



## 1.5A CMOS LDO

### DESCRIPTION

The UTC **L11815A** is a CMOS linear regulator. One of its features is very low quiescent current typical as low as 45 $\mu$ A and its dropout voltage is extremely low with 1.5A output current.

The internal circuit includes thermal shutdown and current fold-back mechanism to prevent device failure when the circuit is operated in the bad conditions.

In application, the UTC **L11815A** needs a low noise, regulated supply. For stable operation, the output capacitance value should be 4.7 $\mu$ F or more.

The UTC **L11815A** is an ideal for battery applications, such as instrumentations, portable electronics, wireless devices, PC peripherals, and battery powered widgets. The output voltage values are set during manufacturing and the accuracy is tighten 1.5%.

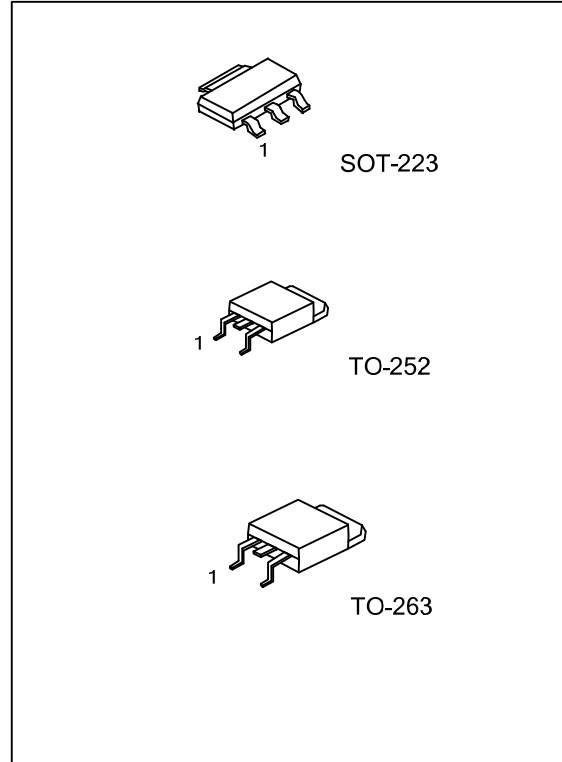
### FEATURES

- \* Quiescent Current (45 $\mu$ A typ.)
- \* Very Low Dropout Voltage
- \* Guaranteed 1.5A output
- \* Accuracy :  $\pm$ 1.5%
- \* Over-Temperature ShutDown
- \* With Current Limiting
- \* Short Circuit Current Fold-Back
- \* Low Temperature Coefficient

### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment	Packing
Lead Free	Halogen Free			
L11815AL-xx-AA3-x-R	L11815AG-xx-AA3-x-R	SOT-223	A: GOI D: IGO	Tape Reel
L11815AL-xx-TN3-x-R	L11815AG-xx-TN3-x-R	TO-252		
L11815AL-xx-TQ2-x-R	L11815AG-xx-TQ2-x-R	TO-263		

Note: Pin Assignment: G:GND O:V<sub>OUT</sub> I:V<sub>IN</sub>  
xx: Output Voltage, refer to Marking Information.

