

## LR9270

Preliminary

CMOS IC

## 800mA LDO REGULATOR

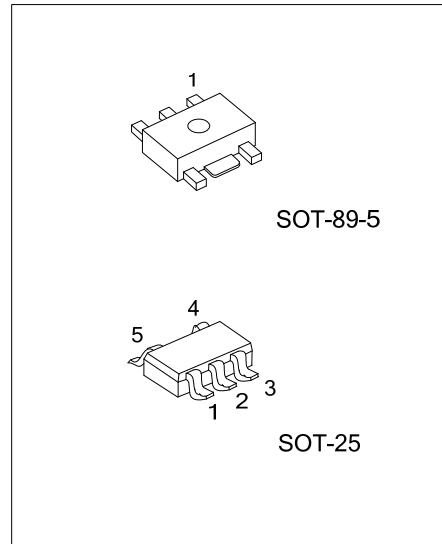
## ■ DESCRIPTION

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

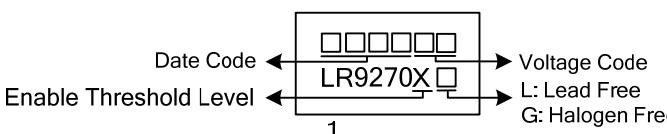
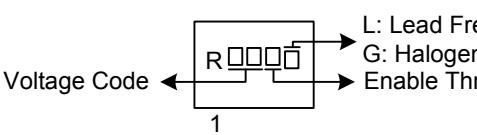
- \* Low standby current
- \* Ultra-Low supply current
- \* Output voltage (stepwise setting with a step of 0.1V in the range of 1.2V~4.0V)
- \* Output current (MIN=800mA@ $V_{IN}=V_{OUT}+1.0V$ )
- \* Low dropout voltage
- \* Line regulation
- \* High output voltage accuracy
- \* Low temperature-drift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

## ■ ORDERING INFORMATION

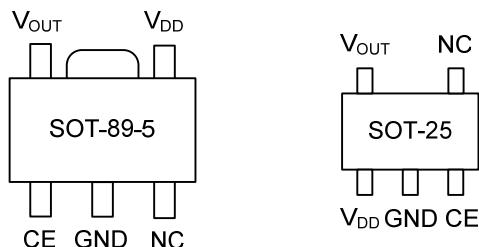
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR9270xL-xx-AB5-R	LR9270xG-xx-AB5-R	SOT-89-5	Tape Reel
LR9270xL-xx-AF5-R	LR9270xG-xx-AF5-R	SOT-25	Tape Reel

LR9270xL-xx-AB5-R	(1)Packing Type (2)Package Type (3)Output Voltage Code (4)Lead Free (5)Enable Threshold Level	(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
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### ■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89-5	18 :1.8V 25 :2.5V 33 :3.3V	 <p>Date Code Enable Threshold Level LR9270X 1 Voltage Code L: Lead Free G: Halogen Free</p>
SOT-25		 <p>Voltage Code R 1 L: Lead Free G: Halogen Free Enable Threshold Level</p>

