370mA Low Dropout Constant Current LED Driver

■ General Description

The LN5935 is a low dropout current regulator rated for 370mA constant sink current, just need only 200mV maximum dropout.It mainly used in battery-powered direct drive 1W LED occasions. In 2.5①V ~ 6.5V voltage range to provide a stable 370mA input current, no external capacitors inductors resistors, no noise, small size.

①: 2.5V is the supply voltage, OUT pin must ensure 200mV dropout . If access LED, please consider the positive dropout VF.

■ Features

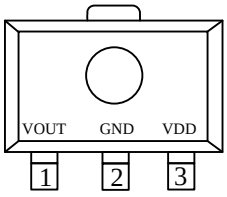
- No external component required
- 370mA constant sink current
- Low dropout voltage, 200 mV@370mA
- Low quiescent current, 500μA
- PWM dimming control
- Supply voltage range 2.5V ~ 6.5V
- Thermal protection
- Undervoltage protection
- SOT-89 package

■ Applications

- Flashlight
- Power-LED Driver

■ Package

- **SOT-89-3L**



SOT-89-3L
(Top View)

■ Ordering Information

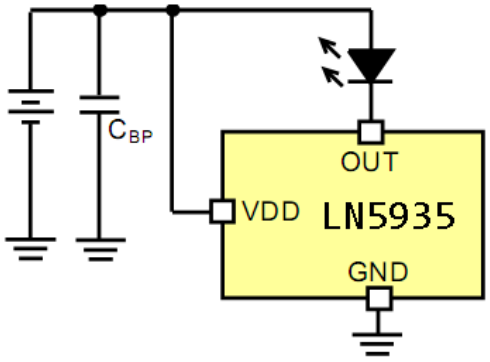
LN5935 ①②③

Item	Symbol	Function
①	P	Package type: SOT89-3L
②	D	Customer specified
	R	Embossed Tape :Standard Feed
	L	Embossed Tape :Reverse Feed
③	A	360-380mA
	B	340-360mA

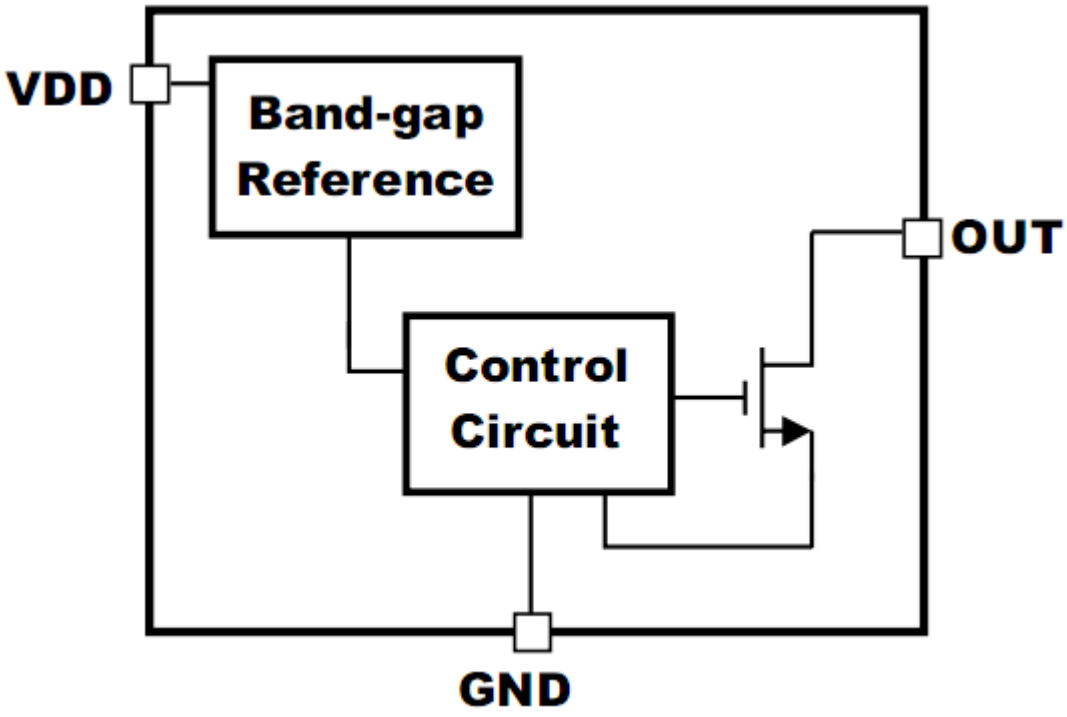
■ Pin Assignment

Pin Number	Pin Name	Function
1	OUT	Output pin
2	GND	Ground
3	VDD	Supply voltage

■ Typical Application Circuit



■ Function Block Diagram



■ Absolute Maximum Ratings

Input Votage(T_A=25℃)

V_{DD}---------- -0.3V to 7V

Temperature

Operating Temperature range ---------- -40℃- 85℃

Storage Temperature range ---------- -65℃-150℃

Lead Temperature(Soldering,10 seconds)---------- 260℃

■ Electrical Characteristics

(Ta=25℃, V_{DD}=3.7V,unless otherwise noted)

