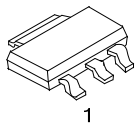
1.5A CMOS LDO



SOT-223

■ DESCRIPTION

The UTC **L11815A** is a COMS linear regulator. One of it's feature is very low quiescent current typical as low as 45μA 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 4.7μF 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 (45μA typ.)
* Very Low Dropout Voltage
* Guaranteed 1.5A output
* Accuracy : ±1.5%
* Over-temperature shut down
* With current limiting
* Short circuit current fold-back
* Low temperature coefficient
* Halogen-free

■ ORDERING INFORMATION

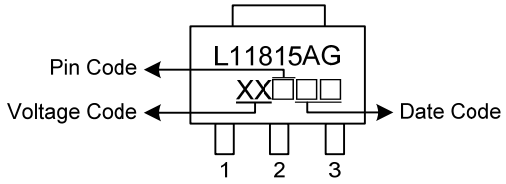
Ordering Number	Package	Pin Assignment			Packing
		1	2	3	
L11815AG-xx-AA3-D-R	SOT-223	I	G	O	Tape Reel

Note: Pin Assignment: G:GND O:V_{OUT} I:V_{IN}
xx: Output Voltage, refer to Marking Information.

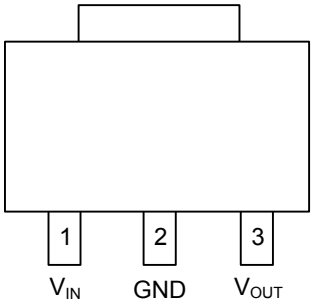
L11815AG-xx-AA3-x-R
(1) Packing Type
(2) Pin Assignment
(3) Package Type
(4) Output Voltage Code
(5) Halogen Free

(1) R: Tape Reel
(2) refer to Pin Assignment
(3) AA3: SOT-223
(4) xx: Refer to Marking Information
(5) G: Halogen Free

■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-223	19: 1.9V 28: 2.8V	

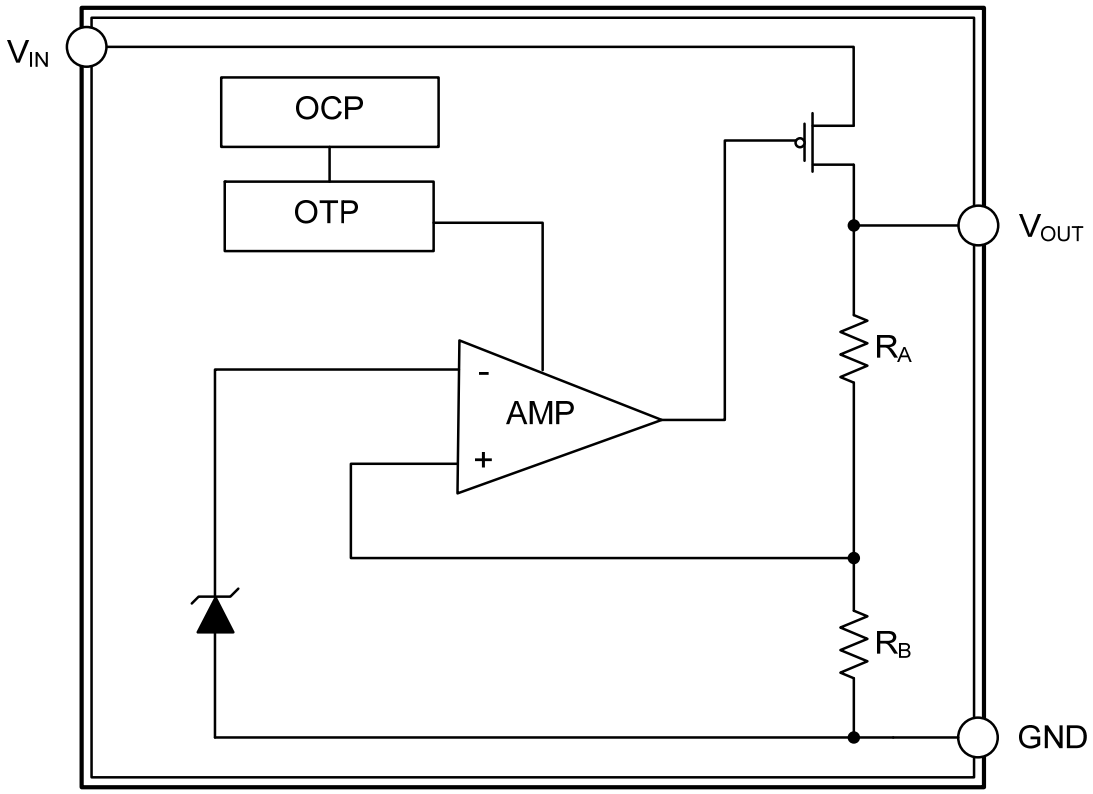
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V_{IN}	Input voltage pin. It should be decoupled with 1μF or greater capacitor.
2	GND	Ground connection pin.
3	V_{OUT}	LDO voltage regulator output pin. It should be decoupled with a 4.7μF or greater value low ESR ceramic capacitor.

■ 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
Output Current	I_{OUT}	$\frac{P_D}{V_{IN} - V_{OUT}}$	mA
Power Dissipation	P_D	900	mW
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	MIN	TYP	MAX	UNIT
Junction to Ambient	θ_{JA}			120	°C/W
Junction to Case (Note)	θ_{JC}			25	°C/W

Note: θ_{JC} on center of molding compound if IC has on tab

■ ELECTRICAL CHARACTERISTICS (V_{IN} = $V_{O(Nom)}$ +2V , Ta = 25°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=1mA		-1.5		1.5	%
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}}$	I_{OUT}=1mA	V_{OUT}<2.0V	-0.15		0.15	%
		V_{IN}=V_{OUT}+1~V_{OUT}+2	V_{OUT}≥2.0V	-0.1	0.02	0.1	%
Load Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}}$	I_{OUT}=1mA ~ 1500mA		-1	0.2	1	%
Output Current	I_{OUT}			1500			mA
Current Limit	I_{LIMIT}			1500	2000		mA
Short Circuit Current	I_{SC}	V_{IN}= $V_{O(NOM)}$+1V, V_{OUT}<0.4V			750		mA
Quiescent Current	I_Q	I_{OUT}=0mA			45	70	μA
Ground Pin Current	I_{GND}	I_{OUT}=1mA ~ 1500mA			45		μA
Dropout Voltage	V_D	I_{OUT}=1.5A	$V_{O(NOM)}$≤2.0V			1300	mV
		V_{OUT}=$V_{O(NOM)}$-2.0%	$V_{O(NOM)}$>2.0V			800	mV
Over Temperature Shutdown	OTS				150		°C
Over Temperature Hysteresis	OTH				30		°C
Temperature Coefficient of Output Voltage	T_CV_O				30		ppm/°C
Power Supply Rejection	PSRR	I_{OUT}=100mA, C_O=4.7μF	f=100Hz		70		dB
			f=1kHz		50		dB
			f=10kHz		20		dB
Output Voltage Noise	eN	f=10Hz ~ 100kHz, I_{OUT}=10mA, Co=4.7μF			30		μVrms

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

■ DETAILED DESCRIPATION

The UTC **L11815A** of CMOS regulators insist 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