700mA Low Dropout Constant Current LED Driver

■ General Description

The LN5936 is a low dropout current regulator rated for dual 350mA constant sink current, just need only 200mV maximum dropout.It mainly used in battery-powered direct drive 3W LED occasions. In 2.5V① ~ 6.5V voltage range to provide dual 350mA input current, no external capacitors inductors resistors, no noise, small size.

①2.5V is the supply voltage, OUT side must ensure 200mV dropout, if the access LED,Consider the LED forward pressure VF.

■ Features

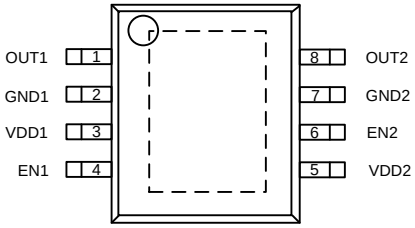
- Maximum output current: 700mA
- Low dropout voltage,200 mV@350mA
- Low power consumption, only 1mA
- PWM dimming control
- Supply voltage range 2.5V ~ 6.5V
- Thermal protection
- Undervoltage protection
- SOP-8/PP package

■ Applications

- Flashlight
- Power-LED Driver

■ Package

- **SOP-8/PP** (LN5936SRA/B)



SOP-8/PP
(TOP VIEW)

■ Ordering Information

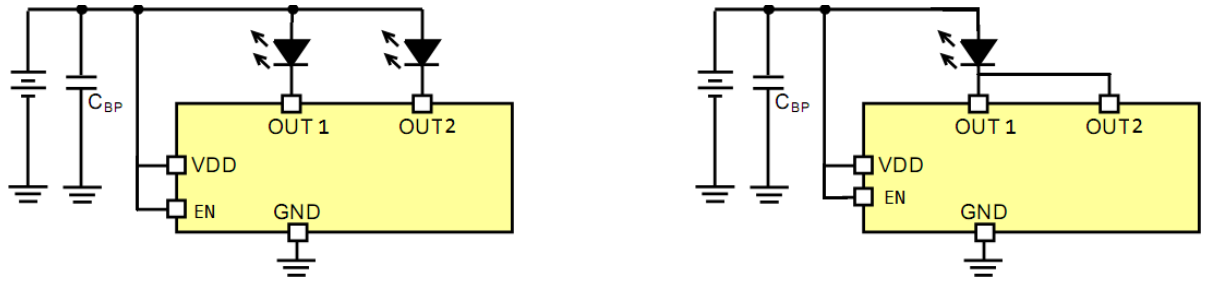
LN5936 ①②③ **Eg:**LN5936SRA

Item	Symbol	Function
①	S	Package type: SOP-8/PP
②	D	Customer specified
	R	Embossed Tape :Standard Feed
	L	Embossed Tape :Reverse Feed
③	A	720-760mA
	B	680-720mA

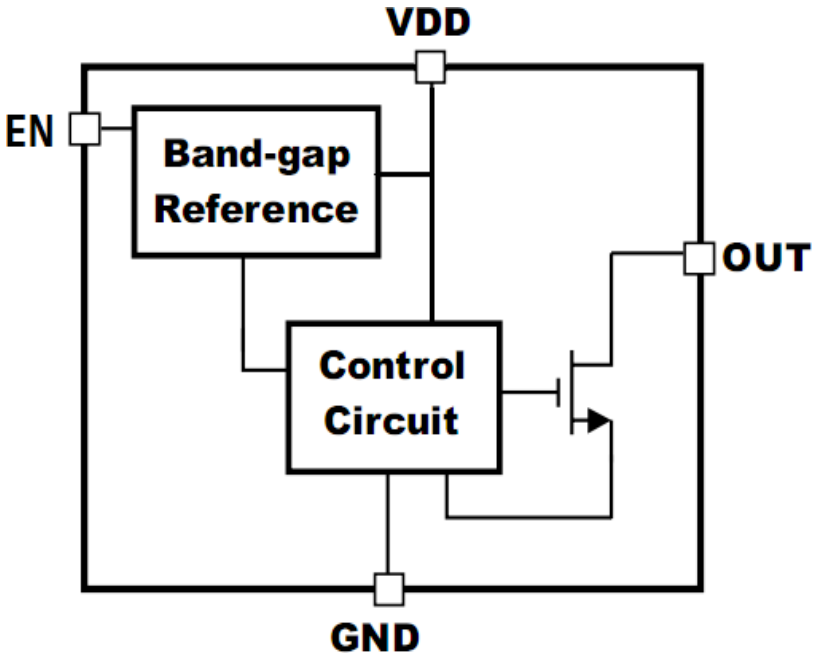
■ Pin Assignment

Pin Number	Pin Name	Function
1	OUT1	Output Voltage 1
2	GND1	Ground
3	VDD1	Power Supply
4	EN1	Chip Enable 1
5	VDD2	Power Supply
6	EN2	Chip Enable 2
7	GND2	Ground
8	OUT2	Output Voltage 2