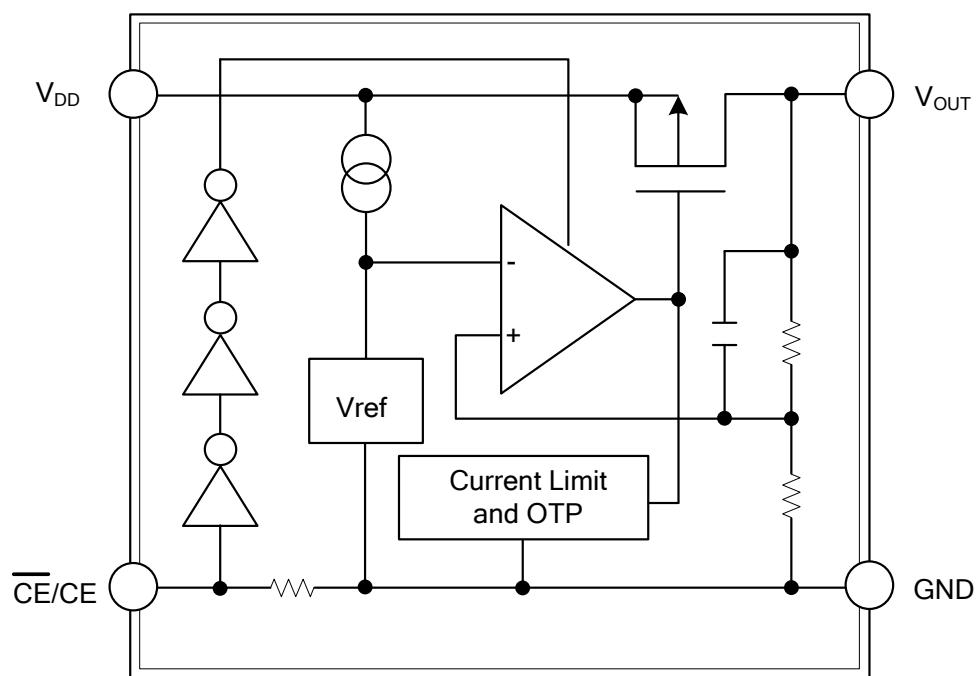
### ■ PIN CONFIGURATION



### ■ PIN DESCRIPTION

PIN NO.		PIN NAME	DESCRIPTION
SOT-89-5	SOT-25		
1	3	CE or CE	Chip Enable Pin Voltage Regulator Output Pin
2	2	GND	Ground Pin
3	4	NC	No Connection
4	1	V <sub>DD</sub>	Input Pin
5	5	V <sub>OUT</sub>	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 ( $T_A=25^\circ C$ , unless otherwise specified)

LR9270L-xx

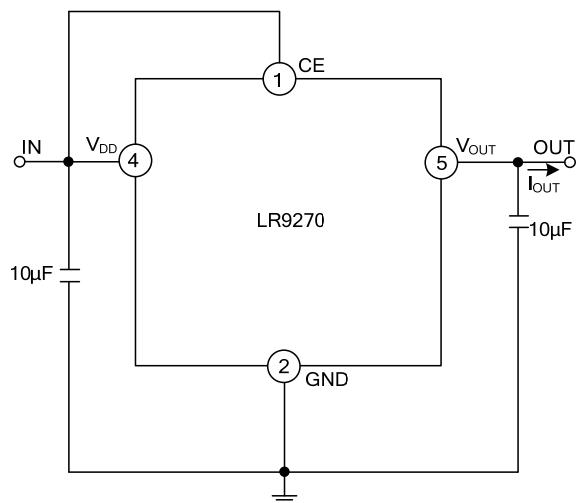
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage	$V_{IN}$				6.0	V
Supply Current1	$I_{SS1}$	$V_{IN}-V_{OUT}=1.0V$ , $V_{CE}=GND$		80	160	µA
Standby Current	$I_{STB}$	$V_{IN}=V_{CE}=6.0V$		0.1	1.0	µA
Output Voltage	$V_{OUT}$	$V_{IN}-V_{OUT}=1.0V$ , $I_{OUT}=100mA$	x0.98		x1.02	V
Output Current	$I_{OUT1}$	$V_{IN}-V_{OUT}=1.0V$	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, Ripple 0.5V <sub>P-P</sub> , $V_{IN}-V_{OUT}=1.0V$		50		dB
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=10mA$ , $-40^\circ C \leq T_A \leq 85^\circ C$		±100		ppm /°C
Short Current Limit	$I_{LIM}$	$V_{OUT}=0V$		40		mA
Pull-up resistance for $\overline{CE}$ pin	$R_{PU}$		1.25	2.50	5.00	MΩ
$\overline{CE}$ 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.)

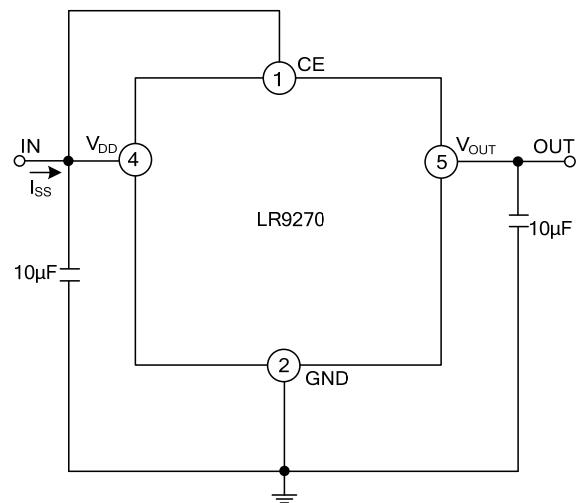
LR9270H-xx

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	$\mu A$
Standby Current	$I_{STB}$	$V_{IN}=6.0V, V_{CE}=GND$		0.1	1.0	$\mu A$
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
			$1.8 \leq V_{OUT} \leq 2.0$	0.20	0.25	V
			$2.1 \leq V_{OUT} \leq 2.4$	0.15	0.20	V
			$2.5 \leq V_{OUT} \leq 4.0$	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, Ripple 0.5Vp-p		50		dB
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$	-40°C ≤ $T_{OPT} \leq 85^{\circ}C$		±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	MΩ
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		$^{\circ}C$

