

# **RC1117**

# 1A Adjustable/Fixed Low Dropout Linear Regulator

#### **Features**

- · Low dropout voltage
- Load regulation: 0.05% typical
- Trimmed current limit
- On-chip thermal limiting
- Standard SOT-223, TO-263, and TO-252 packages
- Three-terminal adjustable or fixed 2.5V, 2.85V, 3.3V, 5V

### **Applications**

- · Active SCSI terminators
- · High efficiency linear regulators
- · Post regulators for switching supplies
- · Battery chargers
- 5V to 3.3V linear regulators
- · Motherboard clock supplies

### **Description**

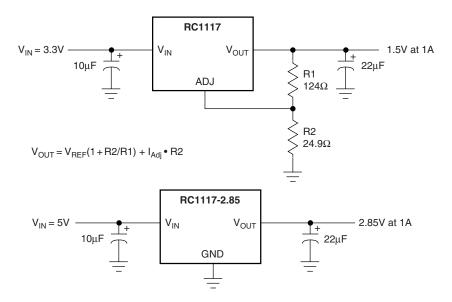
The RC1117 and RC1117-2.5, -2.85, -3.3 and -5 are low dropout three-terminal regulators with 1A output current capability. These devices have been optimized for low voltage where transient response and minimum input voltage are critical. The 2.85V version is designed specifically to be used in Active Terminators for SCSI bus.

Current limit is trimmed to ensure specified output current and controlled short-circuit current. On-chip thermal limiting provides protection against any combination of overload and ambient temperatures that would create excessive junction temperatures.

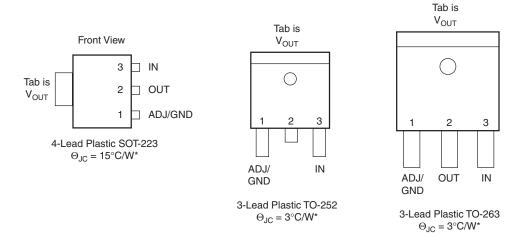
Unlike PNP type regulators where up to 10% of the output current is wasted as quiescent current, the quiescent current of the RC1117 flows into the load, increasing efficiency.

The RC1117 series regulators are available in the industry-standard SOT-223, TO-263 (D2PAK), and TO-252 (DPAK) power packages.

## **Typical Applications**



## **Pin Assignments**



<sup>\*</sup>With package soldered to 0.5 square inch copper area over backside ground plane or internal power plane.,  $\Theta_{JA}$  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 <sub>IN</sub>		7.5	V
Operating Junction Temperature Range	0	125	°C
Storage Temperature Range	-65	150	°C
Lead Temperature (Soldering, 10 sec.)		300	°C

RC1117 PRODUCT SPECIFICATION

#### **Electrical Characteristics**

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

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

Parameter	Conditions		Min.	Тур.	Max.	Units
Reference Voltage, V <sub>REF</sub> <sup>3</sup>	$1.5V \le (V_{IN} - V_{OUT}) \le 5.75V$ , $10mA \le I_{OUT} \le 1A$	•	1.225 (-2%)	1.250	1.275 (+2%)	V
Output Voltage	$\begin{array}{l} 10\text{mA} \leq I_{OUT} \leq 1\text{A} \\ \text{RC1117-2.5, } 4V \leq V_{IN} \leq 7V \\ \text{RC1117-2.85, } 4.35V \leq V_{IN} \leq 7V \\ \text{RC1117-3.3, } 4.8V \leq V_{IN} \leq 7V \\ \text{RC1117-5, } 6.5V \leq V_{IN} \leq 7V \end{array}$	•	2.450 2.793 3.234 4.900	2.5 2.85 3.3 5.0	2.550 2.907 3.366 5.100	V V V
Line Regulation <sup>1,2</sup>	$(V_{OUT} + 1.5V) \le V_{IN} \le 7V, I_{OUT} = 10mA$	•		0.005	0.2	%
Load Regulation <sup>1,2</sup>	$(V_{IN} - V_{OUT}) = 2V$ , $10mA \le I_{OUT} \le 1A$	•		0.05	0.5	%
Dropout Voltage	$\Delta V_{REF} = 1\%$ , $I_{OUT} = 1A$	•		1.100	1.200	V
Current Limit	$(V_{IN} - V_{OUT}) = 2V$	•	1.1	1.5		Α
Adjust Pin Current, I <sub>Adj</sub> <sup>3</sup>		•		35	120	μΑ
Adjust Pin Current Change <sup>3</sup>	$1.5V \le (V_{IN} - V_{OUT}) \le 5.75,$ $10mA \le I_{OUT} \le 1A$	•		0.2	5	μА
Minimum Load Current	$1.5V \le (V_{IN} - V_{OUT}) \le 5.75$	•	10			mA
Quiescent Current	$V_{IN} = V_{OUT} + 1.25V$	•		4	13	mA
Ripple Rejection	$f = 120$ Hz, $C_{OUT} = 22\mu$ F Tantalum, $(V_{IN} - V_{OUT}) = 3V$ , $I_{OUT} = 1A$		60	72		dB
Thermal Regulation	T <sub>A</sub> = 25°C, 30ms pulse			0.004	0.02	%/W
Temperature Stability		•		0.5		%
Long-Term Stability	T <sub>A</sub> = 125°C, 1000hrs.			0.03	1.0	%
RMS Output Noise (% of V <sub>OUT</sub> )	$T_A = 25$ °C, $10Hz \le f \le 10kHz$			0.003		%
Thermal Resistance, Junction	SOT-223			15		°C/W
to Case	TO-252, TO-263			3		°C/W
Thermal Shutdown	Junction Temperature			155		°C
Thermal Shutdown Hysteresis				10		°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. RC1117 only.

