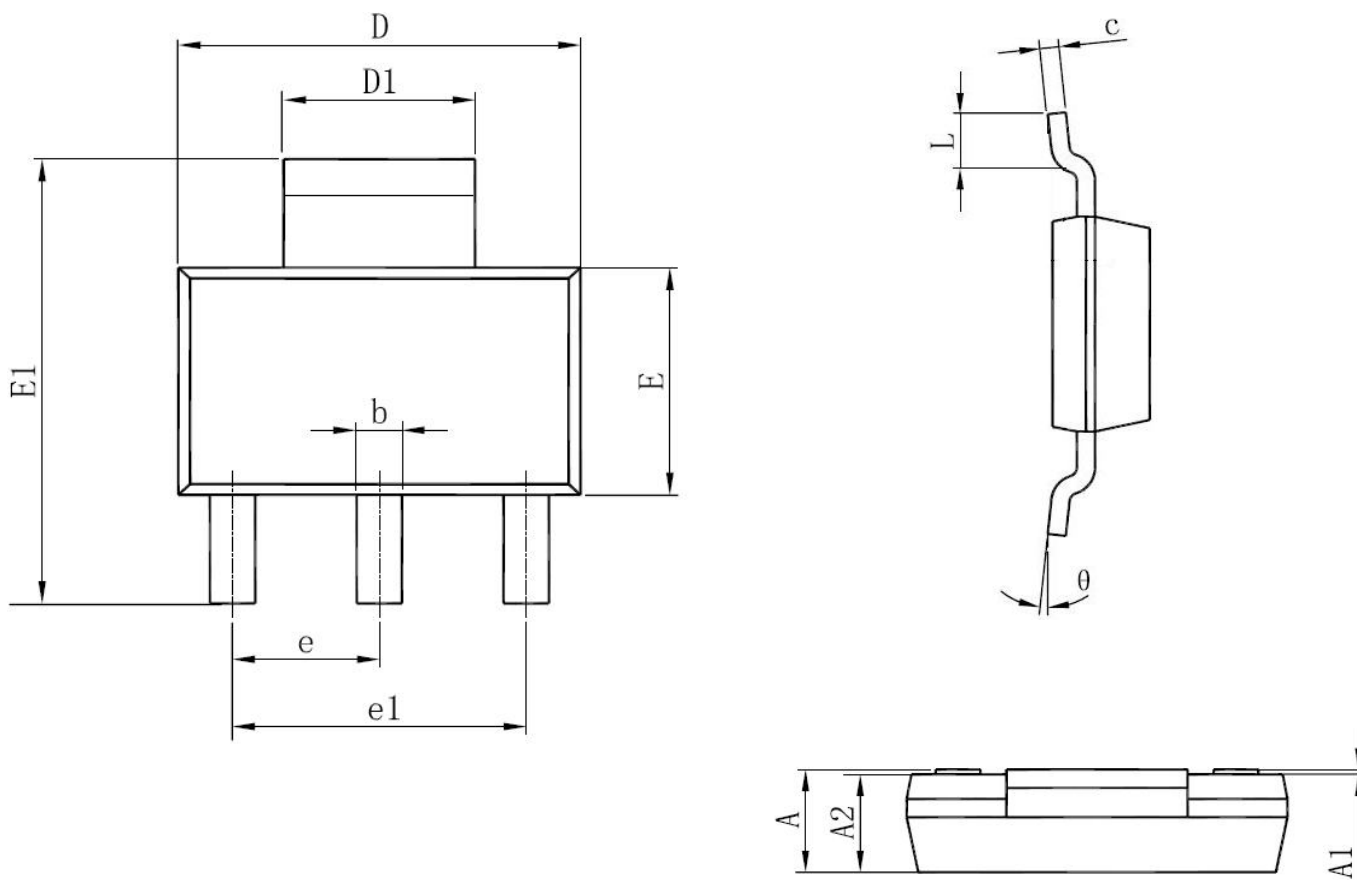
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Characteristics Curve



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Mechanical Dimensions OUTLINE DRAWING SOT223-3L

