

1A Adjustable / Fixed Low Dropout Linear Regulator

Key Features

- Low dropout voltage
- Load regulation: 0.05% typical
- Optimized for Low Voltage
- On-chip thermal limiting
- Standard SOT-223, TO-220, and TO-252 packages
- Three-terminal adjustable or fixed low dropout 1.8V, 2.5V, 2.85V, 3.3V, 5V. regulators

Applications

- Active SCSI terminators
- High efficiency linear regulators
- Post regulators for switching supplies
- Battery chargers
- 12V to 5V linear regulators
- Motherboard clock supply

Notice: The distance between Vout pin and Capacitor should not exceed 4cm for excellent performance.

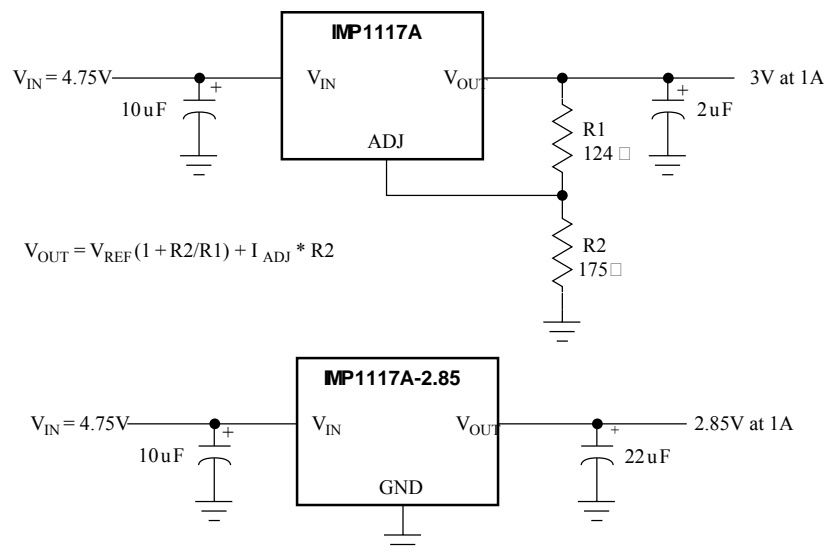
General Description

The IMP1117A and IMP1117A-1.8, -2.5, -2.85, -3.3 and -5 are low dropout three-terminal regulators with 1A output current capability. These devices have been optimized for low voltage where transient response and minimum input voltage are critical. The 2.85V version is designed specifically to be used in Active Terminators for SCSI bus.

On-chip thermal limiting provides protection against any combination of overload and ambient temperatures that would create excessive junction temperatures.

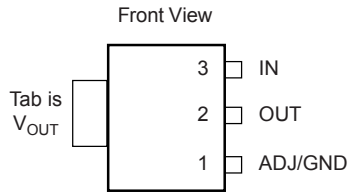
Unlike PNP type regulators where up to 10% of the output current is wasted as quiescent current, the quiescent current of the IMP1117A flows into the load, increasing efficiency.

The IMP1117A series regulators are available in the industry-standard SOT-223, TO-220, and TO-252 (DPAK) power packages.

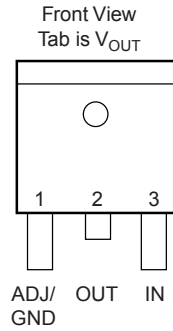


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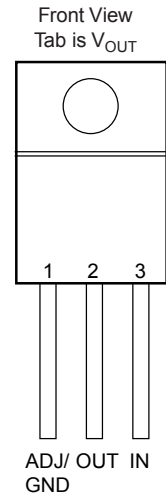
Pin Assignments



4-Lead Plastic SOT-223
 $\theta_{JC} = 15^{\circ}\text{C/W}^*$



3-Lead Plastic TO-252
 $\theta_{JC} = 3^{\circ}\text{C/W}^*$



3-Lead Plastic TO-220
 $\theta_{JC} = 3^{\circ}\text{C/W}^*$

*With package soldered to 0.5 square inch copper area over backside ground plane or internal power plane, θ_{JA} can vary from 30°C/W to more than 50°C/W . Other mounting techniques may provide better thermal resistance than 30°C/W .

Absolute Maximum Ratings

Parameter	Min.	Max.	Unit
V_{IN}		18	V
Operating Junction Temperature Range	0	125	$^{\circ}\text{C}$
Storage Temperature Range	-65	150	$^{\circ}\text{C}$
Lead Temperature (Soldering, 10 sec.)		300	$^{\circ}\text{C}$

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Electrical Characteristic

Operating Conditions: $V_{IN} \leq 7V$, $T_J = 25^\circ C$ unless otherwise specified.