## **Typical Performance Characteristics**

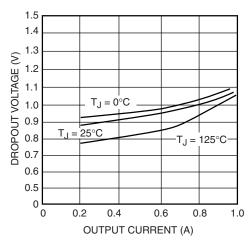


Figure 1. Dropout Voltage vs. Output Current

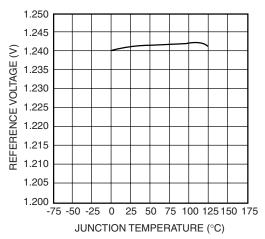


Figure 3. Reference Voltage vs. Temperature

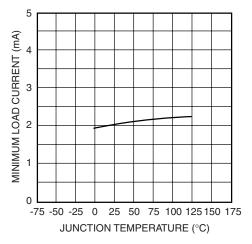


Figure 5. Minimum Load Current vs. Temperature

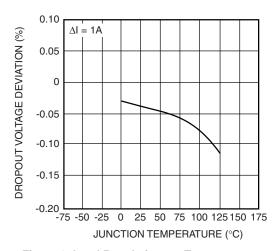


Figure 2. Load Regulation vs. Temperature

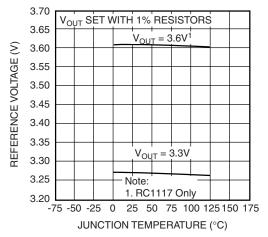


Figure 4. Output Voltage vs. Temperature

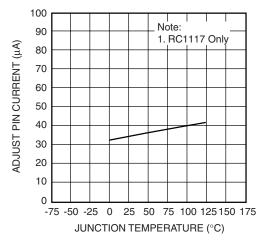


Figure 6. Adjust Pin Current vs. Temperature

RC1117 PRODUCT SPECIFICATION

## **Typical Performance Characteristics** (continued)

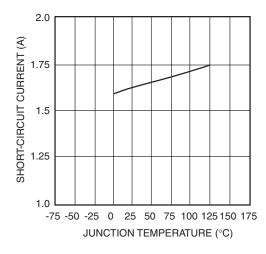


Figure 7. Short-Circuit Current vs. Temperature

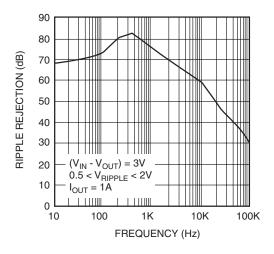


Figure 8. Ripple Rejection vs. Frequency

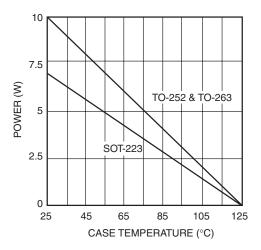
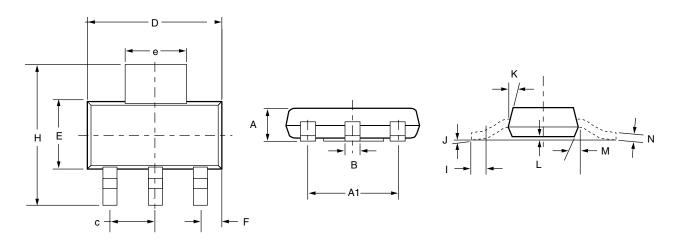


