



LR9270

Preliminary

CMOS IC

800mA LDO REGULATOR

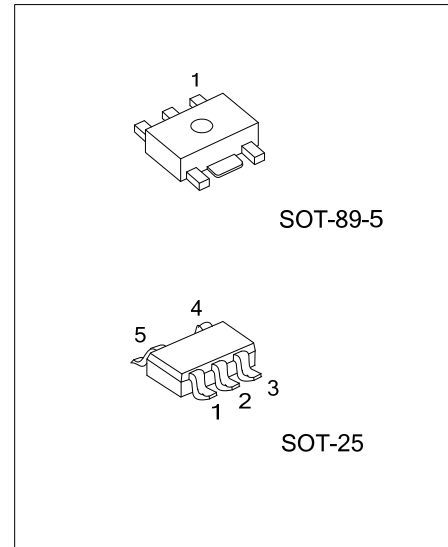
DESCRIPTION

The UTC **LR9270** 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 **LR9270**, 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 **LR9270** 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 **LR9270**.

The UTC **LR9270** 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

- * Low standby current
- * Ultra-Low supply current
- * Output voltage (stepwise setting with a step of 0.1V in the range of 1.2V~4.0V)
- * Output current (MIN=800mA@V_{IN}=V_{OUT}+1.0V)
- * Low dropout voltage
- * Line regulation
- * High output voltage accuracy
- * Low temperature-drift coefficient of output voltage
- * Built-in thermal shunt circuit
- * Built-in current limit circuit

ORDERING INFORMATION

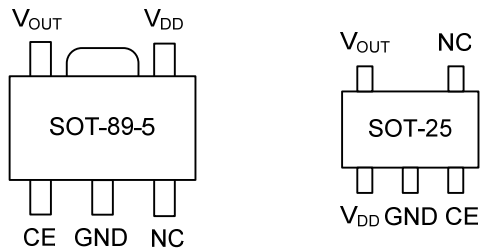
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR9270xL-xx-AB5-R	LR9270xG-xx-AB5-R	SOT-89-5	Tape Reel
LR9270xL-xx-AF5-R	LR9270xG-xx-AF5-R	SOT-25	Tape Reel

<p>LR9270xL-xx-AB5-R</p> <p>(1)Packing Type (2)Package Type (3)Output Voltage Code (4)Lead Free (5)Enable Threshold Level</p>	<p>(1) T: Tube, R: Tape Reel (2) AB5: SOT-89-5, AF5: SOT-25 (3) xx: refer to Marking Information (4) L: Lead Free, G: Halogen Free (5) H: High, L: Low</p>
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MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89-5	18 : 1.8V 25 : 2.5V 33 : 3.3V	
SOT-25		

