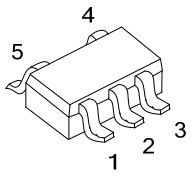
150mA, LOW QUIESCENT CURRENT, FAST TRANSIENT LOW DROPOUT LINEAR REGULATOR



SOT-23-5
(JEDEC TO-236)

■ DESCRIPTION

The UTC **LR1112** is a CMOS-based 150mA voltage regulator with low supply current, low dropout, adjustable and fixed output voltage, The device consists of pass element, error amplifier, band-gap, current limit and thermal shutdown circuitry. The device is turned on when EN pin is set to logic high level.

■ FEATURES

* 150mA low dropout regulator with EN
* Very low I_Q over full load: 30μA
* Wide input voltage range: 2.5~6V
* Wide adjustable output: 0.8V~5.0V
* Fixed output options: 1.0V~3.3V
* Fast start-up time: 80μs
* PSRR: 65dB at 100Hz
* Stable with low ESR, 1μF ceramic output capacitor
* Low dropout: 150mV typical at 150mA
* Excellent Load/Line Transient Response
* Current limit protection
* Ambient temperature range: -40ºC~85°C

■ ORDERING INFORMATION

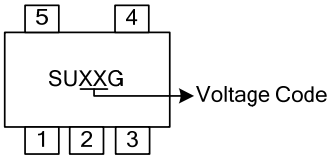
Ordering Number	Package	Packing
LR1112G-xx-AE5-R	SOT-23-5	Tape Reel

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

LR1112G-xx-AE5-R

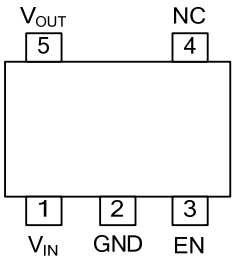
(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) AE5: SOT-23-5
(3)Output Voltage Code	(3) xx: refer to Marking Information
(4)Green Package	(4) G: Halogen Free and Lead Free

■ MARKING INFORMATION

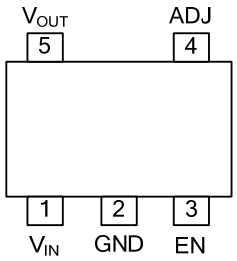
PACKAGE	VOLTAGE CODE	MARKING
SOT-23-5	AD: ADJ	

■ PIN CONFIGURATION

Fixed Output



ADJ Output

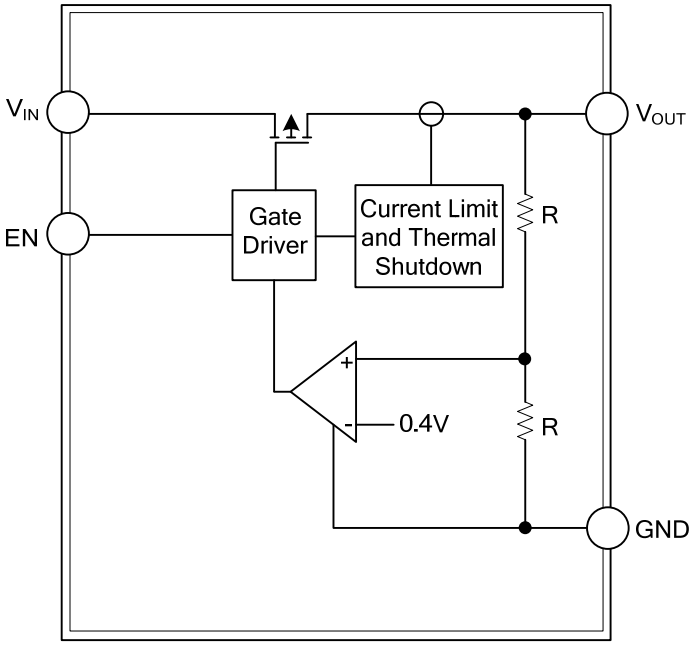


■ PIN DESCRIPTION

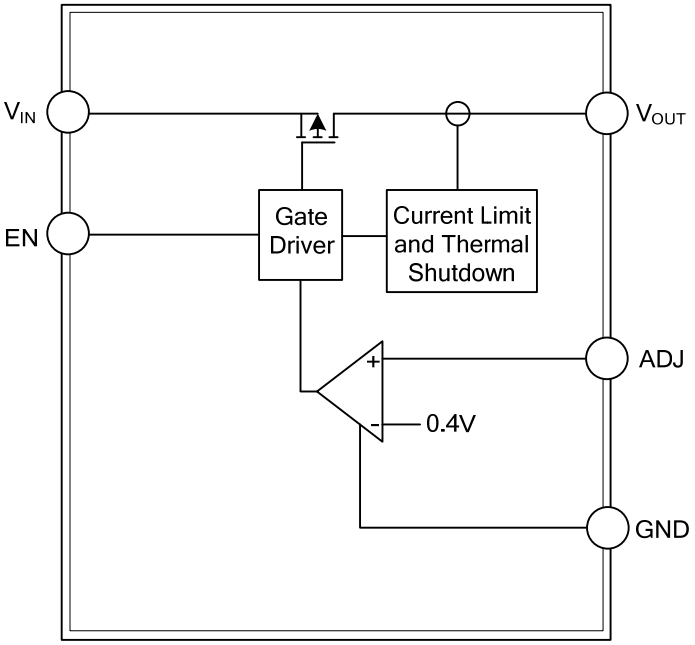
PIN NO.		PIN NAME	DESCRIPTION
Fixed	ADJ		
1	1	V_{IN}	Voltage input pin. Bypass to ground through at least 1μF capacitor
2	2	GND	Ground
3	3	EN	Enable input, active high
-	4	ADJ	Output feedback pin
4	-	NC	No connection
5	5	V_{OUT}	Voltage output pin. Bypass to ground through 1μF ceramic capacitor

