

RC1117

1A Adjustable/Fixed Low Dropout Linear Regulator

Features

- Low dropout voltage at up to 1A
- Load regulation: 0.05% typical
- Trimmed current limit
- On-chip thermal limiting
- Standard SOT-223 and TO-263 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

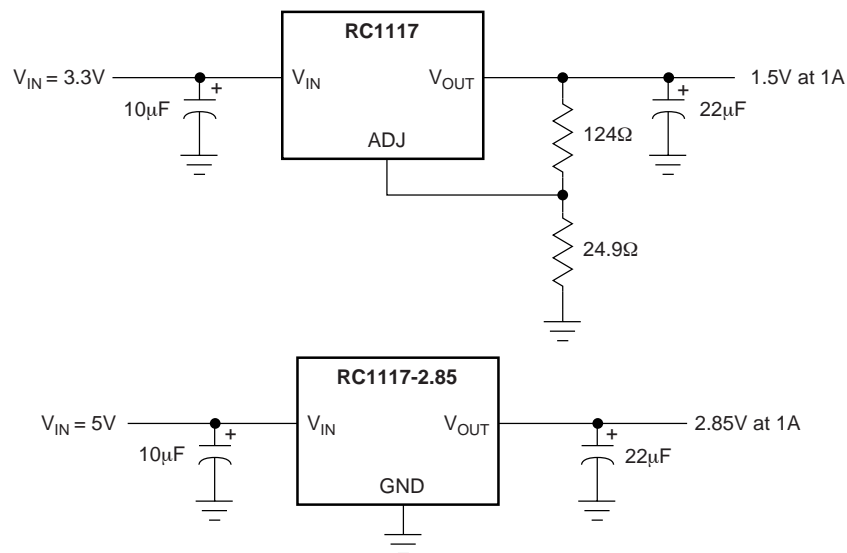
The RC1117 and RC1117-2.5, -2.85, -3.3 and -5 are low dropout three terminal regulators with 1A output current capability. These devices have been optimized for low voltage applications where transient response and minimum input voltage are critical. The 2.85V version is designed specifically to be used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

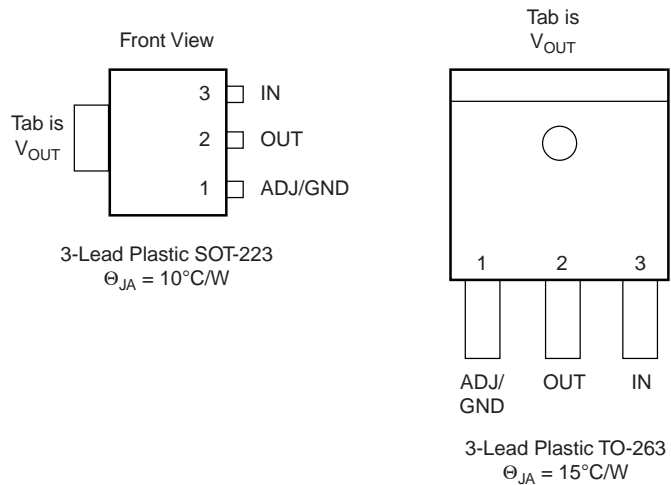
Unlike PNP type regulators where up to 10% of the output current is wasted as quiescent current, the quiescent current of the RC1117 flows into the load, increasing efficiency.

The RC1117 and RC1117-2.5, -2.85, -3.3 and -5 are available in the industry-standard SOT-223 and TO-263 power packages.

Typical Applications



Pin Assignments



Absolute Maximum Ratings

Parameter	Min.	Max.	Unit
V _{IN}		7.5	V
Operating Junction Temperature Range	0	125	°C
Storage Temperature Range	-65	150	°C
Lead Temperature (Soldering, 10 sec.)		300	°C