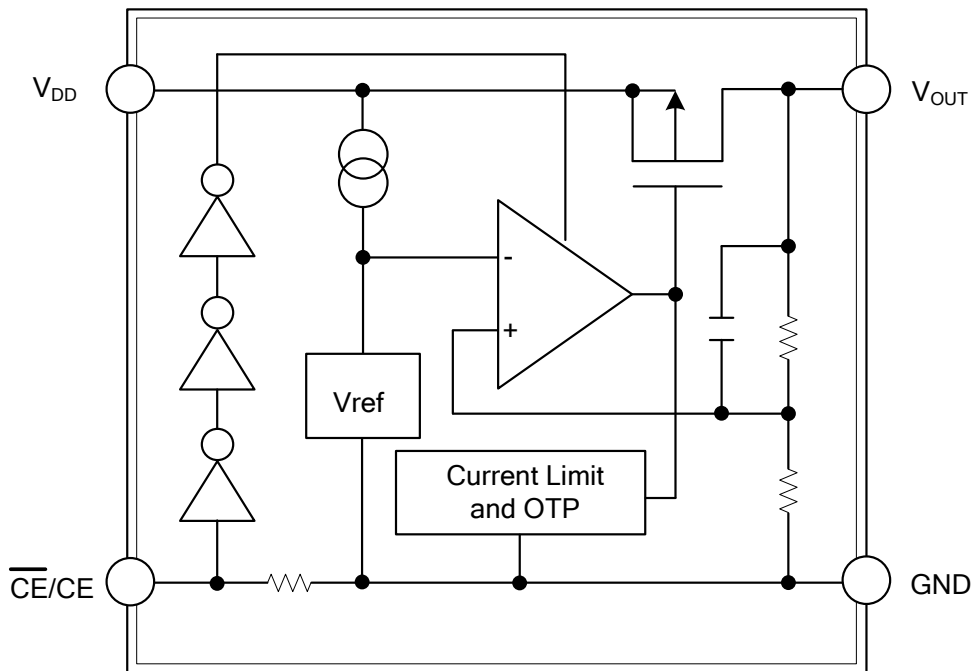
PIN CONFIGURATION



PIN DESCRIPTION

PIN NO.		PIN NAME	DESCRIPTION
SOT-89-5	SOT-25		
1	3	\overline{CE} or CE	Chip Enable Pin Voltage Regulator Output Pin
2	2	GND	Ground Pin
3	4	NC	No Connection
4	1	V_{DD}	Input Pin
5	5	V_{OUT}	Voltage Regulator Output Pin

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	7.0	V
Input Voltage(\overline{CE} or CE Input Pin)	V_{CE}	-0.3~ V_{IN} +0.3	V
Output Voltage	V_{OUT}	-0.3~ V_{IN} +0.3	V
Output Current	I_{OUT}	1.2	A
Power Dissipation	P_D	Internally limited	
Operating Temperature	T_{OPT}	-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 ($T_A=25^\circ\text{C}$, unless otherwise specified)

LR9270L-xx

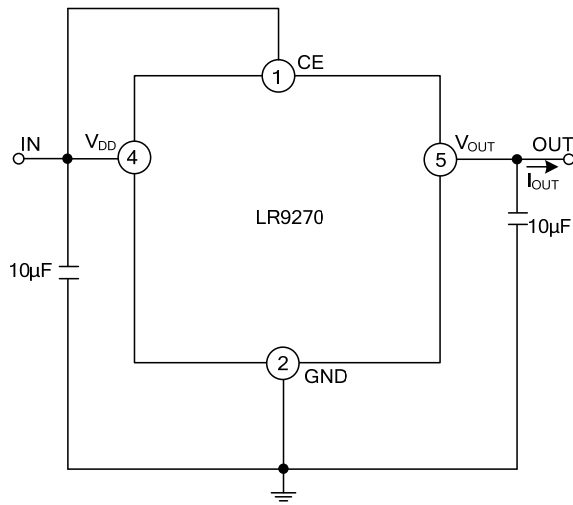
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage	V_{IN}				6.0	V
Supply Current1	I_{SS1}	$V_{IN}-V_{OUT}=1.0\text{V}$, $V_{CE}=\text{GND}$		80	160	μA
Standby Current	I_{STB}	$V_{IN}=V_{CE}=6.0\text{V}$		0.1	1.0	μA
Output Voltage	V_{OUT}	$V_{IN}-V_{OUT}=1.0\text{V}$, $I_{OUT}=100\text{mA}$	x0.98		x1.02	V
Output Current	I_{OUT1}	$V_{IN}-V_{OUT}=1.0\text{V}$	800			mA
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	$V_{IN}-V_{OUT}=1.0\text{V}$, $1\text{mA}\leq I_{OUT}\leq 300\text{mA}$		30	100	mV
Dropout Voltage	V_{DIF}	$I_{OUT}=300\text{mA}$	$V_{OUT}=1.5$	0.35	0.45	V
			$V_{OUT}=1.6$	0.30	0.35	V
			$V_{OUT}=1.7$	0.25	0.30	V
			$V_{OUT}=1.8\leq V_{OUT}\leq 2.0$	0.20	0.25	V
			$V_{OUT}=2.1\leq V_{OUT}\leq 2.4$	0.15	0.20	V
		$V_{OUT}=2.5\leq V_{OUT}\leq 4.0$	0.12	0.18	V	
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	$I_{OUT}=100\text{mA}$, $V_{OUT}+0.5\text{V}\leq V_{IN}\leq 8.0\text{V}$		0.05	0.30	%/V
Ripple Rejection	RR	$f=1\text{kHz}$, Ripple 0.5V _{P-P} , $V_{IN}-V_{OUT}=1.0\text{V}$		50		dB
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=10\text{mA}$, $-40^\circ\text{C}\leq T_A\leq 85^\circ\text{C}$		± 100		ppm/ °C
Short Current Limit	I_{LIM}	$V_{OUT}=0\text{V}$		40		mA
Pull-up resistance for \overline{CE} pin	R_{PU}		1.25	2.50	5.00	M Ω
\overline{CE} Input Voltage "H"	V_{CEH}		1.50			V
\overline{CE} Input Voltage "L"	V_{CEL}				0.25	V
Thermal Shutdown Detector Threshold Temperature	T_{TSD}	Junction Temperature		150		°C
Thermal Shutdown Released Temperature	T_{TSR}	Junction Temperature		120		°C

