

Low-Dropout, High-Brightness LED Driver CN5611

General Description:

The CN5611 current regulator operates from a 2.7V to 6V input voltage range and delivers a constant current that is up to 1.2A to a high-brightness LED, including high-brightness white LED. The output current of CN5611 can be adjusted from 30mA to 1.2A by using an external resistor. An on-chip pass element minimizes external components while providing $\pm 8\%$ output current accuracy. Additional features include over temperature protection, LED short and open protection.

The CN5611 is available in a thermally enhanced 5-pin SOT89 and 5 pin TO252 packages.

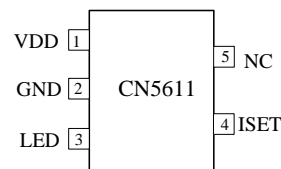
Applications:

- High-Brightness LED Driver
- LED Cap-Lamp
- Flash Light
- Lighting
- Handheld Electronics

Features:

- Operating Supply Voltage Range: 2.7V to 6V
- On-chip Pass Element
- Low-Dropout Voltage
- Adjustable Output Current up to 1.2A
- Output Current Accuracy: $\pm 8\%$
- Over Temperature Protection
- LED Open/Short Protection
- Operating Temperature Range:
- 40 to 85
- Available in 5-pin SOT89 and TO252 Packages
- Pb-free Available

Pin Assignment



SOT89-5 Package

Typical Application Circuit

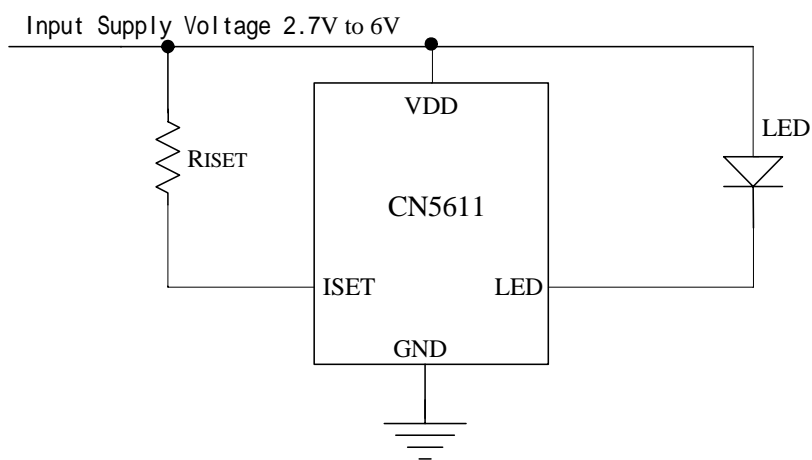


Figure 1 Typical Application Circuit

Ordering Information

Part Number	Package	Operating Ambient Temperature
CN5611	SOT89-5	- 40 to 85
CN5611	TO252-5	- 40 to 85

Block Diagram

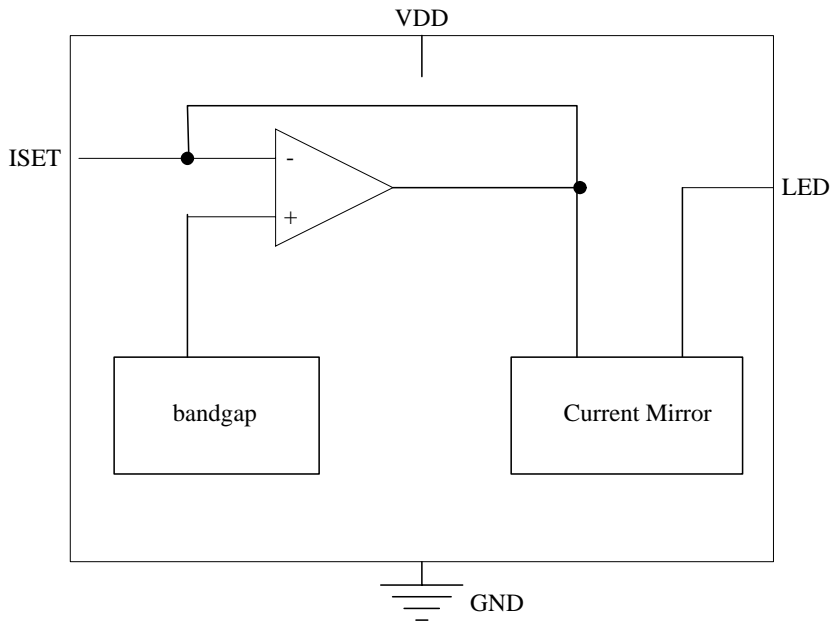


Figure 2 Block Diagram

Pin Description

Pin No.	Name	Function Description
1	VDD	Positive Supply Voltage. V _{DD} is the power supply to the internal circuit.
2	GND	Ground Terminal.
3	LED	LED Cathode Connection Pin.
4	ISET	Constant LED Current Setting Pin. The constant LED current is set by connecting a resistor R _{ISET} from this pin to VDD. The LED current is determined by the following equation: $I_{out} = 910V / R_{ISET}$ R _{ISET} is in ohm

Absolute Maximum Ratings

All Terminal Voltage..... - 0.3V to 6.5V

Operating Temperature..... - 40 to 85

Thermal ResistanceTBD

Maximum Junction Temperature.....150

Storage Temperature..... - 65 to 150

Lead Temperature(Soldering).....300

Stresses beyond those listed under 'Absolute Maximum Ratings' may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to Absolute Maximum Rating Conditions for extended periods may affect device reliability.

