

SDS3548S (ESOP16) Datasheet

(Version:1.0)

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1. Product Description

SDS3548S is multichannel high power factor high voltage linear constant current LED driver chip. SDS3548S uses linear constant current technology to set LED light string drive current with the external resistor. LED twinkle light adopts three period of structure. The solution can adapt to the application requirement of 3 ~ 25 watts of the LED lamps and lanterns with high power factor and low harmonic distortion.

SDS3548S has over temperature protection function. When the system temperature is too high, it reduce the output current to achieve the effect of lowering the temperature.

SDS3548S has the function of the line voltage compensation. When the input voltage is too high, it reduce the output current to ensure that the input power does not change with the input voltage.

SDS3548S has the function of sine wave modulation to reduce harmonic distortion. The THD pin modulates the LED lamp string current through the voltage synchronization signal of the external voltage divider resistor sampling line to realize low harmonic distortion.

2. Product Feature

- Output constant current :5~230mA
- High precision constant current $< \pm 5\%$
- High PF and low harmonic distortion
- High order harmonics meet the requirements Of IEC61000-3-2
- Overheating protection function
- Line voltage compensation function
- Application solutions without EMI problems
- The simple line and low cost power supply
- Package:ESOP16

3. Application

- LED bulb and down light
- LED street Light
- LED mining lamp, project-light lamp



4. Pin Configuration and Definition

a) Pin Configuration

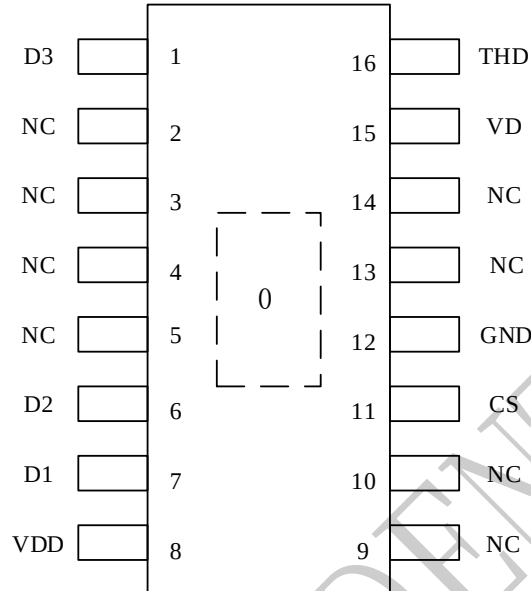


Figure 1: SDS3548S Pin Configuration

b) Pin Definition

Pin Order	Pin Name	In/Out	Function Discription
1	D3	Input	The third section of high voltage constant current source port, links led twinkle light
6	D2	Input	The second section of high voltage constant current source port, links led twinkle light
7	D1	Input	The first section of high voltage constant current source port, links led twinkle light
8	VDD	Power Supply	The internal power supply port of the chip,connected with the external filter capacitor to the ground
11	CS	Power Supply	Chip Ground
12	GND	Input	Chip Ground
15	VD	Output	Line voltage compensation port, connected to external filter capacitor to ground
16	THD	Output	Sine wave modulation sampling port, external voltage divider to VAC and ground
0	NC	Heat sink	Heat sink conducts with GND to increase the area of heat dissipation copper foil
2~5, 9~10, 13~14	NC	-	Suspended,can be used as a thread passing pin

5. Maximum Rating and Electrical Characteristics

a) Maximum Rating (If no specified, the ambient temperature is 25 °C)

Item	Mark	Min	Max	Unit
Store Temperature	Tstg	-55	150	°C
Work Temperature	Topt	-40	125	°C
Work Temperature(section temperature)	Tjuc	-40	150	°C
High voltage pin pressure(D1/D2/D3)	V_{Dout}	700	--	V
LOW voltage pin pressure (VDD/CS/THD/VD)	V_{CS}	10	--	V
Static tolerance(HBM)	V_{ESD}	2000	--	V