■ ELECTRICAL CHARACTERISTICS(Cont.)

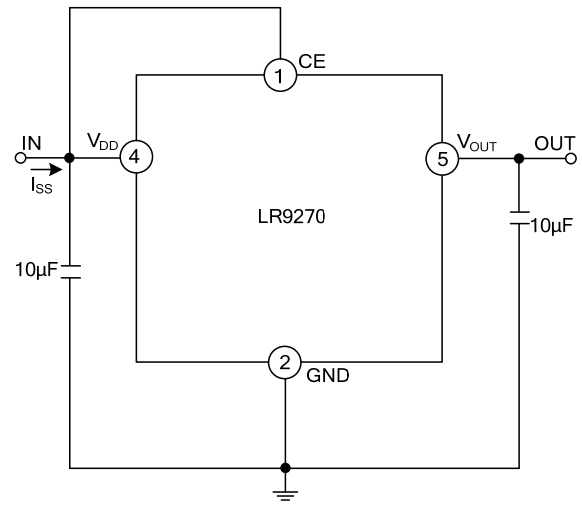
LR9270H-xx

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage	V_{IN}				6.0	V
Supply Current	I_{SS}	$V_{IN}-V_{OUT}=1.0V, V_{CE}=V_{IN}$		80	160	μA
Standby Current	I_{STB}	$V_{IN}=6.0V, V_{CE}=GND$		0.1	1.0	μA
Output Voltage	V_{OUT}	$V_{IN}-V_{OUT}=1.0V, I_{OUT}=100mA$	x0.98		x1.02	V
Output Current	I_{OUT}	$V_{IN}-V_{OUT}=1.0V$	800			mA
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	$V_{IN}-V_{OUT}=1.0V, 1mA \leq I_{OUT} \leq 300mA$		30	100	mV
Dropout Voltage	V_{DIF}	$I_{OUT}=300mA$	$V_{OUT}=1.5$	0.35	0.45	V
			$V_{OUT}=1.6$	0.30	0.35	V
			$V_{OUT}=1.7$	0.25	0.30	V
			$V_{OUT}=1.8 \leq V_{OUT} \leq 2.0$	0.20	0.25	V
			$V_{OUT}=2.1 \leq V_{OUT} \leq 2.4$	0.15	0.20	V
		$V_{OUT}=2.5 \leq V_{OUT} \leq 4.0$	0.12	0.18	V	
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	$I_{OUT}=100mA, V_{OUT}+0.5V \leq V_{IN} \leq 8.0V$		0.05	0.30	%/V
Ripple Rejection	RR	$f=1kHz, \text{Ripple } 0.5V_{p-p}$		50		dB
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$	$-40^{\circ}C \leq T_{OPT} \leq 85^{\circ}C$		± 100		ppm/ $^{\circ}C$
Short Current Limit	I_{LIM}	$V_{OUT}=0V$		40		mA
Pull-down resistance for CE pin	R_{PD}		1.25	2.5	5	M Ω
CE Input Voltage "H"	V_{CEH}		1.5			V
CE Input Voltage "L"	V_{CEL}				0.25	V
Thermal Shutdown Detector Threshold Temperature	T_{TSD}	Junction Temperature		150		$^{\circ}C$
Thermal Shutdown Released Temperature	T_{TSR}	Junction Temperature		120		$^{\circ}C$

