Rochester Electronics

Datasheet

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
    - Class Q Military
    - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)

    - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

FAIRCHILD SEMICONDUCTOR TM

www.fairchildsemi.com

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

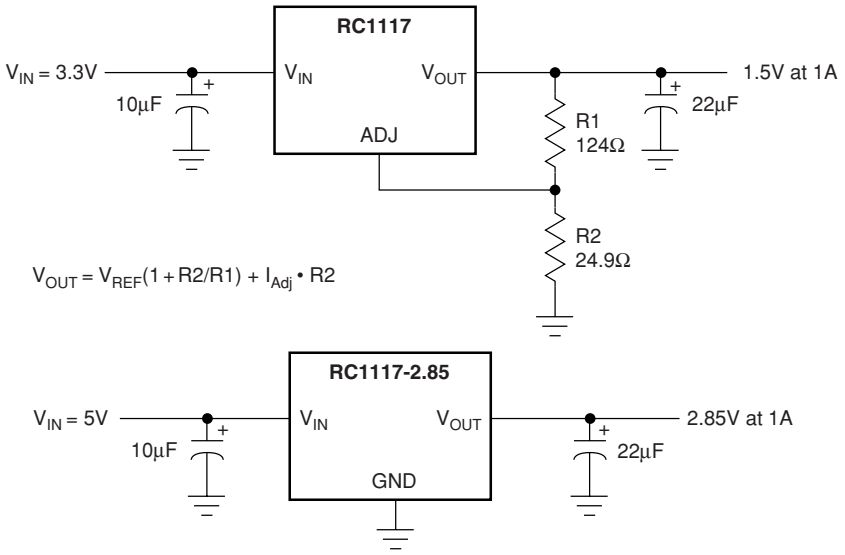
The RC1117 and RC1117-2.5, -2.85, -3.3 and -5 are low dropout three-terminal regulators with 1A output current capability. These devices have been optimized for low voltage where transient response and minimum input voltage are critical. The 2.85V version is designed specifically to be used in Active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

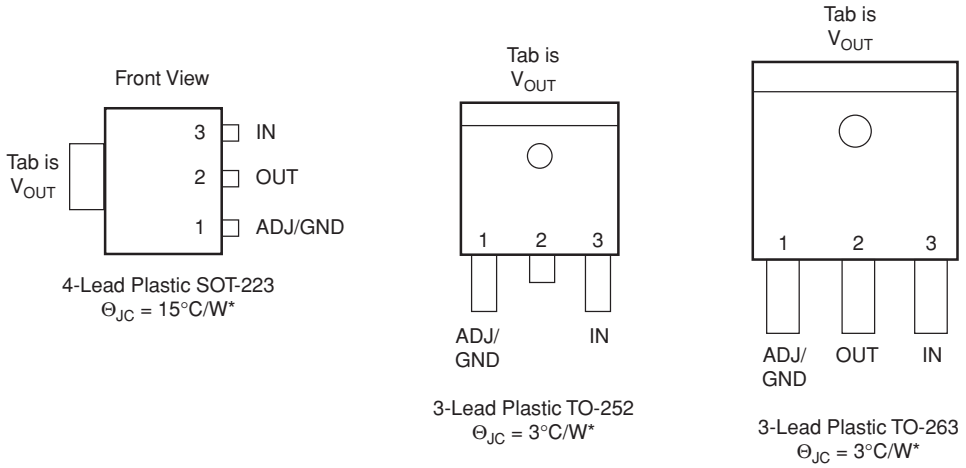
Unlike PNP type regulators where up to 10% of the output current is wasted as quiescent current, the quiescent current of the RC1117 flows into the load, increasing efficiency.

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



*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}		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: $V_{IN} \leq 7V$, $T_J = 25°C$ unless otherwise specified.

