CS8801(NP)

18V/1A High Brightness Constant Current LED Driver

■ Description

The chip is a constant current output floating buck switching converter designed to provide constant current to high power LEDs with high efficiency. The device is ideal for architectural, industrial and ambient lighting applications.

The chip delivers constant current within ±5% accuracy to a wide variety and number of series connected LEDs. Output current is adjusted with an external current sensing resistor to drive high power LEDs in excess of 1A. For improved accuracy and efficiency, the chip features dual-side hysteresis, and short propagation delay. Additional features a dimming input to enable LED brightness control by Pulse Width Modulation (PWM).

Additional features include a +5V regulated output with 10mA output current ability.

■ Feature

- Input operating range of 6V ~ 18V
- Constant current output with ±5% accuracy in excess of 1A
- Maximum efficiency over 90%
- Hysteretic control for speed and simplicity
- High speed COMS compatible PWM dimming (Up to 20kHz)
- Input Under Voltage Lock Out (UVLO)
- Over Temperature protection (OTP)
- 5V, 10mA On-Board Regulator
- -40°C to +125°C Operating Temperature Range

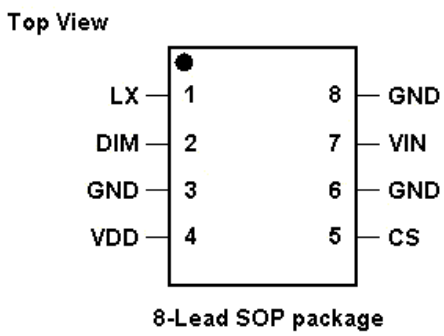
■ Applications

- High Power LED Driver
- Automotive, general illumination, and industrial lighting
- Lighting such as MR16, AR111 or Other LED Bulbs

■ Product Family

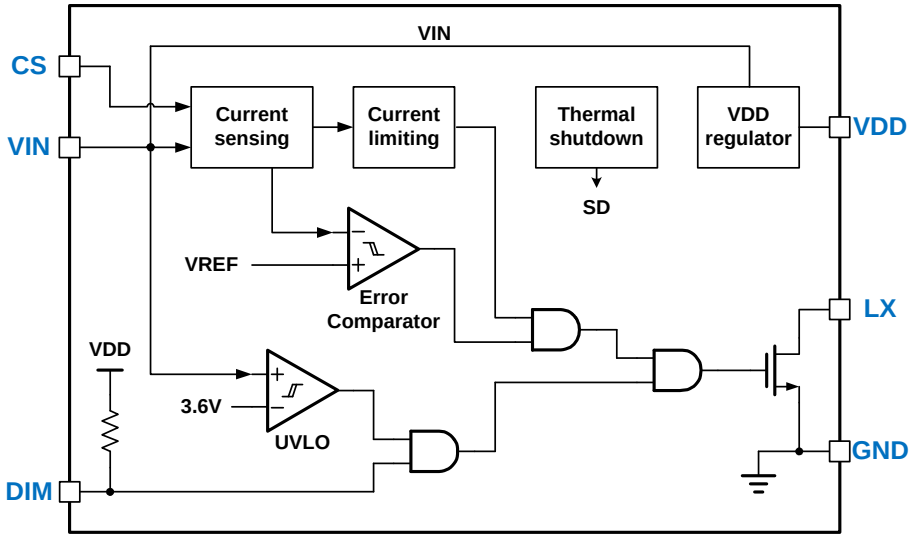
CS8801NP ------- 8SOP (150mil, 1.27mm lead-pitch)

■ Pin Assignment



Pin No.	Pin Name	Function
1	LX	N-MOSFET switch
2	DIM	PWM dimming input pin
3	GND	Ground pin
4	VDD	Internal regulator output pin
5	CS	LED current sense pin
6	GND	Ground pin
7	VIN	Power supply input pin
8	GND	Ground pin