The ~ denotes specifications which apply over the specified operating temperature range .

Parameter	Conditions	Min.	Typ.	Max.	Units	
Reference Voltage ³	$1.5V \leq (V_{IN} - V_{OUT}) \leq 7V$, $10mA \leq I_{OUT} \leq 1A$	~ 1.225 (-2%)	1.250	1.275 (+2%)	V	
Output Voltage ⁴	$10mA \leq I_{OUT} \leq 1A$ IMP1117A-1.8, $3.3V \leq V_{IN} \leq 8.8V$ IMP1117A-2.5, $4V \leq V_{IN} \leq 9.5V$ IMP1117A-2.85, $4.35V \leq V_{IN} \leq 9.85V$ IMP1117A-3.3, $4.8V \leq V_{IN} \leq 10.3V$ IMP1117A-5, $6.5V \leq V_{IN} \leq 12V$	~ ~ ~ ~ ~	1.764 2.450 2.793 3.234 4.900	1.8 2.5 2.85 3.3 5.0	1.836 2.550 2.907 3.366 5.100	V V V V V
Line Regulation ^{1,2}	$(V_{OUT} + 1.5V) \leq V_{IN} \leq 12V$, $I_{OUT} = 10mA$	~	0.005	0.2	%	
Load Regulation ^{1,2}	$(V_{IN} - DV_{OUT}) = 2V$, $10mA \leq I_{OUT} \leq 1A$	~	0.05	0.5	%	
Dropout Voltage	$DV_{REF} = 1\%$, $I_{OUT} = 1A$	~	1.100	1.200	V	
Current Limit	$(V_{IN} - DV_{OUT}) = 2V$	~	1.1	1.5	A	
Adjust Pin Current ³		~	35	120	$\square A$	
Adjust Pin Current Change ^{3,4}	$1.5V \leq (V_{IN} - DV_{OUT}) \leq 7V$, $10mA \leq I_{OUT} \leq 1A$	~	0.2	5	$\square A$	
Minimum Load Current	$1.5V \leq (V_{IN} - DV_{OUT}) \leq 15V$	~	10		mA	
Quiescent Current	$V_{IN} = V_{OUT} + 1.25V$	~	4	13	mA	
Ripple Rejection	$f = 120Hz$, $C_{OUT} = 22 \square F$ Tantalum, $(V_{IN} - DV_{OUT}) = 3V$, $I_{OUT} = 1A$		60	72	dB	
Thermal Regulation	$T_A = 25^\circ C$, 30ms pulse		0.004	0.02	%/W	
Temperature Stability		~	0.5		%	
Long-Term Stability	$T_A = 125^\circ C$, 1000hrs.		0.03	1.0	%	
RMS Output Noise (% of V_{OUT})	$T_A = 25^\circ C$, $10Hz \leq f \leq 10kHz$		0.003		%	
Thermal Resistance, Junction to Case	SOT-223 TO-252, TO-220		15 3		$^\circ C/W$ $^\circ C/W$	
Thermal Shutdown	Junction Temperature		155		$^\circ C$	
Thermal Shutdown Hysteresis			10		$^\circ C$	

Notes:

1. See thermal regulation specifications for changes in output voltage due to heating effects. Load and line regulation are measured at a constant junction temperature by low duty cycle pulse testing.
2. Line and load regulation are guaranteed up to the maximum power dissipation (18W). Power dissipation is determined by input/output differential and the output current. Guaranteed maximum output power will not be available over the full input/output voltage range.
3. IMP1117A only.
4. Output current must be limited to meet the absolute maximum ratings of the part.

