



LR9102

Preliminary

CMOS IC

LOW NOISE 300mA LDO REGULATOR

DESCRIPTION

The UTC **LR9102** is a typical LDO (linear regulator) with the features of high output voltage accuracy, low supply current, low ON-resistance, and high ripple rejection.

During operation of the UTC **LR9102**, the dropout voltage is very low and the response of line transient and load transient are very well.

Internally, there're many functions of UTC **LR9102** which can be seen in the block figure. There are a voltage reference unit, an error amplifier, resistor-net for voltage setting, a current limit circuit, and a chip enable circuit in each UTC **LR9102**.

The UTC **LR9102** can be used as an ideal of the power supply for hand-held communication equipment, such as: power source for portable communication equipment, power source for electrical appliances, for example, cameras, VCRs and camcorders and power source for battery-powered equipment.

FEATURES

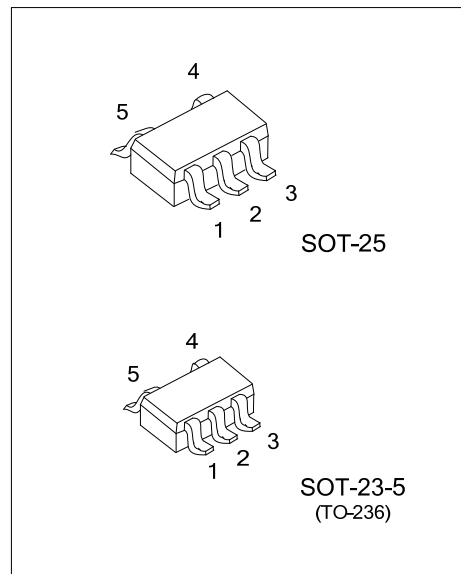
- * Ultra Supply Current: 50µA (Typ.)
- * Standby Mode: 0.1µA (Typ.)
- * Very Low Dropout Voltage: 0.14V (Typ.)
@I_{OUT}=300mA, V_{OUT}=2.85V
- * Ripple Rejection: 75dB (Typ.)
@f=1kHz, V_{OUT}=2.85V
- * Temperature-Drift Coefficient of Output Voltage: ±50ppm/°C (Typ.)
- * Well Line Regulation: 0.02%/ V (Typ.)
- * Output Voltage Accuracy: ±1.0% (Typ.)
- * Internal Fold Back Protection 50mA (Typ.) @ short mode Circuit:
- * C_{IN}=C_{OUT}=1µF or more (Ceramic capacitors) are recommended to be used with this IC

ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR9102L-xx-AE5-R	LR9102G-xx-AE5-R	SOT-23-5	Tape Reel
LR9102L-xx-AF5-R	LR9102G-xx-AF5-R	SOT-25	Tape Reel

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

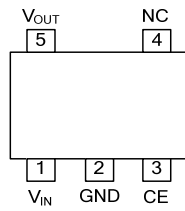
<p>LR9102L-xx-AE5-R</p>	<p>(1) Packing Type (1) R: Tape Reel</p> <p>(2) Package Type (2) AE5: SOT-23-5, AF5: SOT-25</p> <p>(3) Output Voltage Code (3) xx: refer to Marking Information</p> <p>(4) Halogen Free (4) L: Lead Free, G: Halogen Free</p>
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MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-23-5 SOT-25	15: 1.8V 25: 2.5V 28 :2.8V 33: 3.3V	

