



## LD3117

Preliminary

LINEAR INTEGRATED CIRCUIT

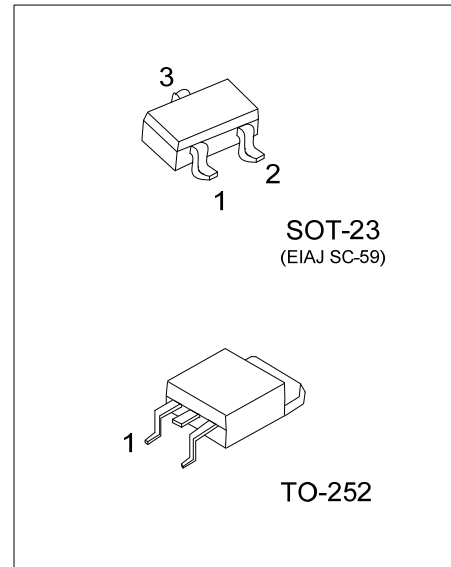
### 500mA LOW DROPOUT LINEAR VOLTAGE REGULATORS

#### DESCRIPTION

The UTC **LD3117** are 500mA fixed output voltage low dropout linear regulators. Wide range of available output voltage fits most of applications. Built-in output current-limiting most thermal-limiting provide maximal protection against any fault conditions.

#### FEATURES

- \*Guaranteed 500mA output current
- \*Input voltage range up to 20V
- \*Extremely tight load regulation
- \*Fast transient response
- \*Current-limiting and Thermal-limiting
- \*Three-terminal adjustable or fixed 1.5V, 1.8V, 2.2V, 2.5V, 2.7V, 2.8V, 2.9V, 3.0V, 3.3V, 3.5V, 3.6V, 3.7V, 4.7V, 5.0V



#### ORDERING INFORMATION

Ordering Number		Package	① Pin Assignment			Packing	
Lead Free	Halogen Free		PIN CODE	1	2		3
LD3117L-xx-AE3-①-R	LD3117G-xx-AE3-①-R	SOT-23	1	G	I	O	R: Tape Reel
			3	G	O	I	
			5	O	G	I	
			6	I	G	O	
LD3117L-xx-TN3-①-R	LD3117G-xx-TN3-①-R	TO-252	PIN CODE	1	2	3	R: Tape Reel
			A	G	O	I	

Note: 1. Pin assignment: G: GND (Ground/Adjustable) I:  $V_{IN}$  (Positive Power Input) O:  $V_{OUT}$  (Output)  
 2. xx: Output Voltage, refer to Marking Information.

<p>LD3117G-xx-AE3-①-R</p>	<p>(1) R: Tape Reel</p> <p>(2) refer to Pin Assignment</p> <p>(3) AE3: SOT-23, TN3: TO-252</p> <p>(4) xx: refer to Marking Information</p> <p>(5) G: Halogen Free and Lead Free, L: Lead Free</p>
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### MARKING INFORMATION

PACKAGE	VOLTAGE CODE	Pin Assignment	MARKING																				
SOT-23	15:1.5V	<table border="1"> <thead> <tr> <th>PIN CODE</th> <th>PIN 1</th> <th>PIN 2</th> <th>PIN 3</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>G</td> <td>I</td> <td>O</td> </tr> <tr> <td>3</td> <td>G</td> <td>O</td> <td>I</td> </tr> <tr> <td>5</td> <td>O</td> <td>G</td> <td>I</td> </tr> <tr> <td>6</td> <td>I</td> <td>G</td> <td>O</td> </tr> </tbody> </table>	PIN CODE	PIN 1	PIN 2	PIN 3	1	G	I	O	3	G	O	I	5	O	G	I	6	I	G	O	
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	1		G	I	O																		
	3		G	O	I																		
	5		O	G	I																		
	6		I	G	O																		
	18:1.8V																						
22:2.2V																							
25:2.5V																							
27:2.7V																							
28:2.8V																							
29:2.9V																							
TO-252	30:3.0V	<table border="1"> <thead> <tr> <th>PIN CODE</th> <th>PIN 1</th> <th>PIN 2</th> <th>PIN 3</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>G</td> <td>O</td> <td>I</td> </tr> </tbody> </table>	PIN CODE	PIN 1	PIN 2	PIN 3	A	G	O	I													
	PIN CODE		PIN 1	PIN 2	PIN 3																		
	A		G	O	I																		
	33:3.3V																						
	35:3.5V																						
	36:3.6V																						
	37:3.7V																						
47:4.7V																							
50:5.0V AD:ADJ																							