Typical Performance Characteristics

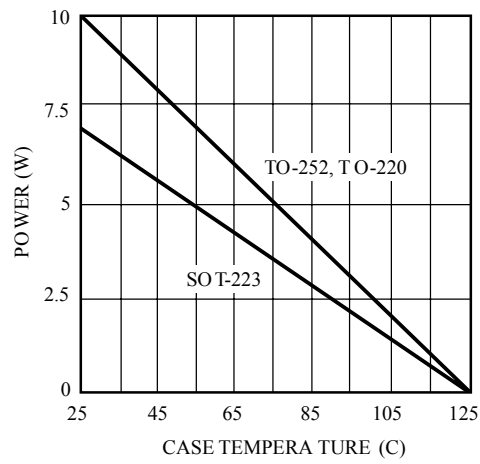
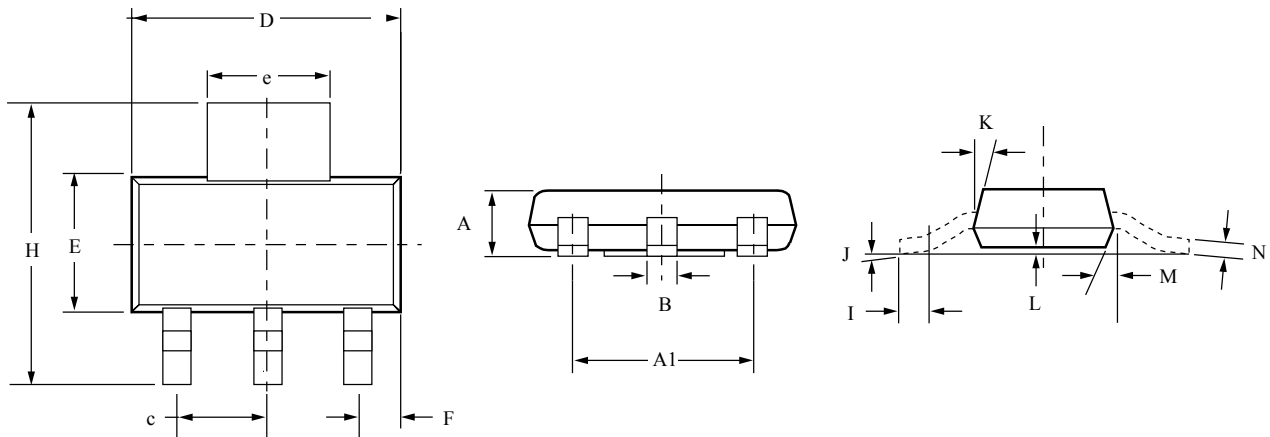


Figure 2. Maximum Power Dissipation

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Mechanical Dimensions 4-Lead SOT-223 Package

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	Ñ	.071	Ñ	1.80	
A1	Ñ	.181	Ñ	4.80	
B	.025	.033	.640	.840	
c	Ñ	.090	Ñ	2.29	
D	.248	.264	6.30	6.71	
E	.130	.148	3.30	3.71	
e	.115	.124	2.95	3.15	
F	.033	.041	.840	1.04	
H	.264	.287	6.71	7.29	
I	.012	Ñ	.310	Ñ	
J	Ñ	10°	Ñ	10°	
K	10°	16°	10°	16°	
L	.0008	.0040	.0203	.1018	
M	10°	16°	10°	16°	
N	.010	.014	.250	.360	



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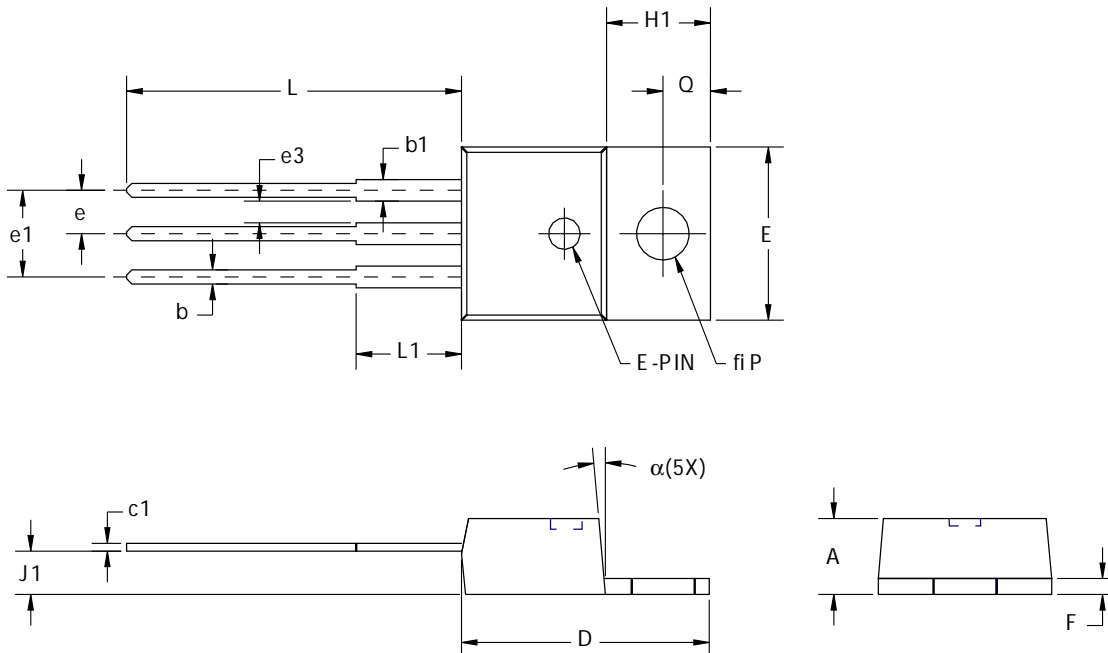
Mechanical Dimensions (continued)