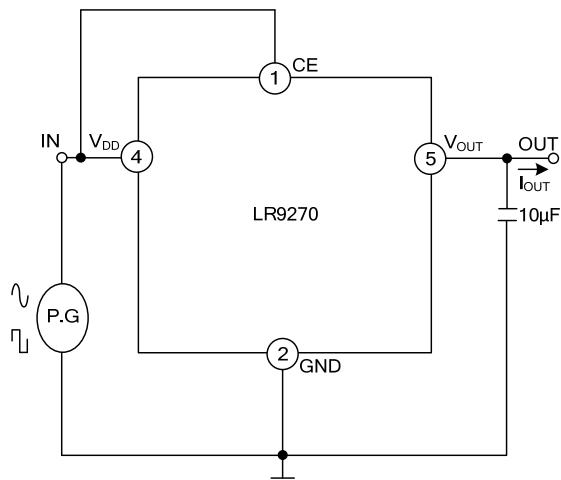
■ TEST CIRCUIT



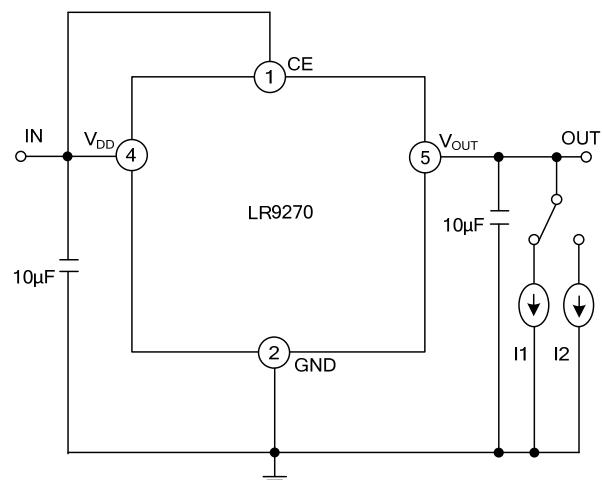
Standard Test Circuit



Supply Current Test Circuit

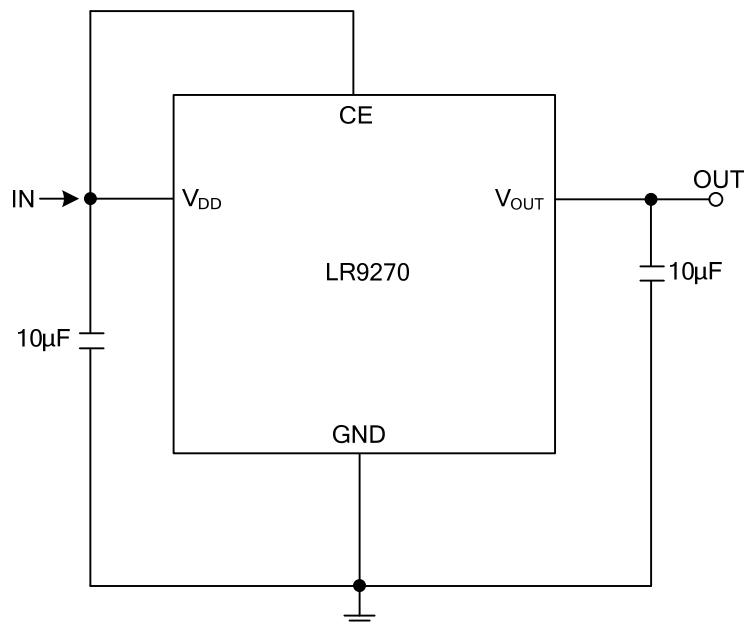


Test Circuit for Ripple Rejection, Input Transient Response



Test Circuit for Load Transient Response

- TYPICAL APPLICATION CIRCUIT



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