Item	Symbol	Condtion	Min.	Typ.	Max.	Unit
Input supply voltage	V_{IN}		2.5	-	6.5	V
Undervoltage protection threshold voltage	V_{UVLO}		-	2.1	-	V
Output Current	I_{OUT}	LN5935A	360	370	380	mA
		LN5935B	340	350	360	
Quiescent Current	I_Q		-	500	-	uA
OUT Pin Dropout Voltage	$V_{OUT-DROP}$	90%maxmium current		160	200	mV
OUT Pin Current linear regulation	ILED-LINEAR	VOUT=0.5V~2V	-3	-	+3	%/V
Thermal protection threshold				150		℃

■ Application Information

LN5935 is a constant current IC. Its main function is to stabilize the electric current flow through the LED, rather than stable LED voltage. Now the most of LED driver IC are voltage regulator IC. However, due to LED forward voltage (Forward Voltage, VF) caused by different values even in the same framework, the regulator IC will not put the different LED have the same electrical current. Because of this architecture , the LED will have the brightness problem. LN5935 steady flow IC architecture can improve the problem completely. The brightness of LED are determined by the current, so long as we can control the current flow through LED, we can grasp the brightness of LED. There is significant difference in especially hand-held circuit .

The course must pay attention to **the choice of power supply voltage**. Because of the chip heat dissipation problems. For example VF = 3.2V, VDD = 6.5V, current of 370mA, that the power consumption of the chip is (6.5-3.2) × 0.37 = 1.221W, more than the SOT89-3L package allows power dissipation, so that the chip temperature Sharply, resulting in thermal protection circuit starts to cut off the current of OUT pin. Serious or even directly burn chips. So be sure to pay attention to the choice of power supply voltage. Maximum power dissipation is calculated as:

$$P_{D(MAX)} = V_{OUT(MAX)} \times I_{OUT(NOM)} + V_{IN(MAX)} \times I_Q$$

$V_{OUT(MAX)}$ = the maximum voltage on output pin;

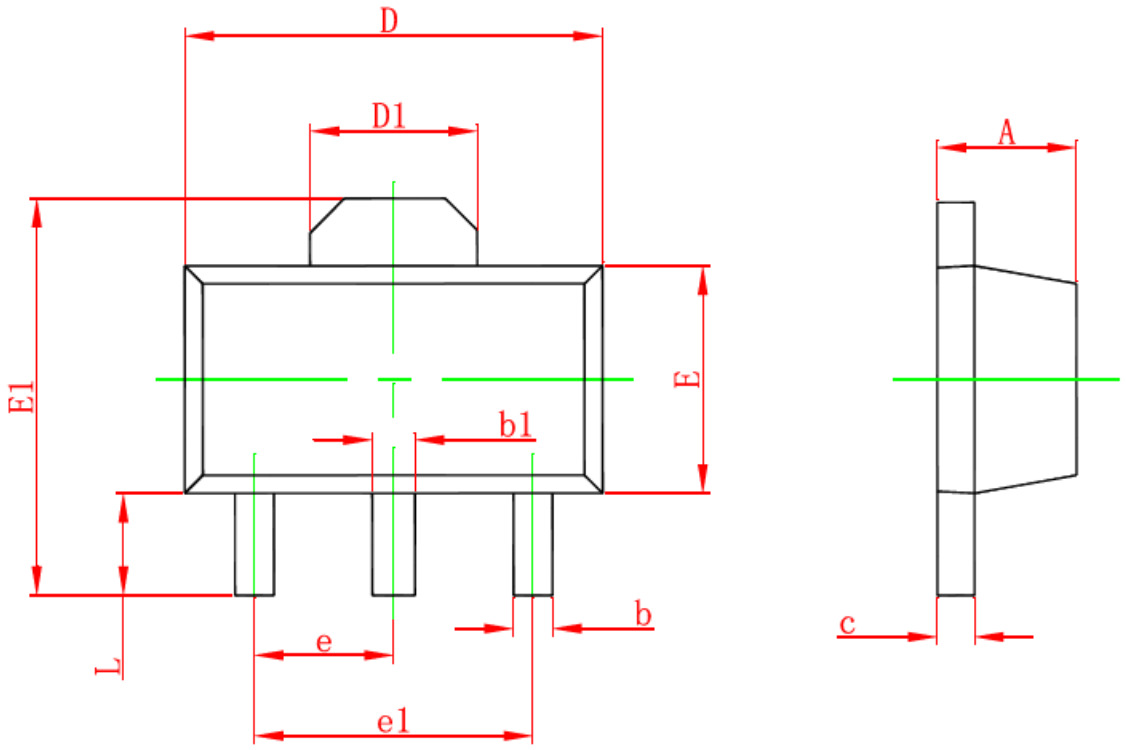
$I_{OUT(NOM)}$ = the nominal output current;

I_Q = the quiescent current the regulator consumes at IOUT(MAX);

$V_{IN(MAX)}$ = the maximum input voltage.

■ Package Information

- **SOT-89-3L**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047