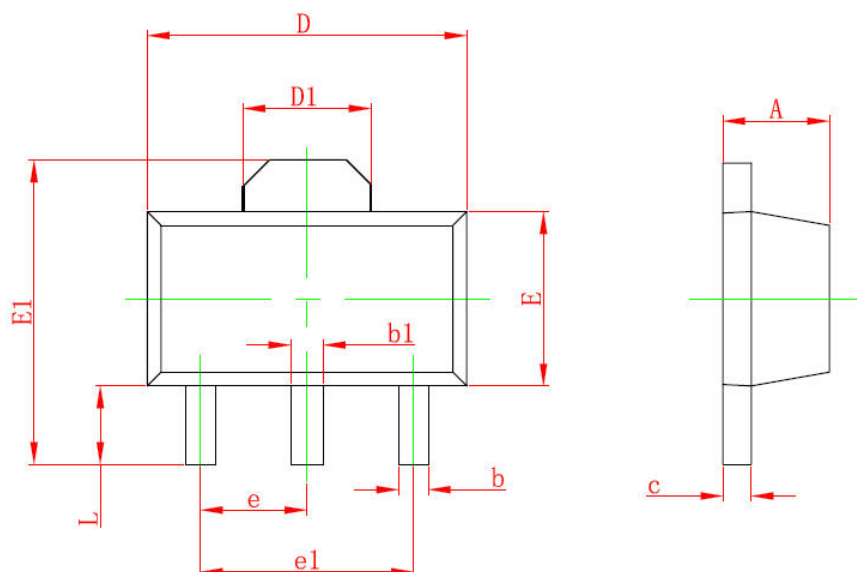


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.450	1.800	0.0571	0.071
A1	0.020	0.100	0.0008	0.004
A2	1.430	1.750	0.056	0.069
b	0.610	0.820	0.024	0.032
c	0.230	0.350	0.009	0.014
D	6.300	6.710	0.248	0.264
D1	2.900	3.150	0.114	0.124
E	3.300	3.710	0.130	0.148
E1	6.710	7.290	0.264	0.287
e	2.150	2.450	0.085	0.097
e1	4.450	4.750	0.175	0.187
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°

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Mechanical Dimensions (Continued)

OUTLINE DRAWING SOT89-3L

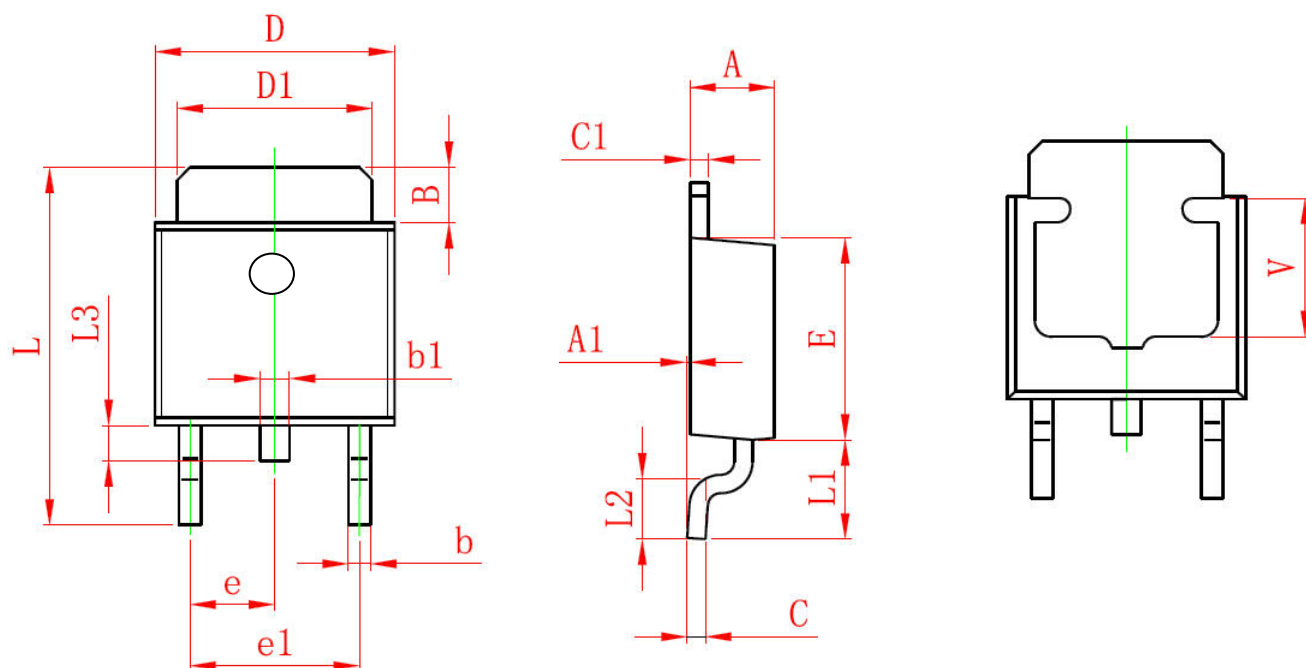


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.445	1.775	0.057	0.069
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.350	1.650	0.053	0.065
e1	2.850	3.150	0.112	0.124
L	0.900	1.200	0.035	0.047

