



LR9107

Preliminary

CMOS IC

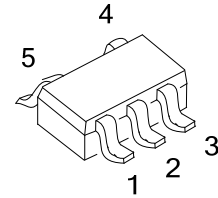
OUTPUT CAPACITOR-LESS LOW VOLTAGE 200mA LDO REGULATOR

DESCRIPTION

The UTC **LR9107** is a CMOS-based low dropout regulator with high output voltage accuracy, low dropout, high PSRR and low quiescent current.

The UTC **LR9107** includes a voltage reference unit, an error amplifier, current limit circuit, resistors for setting output voltage, and a chip enable circuit. With its low power consumption, excellent line and load transient response, the UTC **LR9107** is well suited for low power handheld communication equipment.

Since the output capacitor and noise bypass capacitor are able to be reduced, high density mounting on boards are possible.



SOT-25

FEATURES

- * Quiescent current: Typ. 9.5 μ A
- * Low V_{IN} and wide V_{IN} range: 1.4V~5.25V
- * Guarantee output current: 200mA
- * V_{OUT} accuracy: $\pm 1\%$
- * Ripple Rejection: Typ. 70dB ($f=1\text{kHz}, V_{OUT}\leq 1.2\text{V}$)
Typ. 65dB ($f=1\text{kHz}, 1.2\text{V}<V_{OUT}<2.2\text{V}$)
Typ. 60dB ($f=1\text{kHz}, V_{OUT}\geq 2.2\text{V}$)
- * Temperature-drift coefficient of output voltage: Typ. $\pm 100\text{ppm}/^\circ\text{C}$
- * Low output noise: 60uVrms (10Hz~100kHz)
- * Quiescent current: 35 μ A

ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR9107xL-xx-AF5-R	LR9107xG-xx-AF5-R	SOT-25	Tape Reel

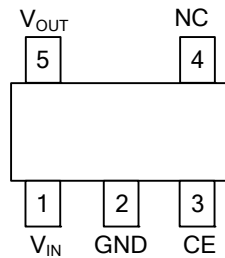
Note: xx: Output Voltage, refer to Marking Information.

<p>LR9107xG-xx-AF5-R</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Output Voltage Code (4) Green Package (5) Active 	<ul style="list-style-type: none"> (1) R: Tape Reel (2) AF5: SOT-25 (3) xx: refer to Marking Information (4) G: Halogen Free and Lead Free, L: Lead Free (5) B: without auto discharge function D: with auto discharge function
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MARKING

PACKAGE	VOLTAGE CODE	MARKING
SOT-25	18: 1.8V 28: 2.8V	

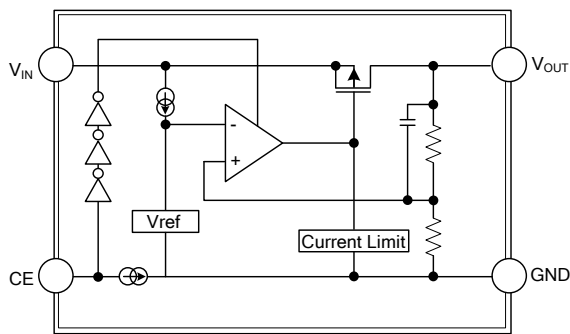
PIN CONFIGURATION



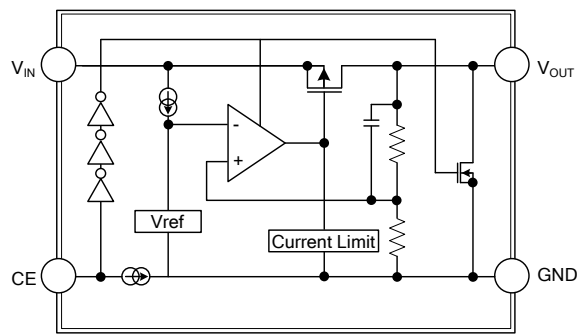
PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V_{IN}	Power Input Pin
2	GND	Ground
3	CE	Enable Pin. This pin should not be floating. Driving this pin "1" enables the regulator, while "0" shutdown the regulator.
4	NC	No Connection
5	V_{OUT}	Power Output Pin

BLOCK DIAGRAM



UTC LR9107B (Non Discharge)



UTC LR9107D (With Discharge)

■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$, unless otherwise specified.)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	6.0	V
Input Voltage CE	V_{CE}	6.0	V
Output Voltage	V_{OUT}	-0.3 ~ $V_{IN}+0.3$	V
Output Current	I_{OUT}	300	mA
Power Dissipation	P_D	380	mW
Operating Temperature	T_A	-40 ~ +85	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +125	$^\circ\text{C}$

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 ($T_A=25^\circ\text{C}$, unless otherwise specified.)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	1.7 ~ 5.25	V
Output Current	I_{OUT}	0 ~ 150	mA
Operating Ambient Temperature	T_A	-40 ~ +85	$^\circ\text{C}$

