



LR1112

Preliminary

LINEAR INTEGRATED CIRCUIT

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

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

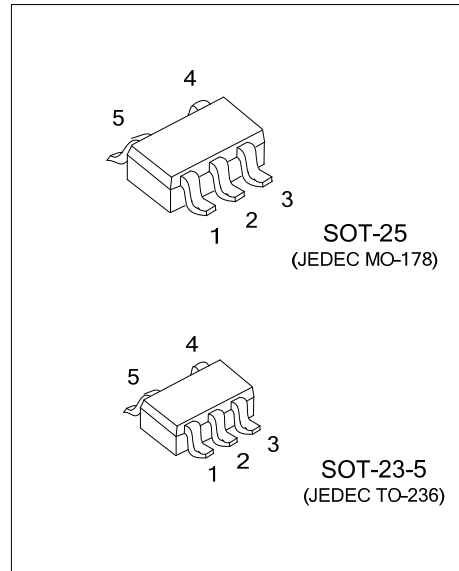
- * 150mA low dropout regulator with EN
- * Very low I_Q over full load: 30μA
- * Wide input voltage range: 2.5~6V
- * Wide adjustable output: 0.8V~5.0V
- * Fixed output options: 1.0V~3.3V
- * Fast start-up time: 80μs
- * PSRR: 65dB at 100Hz
- * Stable with low ESR, 1μF ceramic output capacitor
- * Low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

ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR1112L-xx-AE5-R	LR1112G-xx-AE5-R	SOT-23-5	Tape Reel
LR1112G-xx-AF5-R	LR1112G-xx-AF5-R	SOT-25	Tape Reel

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

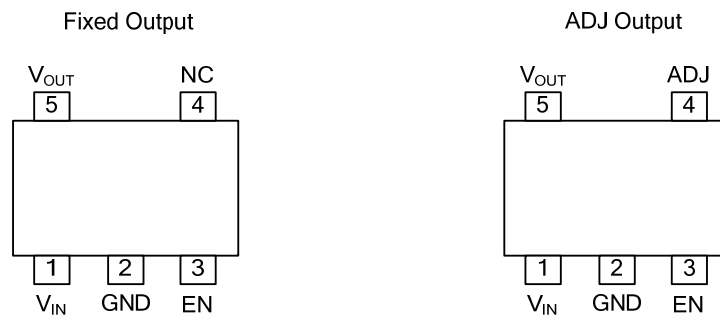
<p>LR1112G-xx-AE5-R</p>	<p>(1) R: Tape Reel (2) AE5: SOT-23-5, AF5: SOT-25 (3) xx: refer to Marking Information (4) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-23-5 SOT-25	AD: ADJ	

