



## High voltage piecewise linear Constant current LED control chip

### Description

D8084B is a high power factor linear constant current LED driver chip, it Integrated high-voltage rectifier diode and JFET high voltage power supply, which application in LED lighting field, single chip support to 22W application. By the unique constant current control technology, the constant current accuracy is less than  $\pm 5\%$ , and the output current can be adjusted by the external CS resistance. Chip with high PF and low THD.

D8084B don't need transformer and high voltage electrolytic capacitor, its system is simple in structure, and can realize the batch operation of LED lighting project.

D8084B Integrated input line voltage compensation function. When the input line voltage is too high, the output current is reduced by the external compensation resistor, which ensures that the input power is not changed with the line voltage; D8084B is also integrates over temperature adjustment function, and when the internal temperature exceeds  $130^{\circ}\text{C}$ , it will reduce the output current.

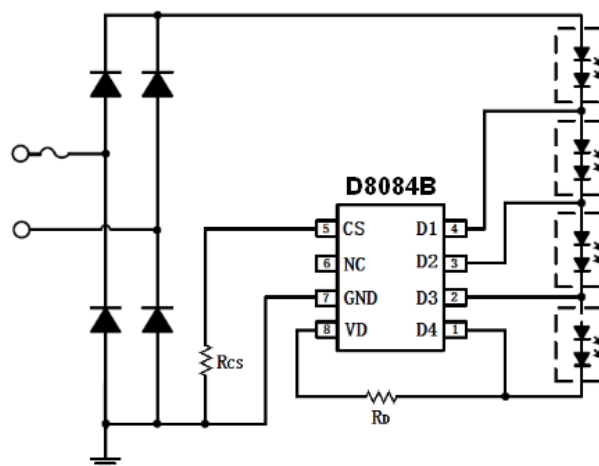
### Feature

- The peripheral driving circuit is simple and the drive volume is small.
- No need for electrolytic capacitors and magnetic components, stable performance
- Input line voltage compensation function
- Built-in overheat regulating function
- $\pm 5\%$  adjustable output current accuracy
- Max output current 100mA
- Single chip support for 22W application
- The output current is stable when the multi chip is used in parallel.
- ESOP8 package.

### Application range

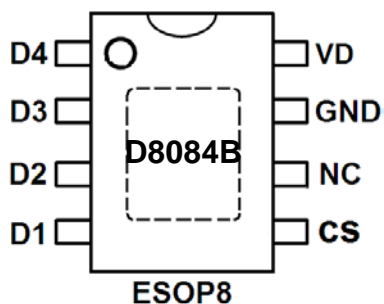
- LED bulb lamp, down light, tube light
- Projection lamp, candle lamp, other LED lamp

### Typical applications





## Pin package diagram



## Pin Definition

Pin No.	Name	Description
1	D4	The fourth segment of LED lamp pin
2	D3	The third segment of LED lamp pin
3	D2	The second segment of LED lamp pin
4	D1	The first segment of LED lamp pin
5	CS	Current sampling
6	NC	Empty pin
7	GND	Ground
8	VD	Input voltage detection pin

## Absolute Maximum Ratings (Note1, Note2)

Symbol	Parameter	Range	Units
D1, D2 -GND	50V high voltage pin	-0.3~500	V
D3, D4 -GND	300V high voltage pin	-0.3~300	V
CS, VD—GND	Chip low voltage pin	-0.3~6	V
Pmax	Maximum power of single chip	25	W
Rja	PN junction to ambient thermal resistance	60	°C/W
TA	Operating temperature range	-40~150	°C
TSTG	Storage Temperature Range	-55~150	°C
ESD	Electrostatic protection	2000	V

Note1: the Absolute Maximum Ratings is beyond the scope of in practical application, will be most likely to cause permanent damage to the chip. The above Absolute Maximum Ratings showed pressure can withstand the chip, but it is not recommended to chip in the Absolute Maximum Ratings or beyond the recommended operating conditions. Chip for a



long time at the maximum rated operating conditions, will affect the reliability of the chip.

