

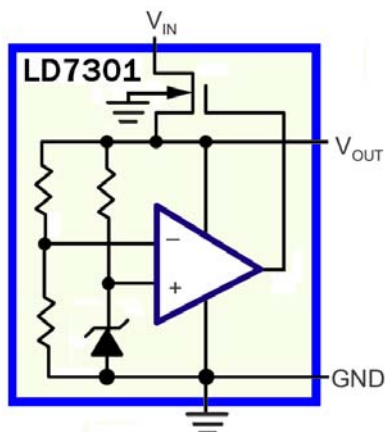
## Features

- Wide working voltage range : 15V to 450V
- Output current up to 3.0mA continuous supply, 30mA peak value
- Supply current : 250 $\mu$ A (typically)
- Line regulation : 0.1mV/V (typically)
- Output Voltage: 5V, 9V, 12V

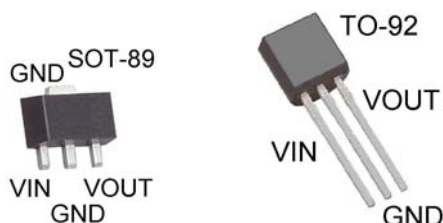
## Applications

- Off-line SMPS PWM controller startup circuit

## Equivalent Block Diagram



## Package Pin out



## General Description

The LD7301 is a low cost linear regulator producing top-quality power supply for high input voltage. Its features include a 3-terminal fixed output voltage version in TO-92 and SOT-89 packages. Other than the functions like ordinary low voltage regulators, the LD7301 provides the use of much higher input voltages (up to 450V).

It eliminates the need for large power resistors when used in a SMPS startup circuit. In this application, current is drawn from the high voltage line only during start-up. There is only current flow leakage after start-up, thereby reducing the continuous power dissipation from milliwatts to watts.

## Ordering Information

Part No.	Package	Voltage	Packing Options
			Bag(BG)
LD7301	SOT-89-3	5V	LD73015L5-BG
		9V	LD73019L5-BG
		12V	LD730112L5-BG
	TO-92-3	5V	LD73015T1-BG
		9V	LD73019T1-BG
		12V	LD730112T1-BG

- Package material default is "Green" package.

## Product Marking

LD8888	◇ Line 1 – "LD" is a fixed character
SSSSS...	8888: product name
●	◇ Line 2 – SSSSS...: lot number

## Absolute Maximum Ratings

Parameter	Value	Units
Maximum operating voltage	450	V
Maximum output voltage	15	V
Junction temperature range	-40 to +125	°C
Storage temperature range	-55 to +150	°C

The values beyond the boundaries of absolute maximum rating may cause the damage to the device. Functional operation in this context is not implied. Continuous use of the device at the absolute rating level might influence device reliability. All voltages have their reference to device ground.

## Thermal Characteristics

Package	Power Dissipation @ $T_A=25^\circ\text{C}$	$\theta_{JC}$ °C/W	$\theta_{JA}$ °C/W
TO-92	0.6W	100	300
SOT-89	1.3W	100	300

## Electrical Characteristics

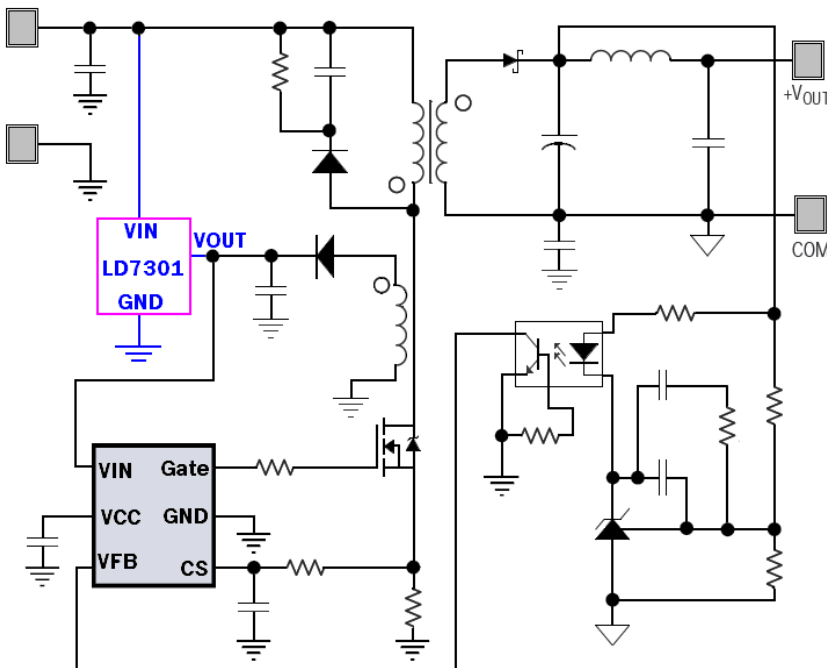
Test conditions unless otherwise specified:  $T_A=25^\circ\text{C}$ ,  $V_{IN}=50\text{V}$ ,  $C_{OUT}=0.01\mu\text{F}$