■ Block Diagram

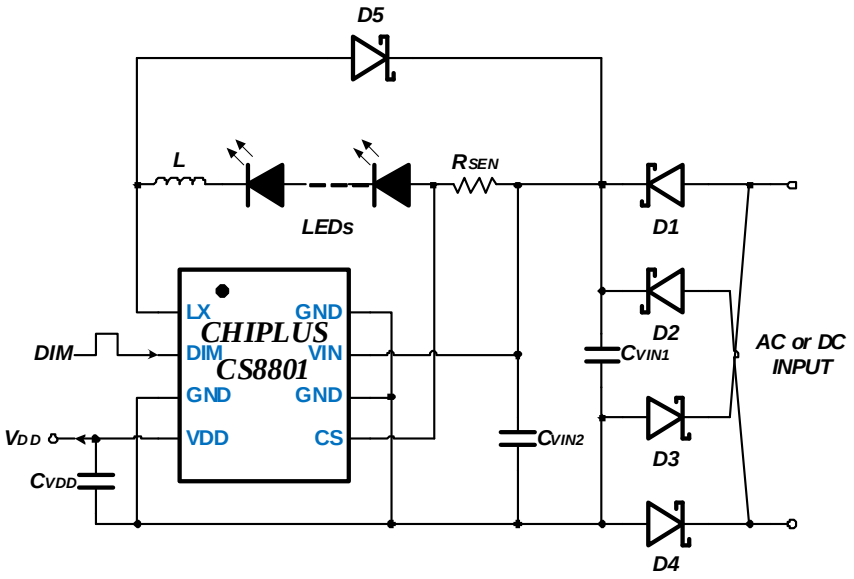


■ Absolute Maximum Ratings

VIN, CS to GND ….....-0.3V to +20V
VDD, LX, DIM to GND .....-0.3V to +9V
CS to VIN.....-1V to +1V
Maximum Current into Any Pin
(except VIN, LX, and VDD).....±20mA

Operating Temperature Range
…….....-40℃ to +125℃
Junction Temperature.....+150℃
Storage Temperature.....-65℃ to + 125℃

■ Typical Operating Circuit



Reference Component Table

Designator	Component	Description
D1 ~ D5	Schottky	>20V, >2A
R_{SEN}	Resistor	0.5Ω, ±1%, >0.5W
L	Inductor	22uH, >2A
C_{VDD}	Capacitor	1uF, >6V
C_{VIN1}	Capacitor	>10uF, >20V
C_{VIN2}	Capacitor	1uF, >20V

■ Applications Information

Output Current Setting

The LED average current is programmed using a resistor between VIN and CS, show as R_{SEN} in the typical application schematic. Use the following equation to calculate the value of this resistor:

$$R_{SEN} = \frac{V_{SEN}}{I_{LED}}$$

Where V_{SEN} is 500mV typically, and I_{LED} is the DC average LED current.

Switching Frequency

Although hysteretic control is a simple control method, the switching frequency depends on application conditions and components. Use the following equation to determine the operating frequency:

$$f_{SW} = \frac{(V_{IN} - n \cdot V_{LED}) \cdot n \cdot V_{LED} \cdot R_{SEN}}{V_{IN} \cdot \Delta V \cdot L}$$

Where n is the number of LEDs, V_{LED} is the forward voltage drop of 1 LED, and ΔV is 50mV.

Inductor Selection

The inductor value can be calculated from a known frequency by re-arranging the same equation:

$$L = \frac{(V_{IN} - n \cdot V_{LED}) \cdot n \cdot V_{LED} \cdot R_{SEN}}{V_{IN} \cdot \Delta V \cdot f_{SW}}$$