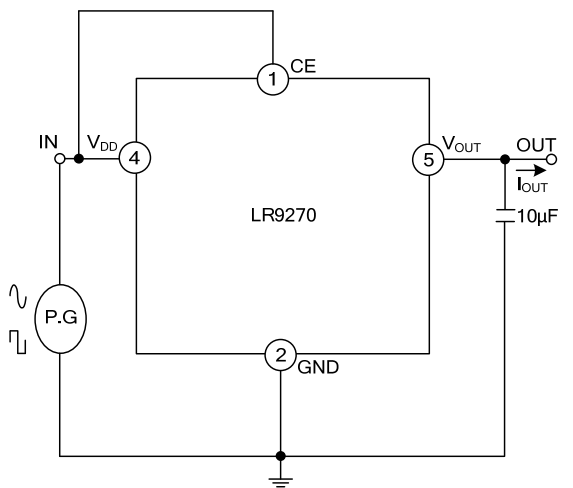
■ TEST CIRCUIT



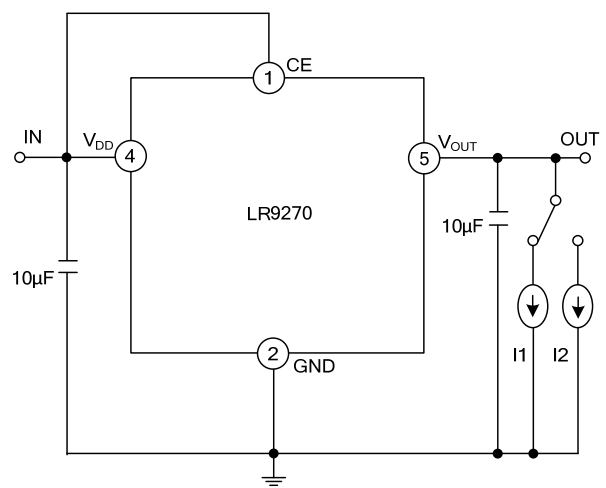
Standard Test Circuit



Supply Current Test Circuit

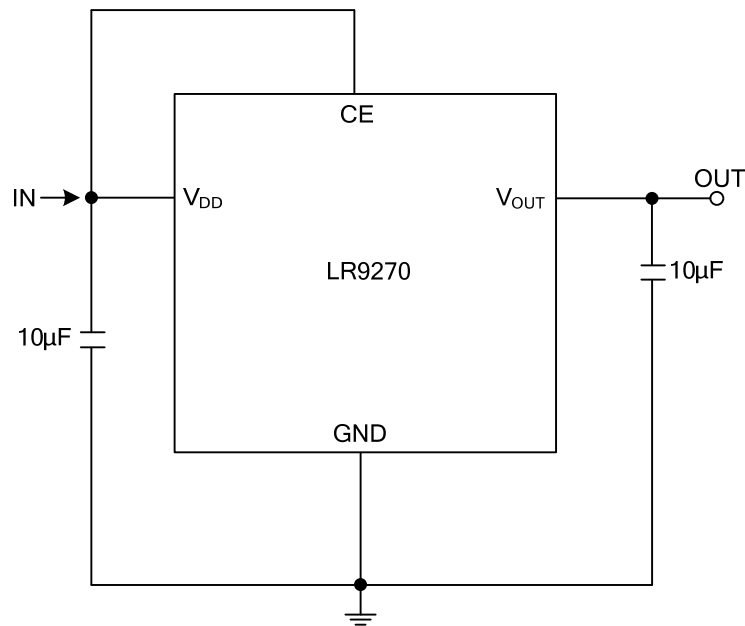


Test Circuit for Ripple Rejection, Input Transient Response



Test Circuit for Load Transient Response

■ TYPICAL APPLICATION CIRCUIT



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