■ ELECTRICAL CHARACTERISTICS

($V_{CE}=V_{IN}=V_{OUT}+1.0\text{V}$, $C_{IN}=C_{OUT} 0.47\mu\text{F}$, $I_{OUT}=1.0\text{mA}$, $T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage	V_{IN}	$T_A=-40^\circ\text{C}\sim+85^\circ\text{C}$			5.25	V
Output Voltage Accuracy (Note 6)	V_{OC}	$V_{IN}=(V_{OUT-NOM}+1.0\text{V})\sim 5.25\text{V}$, $I_{OUT}=1\text{mA}\sim 200\text{mA}$	$T_A=+25^\circ\text{C}$ -1		+1 +1.5	%
Line Regulation ($dV_{OUT}/dV_{IN}/V_{OUT}$)	$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	$V_{IN}=(V_{OUT-NOM}+1.0\text{V})\sim 5.25\text{V}$, $I_{OUT}=1.0\text{mA}$		0.02	0.1	%/V
Load Regulation ($dV_{OUT}/V_{OUT}/dI_{OUT}$)	$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	$V_{IN}=V_{OUT-NOM}+1.0\text{V}$, $I_{OUT}=1\text{mA}\sim 200\text{mA}$		0.5	1.0	%/A
Quiescent Current (Note 2)	I_Q	$I_{OUT}=0\text{mA}$		9.5	25	μA
$I_{STANDBY}$	$I_{STANDBY}$	$V_{CE}=0\text{V}$ (Disabled)		0.1	3.0	μA
Output Current	I_{OUT}		200			mA
Fold-Back Short Current (Note 3)	I_{SC}	V_{OUT} short to ground		50		mA
Ripple Rejection (Note 4)	RR	$V_{OUT}\leq 1.2\text{V}$ $1.2\text{V}<V_{OUT}<2.2\text{V}$ $V_{OUT}\geq 2.2\text{V}$	$f=1\text{kHz}$ $V_{IN}=[V_{OUT}+1\text{V}]$, $I_{OUT}=30\text{mA}$	70 65 60		dB
Dropout Voltage (Note 1)	V_{DROP}	$I_{OUT}=200\text{mA}$	$1.5\text{V}\leq V_{OUT}<2.0\text{V}$ $2.0\text{V}\leq V_{OUT}<2.6\text{V}$ $2.6\leq V_{OUT}$	0.44 0.35 0.27		V
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T}$	$I_{OUT}=30\text{mA}$, $T_A=-40^\circ\text{C}\sim+85^\circ\text{C}$		± 100		ppm/ $^\circ\text{C}$
CE Pull-Down Current	I_{PD}			0.1		μA
CE Input Low Voltage	V_{CEL}				0.4	V
CE Input High Voltage	V_{CEH}		1.0			V
On Resistance of N-channel for Auto-Discharge (Note 5)	R_{ON}	$V_{IN}=4.0\text{V}$, $V_{EN}=0\text{V}$ (Disabled)		30		Ω

Notes: 1. Dropout voltage (V_{DROP}) is the voltage difference between the input and the output at which the output voltage drops 2% below its nominal value.

2. Quiescent current (I_Q) is the current difference between the input and the output.

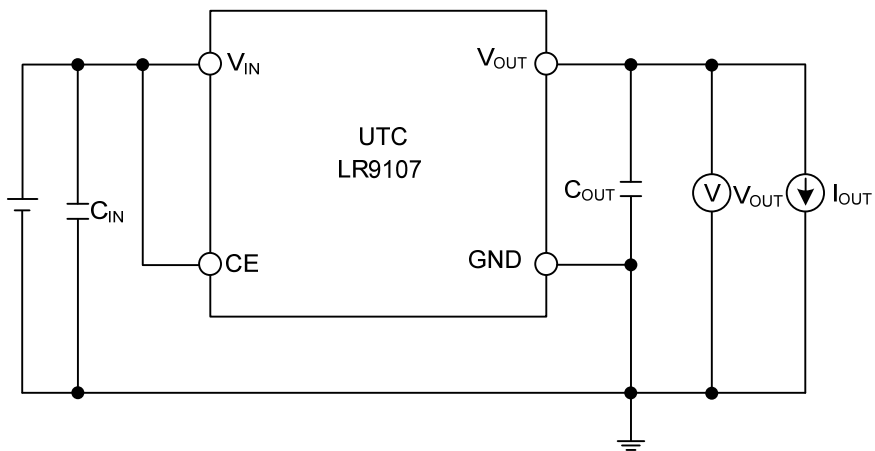
3. Short circuit current (I_{SC}) is measured with V_{OUT} pulled to GND.