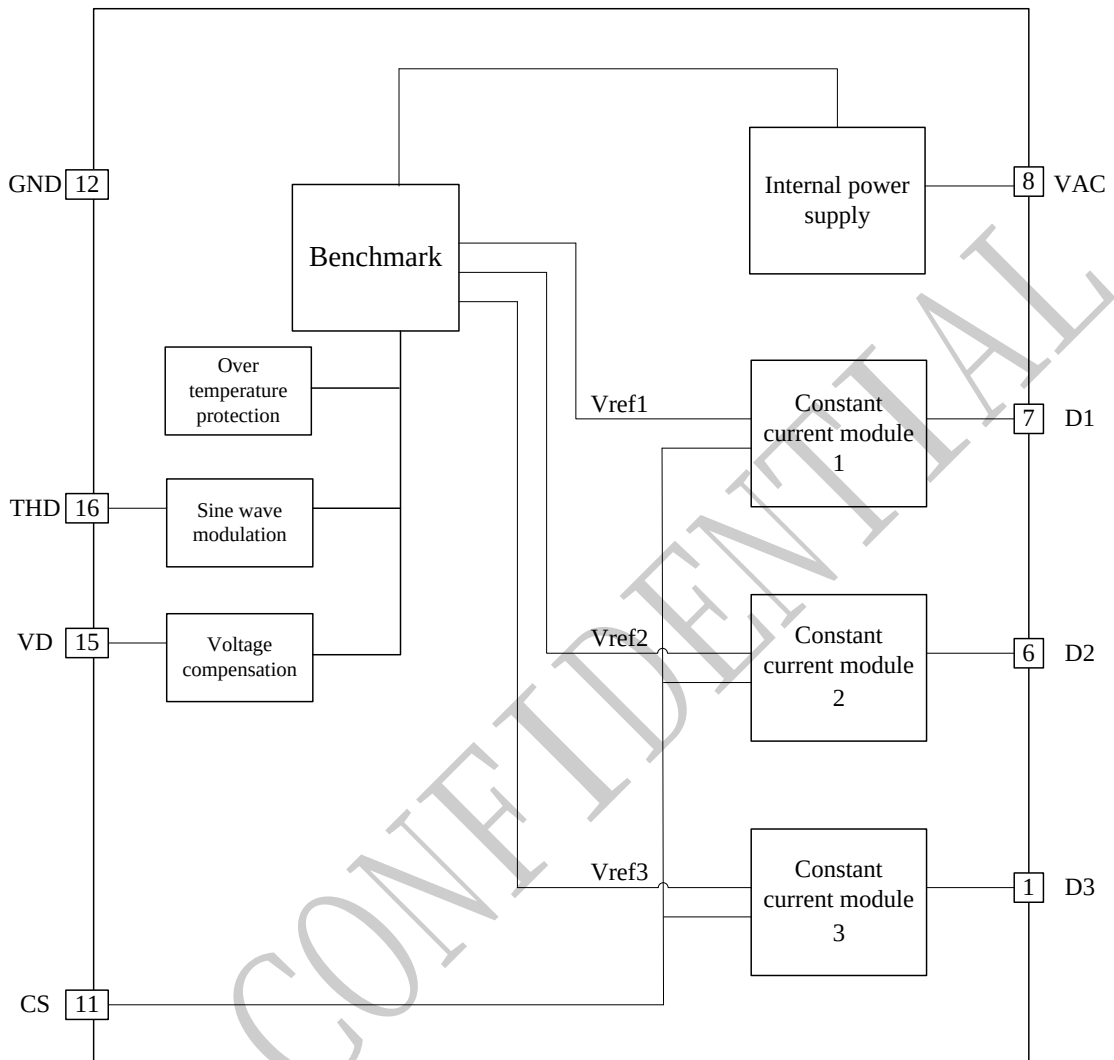
b) Electrical Characteristics (If no specified, the ambient temperature is 25 °C)

Parameter	Mark	Test condition	Min	Typical	Max	Unit
Input line voltage	VAC	AC 200~270V	50	311	400	V
Quiescent Current	I_q	D1=30V	--	300	350	uA
D1 Input Voltage	VD1	--	30	--	--	V
Peak voltage of CS port	V_{Sin}	D1=30V, VD=0, THD=50Hz, Rcs=100Ω	--	2.9	3.0	V
Starting voltage of thd port	V_{THD}	D1=30V, THD=50Hz, Rcs=100Ω	--	760	--	mV
Turning point of temperature protection	T_{sw}	--	--	140	--	°C

c) Package Thermal Resistance

Parameter	Mark	Min	Max	Unit
ESOP16 Package Thermal Resistance	θ_{jc}	--	25	°C/W

6. Function Description



Figur2: SDS3548S internal block diagram

Working principle

After the system is powered on, it supplies power to the chip through D1. When the voltage of D1 is more than 30V, the internal voltage is stability, then IC begin to work. SDS3548S selects a specific conduction constant current module according to voltage change of the rectifying waveform. So it can change the access number of LED lights: When the input voltage is low, some LED lights up; When the input voltage is higher, most or all of the LED lights are lit.