Electrical Characteristics

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 ⁴	$1.5V \leq (V_{IN} - V_{OUT}) \leq 5.75V$, $10mA \leq I_{OUT} \leq 1A$	• 1.225 (-2%)	1.250	1.275 (+2%)	V
Output Voltage	$10mA \leq I_{OUT} \leq 1A$ RC1117-2.5, $3.8V \leq V_{IN}$ RC1117-2.85, $4.15V \leq V_{IN}$ RC1117-3.3, $4.6V \leq V_{IN}$ RC1117-5, $6.3V \leq V_{IN}$	• 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 V
Line Regulation ^{1,2}	$(V_{IN} - V_{OUT}) > 1.3V$, $I_{OUT} = 10mA$	•	0.005	0.2	%
Load Regulation ^{1,2}	$(V_{IN} - V_{OUT}) = 2V$, $10mA \leq I_{OUT} \leq 1A$	•	0.05	0.5	%
Dropout Voltage	$\Delta V_{OUT} = -1\%$, $I_{OUT} = 1A$	•	1.100	1.200	V
Current Limit ³		1.1	1.3	1.5	A
Adjust Pin Current ⁴		•	35	120	μA
Adjust Pin Current Change ⁴	$(V_{IN} - V_{OUT}) > (V_{OUT} + 1.25V)$, $10mA \leq I_{OUT} \leq 1A$	•	0.2	5	μA
Minimum Load Current	$(V_{IN} - V_{OUT}) > (V_{OUT} + 1.25V)$	•		5	mA
Quiescent Current	$V_{IN} = V_{OUT} + 1.25V$	•	5	10	mA
Ripple Rejection	$f = 120Hz$, $C_{OUT} = 22\mu F$ Tantalum, $(V_{IN} - V_{OUT}) = 3V$, $I_{OUT} = 1A$		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 Shutdown			150		$^\circ C$

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. 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. The RC1117 series has a current limit that is independent of changes in input-to-output voltage.
4. RC1117 only.