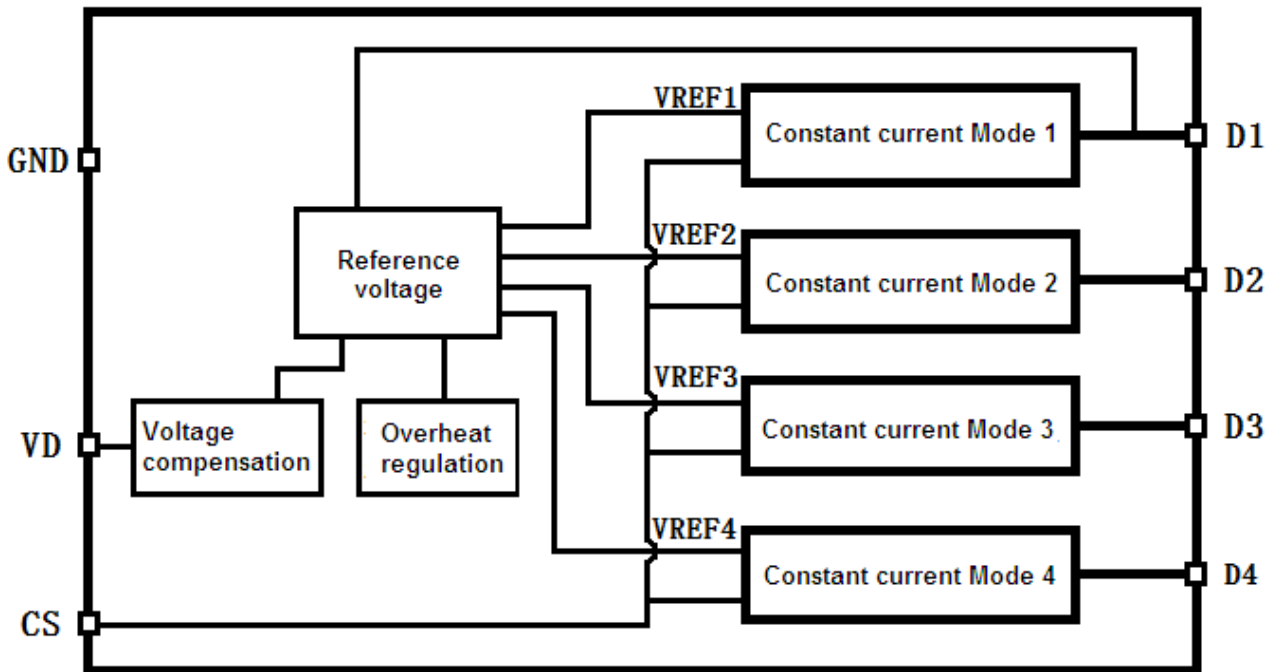
Note2: Human Body model, 100pF capacitor discharge through 1.5K resistance.

## Electrical parameters

Symbol	Parameter	Condition	Min.	Typ	Max.	Unit
<b>Recommended power range</b>						
P220	220Vac Input power	Vout=250V		20		W
P110	110Vac Input power	Vout=130V		15		W
<b>Power Supply</b>						
Vst	Start-up voltage	D1Voltage rise		5		V
IDD	Operating current	D1=10V, CS floating		190		uA
<b>Power MOSFET section</b>						
Vds_bv1-2	D1, D2 Pressure	—		500		V
Vds_bv3-4	D3, D4 Pressure	—		300		V
I <sub>max</sub>	D1, D2 Max. current	—		100		mA
I <sub>max</sub>	D3, D4 Max. current	—		180		mA
<b>Current sampling</b>						
Vref1	First reference voltage	D1=10V, CS=10 Ω		0.57		V
Vref2	Second reference current	D1=D2=10V, CS=10 Ω		0.68		V
Vref3	Third reference voltage	D1=D3=10V, CS=10 Ω		0.83		V
Vref4	Fourth reference voltage	D1=D4=10V, CS=10 Ω		0.89		V
Dout	Output current accuracy	—		±4		%
<b>Protection</b>						
Treg	Overheat regulation	—		130		°C



## Internal structure diagram



## Application information

D8084B is a LED constant current drive control circuit, the internal integrated LED constant current control module, high voltage drive and other functional modules.

### Power supply and drive

After power on the system, the D1 supply power to the chip through the internal high voltage JFET, when the D1 voltage is more than 5V, the chip will begin to work.

According to the D8084B bus voltage changing, to change the connecting LED lamp quantity. In the whole alternating current (AC) cycle, with the rising of bus voltage, every segment of LED lamps will light gradually, and the current is increased, which can achieve high PF and low THD.

D8084B general combined with high voltage lamp, it request total series lamps voltage close to the input voltage. In  $V_{IN}=220V_{ac}$  applications, if use 18V lamp, it need 14 lamps and 5:5:2:2 proportion arrangement in parallel.

### Input line voltage compensation

When the input voltage is too high, D8084B detect the D4 voltage through the VD, reduce the output current, to ensure that the input power almost does not change with the input voltage.