Compared to the solution of single channel high voltage linear constant current LED driver, SDS3538BS don't need the valley capacitance but has high power factor and low harmonic distortion. Also in the communication cycle, it increases the led light up time to improve the utilization rate of the LED and the total number of LM output.

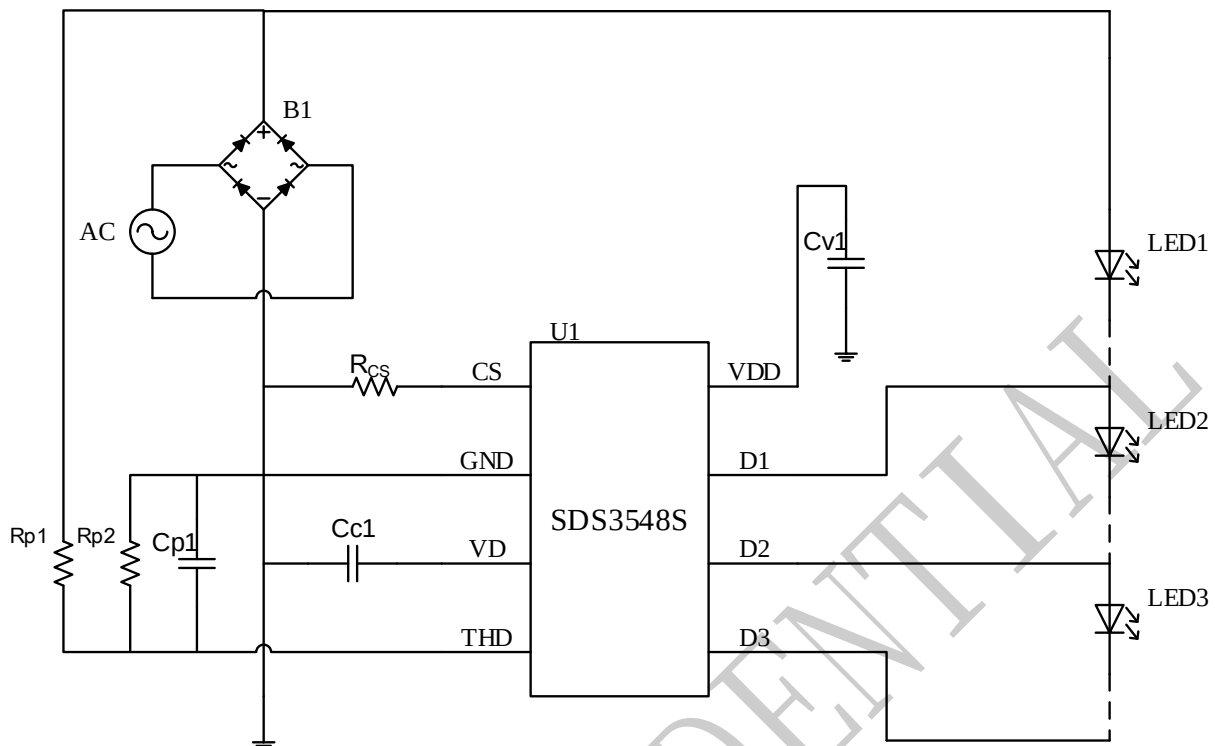


Figure3: SDS3548S typical circuit

The drive current setting

SDS3548S sets the driving current of LED lamp string through CS pin connecting sampling resistor in Figure 3 to ground. With sine wave of AC wire voltage, led section by section turns on and then turns off section by section. The sampling voltage of CS pin will keep the sine wave synchronous with the voltage of AC wire. The current flowing through LED string is also sine wave, and the peak current calculation formula is as follows:

$$I_{\text{peak}} = 2900 / R_{\text{cs}} \text{ mA}$$

Line voltage compensation

SDS3548S has the function of wire voltage compensation. Through the THD pin sampling AC wire voltage VAC, according to the voltage of VAC to reduce the LED current, so as to achieve the effect that the input power basically does not change with the line voltage. The line voltage compensation of SDS3548S is not affected by LED string voltage.