Typical Performance Characteristics

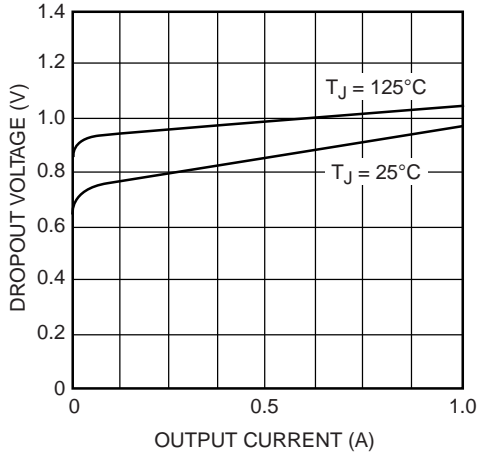


Figure 1. Dropout Voltage vs. Output Current

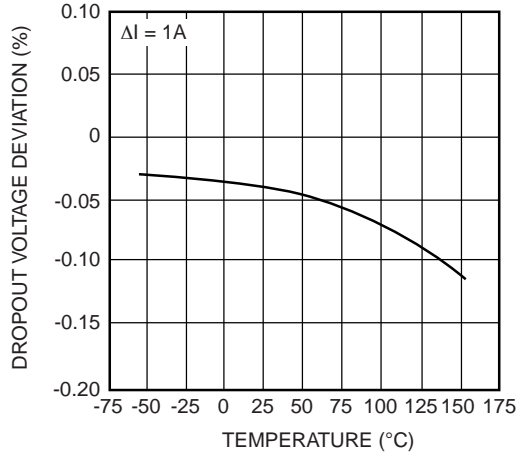


Figure 2. Load Regulation vs. Temperature

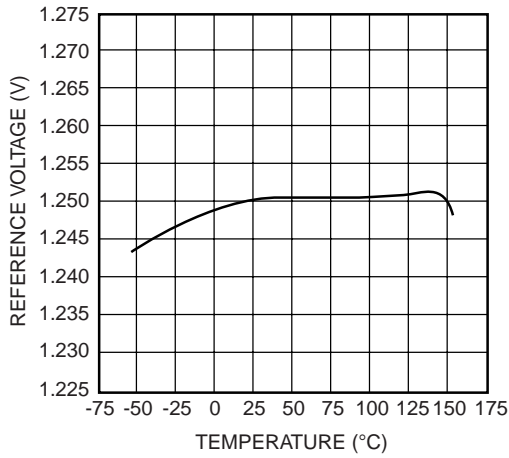


Figure 3. Reference Voltage vs. Temperature

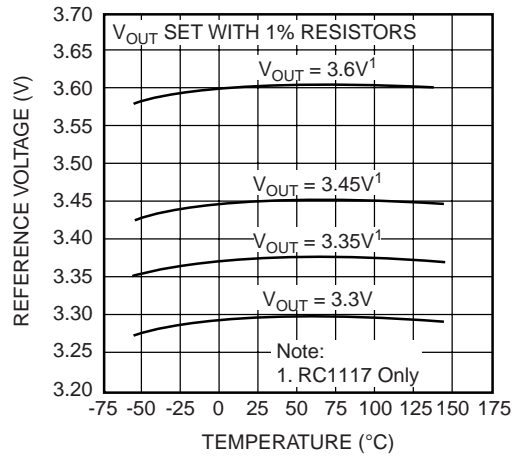


Figure 4. Output Voltage vs. Temperature

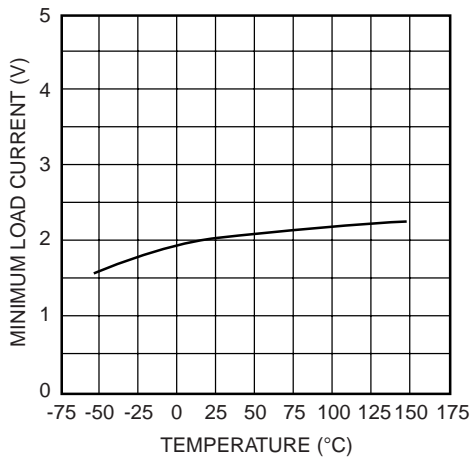


Figure 5. Minimum Load Current vs. Temperature

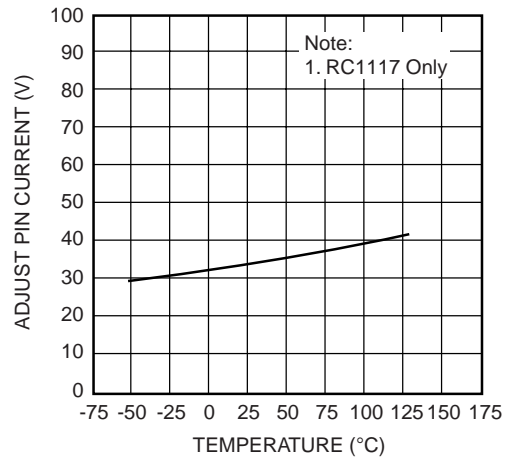


Figure 6. Adjust Pin Current vs. Temperature

Typical Performance Characteristics (continued)