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

Parameter	Conditions		Min.	Typ.	Max.	Units
Reference Voltage, V_{REF}[3]	$1.5V \leq (V_{IN} - V_{OUT}) \leq 5.75V$, $10mA \leq I_{OUT} \leq 1A$	•	1.225 (-2%)	1.250	1.275 (+2%)	V
Output Voltage	$10mA \leq I_{OUT} \leq 1A$					
	RC1117-2.5, $4V \leq V_{IN} \leq 7V$	•	2.450	2.5	2.550	V
	RC1117-2.85, $4.35V \leq V_{IN} \leq 7V$	•	2.793	2.85	2.907	V
	RC1117-3.3, $4.8V \leq V_{IN} \leq 7V$	•	3.234	3.3	3.366	V
	RC1117-5, $6.5V \leq V_{IN} \leq 7V$	•	4.900	5.0	5.100	V
Line Regulation[1,2]	$(V_{OUT} + 1.5V) \leq V_{IN} \leq 7V$, $I_{OUT} = 10mA$	•		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	$\Delta V_{REF} = 1\%$, $I_{OUT} = 1A$	•		1.100	1.200	V
Current Limit	$(V_{IN} - V_{OUT}) = 2V$	•	1.1	1.5		A
Adjust Pin Current, I_{Adj}[3]		•		35	120	µA
Adjust Pin Current Change[3]	$1.5V \leq (V_{IN} - V_{OUT}) \leq 5.75$, $10mA \leq I_{OUT} \leq 1A$	•		0.2	5	µA
Minimum Load Current	$1.5V \leq (V_{IN} - V_{OUT}) \leq 5.75$	•	10			mA
Quiescent Current	$V_{IN} = V_{OUT} + 1.25V$	•		4	13	mA
Ripple Rejection	f = 120Hz, C_{OUT} = 22µF Tantalum, $(V_{IN} - V_{OUT}) = 3V$, $I_{OUT} = 1A$		60	72		dB
Thermal Regulation	$T_A = 25°C$, 30ms pulse			0.004	0.02	%/W
Temperature Stability		•		0.5		%
Long-Term Stability	$T_A = 125°C$, 1000hrs.			0.03	1.0	%
RMS Output Noise (% of V_{OUT})	$T_A = 25°C$, $10Hz \leq f \leq 10kHz$			0.003		%
Thermal Resistance, Junction to Case	SOT-223			15		°C/W
	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