4. This specification is guaranteed by design.

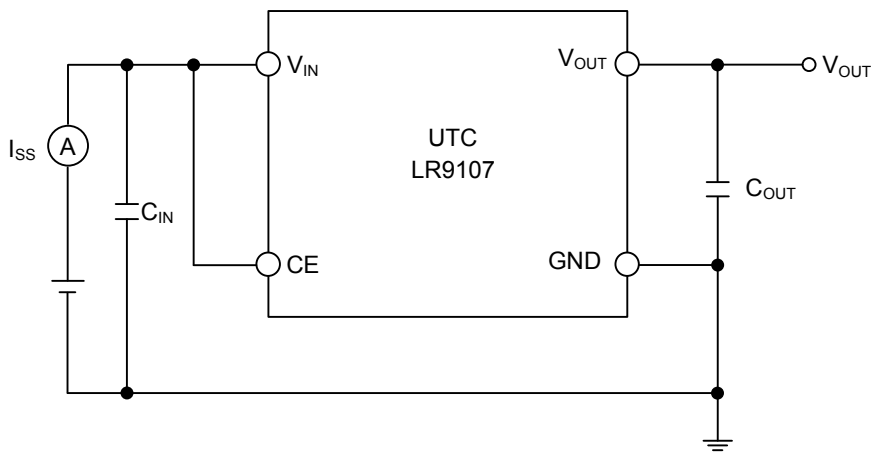
5. UTC LR9107 has 2 options for output, built-in discharge and non-discharge.

6. Potential multiple grades based on following output voltage accuracy.

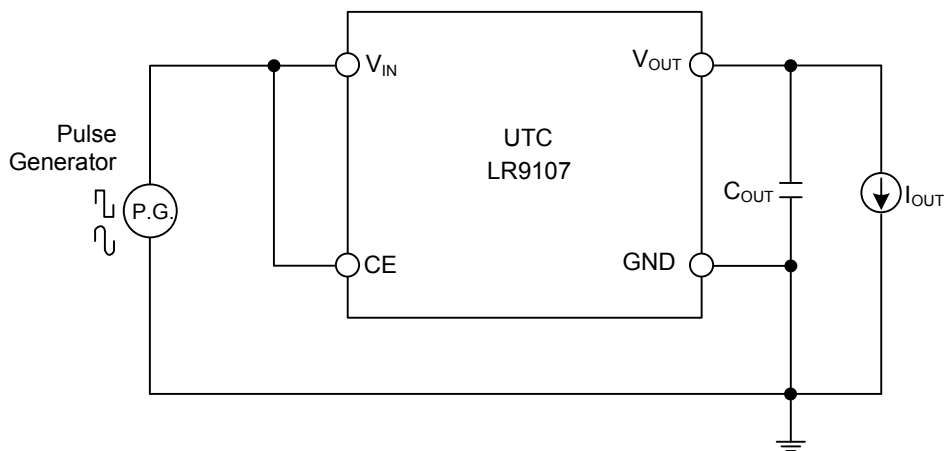
■ TEST CIRCUITS



Basic Test Circuit

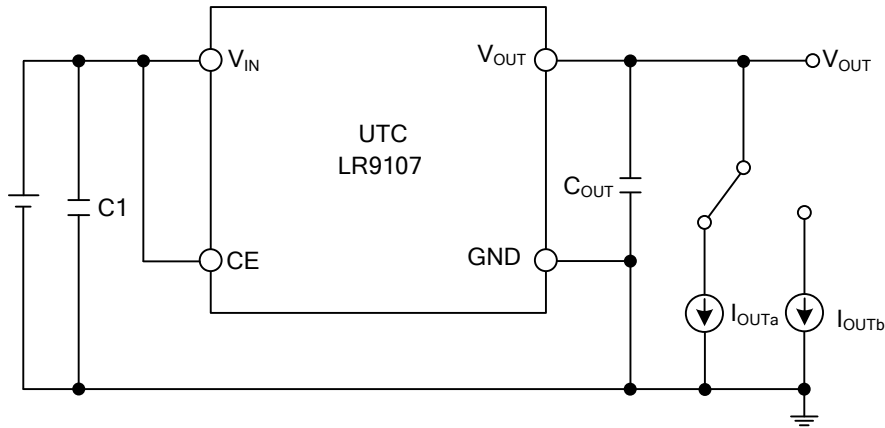


Test Circuit for Supply Current



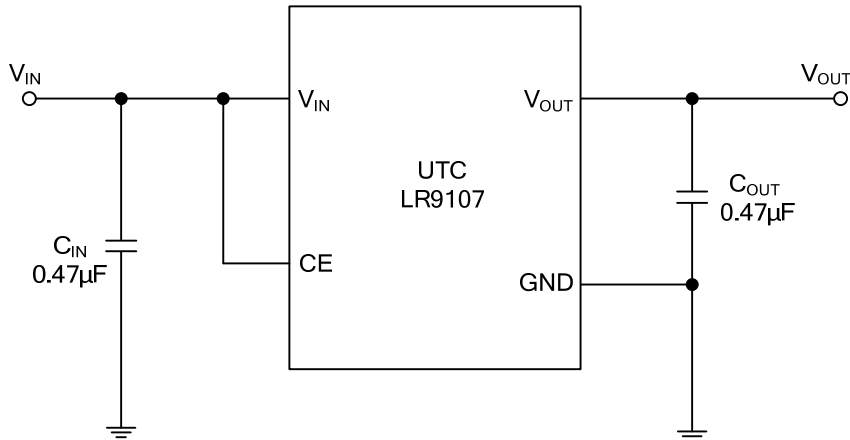
Test Circuit for Ripple Rejection

■ TEST CIRCUITS (Cont.)



Test Circuit for Load Transient Response

■ TYPICAL APPLICATION CIRCUIT



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