1A Low Dropout Positive Voltage Regulator

Mechanical Dimensions (Continued)

OUTLINE DRAWING TO252-3L

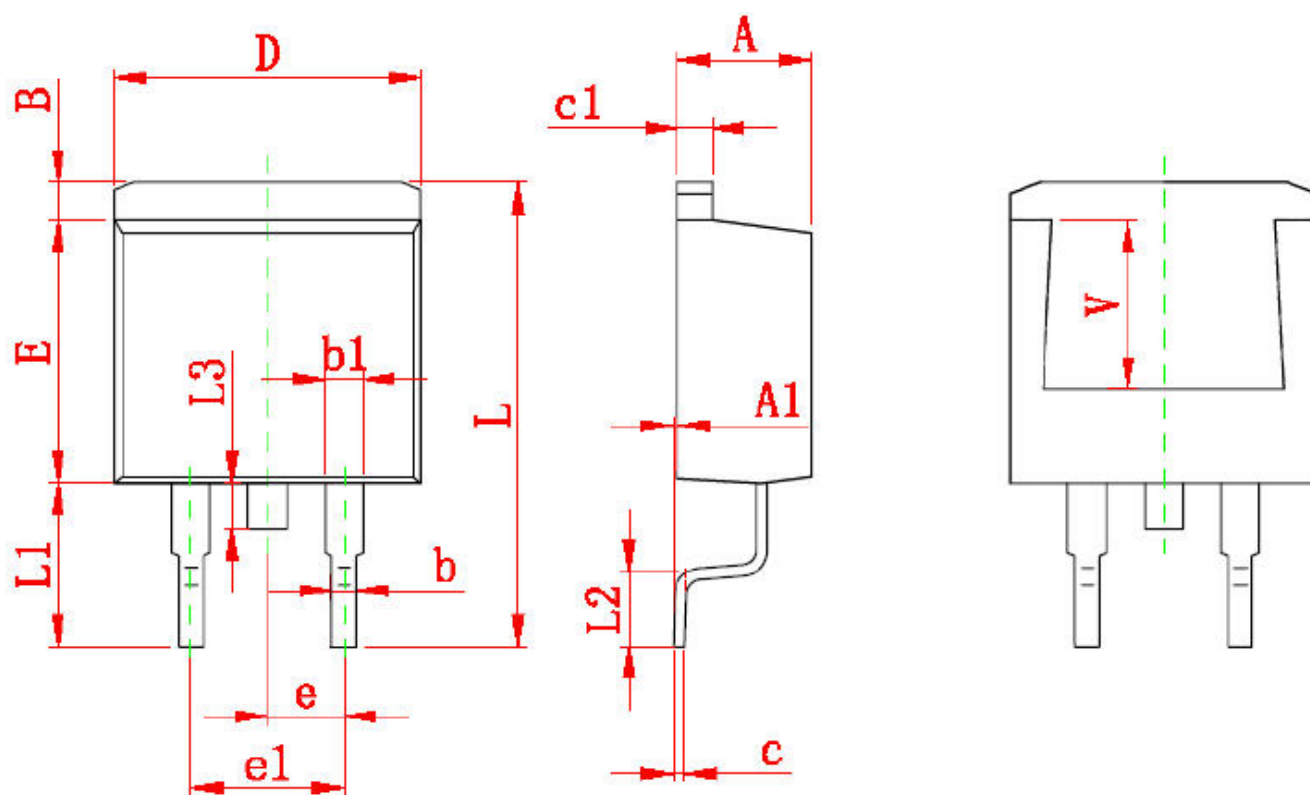


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.450	0.750	0.018	0.030
b1	0.600	1.000	0.024	0.040
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.300	6.700	0.249	0.264
D1	5.100	5.500	0.201	0.217
E	5.400	5.700	0.213	0.224
e	2.150	2.450	0.085	0.097
e1	4.450	4.750	0.175	0.187
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	1.000	0.024	0.040
V	3.400	3.800	0.134	0.150

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Mechanical Dimensions (Continued)

OUTLINE DRAWING TO263-2L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.170	1.370	0.046	0.054
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
L	15.050	15.450	0.593	0.608
L1	5.080	5.480	0.200	0.216
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
V	5.600 REF		0.220 REF	