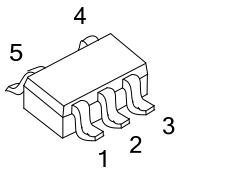
500mA, LOW DROPOUT, LOW NOISE ULTRA-FAST WITH SOFT START CMOS LDO REGULATOR



SOT-25

■ DESCRIPTION

UTC **LR1120**, a 500mA LDO regulator, has very high PSRR and super low dropout voltage especially suitable for wireless and portable applications.

In the field of hand-held wireless devices, board space and battery life are the main concerns of designers and end-users. Because of the low quiescent current and low ESR ceramic capacitors, UTC **LR1120** can satisfy those concerns.

Furthermore, low current consumption in shutdown mode (0.7μA), fast turn-on time (<70μs), high output accuracy, current limiting protection, and high ripple rejection ratio are advantages of UTC **LR1120**.

■ FEATURES

* Operating Voltage Ranges : 2.2V to 5.5V
* Dropout : 250mV at 500mA
* When IC Shutdown: 5mA Discharge Current of V_{OUT}
* Extreme Low Noise for DSC Application
* Extreme Fast Response in Line/Load Transient
* Internal Current Limiting Protection
* Internal Thermal Shutdown Protection
* High PSRR
* Recommended 1μF Output Capacitor only for Stability
* With TTL Logic Controlled Shutdown Input

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR1120L-xx-AF5-R	LR1120G-xx-AF5-R	SOT-25	Tape Reel

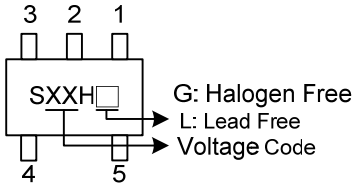
Note: xx: Output Voltage, refer to Marking Information.

LR1120L-xx-AF5-R

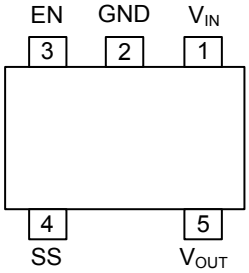
(1) Packing Type
(2) Package Type
(3) Output Voltage Code
(4) Lead Free

(1) R: Tape Reel
(2) AF5: SOT-25
(3) xx: Refer to Marking Information
(4) G: Halogen Free, L: Lead Free

■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-25	18 :1.8V 25 :2.5V 28 :2.8V 31 :3.1V 33 :3.3V 40 :4.0V	

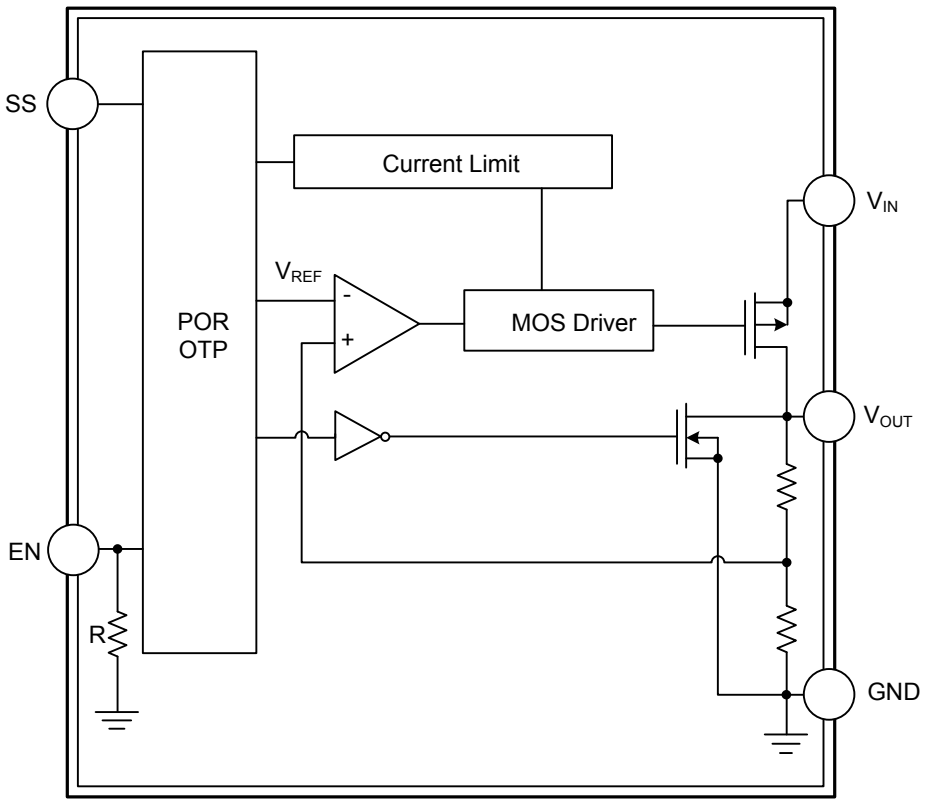
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO	PIN NAME	DESCRIPTION
1	V_{IN}	Supply voltage input.
2	GND	Ground.
3	EN	Input logic pin, active high for enabling the chip. When this pin goes to a logic low, the chip will be shutdown.
4	SS	Soft start pin.
5	V_{OUT}	Regulator output voltage pin.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Ta= 25°C, unless otherwise specified.)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage	V_{IN}	6	V
EN Input Voltage	V_{EN}	6	V
Power Dissipation (Ta = 25°C)	P_D	0.4	W
Junction Temperature	T_J	150	°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	θ_{JA}	250	°C/W

■ OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage	V_{IN}	2.2 ~ 5.5	V
Junction Temperature	T_J	−40 ~ +125	°C
Ambient Temperature	T_A	−40 ~ +85	°C

Note: The device is not guaranteed to function outside its operating conditions.

■ ELECTRICAL CHARACTERISTICS

(V_{IN} = V_{OUT} + 0.5V, V_{EN} = V_{IN}, C_{IN} = C_{OUT} = 1μF (Ceramic), Ta= 25°C, unless otherwise specified.)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage		V_{IN}		2.2		5.5	V
Output Voltage Accuracy		ΔV_{OUT}	I_{OUT} = 10mA	-2	0	+2	%
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	V_{IN} = (V_{OUT}+0.5V) ~ 5.5V I_{OUT} = 1mA		0.01	0.2	%/V
Load Regulation (Note 1)		$\frac{\Delta V_{OUT}}{V_{OUT}}$	1mA<I_{OUT}<400mA 2.2V≤V_{IN}<2.7V			0.6	%
			1mA<I_{OUT}<500mA 2.7 V≤V_{IN}≤5.5V			1	%
Quiescent Current (Note 2)		I_Q	V_{EN} = 5V, I_{OUT} = 0mA		25	50	μA
Standby Current		I_{STN-BY}	V_{EN} = 0V		0.7	1.5	μA
Current Limit		I_{LIMIT}	R_{LOAD} = 0Ω, 2.2V≤V_{IN}<2.7V	0.4	0.7	1.05	A
			R_{LOAD} = 0Ω, 2.7V≤V_{IN}≤5.5V	0.5	0.8	1.05	A
Dropout Voltage (Note 3)		V_D	I_{OUT} = 400mA, 2.2V≤V_{IN} ≤2.7V		160	320	mV
			I_{OUT} = 500mA, 2.7V≤V_{IN} ≤5.5V		250	400	
Soft Start Time			V_{OUT} = 2.5V, C_{SS} = 1nF, C_{OUT} = 1μF		0.7	1	ms
EN Threshold	Logic-Low	V_{IL}		0		0.6	V
	Logic-High	V_{IH}		1.6		5.5	V
Enable Pin Current		I_{EN}		0.1	1	5	μA
Over Temperature Shutdown		OTS			170		°C
Over Temperature Hysteresis		OTH			30		°C
Power Supply Rejection Rate (f = 10kHz)		PSRR	I_{OUT} = 10mA		55		dB
Output Noise Voltage		eN	V_{OUT} = 1.5V, C_{OUT} = 1μF, I_{OUT} = 0mA, C_{SS} = 1nF		40		μVrms

Note: 1. Regulation is measured at constant junction temperature by using a 2ms current pulse. Devices are tested for load regulation in the load range from 1mA to 500mA.

2. Quiescent, or ground current, is the difference between input and output currents. It is defined by I_Q = I_{IN} - I_{OUT} under no load condition (I_{OUT} = 0mA). The total current drawn from the supply is the sum of the load current plus the ground pin current.

3. The dropout voltage is defined as V_{IN} -V_{OUT}, which is measured when V_{OUT} is $V_{OUT(NORMAL)}$×98%.

■ TYPICAL APPLICATION CIRCUIT