■ Typical Application Circuit



■ Function Block Diagram



■ Absolute Maximum Ratings

(Ta=25°C)

Item	Symbol	Absolute maximum ratings	Unit
VIN to GND	V_{IN}	GND-0.3～7	V
EN Pin voltage	V_{EN}	GND -0.3~7	V
Operating Temperature range	Topr	-40～＋85	℃
Storage Temperature range	Tstg	-65～＋150	
Reflow Temperature (soldering, 10sec)	Tref	260	

Caution: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

■ 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}	LN5936A	350	365	380	mA
		LN5936B	320	335	350	
Quiescent Current	I_Q		-	1000	-	μA
OUT Pin Dropout Voltage	$V_{OUT-DROP}$	90%maxmium current		160	200	mV
OUT Pin Current linear regulation	$I_{LED-LINEAR}$	V_{OUT}=0.5V~2V	-3	-	+3	%/V
Thermal protection threshold				150		℃

■ Application Information

LN5936 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. LN5936 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 740mA, that the power consumption of the chip is (6.5-3.2) × 0.74= 2.442W, more than the SOP-8/PP 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;

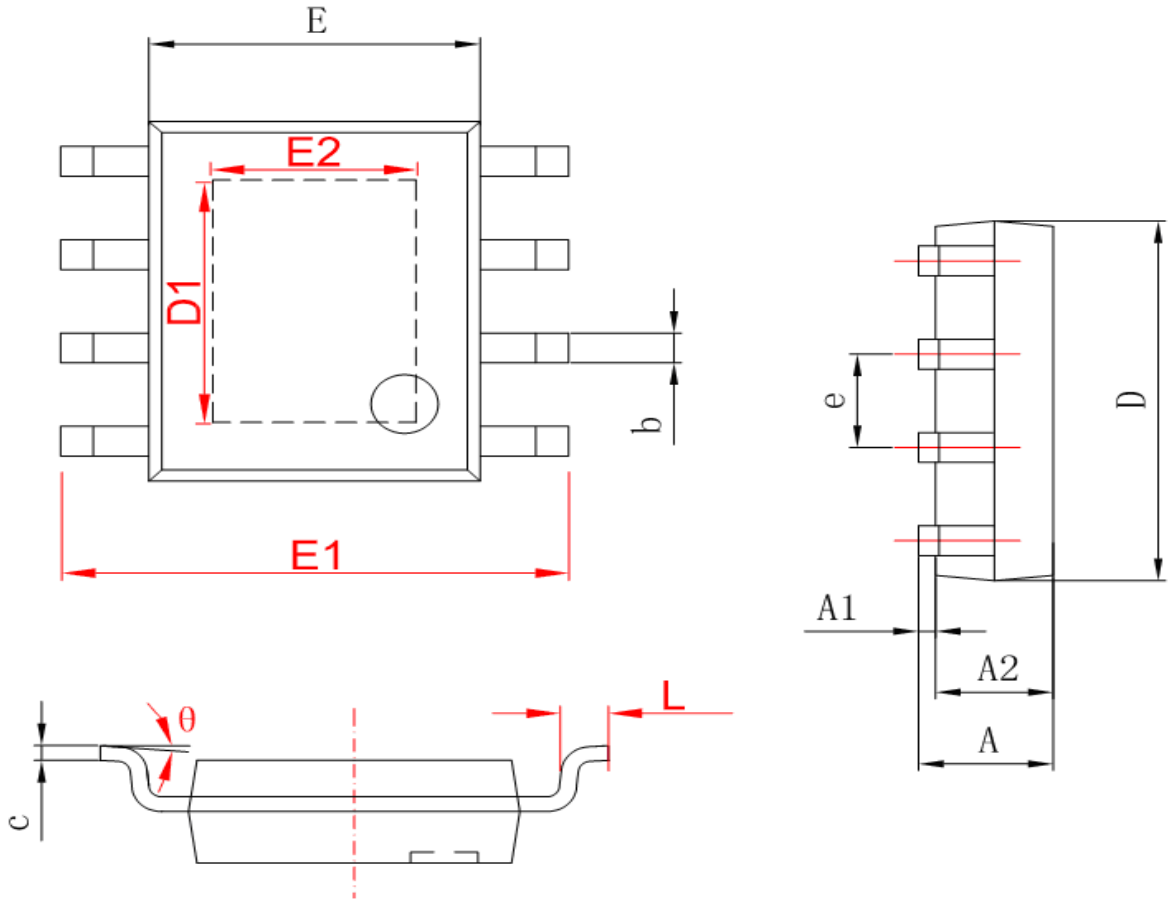
$I_{OUT(NOM)}$ = the nominal output current;

I_Q = the quiescent current the regulator consumes at $I_{OUT(MAX)}$;

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

■ Package Information

- **SOP-8/PP**



字符	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.050	0.150	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
D1	3.202	3.402	0.126	0.134
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
E2	2.313	2.513	0.091	0.099
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°