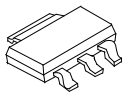
800mA CMOS LDO



SOT-223

■ DESCRIPTION

As UTC LDO, the features of the UTC **L1188** include low quiescent current and very low dropout voltage.

In order prevent form the bad operating conditions, there are internal thermal shutdown and current fold-back. For stably operation, the UTC **L1188** should be connected to an output capacitance of 2.2μF or larger.

The UTC **L1188** can be an ideal for battery applications, such as portable electronics, wireless devices, cordless phones, PC peripherals and battery powered widgets.

■ FEATURES

* Extra low dropout voltage
* Output current: 800mA (guaranteed)
* Output voltage accuracy: ±1.5%
* Quiescent current: 30μA
* Internal Over-Temperature shutdown
* With Current limiting
* Internal short circuit current fold-back
* Pre-set output voltages in factory
* Very low temperature coefficient
* Halogen Free

■ ORDERING INFORMATION

Ordering Number	Package	Pin Assignment			Packing
		1	2	3	
L1188G-xx-AA3-A-R	SOT-223	G	O	I	Tape Reel

Note: Pin Assignment: G:GND O:V_{OUT} I:V_{IN}

xx: Output Voltage, refer to Marking Information.

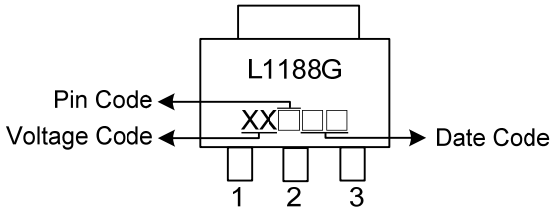
L1188G-xx-AA3-R

(1) Packing Type
(2) Package Type
(3) Output Voltage Code
(4) Halogen Free

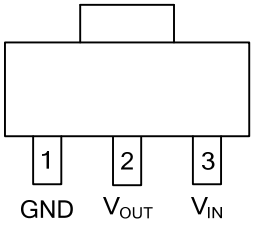
(1) R: Tape Reel
(2) AA3: SOT-223
(3) xx: Refer to Marking Information
(4) G: Halogen Free

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■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-223	28 :2.8V	

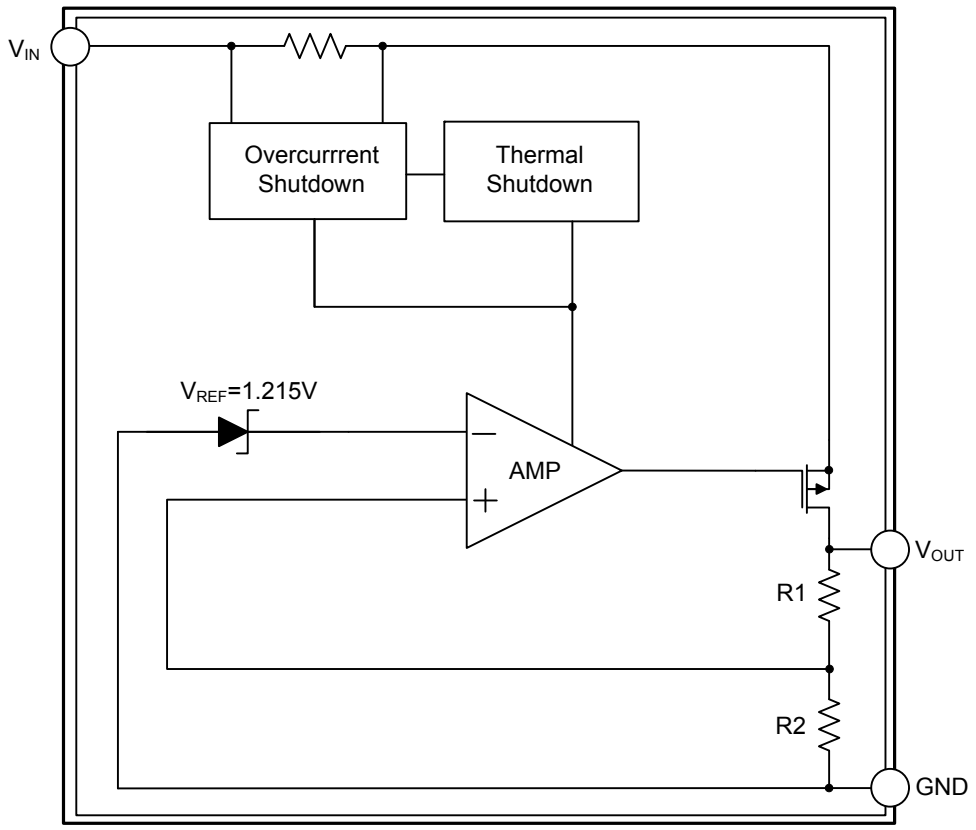
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	GND	Ground.
2	V_{OUT}	Output voltage pin which should be decoupled with a ceramic capacitor (Value: 2.2μF or larger and low ESR).
3	V_{IN}	Input voltage pin which should be decoupled with 1μF or greater capacitor.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	8	V
Input, Output Voltage		GND - 0.3 ~ V_{IN} + 0.3	V
Output Current	I_{OUT}	1	A
Power Dissipation	P_D	800	mW
Junction Temperature	T_J	125	°C
Operating Temperature	T_{OPR}	- 40 ~ +85	°C
Storage Temperature	T_{STG}	- 65 ~ +150	°C

Notes: 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	θ_{JA}	135	°C/W
Junction to Case (Note)	θ_{JC}	31	°C/W

Note: Measure θ_{JC} on backside center of tab.