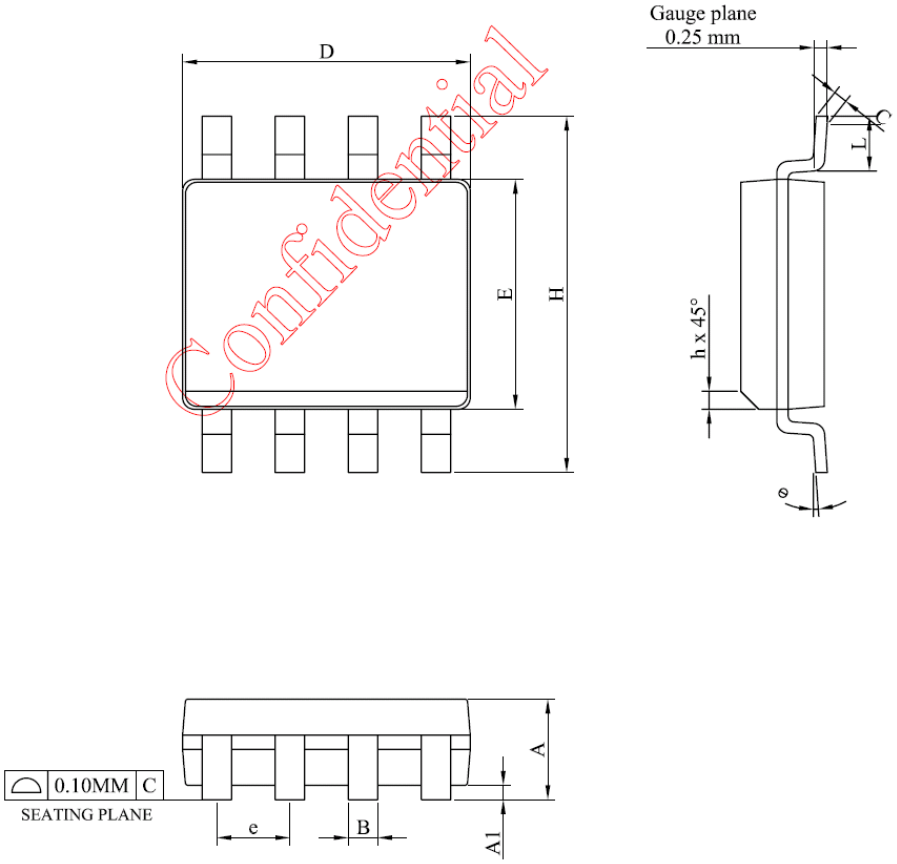
Diode Selection

The forward voltage of the diode should be as low as possible for better efficiency. A Schottky diode is a good choice as long as the breakdown voltage is high enough to withstand the maximum operating voltage. The forward current rating of the diode must be at least equal to the maximum LED current.

■ Order Information

Part No.	Package Type	Lead Pitch
CS8801NP	8SOP(mil)	mm

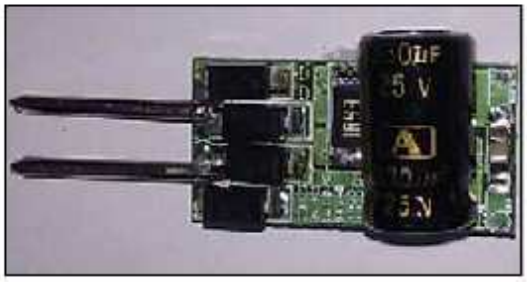
Title: Package outline for 8L SOP- 150 mil



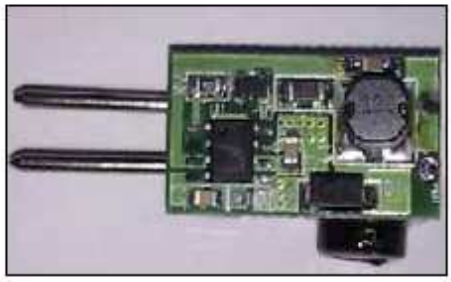
Note: Plating thickness spec : 0.3 mil ~ 0.8 mil.

SYMBOL / UNIT		A	A1	B	C	e	D	H	E	L	h	θ
mm	Min.	1.35	0.10	0.33	0.19	1.27 BSC	4.80	5.80	3.80	0.40	0.25	0
	Nom.	--	--	--	--		--	--	--	--	--	--
	Max.	1.75	0.25	0.51	0.25		5.00	6.20	4.00	1.27	0.50	8
inch	Min.	0.0532	0.0040	0.013	0.0075	0.050 BSC	0.1890	0.2284	0.1497	0.016	0.0099	0
	Nom.	--	--	--	--		--	--	--	--	--	--
	Max.	0.0688	0.0098	0.020	0.0098		0.1988	0.2440	0.1574	0.050	0.0196	8

Title: Outline drawing for MR16



(Top view)



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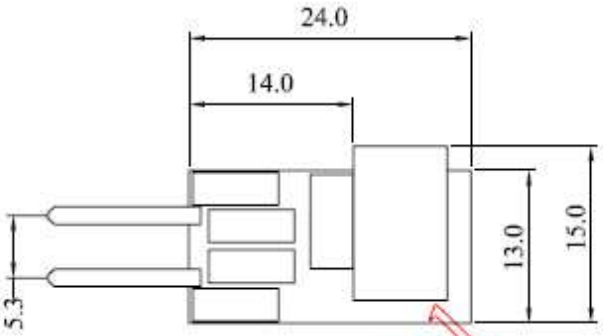

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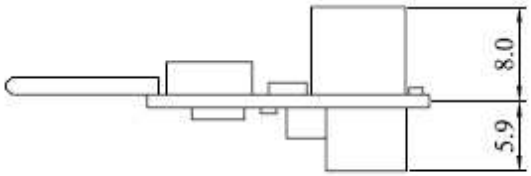
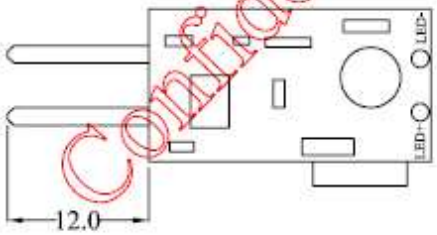


(Side view)



(Back view)

(Unit:mm)