The starting point of line voltage compensation is set by the voltage dividing resistance ratio of THD pin. 510k and 3.74k resistors are generally used to ensure the optimal constant power curve at ac180 ~ 260V when AC220V is applied. SDS3548S VD pin is connected with 330nf capacitor to filter the line voltage sampling signal to ensure that the line voltage compensation signal will not fluctuate violently with the sine wave waveform of line voltage.

Over temperature protection setting

SDS3548S has over temperature protection function. When the system temperature decreases the output current, it controls the output power and temperature rise to keep temperature of power supply in the set value and improve the reliability of the system. The over temperature protection point is fixed at 140 °C.

Harmonic distortion

SDS3548S has the function of sinusoidal wave modulation to reduce harmonic distortion. The THD pin modulates the LED lamp string current through the voltage synchronization signal of the external voltage divider resistor sampling line to realize low harmonic distortion. Each higher harmonic can meet the requirements of IEC61000-3-2 for Class C equipment.

7. Typical application circuits

Application of AC220 V 50W low harmonic distortion

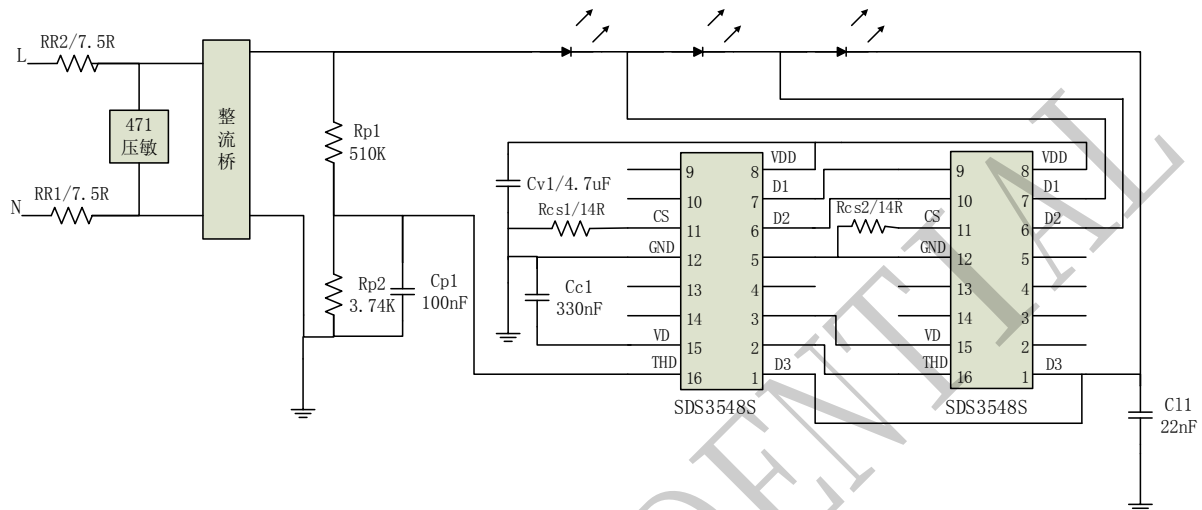


Figure 4:SDS3548s 50W application reference circuit

Element No	Species	Element Specification
MOV	MOV	7D471(Selection according to surge protection requirements)
RR1/RR2	Winding resistance	0309/7.5R/2W
B1	SMD rectifier bridge	MB10F/1KV/1A
Rp1	Chip resistance	1206/510K/1%
Rp2	Chip resistance	1206/3.74K/1%
Rcs1/Rcs2	Chip resistance	1206/14R/1%
Cp1	Chip capacitor	0805/100nF/16V/10%/X7R
Cv1	Chip capacitor	0805/4.7uF/16V/10%/X7R
Cc1	Chip capacitor	0805/330nF/16V/10%/X7R
Cl1	Chip capacitor	1206/22nF/630V/10%/X7R
U1/U2	Drive chip	SDS3548S /ESOP16
LED1~LED3	LEDS	27*9V LED depart 3 segments, 9: 9: 9