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Input Voltage $V_{IN}$		$V_{IN}$	-0.3 ~ +20	V
Power Dissipation	SOT-23	$P_D$	295	mW
	TO-252		890	mW
Operating Temperature		$T_{OPR}$	-40 ~ +85	°C
Storage Temperature		$T_{STG}$	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23	$\theta_{JA}$	335	°C/W
	TO-252		112	°C/W

■ ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ ,  $C_{IN}=1\mu\text{F}$ ,  $C_{OUT}=10\mu\text{F}$ , unless otherwise specified)

For LD3117-1.5V, 1.8V, 2.2V, 2.5V, 2.7V, 2.8V, 2.9V, 3.0V

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$I_L=2\text{mA}$ , $V_{IN}-V_{OUT}=1.4\text{V}$	1.47	1.50	1.53	V
			1.77	1.80	1.83	V
			2.16	2.20	2.24	V
			2.45	2.50	2.55	V
			2.65	2.70	2.75	V
			2.74	2.80	2.86	V
			2.84	2.90	2.96	V
			2.94	3.00	3.06	V
Dropout Voltage (Note 4,5)	$V_D$	$I_L=500\text{mA}$			1.5	V
Line Regulation	$\Delta V_{OUT}$	$I_L=2\text{mA}$ , $V_{IN}-V_{OUT}=2\text{V} \sim V_{IN}=9\text{V}$			0.5	% $V_{OUT}$
Load Regulation (Note 2)	$\Delta V_{OUT}$	$I_L=2\text{mA} \sim 500\text{mA}$ , $V_{IN}-V_{OUT}=2\text{V}$		10	50	mV
Current Limit (Note 3)	$I_{LIMIT}$	$V_{IN}-V_{OUT}=2\text{V}$ , $V_{OUT}=0\text{V}$		550		mA
Standby Current	$I_{ST-BY}$	$I_L=0$ , $V_{IN}=9\text{V}$			5.0	mA

■ ELECTRICAL CHARACTERISTICS (Cont.)

For LD3117-ADJ, 3.3V, 3.5V, 3.6V, 3.7V, 4.7V, 5.0V

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>ADJUSTABLE (R1=120Ω, R2=200Ω, V<sub>OUT</sub>=3.3V)</b>							
Reference Voltage		V <sub>REF</sub>	V <sub>IN</sub> -V <sub>OUT</sub> =2V, I <sub>L</sub> =2mA	1.238	1.250	1.262	V
Output Voltage-LD3117		V <sub>OUT</sub>	I <sub>L</sub> =2mA, V <sub>IN</sub> -V <sub>OUT</sub> =1.4V	3.23	3.30	3.37	V
				3.43	3.50	3.57	V
				3.53	3.60	3.67	V
				3.63	3.70	3.77	V
				4.61	4.70	4.79	V
				4.90	5.00	5.10	V
Dropout Voltage (Notes 4, 5)	LD3117	V <sub>D</sub>	I <sub>L</sub> =500mA			1.3	V
	LD3117-ADJ	V <sub>D</sub>	I <sub>L</sub> =500mA			1.5	V
Line Regulation		ΔV <sub>OUT</sub>	I <sub>L</sub> =2mA, V <sub>IN</sub> -V <sub>OUT</sub> =2V ~ V <sub>IN</sub> =12V			0.5	%V <sub>OUT</sub>
Load Regulation (Note 2)		ΔV <sub>OUT</sub>	I <sub>L</sub> =2mA ~ 500mA, V <sub>IN</sub> -V <sub>OUT</sub> =2V		10	50	mV
Current Limit (Note 3)		I <sub>LIMIT</sub>	V <sub>IN</sub> -V <sub>OUT</sub> =2V, V <sub>OUT</sub> =0V		550		mA
Standby current		I <sub>ST-BY</sub>	I <sub>L</sub> =0, V <sub>IN</sub> =12V			5.0	mA
Adjust Pin Current		I <sub>ADJ</sub>	V <sub>IN</sub> =12V			200	μA
Adjust Pin Current Change		ΔI <sub>ADJ</sub>	V <sub>IN</sub> =2.75V~12V, I <sub>L</sub> =1mA~500mA			5	μA