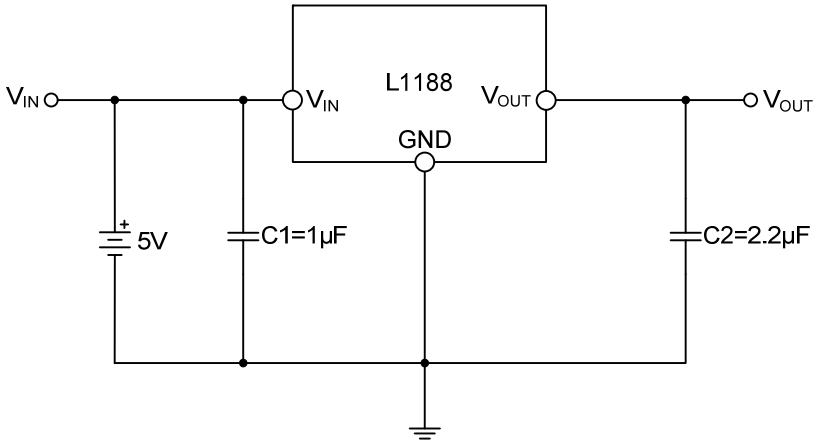
■ ELECTRICAL CHARACTERISTICS (Ta = 25°C, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Input Voltage	V_{IN}			Note1		7	V
Output Voltage Accuracy	V_{OUT}	I_{OUT} = 1mA		-1.5		1.5	%
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}}$	I_{OUT}=1mA V_{IN}=V_{OUT}+1~V_{OUT}+2	1.8V≤V_{OUT}≤2.0V	-0.15		0.15	%
			2.0V<V_{OUT}<4.0V	-0.1	0.02	0.1	%
			V_{OUT}≥4.0V	-0.4	0.2	0.4	%
Load Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}}$	I_{OUT} =1mA~800mA			0.2	1	%
Output Current	I_{OUT}	V_{OUT}≥1.8V		800			mA
Current Limit	I_{LIMIT}	V_{OUT}≥1.8V		900			mA
Short Circuit Current	I_{SC}	V_{OUT}<0.8V			400	800	mA
Quiescent Current	I_Q	I_{OUT}=0mA			30	50	μA
Ground Pin Current	I_{GND}	I_{OUT}=1mA ~ 800mA			35		μA
Dropout Voltage	V_D	I_{OUT}=800mA V_{OUT}=$V_{OUT(NOM)}$-2.0%	1.8V≤$V_{OUT(NOM)}$≤2.0V			1400	mV
			2.0V<$V_{OUT(NOM)}$≤2.8V			1000	mV
			2.8V<$V_{OUT(NOM)}$			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 Ripple Rejection	PSRR	I_{OUT}=100mA C_O=2.2μF	f=100Hz		60		dB
			f=1kHz		50		dB
			f=10kHz		20		dB
Output Voltage Noise	eN	I_{OUT}=10mA, C_{OUT}=2.2μF, f=10Hz~100kHz			30		μVrms

Notes: 1. $V_{IN(MIN)}$=V_{OUT}+V_D

2. To prevent the Short Circuit Current protection feature from being prematurely activated, the input voltage must be applied before a current source load is applied.

■ TYPICAL APPLICATION CIRCUIT



■ APPLICATION INFORMATION

1. Detailed Description

Internal circuits include: a PMOS pass transistor, voltage reference, error amplifier, over-current protection, and thermal shutdown.

The data through the error amplifier, over-current shutdown, and thermal protection circuits, then to the P-channel pass transistor.

As soon as the junction temperature exceeds 150°C or the current exceeds 900mA, over-current and thermal shutdown circuits start working. When the junction temperature drops below 120°C, normal operation is restored.

When the load exceeds the rated output current, for preventing the over stress, the chip switches from voltage mode to current mode.

2. External Information

When considering the external capacitors, the L1188 is stable with an output capacitor to ground of 2.2μF or greater. As we know, the ceramic capacitors have the lowest ESR but can offer the best AC performance; the aluminum electrolytic capacitors exhibit the highest ESR but offer the poorest AC response. And also large value ceramic capacitors are expensive. Consider all the situation, the best way is to parallel a 0.1μF ceramic capacitor with a 10μF Aluminum Electrolytic (low ESR, high capacitance, and low overall cost).

For better beneficial effecting, the input capacitor should be at least 0.1μF.

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