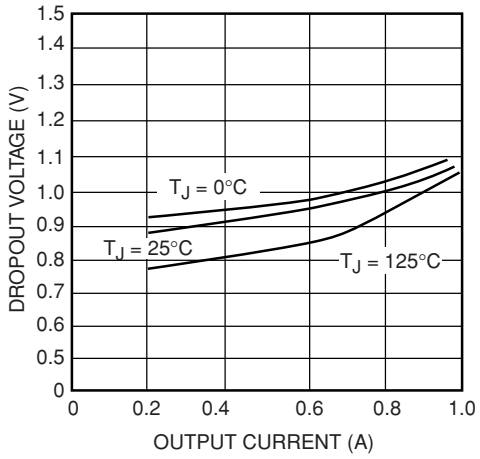


Figure 1. Dropout Voltage vs. Output Current

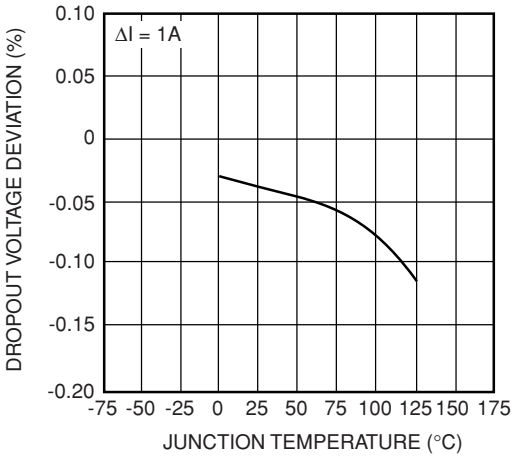


Figure 2. Load Regulation vs. Temperature

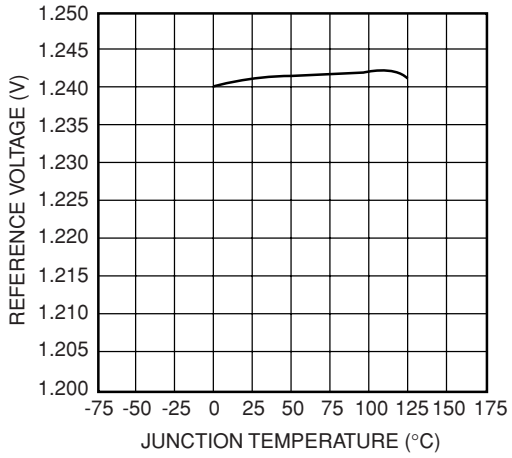


Figure 3. Reference Voltage vs. Temperature

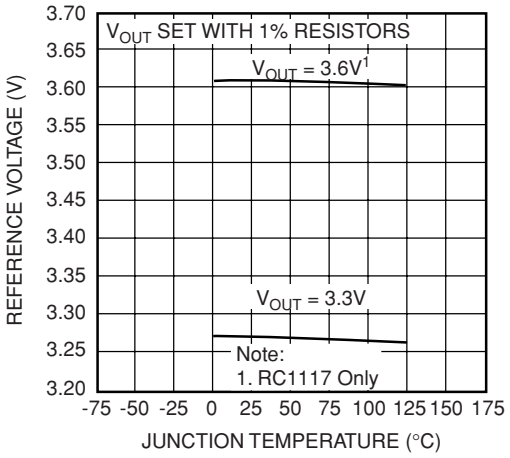


Figure 4. Output Voltage vs. Temperature

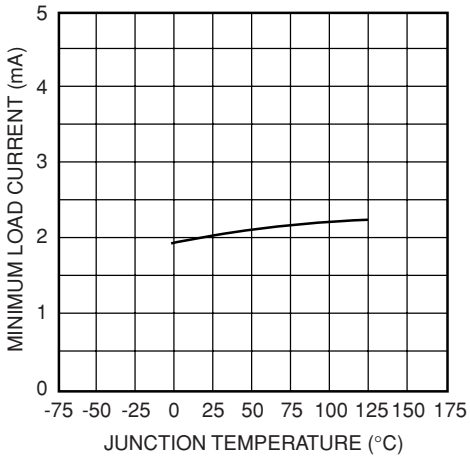


Figure 5. Minimum Load Current vs. Temperature

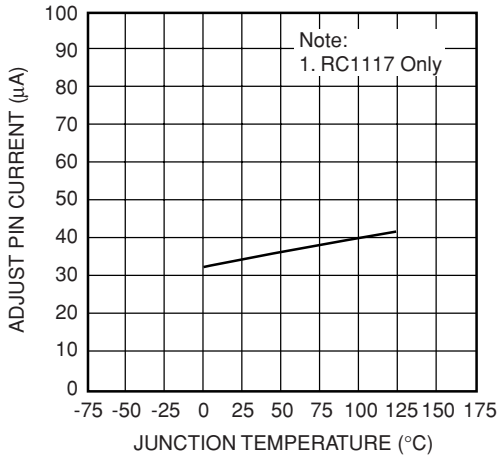


Figure 6. Adjust Pin Current vs. Temperature

Typical Performance Characteristics (continued)