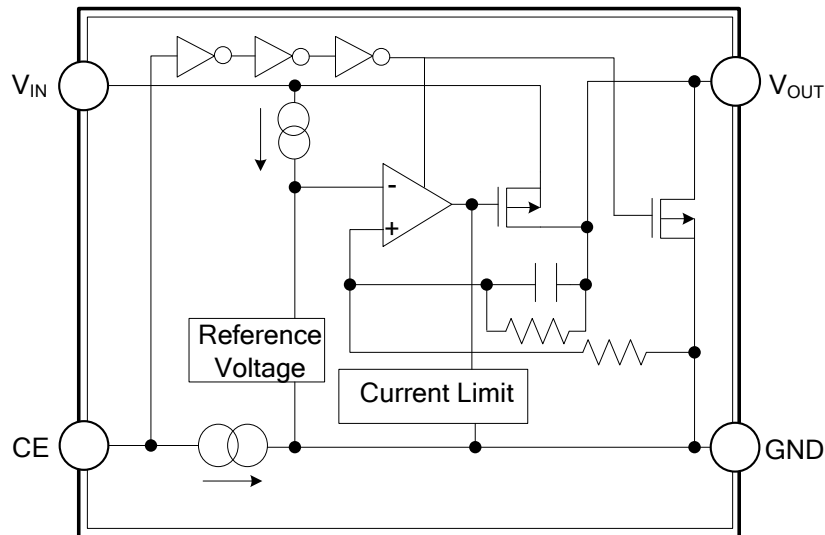
PIN CONFIGURATION



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V _{IN}	Input Pin
2	GND	Ground Pin
3	CE	Chip Enable Pin. Active when this Pin is high.
4	NC	No Connection
5	V _{OUT}	Output Pin

BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	6	V
Input Voltage (CE Pin)	V_{CE}	6	V
Output Voltage	V_{OUT}	$-0.3 \sim V_{IN}+0.3$	V
Output Current	I_{OUT}	400	mA
Power Dissipation	P_D	420	mW
Junction Temperature	T_J	+125	°C
Operating Temperature	T_{OPR}	-40~+85	°C
Storage Temperature	T_{STG}	-55~+125	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

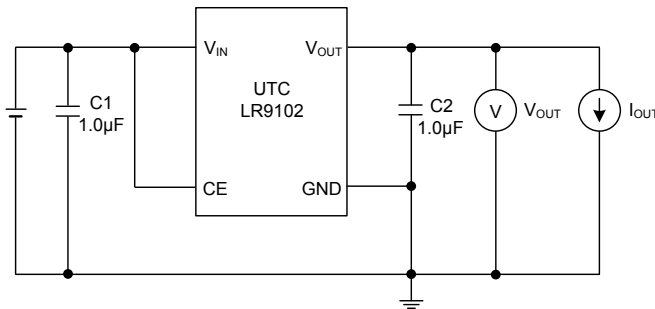
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS

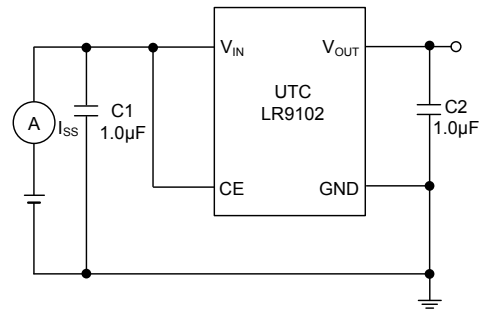
($T_A=25^\circ\text{C}$, $V_{IN}=\text{Set } V_{OUT}+1\text{V}$, $I_{OUT}=1\text{mA}$, $C_I=C_O=1\mu\text{F}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN} = \text{Set } V_{OUT}+1\text{V}$	$V_{OUT} > 2.0\text{V}$	$\times 0.99$	$\times 1.01$	V
			$V_{OUT} \leq 2.0\text{V}$	-20	+20	mV
Input Voltage	V_{IN}				6	V
Load Regulation	ΔV_{OUT}	$1\text{mA} \leq I_{OUT} \leq 150\text{mA}$		20	40	mV
Output Current	I_{OUT}		300			mA
Supply Current	I_{SS}	$I_{OUT}=0\text{A}$		50	90	μA
Supply Current (Standby)	I_{ST-BY}	$V_{CE}=0\text{V}$		0.1	2	μA
Short Current Limit	I_{LIMIT}	$V_{OUT}=0\text{V}$		50		mA
CE Pull-down Current	I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}	1.2			V
	Low	V_{CEL}			0.3	V
Output Noise	eN	$B_W=10\text{Hz to } 100\text{kHz}$, $I_{OUT}=30\text{mA}$		30		μVrms
Ripple Rejection	RR	$f=1\text{kHz}$, Ripple 0.2V_{P-P} $V_{IN}=\text{Set } V_{OUT}+1\text{V}$, $I_{OUT}=30\text{mA}$ (In case that $V_{OUT}=2.0\text{V}$, $V_{IN}=3\text{V}$)		75		dB
Dropout Voltage	V_D	$I_{OUT}=300\text{mA}$	$1.2\text{V} \leq V_{OUT} < 1.5\text{V}$	0.30	0.50	V
			$1.5\text{V} \leq V_{OUT} < 1.7\text{V}$	0.22	0.32	
			$1.7\text{V} \leq V_{OUT} < 2.0\text{V}$	0.20	0.28	
			$2.0\text{V} \leq V_{OUT} < 2.5\text{V}$	0.17	0.24	
			$2.5\text{V} \leq V_{OUT} < 2.8\text{V}$	0.14	0.20	
			$2.8\text{V} \leq V_{OUT} \leq 5.0\text{V}$	0.12	0.19	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	$1.2\text{V} \leq V_{OUT} \leq 4.0\text{V}$, $V_{SET}+0.5\text{V} \leq V_{IN} \leq 5\text{V}$		0.02	0.10	%V
		$4.0\text{V} < V_{OUT} \leq 5.0\text{V}$, $V_{SET}+0.5\text{V} \leq V_{IN} \leq 6.5\text{V}$				
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T}$	$-40^\circ\text{C} \leq T_{OPR} \leq 85^\circ\text{C}$		± 50		ppm/°C
Low Output Nch Tr. ON Resistance	R_{LOW}	$V_{IN}=4.0\text{V}$, $V_{CE}=0\text{V}$		70		Ω

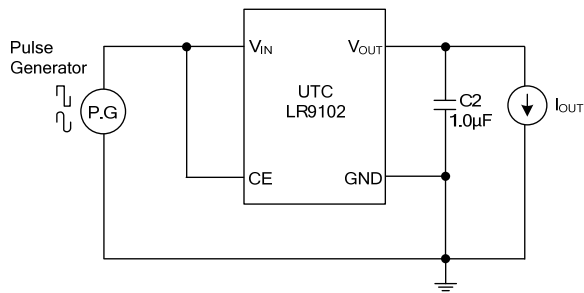
■ TEST CIRCUIT



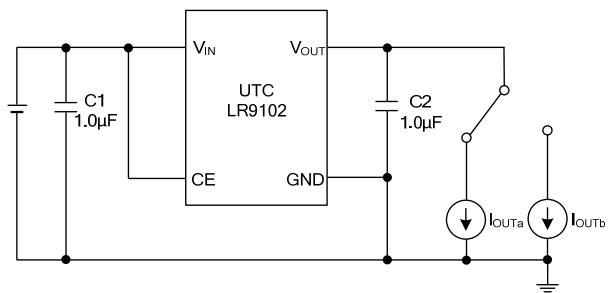
Basic Test Circuit



Test Circuit for Supply Current

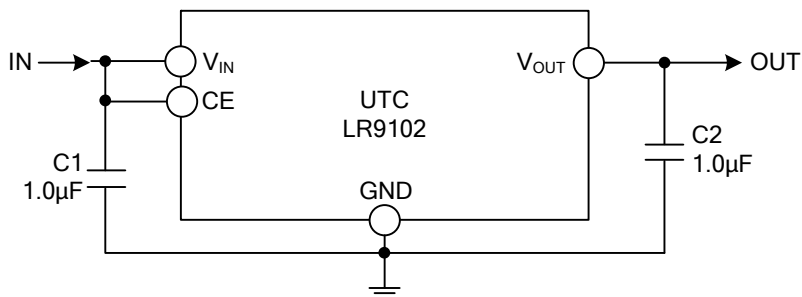


Test Circuit for Ripple Rejection



Test Circuit for Load Transient Response

■ TYPICAL APPLICATION CIRCUIT



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