3-Lead TO-220 Package

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	.140	.190	3.56	4.83	
b	.015	.040	.38	1.02	
b1	.045	.070	1.14	1.78	
c1	.014	.022	.36	.56	
fiP	.139	.161	3.53	4.09	
D	.560	.650	14.22	16.51	
E	.380	.420	9.65	10.67	
e	.090	.110	2.29	2.79	
e1	.190	.210	4.83	5.33	
e3	.045	\bar{N}	1.14	\bar{N}	
F	.020	.055	.51	1.40	
H1	.230	.270	5.94	6.87	
J1	.080	.115	2.04	2.92	
L	.500	.580	12.70	14.73	
L1	.250 BSC		6.35 BSC		
Q	.100	.135	2.54	3.43	
α	3°	7°	3°	7°	

Notes:

1. Dimension c1 apply for lead finish.



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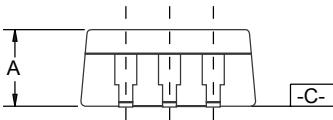
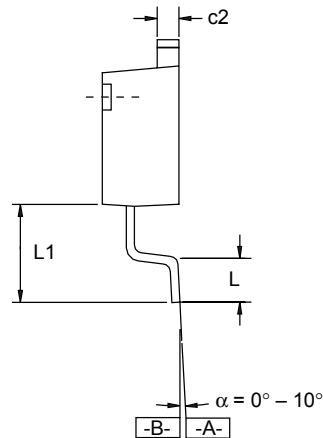
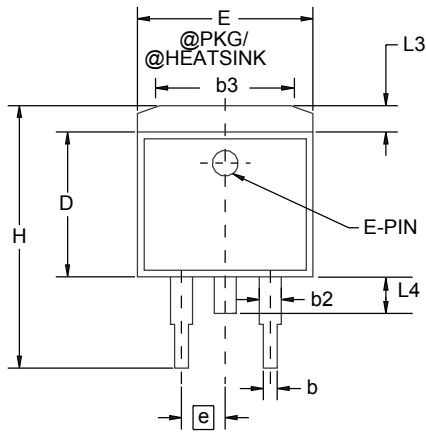
Mechanical Dimensions (continued)

3-Lead TO-252 Package

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	.086	.094	2.19	2.39	
b	.025	.035	0.64	0.89	
b2	.030	.045	0.76	1.14	
b3	.205	.215	5.21	5.46	4
c	.018	.024	0.46	0.61	
c2	.018	.023	0.46	0.58	
D	.210	.245	5.33	6.22	1
E	.250	.265	6.35	6.73	1
e	.090 BSC		2.29 BSC		
H	.370	.410	9.40	10.41	
L	.055	.070	1.40	1.78	3
L1	.108 REF		2.74 REF		
L3	.035	.080	0.89	2.03	4
L4	.025	.040	0.64	1.02	

Notes:

1. Dimensions are exclusive of mold flash, metal burrs or interlead protrusion.
2. Stand off-height is measured from lead tip with ref. to Datum -B-.
3. Foot length is measured with ref. to Datum -A- with lead surface.
4. Thermal pad contour optional within dimension b3 and L3.
5. Formed leads to be planar with respect to one another at seating place -C-.
6. Dimensions and tolerances



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Ordering Information

Product Number	Package
IMP1117ADX/T	TO-252 in tape and reel
IMP1117ASX/T	SOT-223 in tape and reel
IMP1117AD18X/T	TO-252 in tape and reel
IMP1117AS18X/T	SOT-223 in tape and reel
IMP1117AD25X/T	TO-252 in tape and reel
IMP1117AS25X/T	SOT-223 in tape and reel
IMP1117AD285/T	TO-252 in tape and reel
IMP1117AS285/T	SOT-223 in tape and reel
IMP1117AD33/T	TO-252 in tape and reel
IMP1117AS33/T	SOT-223 in tape and reel
IMP1117AT33	TO-220
IMP1117AD5X/T	TO-252 in tape and reel
IMP1117AS5X/T	SOT-223 in tape and reel



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