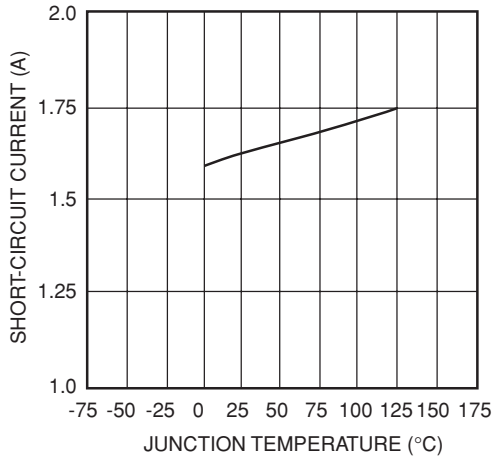


Figure 7. Short-Circuit Current vs. Temperature

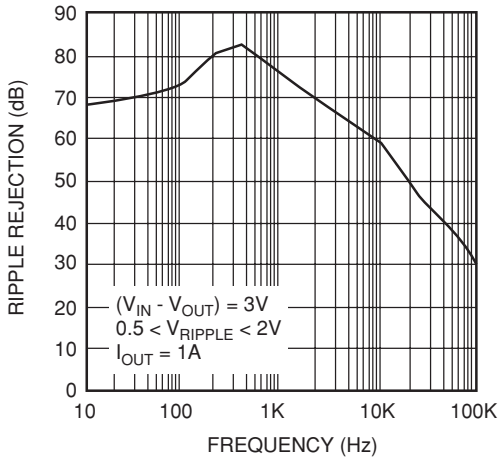


Figure 8. Ripple Rejection vs. Frequency

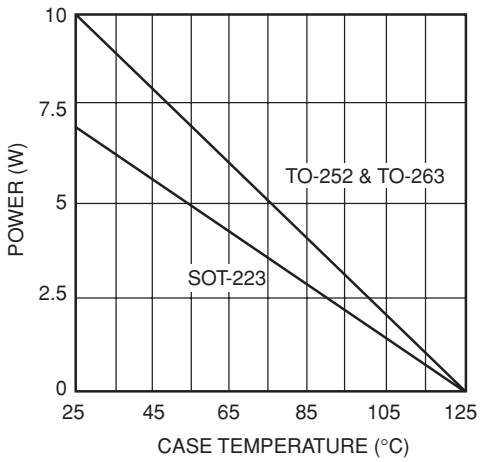
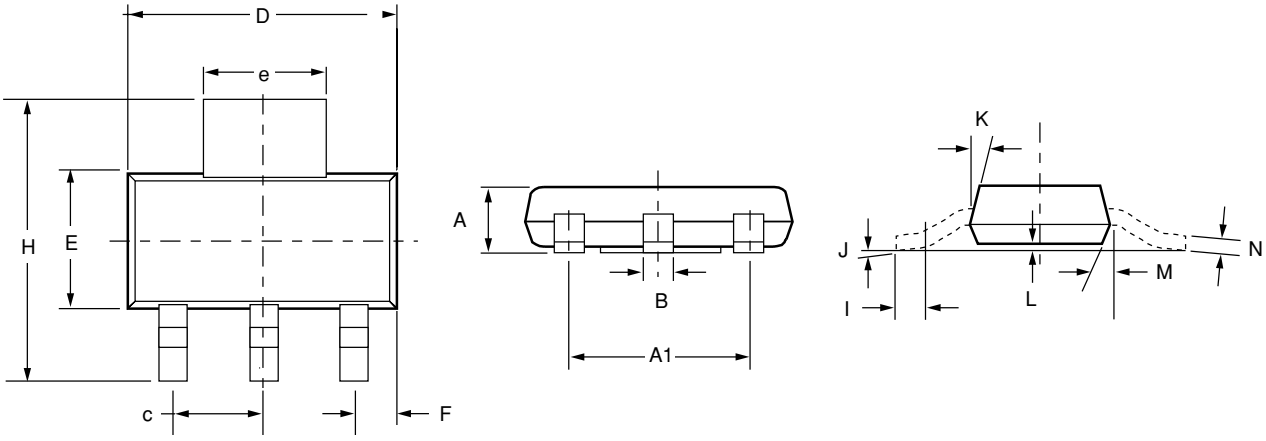


Figure 9. Maximum Power Dissipation

Mechanical Dimensions

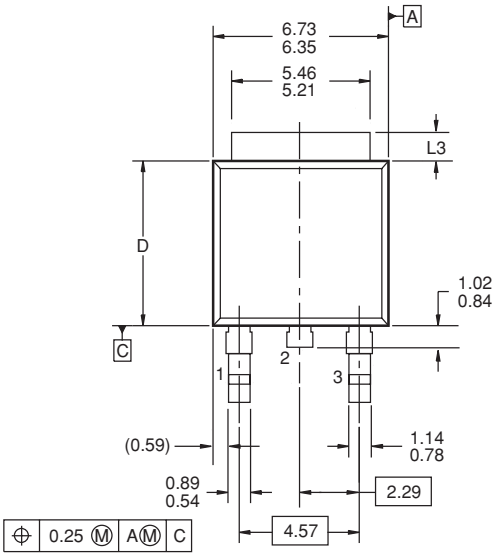
4-Lead SOT-223 Package

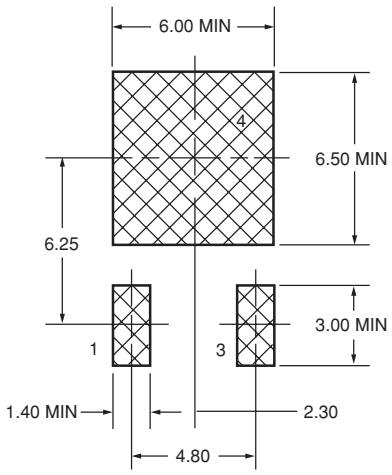
Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	—	.071	—	1.80	
A1	—	.181	—	4.80	
B	.025	.033	.640	.840	
c	—	.090	—	2.29	
D	.248	.264	6.30	6.71	
E	.130	.148	3.30	3.71	
e	.115	.124	2.95	3.15	
F	.033	.041	.840	1.04	
H	.264	.287	6.71	7.29	
I	.012	—	.310	—	
J	—	10°	—	10°	
K	10°	16°	10°	16°	
L	.0008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