Notes: 1. Guaranteed by design.

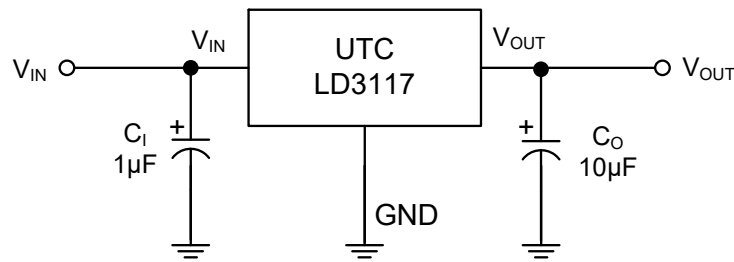
2. Regulation is measured at constant junction temperature, using pulsed ON time

3. Current Limit is measured at constant junction temperature, using pulsed ON time.

4. Dropout is measured at constant junction temperature, using pulsed ON time, and the criterion is V<sub>OUT</sub> inside target value±2%.

5: Dropout test is skipped at the condition of V<sub>IN</sub><3V.

### ■ TYPICAL APPLICATION CIRCUIT

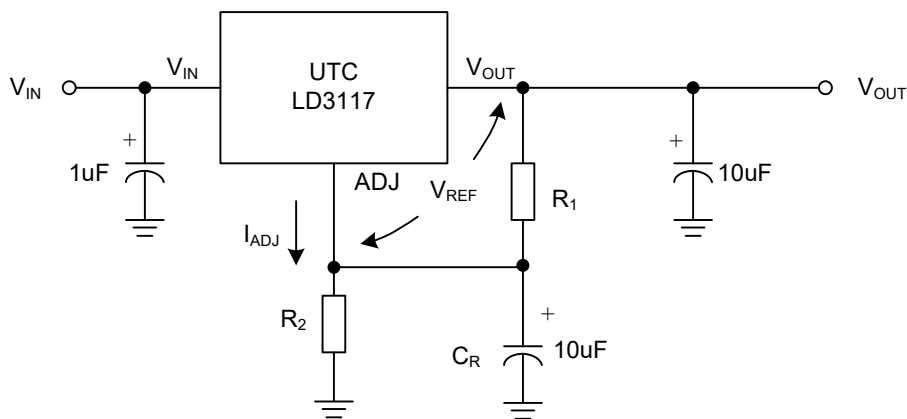


### ■ APPLICATION INFORMATION

A 10µF (or larger) capacitor is recommended between  $V_{OUT}$  and GND for stability. The part may oscillate without the capacitor. Any type of capacitor can be used, but not Aluminum electrolytics when operating below -25°C. The capacitance may be increased without limit.

A 1µF capacitor (or larger) should be placed between  $V_{IN}$  to GND.

### LD3117 ADJUSTABLE



$C_R$ : 10µF to improve ripple rejection

$$V_{OUT} = V_{REF}(1 + R_2/R_1) + I_{ADJ} * R_2$$

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