■ PIN CONFIGURATION

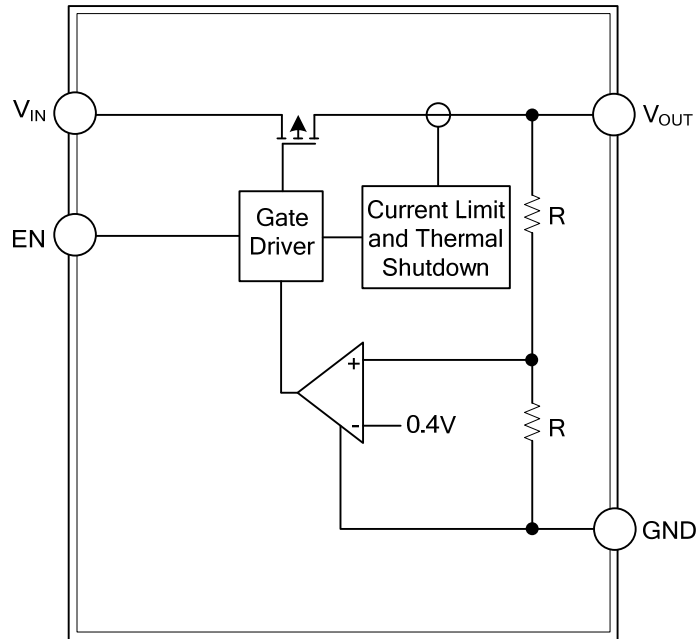


■ PIN DESCRIPTION

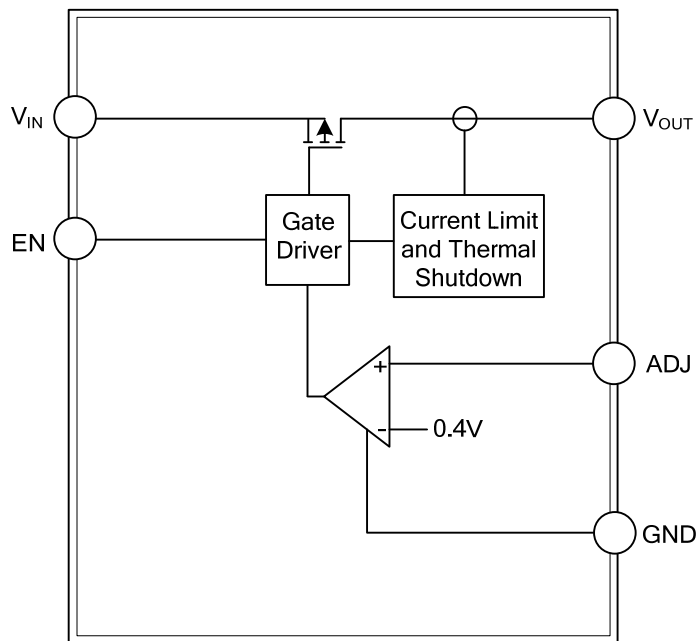
PIN NO.		PIN NAME	DESCRIPTION
Fixed	ADJ		
1	1	V _{IN}	Voltage input pin. Bypass to ground through at least 1μF capacitor
2	2	GND	Ground
3	3	EN	Enable input, active high
-	4	ADJ	Output feedback pin
4	-	NC	No connection
5	5	V _{OUT}	Voltage output pin. Bypass to ground through 1μF ceramic capacitor

■ 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
Junction Temperature	T_J	+150	°C
Operating Junction Temperature Range	T_{OPR}	-40 ~ +125	°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}	280	°C/W

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

■ ELECTRICAL CHARACTERISTICS

($T_A=25^\circ\text{C}$, $V_{IN}=V_{OUT}+1\text{V}$, $C_{IN}=1\mu\text{F}$, $C_{OUT}=1\mu\text{F}$, $V_{EN}=2\text{V}$, unless otherwise stated)

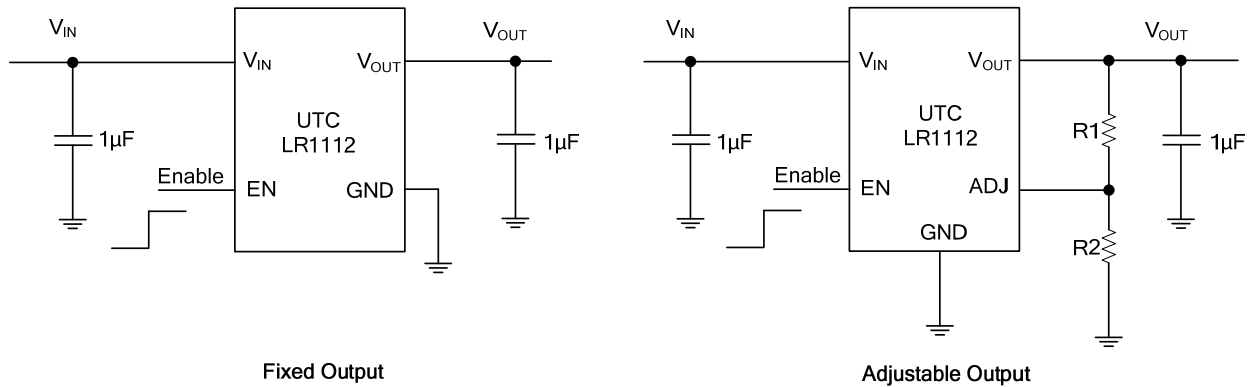
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Quiescent Current	I_Q	$V_{EN}=V_{IN}$, $I_{OUT}=0\text{mA}$		30	50	μA
		$V_{EN}=V_{IN}$, $I_{OUT}=150\text{mA}$		50	85	μA
Input Shutdown Current	I_{SHDN}	$V_{EN}=0\text{V}$, $I_{OUT}=0\text{mA}$			1	μA
Input Leakage Current	I_{LEAK}	$V_{EN}=0\text{V}$,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

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



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

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