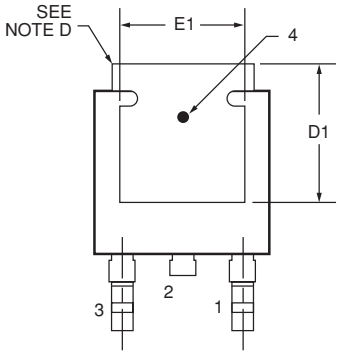
Mechanical Dimensions

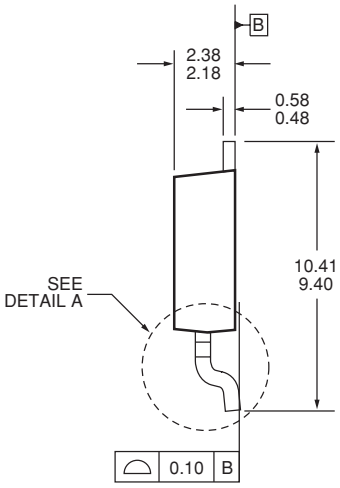
3-Lead TO-252 Package

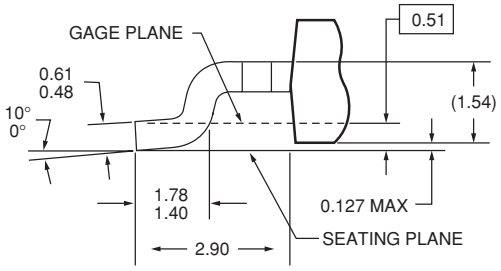




LAND PATTERN RECOMMENDATION







DETAIL A
(ROTATED –90°
SCALE 12X

NOTES: UNLESS OTHERWISE SPECIFIED

A) ALL DIMENSIONS ARE IN MILLIMETERS.

B) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE C. VARIATION AA & AB, DATED NOV. 1999.

C) DIMENSIONING AND TOLERANCING PER ASME Y14.5–1994.

D) HEAT SINK TOP EDGE COULD BE IN CHAMFERED CORNERS OR EDGE PROTRUSION.

E) DIMENSIONS L3, D, E1 & D1 TABLE:

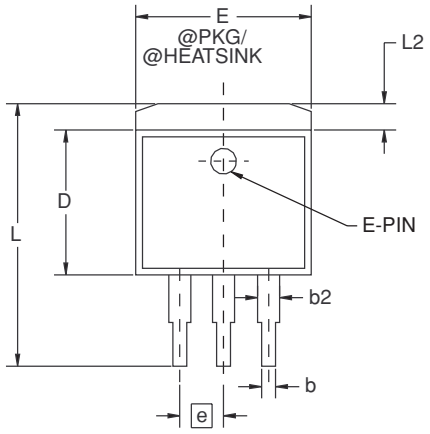
	OPTION AA	OPTION AB
L3	0.89 – 1.27	1.52 – 2.03
D	5.97 – 6.22	5.33 – 5.59
E1	4.32 MIN	3.81 MIN
D1	5.21 MIN	4.57 MIN

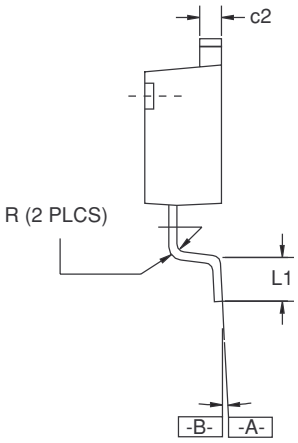
Mechanical Dimensions

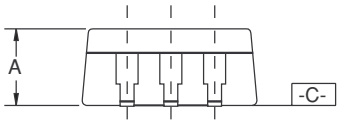
3-Lead TO-263 Package

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	.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	
e	.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:
1. Dimensions are exclusive of mold flash and metal burrs.
2. 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).
4. Dimensiuon exclusive of dambar protrusion or intrusion.
5. Formed leads to be planar with respect to one another at seating place -C-.







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