Figure 9. Maximum Power Dissipation

## **Mechanical Dimensions**

## 4-Lead SOT-223 Package

Cumbal	Inches		Millimeters		Notes
Symbol	Min.	Max.	Min.	Max.	Notes
Α	_	.071	_	1.80	
A1	_	.181	_	4.80	
В	.025	.033	.640	.840	
С	_	.090	_	2.29	
D	.248	.264	6.30	6.71	
Е	.130	.148	3.30	3.71	
е	.115	.124	2.95	3.15	
F	.033	.041	.840	1.04	
Н	.264	.287	6.71	7.29	
1	.012	_	.310	_	
J	_	10°	_	10°	
K	10°	16°	10°	16°	
L	.0008	.0040	.0203	.1018	
М	10°	16°	10°	16°	
N	.010	.014	.250	.360	



RC1117 PRODUCT SPECIFICATION

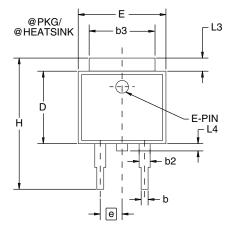
### **Mechanical Dimensions**

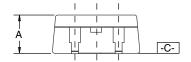
#### 3-Lead TO-252 Package

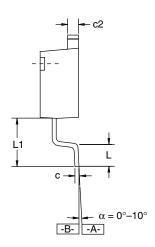
Cumbal	Inches		Millimeters		Notes
Symbol	Min.	Max.	Min.	Max.	Notes
Α	.086	.094	2.19	2.39	
b	.025	.035	0.64	0.89	
b2	.030	.045	0.76	1.14	
b3	.205	.215	5.21	5.46	4
С	.018	.024	0.46	0.61	
c2	.018	.023	0.46	0.58	
D	.210	.245	5.33	6.22	1
E	.250	.265	6.35	6.73	1
е	.090 BSC		2.29	BSC	
Н	.370	.410	9.40	10.41	
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 and metal burrs.
- 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 dimensions b3 and L3
- Formed leads to be planar with respect to one another at seating plane -C-.
- 6. Dimensions and tolerances per ASME Y14.5M-1994.







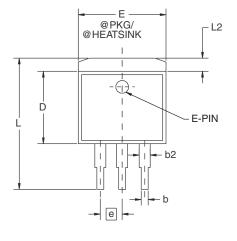
### **Mechanical Dimensions**

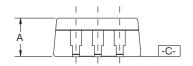
#### 3-Lead TO-263 Package

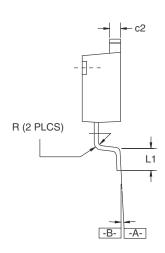
Cumbal	Inches		Millimeters		Nata
Symbol	Min.	Max.	Min.	Max.	Notes
Α	.160	.190	4.06	4.83	
b	.020	.036	0.51	0.91	
b2	.049	.051	1.25	1.30	
c2	.045	.055	1.14	1.40	
D	.340	.380	8.64	9.65	
E	.380	.405	9.65	10.29	
е	.100	BSC	2.54	BSC	
L	.575	.625	14.61	15.88	
L1	.090	.110	2.29	2.79	
L2	_	.055	_	1.40	
R	.017	.019	0.43	0.78	
α	0°	8°	0°	8°	

#### Notes:

- Dimensions are exclusive of mold flash and metal burrs.
  Standoff-height is measured from lead tip with ref. to Datum -B-.
- 3. Foot length is measured with ref. to Datum -A- with lead surface (at inner R).
- Dimension exclusive of dambar protrusion or intrusion.
  Formed leads to be planar with respect to one another at seating







### **Ordering Information**

Product Number	Output	Package
RC1117DX	Adjustable	TO-252 in tape and reel
RC1117M	Adjustable	TO-263
RC1117MT	Adjustable	TO-263 in tape and reel
RC1117ST	Adjustable	SOT-223 in tape and reel
RC1117D25X	2.5 volt	TO-252 in tape and reel
RC1117M25	2.5 volt	TO-263
RC1117M25T	2.5 volt	TO-263 in tape and reel
RC1117S25T	2.5 volt	SOT-223 in tape and reel
RC1117M285	2.85 volt	TO-263
RC1117M285T	2.85 volt	TO-263 in tape and reel
RC1117S285T	2.85 volt	SOT-223 in tape and reel
RC1117D33X	3.3 volt	TO-252 in tape and reel
RC1117M33	3.3 volt	TO-263
RC1117M33T	3.3 volt	TO-263 in tape and reel
RC1117S33T	3.3 volt	SOT-223 in tape and reel
RC1117D5X	5 volt	TO-252 in tape and reel
RC1117M5	5 volt	TO-263
RC1117M5T	5 volt	TO-263 in tape and reel
RC1117S5T	5 volt	SOT-223 in tape and reel

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- A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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