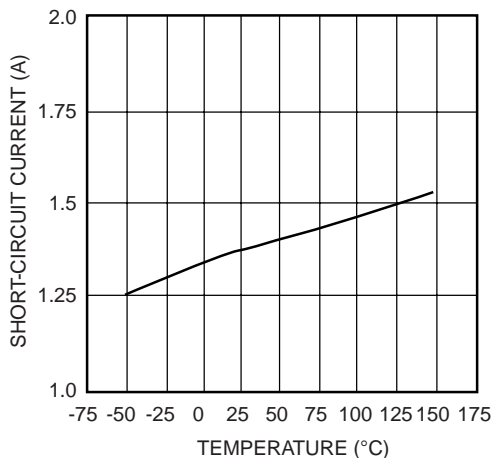


Figure 7. Short-Circuit Current vs. Temperature

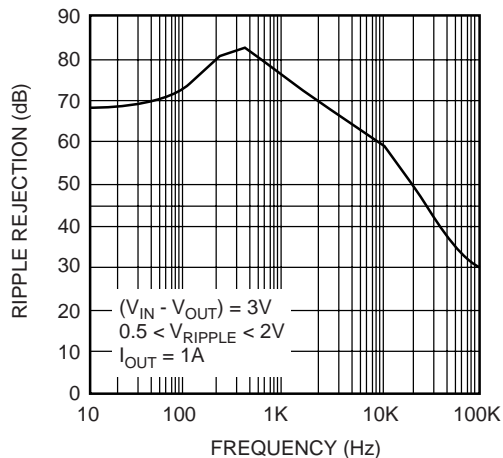


Figure 8. Ripple Rejection vs. Frequency

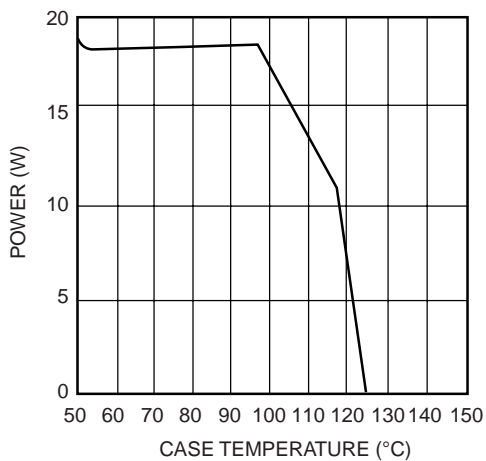


Figure 9. Maximum Power Dissipation, TO-263

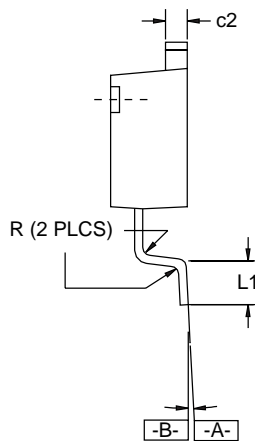
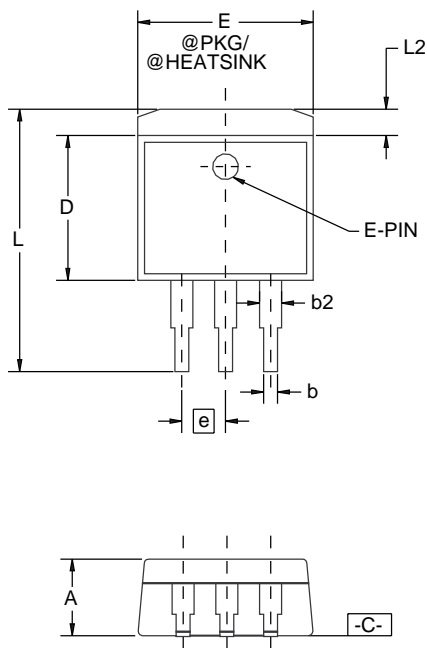
Mechanical Dimensions

3-Lead TO-263 Package

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	.160	.190	4.06	4.83	
b	.020	.039	0.51	0.99	
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	
e	.100 BSC		2.54 BSC		
L	.575	.625	14.61	10.88	
L1	.090	.100	2.29	2.79	
L2	—	.055	—	1.40	
R	.017	.019	0.43	0.48	
α	0°	8°	0°	8°	

Notes:

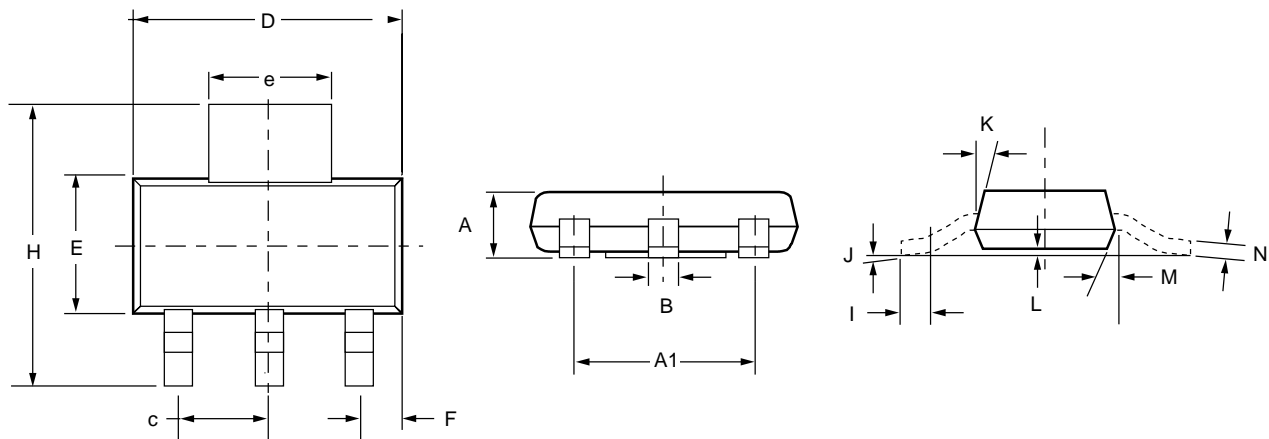
1. Dimensions are exclusive of mold flash and metal burrs.
2. Stand off-height is measured from lead tip with ref. to Datum -B-.
3. Foot length is measured with ref. to Datum -A- with lead surface (at inner R).
4. Dimension exclusive of dambar protrusion or intrusion.
5. Formed leads to be planar with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



Mechanical Dimensions

SOT-263 Package

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	—	.071	—	1.80	
A1	—	.181	—	4.80	
B	.025	.033	.640	.840	
c	—	.090	—	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	—	.310	—	
J	—	10°	—	10°	
K	10°	16°	10°	16°	
L	.0008	.0040	.0203	.1018	
M	10°	16°	10°	16°	
N	.010	.014	.250	.360	



Ordering Information

Product Number	Package
RC1117M	TO-263
RC1117ST	SOT-223
RC1117M-2.5	TO-263
RC1117ST-2.5	SOT-223
RC1117M-2.85	TO-263
RC1117ST-2.85	SOT-223
RC1117M-3.3	TO-263
RC1117ST-3.3	SOT-223
RC1117M-5	TO-263
RC1117ST-5	SOT-223

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