■ BLOCK DIAGRAM

Fixed Version



Adjustable Version



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	7	V
EN Voltage		V_{IN}+0.3	V
Continuous Load Current		Internal Limited	
Power Dissipation (Note 1)	P_D	640	mW
Operating Junction Temperature Range	T_{OPR}	-40~125	°C
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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Input Voltage	V_{IN}	2.5		6	V
Output Current (Note 2)	I_{OUT}	0		150	mA
Operating Ambient Temperature	T_A	-40		85	°C

■ THERMAL RESISTANCES CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	260	°C/W

Note: θ_{JA} is measured in the natural convection at T_A=25°C on a low effective thermal conductivity test board of JEDEC 51-3 thermal measurement standard.

■ ELECTRICAL CHARACTERISTICS

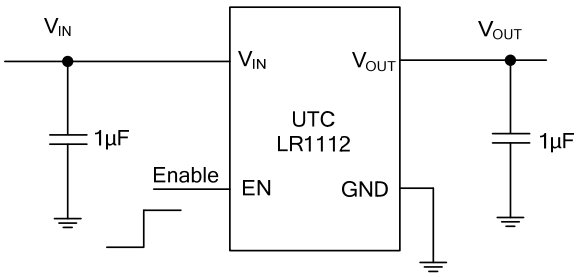
(T_A=25°C, V_{IN}=V_{OUT}+1V, C_{IN}=1μF, C_{OUT}=1μF, V_{EN}=2V, unless otherwise stated)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Quiescent Current	I_Q	V_{EN}=V_{IN}, I_{OUT}=0mA		30	50	μA
		V_{EN}=V_{IN}, I_{OUT}=150mA		50	85	μA
Input Shutdown Current	I_{SHDN}	V_{EN}=0V, I_{OUT}=0mA			1	μA
Input Leakage Current	I_{LEAK}	V_{EN}=0V, OUT grounded			1	μA
Dropout Voltage (Note 3)	$V_{Dropout}$	I_{OUT}=150mA		150	300	mV
ADJ Reference Voltage (Adjustable Version)	V_{REF}	I_{OUT}=0mA		0.4		V
ADJ Leakage (Adjustable Version)	I_{ADJ}				1	μA
Output Voltage Accuracy	V_{OUT}	T_A=-40°C~85°C, I_{OUT}=30mA	-2		2	%
Line Regulation	ΔV_{OUT} /ΔV_{IN}/V	V_{IN}=(V_{OUT} +1V)~$V_{IN\text{-}Max}$, V_{EN}=V_{IN}, I_{OUT}=1mA		0.01	0.20	%/V
Load Regulation	ΔV_{OUT} /V_{OUT}	V_{IN}=(V_{OUT} +1V)~$V_{IN\text{-}Max}$, I_{OUT} from 1mA to 150mA	-0.6		0.6	%
Start-Up Time	t_{ST}	V_{EN}=0V~2.0V, V_{OUT}=1.8V I_{OUT}=150mA		80		μs
PSRR	PSRR	V_{IN}=[V_{OUT} +1V]V_{DC}+0.5VppAC, f =100Hz, I_{OUT}=30mA		65		dB
Current Limit	I_{LIMIT}	V_{IN}=(V_{OUT} +1V)~$V_{IN\text{-}Max}$, V_{OUT}/R_{OUT}=0.5A	200	300		mA
EN Input Logic Low Voltage	V_{IL}	V_{IN}=$V_{IN\text{-}Min}$ ~$V_{IN\text{-}Max}$			0.4	V
EN Input Logic High Voltage	V_{IH}	V_{IN}=$V_{IN\text{-}Min}$ ~$V_{IN\text{-}Max}$	1.4			V
Thermal Shutdown Threshold	T_{SHDN}			140		°C
Thermal Shutdown Hysteresis	T_{HYS}			15		°C

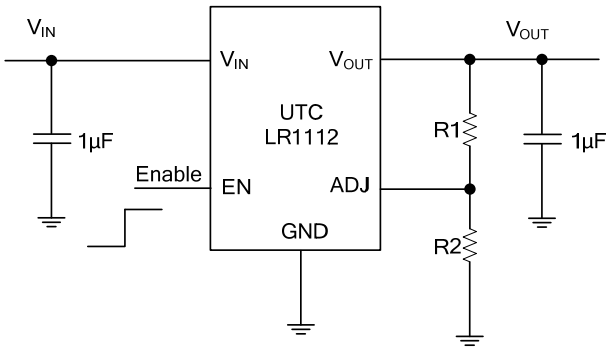
Notes: 1. Ratings apply to ambient temperature at 25°C

2. The device maintains a stable, regulated output voltage without a load current.
3. Dropout voltage is the voltage difference between the input and the output at which the output voltage drops 2% below its nominal value. This parameter only applies to output voltages above 1.8V.

■ TYPICAL APPLICATION CIRCUIT



Fixed Output



Adjustable Output

$$V_{OUT}=V_{REF}\,(1+\frac{R1}{R2})$$