To reduce the current range, adjusted the  $R_d$  resistance between D4 and VD, the relationship is as follows:

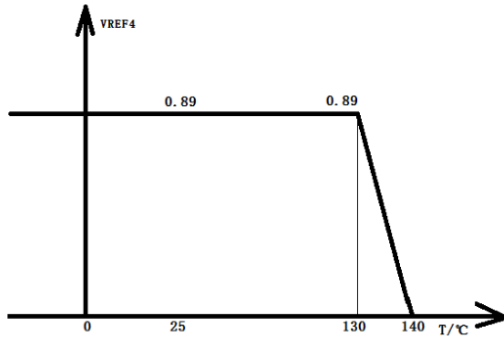
$$V_{ref4}=0.89 - V_{d4} * 1.6K \Omega \div R_d$$

$R_d$  is generally set at about 430k.



## Overheat regulating function

D8084B has the function of overheat regulation, when the internal temperature of the chip reaches 130 °C, the output current is reduced, so that the output power and temperature rising can be controlled, and the reliability of the system can be improved.



## PCB/ aluminum substrate PCB design considerations

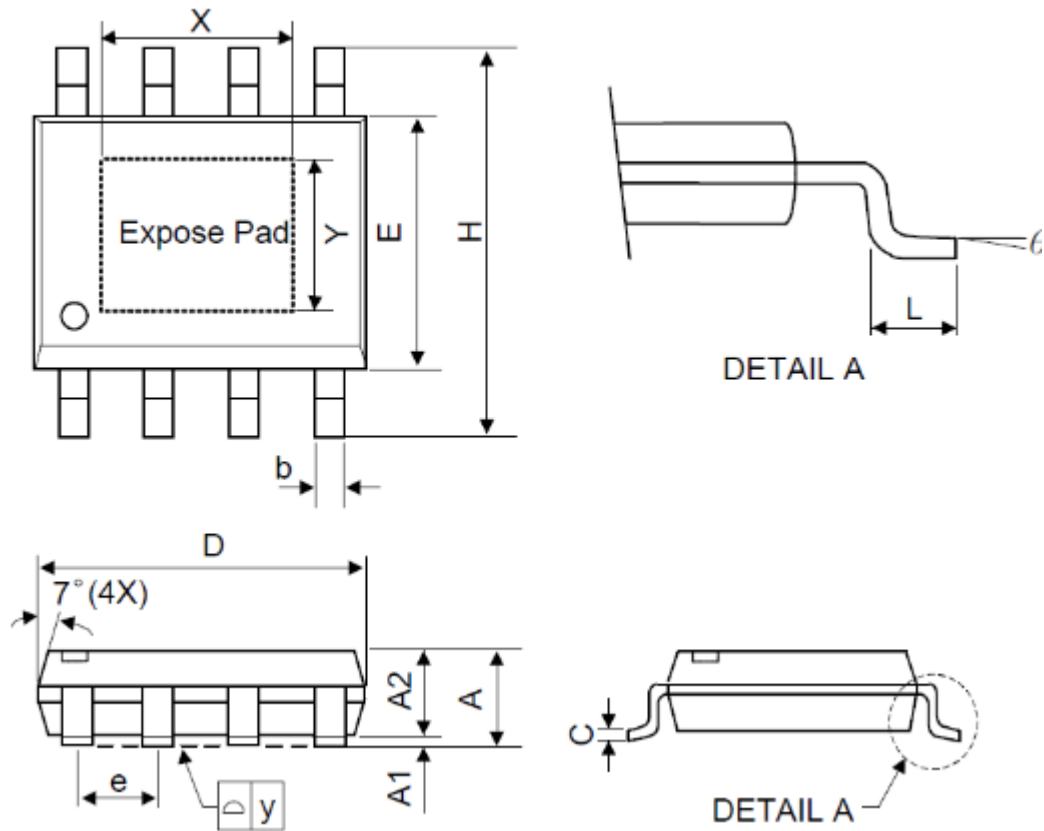
The chip bottom of D8084B has heat sink with enhanced heat dissipation capability, it can be floated or connected to the GND, and contact as much as possible with the aluminum substrate PCB or PCB copper clad, to achieve a good cooling effect.

The power GND wire of the current sampling resistor of D8084B must as short as possible.



## Package information

### ESOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.050	0.250	0.002	0.010
A2	1.250	1.650	0.049	0.065
b	0.310	0.510	0.012	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.150	0.185	0.203
E	3.800	4.000	0.15	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.05 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



日期 Date	版本 Version	说明 Description	排版 Typeseting	工程师 Engineer	状态 Status
2016-3-30	A0_J	/	Jasper	/	Active