Parameter	Symbol	Condition	Min	Typ	Max	Units
Input DC Voltage Range	$V_{IN}$		15	---	450	V
Output voltage	$V_{OUT}$	5V version: $T_j -40^\circ\text{C} \sim +125^\circ\text{C}$ , No load <sup>*1</sup>	4.5	5	TBD	V
		9V version: $T_j -40^\circ\text{C} \sim +125^\circ\text{C}$ , No load <sup>*1</sup>	8.5	9	9.5	V
		12V version: $T_j -40^\circ\text{C} \sim +125^\circ\text{C}$ , No load <sup>*1</sup>	11.5	12	12.5	V
Line regulation	$\Delta V_{OUT, line}$	$V_{IN} = 15\text{V} \sim 400\text{V}$ , no load	---	40	200	mV
Load regulation	$\Delta V_{OUT, load}$	$V_{IN} = 50\text{V}$ , $I_{OUT} = 0 \sim 3.0\text{mA}$	---	150	400	mV
Input quiescent current	$I_Q$	$V_{IN} = 15\text{V} \sim 450\text{V}$ , no load	---	250	350	$\mu\text{A}$
$V_{IN}$ off-state leakage current	$I_{OFF}$	$V_{AUX} \geq V_{OUT}+1\text{V}$ applied to $V_{OUT}$ pin	---	0.1	10	$\mu\text{A}$
Input current to $V_{OUT}$	$I_{AUX}$	$V_{AUX} \geq V_{OUT}+1\text{V}$ applied to $V_{OUT}$ pin	---	---	400	$\mu\text{A}$
Output peak current	$I_{PEAK}$	$C_{OUT} = 10\mu\text{F}$ , $V_{IN} = 400\text{V}$ <sup>*2</sup>	---	TBD	---	mA
External voltage applied to $V_{OUT}$	$V_{AUX}$	---	---	---	15	V

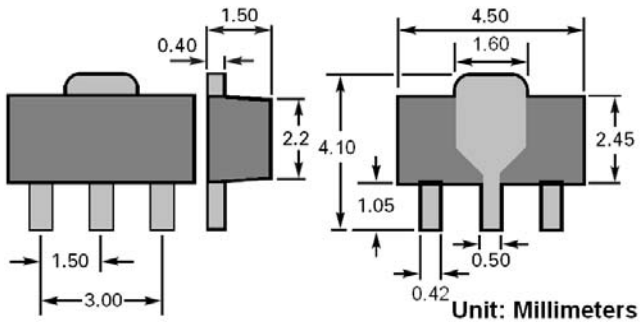
Note:

1. Guaranteed by design
2. Pulse test cycle < 1.0 mS, duty cycle < 2%

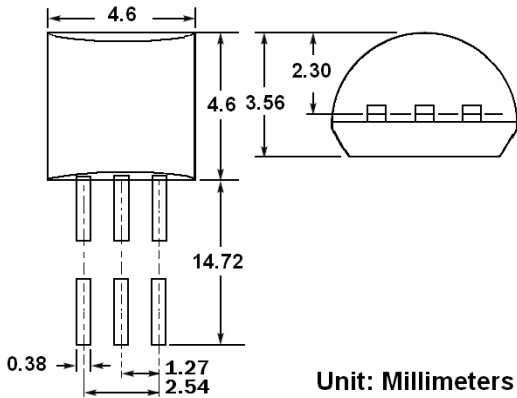
## Typical Application Circuit



**Package Outline**  
**SOT-89:**



**TO-92:**



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