Electrical Characteristics

(VIN=3.7V, TA= - 40 to 85 , Typical Values are measured at TA=25 , unless otherwise noted)

Parameters	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Supply Voltage	VDD		2.7		6	V
Operating Current	IVDD	R _{ISET} =10K ohm		335		uA
LED Pin Sink Current	I _{LED}	R _{ISET} =5K	168	182	196	mA
Over Temperature Protection Temperature	T _{OTP}			125		
Over Temperature Protection Hysteresis	T _H			11		
LED pin Leakage Current	I _{LKG}	VDD=GND, V _{LED} =5.5V			1	uA
Output Dropout Voltage	V _{DROPOUT}	I _{LED} =180mA		150		mV

Detailed Description

The CN5611 is a current regulator capable of providing output current up to 1.2A to high-brightness LED. In addition, CN5611 features over temperature protection, LED open/short protection.

The CN5611 enters a thermal-shutdown mode in the event of over temperature. This typically occurs in overload or LED short-circuit conditions. When CN5611's junction temperature exceeds T_J = + 125 (typical), the internal over temperature protection circuitry turns off the series pass device to prevent the device from damage. CN5611 recovers from thermal-shutdown mode once the junction temperature drops by 11°C (typical). The device will therefore protect itself by thermally cycling in the event of LED short-circuit or overload condition.

Application Information

Adjusting LED Current

CN5611 uses a resistor between ISET pin and VDD pin to set the LED current. The LED current is given by the following equation:

$$I_{LED} = 910V / R_{ISET}$$

Where:

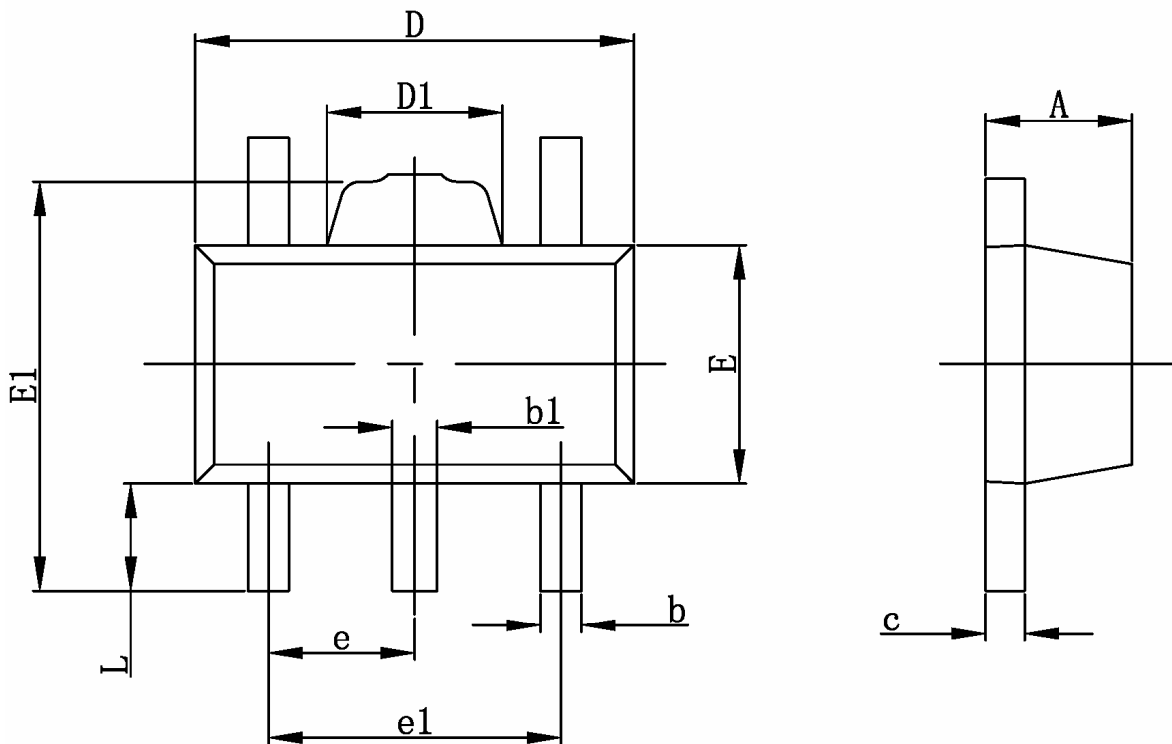
I_{LED} is the LED current in ampere

R_{ISET} is the total resistance from the ISET pin to VDD pin in ohm

For example, if 200mA LED current is required, calculate:

$$R_{ISET} = 910V/0.2A = 4.55k$$

Package Information



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	0.360	0.560	0.014	0.022
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.400	1.800	0.055	0.071
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	2.900	3.100	0.114	0.122
L	0.900	1.100	0.035	0.043