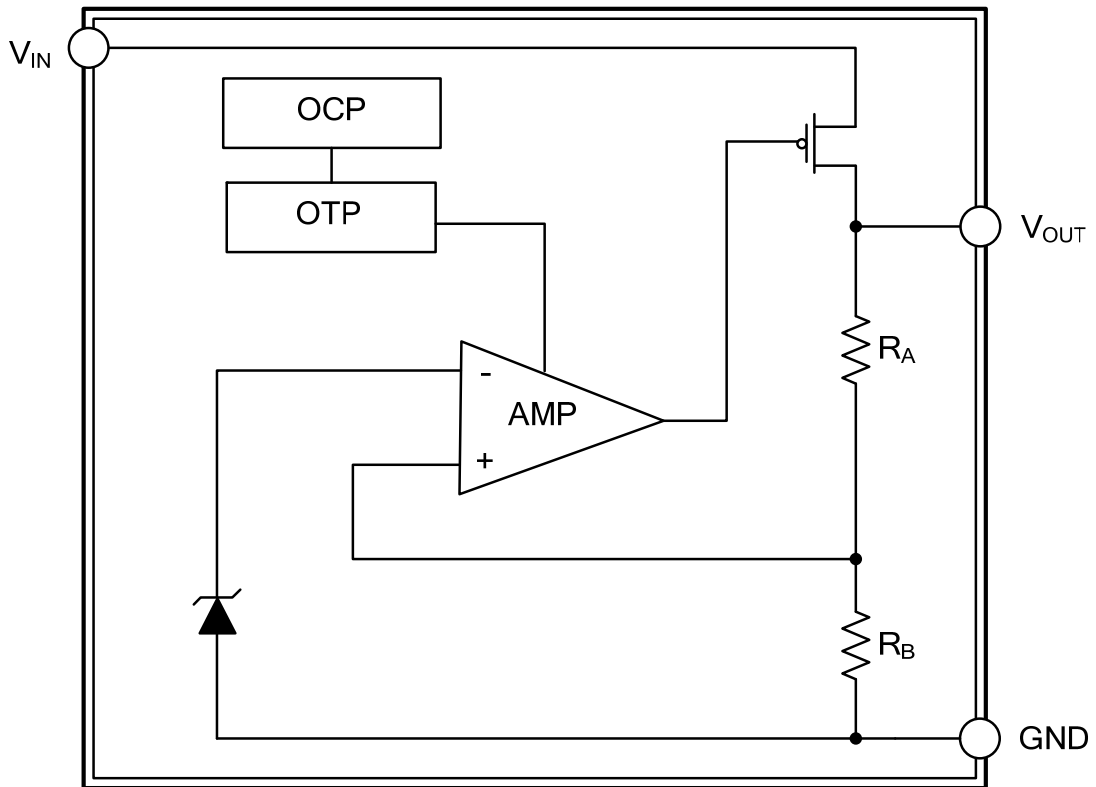


<p>L11815AG-xx-AA3-x-R</p>	<p>(1) Packing Type</p> <p>(2) Pin Assignment</p> <p>(3) Package Type</p> <p>(4) Output Voltage Code</p> <p>(5) Lead Free</p>	<p>(1) R: Tape Reel</p> <p>(2) refer to Pin Assignment</p> <p>(3) AA3: SOT-223, TN3:TO-252, TQ2:TO-263</p> <p>(4) xx: Refer to Marking Information</p> <p>(5) G: Halogen Free, L:Lead Free</p>
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■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-223	15: 1.5V 19: 1.9V 25: 2.5V 28: 2.8V	
TO-252 TO-263		

■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	$V_{IN}$	-0.3 ~ +8	V
Output Voltage	$V_{OUT}$	GND - 0.3 ~ $V_{IN} + 0.3$	V
Power Dissipation	$P_D$	Internally limited	
Junction Temperature	$T_J$	150	°C
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 Case	TO-252	103	°C/W
	TO-263	62.5	
	SOT-223	140	

### ■ ELECTRICAL CHARACTERISTICS ( $V_{IN} = V_{O(NOM)} + 2V$ , $T_a = 25^\circ\text{C}$ , unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Input Voltage	$V_{IN}$		Note		7	V	
Output Voltage Accuracy	$V_{OUT}$	$I_{O} = 1\text{mA}$	-1.5		1.5	%	
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}}$	$I_{OUT} = 1\text{mA}$ $V_{IN} = V_{OUT} + 1 \sim V_{OUT} + 2$	$V_{OUT} < 2.0\text{V}$	-0.15		0.15	%
			$V_{OUT} \geq 2.0\text{V}$	-0.1	0.02	0.1	%
Load Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}}$	$I_{OUT} = 1\text{mA} \sim 1500\text{mA}$	-1	0.2	1	%	
Output Current	$I_{OUT}$		1500			mA	
Current Limit	$I_{LIMIT}$		1500	2000		mA	
Short Circuit Current	$I_{SC}$	$V_{IN} = V_{O(NOM)} + 1\text{V}$ , $V_{OUT} < 0.4\text{V}$		750		mA	
Quiescent Current	$I_Q$	$I_{OUT} = 0\text{mA}$		45	70	$\mu\text{A}$	
Ground Pin Current	$I_{GND}$	$I_{OUT} = 1\text{mA} \sim 1500\text{mA}$		45		$\mu\text{A}$	
Dropout Voltage	$V_D$	$I_{OUT} = 1.5\text{A}$ $V_{OUT} = V_{O(NOM)} - 2.0\%$	$V_{O(NOM)} \leq 2.0\text{V}$		1300	mV	
			$V_{O(NOM)} > 2.0\text{V}$		800	mV	
Over Temperature Shutdown	OTS			150		°C	
Over Temperature Hysteresis	OTH			30		°C	
Temperature Coefficient of Output Voltage	$T_C V_O$			30		ppm/°C	
Power Supply Rejection	PSRR	$I_{OUT} = 100\text{mA}$ , $C_O = 4.7\mu\text{F}$	$f = 100\text{Hz}$		70		dB
			$f = 1\text{kHz}$		50		dB
			$f = 10\text{kHz}$		20		dB
Output Voltage Noise	eN	$f = 10\text{Hz} \sim 100\text{kHz}$ , $I_{OUT} = 10\text{mA}$ , $C_O = 4.7\mu\text{F}$		30		$\mu\text{Vrms}$	

Note:  $V_{IN(MIN)} = V_{OUT} + V_D$

#### ■ DETAILED DESCRIPTION

The UTC **L11815A** of CMOS regulators consist of a PMOS pass transistor, voltage reference, error amplifier, over-current protection, and thermal shutdown.

The error amplifier, over-current shutdown, and thermal protection circuits provides data for P-channel pass transistor. The error amplifier takes output voltage for a precision reference in the normal operation and the normal operation is restored when the junction temperature drops below 120°C. Over-current and Thermal shutdown circuits start to work when the junction temperature is higher than 150 °C, or the current exceeds 2.2A. The output voltage stays low when the thermal shutdown is in active.

The UTC **L11815A** behaves like a current source when the load reaches 2.2A. But the current would fall back to 600mA to prevent excessive power loss when the load impedance value is below 0.3Ω. Normal operation is restored when the load resistance value is higher than 0.75 Ω.

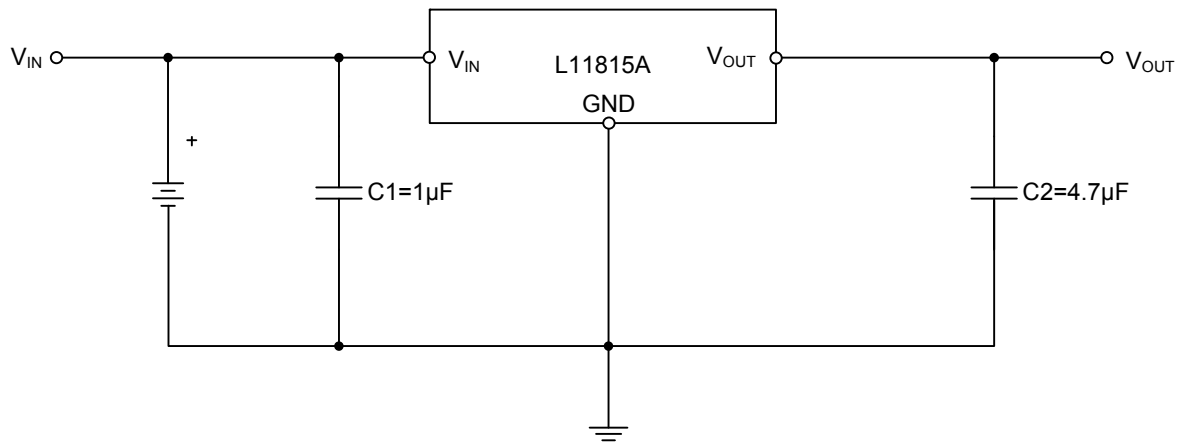
#### ■ EXTERNAL CAPACITORS

The UTC **L11815A** has an output capacitor to ground of 4.7μF or more in the stable operation. Ceramic capacitors can provide the lowest ESR with the best AC performance. Aluminum Electrolytic capacitors, in contrast, have the highest ESR with poorest AC response. Unfortunately, large value ceramic capacitors are comparatively expensive. So we can parallel a 0.1μF ceramic capacitor with a 10μF Aluminum Electrolytic. The result is low ESR, high capacitance, and low overall cost.

A second capacitor is recommended between the input and ground to stabilize input voltage. To get an ideal effect the value of the input capacitor should be at least 0.1μF.

All capacitors should be placed in close proximity to the pins. This can be achieved with a star connection.

## ■ TYPICAL APPLICATION CIRCUIT



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