High-current LED Controller

■ General Description

XT2111 is a high-current LED control chip. The chip uses DC-DC control mode , frequency is 500KHz, the chip has wide operating voltage range , the LED current is set by an external resistor, internal to provide an accurate reference to ensure the accuracy of LED current.

When the input voltage is above a set value, the chip enters the protection mode at the same time turn off the output. The chip indudes a bendchmark bias, voltage comparator and temperature detection module, XT2111 using thermally enhanced 8-pin small outline package SOP-8.

■ Features

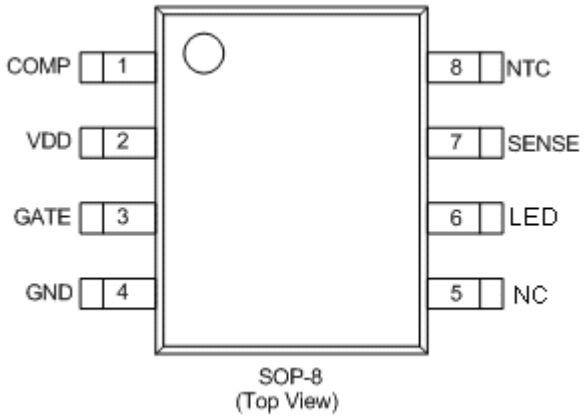
- Wide Input Supply Range: 6.0V to 20V
- Current Mode PWM Controller DC-DC
- Charge Current Accuracy: ±10%
- 8-Lead SOP Package

■ Applications

- T6 LED Flahlight
- LED stage lights

■ Package

- SOP-8



SOP-8
(Top View)

■ Ordering Information

XT2111 ①②③④

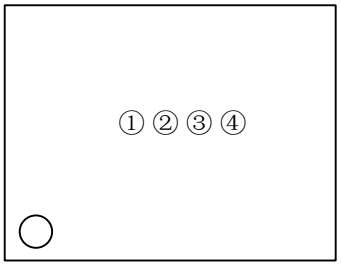
Designator	Represents	Symbol	Description
①	Type	W	External charger MOS
		U	Internal charger MOS
②	Whether with output Protection voltage	A	With output protection
		B	Without output protection
③	Package Type	M	SOP-8
④	Device Orientation	R	Standard Feed
		L	Reverse Feed

■ Functional Pin Description

Pin Number	Pin Name	Function Description	Pin Number	Pin Name	Function Description
1	COMP	Compensation and charge set	5	NC	No connect
2	VDD	Power Supply	6	LED	LED pin
3	GATE	External MOS drive port	7	SENSE	Current detection
4	GND	Ground	8	NTC	Temperature detection

■ Marking Rule

- **SOP-8**



① Represents the product name

Symbol	Product Name
Z	XT2111◆◆◆◆

② Represents continuous charging voltage type

Symbol	MOS	Product Name
W	External	XT2111W◆◆◆
U	Internal	XT2111U◆◆◆

③ Represents Whether with output Protection voltage

Symbol	MOS	Product Name
A	With Protection	XT2111◆A◆◆
B	Without Protection	XT2111◆B◆◆

④ Represents the assembly lot No.

0-9，A-Z; 0-9，A-Z mirror writing，repeated（G，I，J，O，Q，W exception）

■ Absolute Maximum Ratings

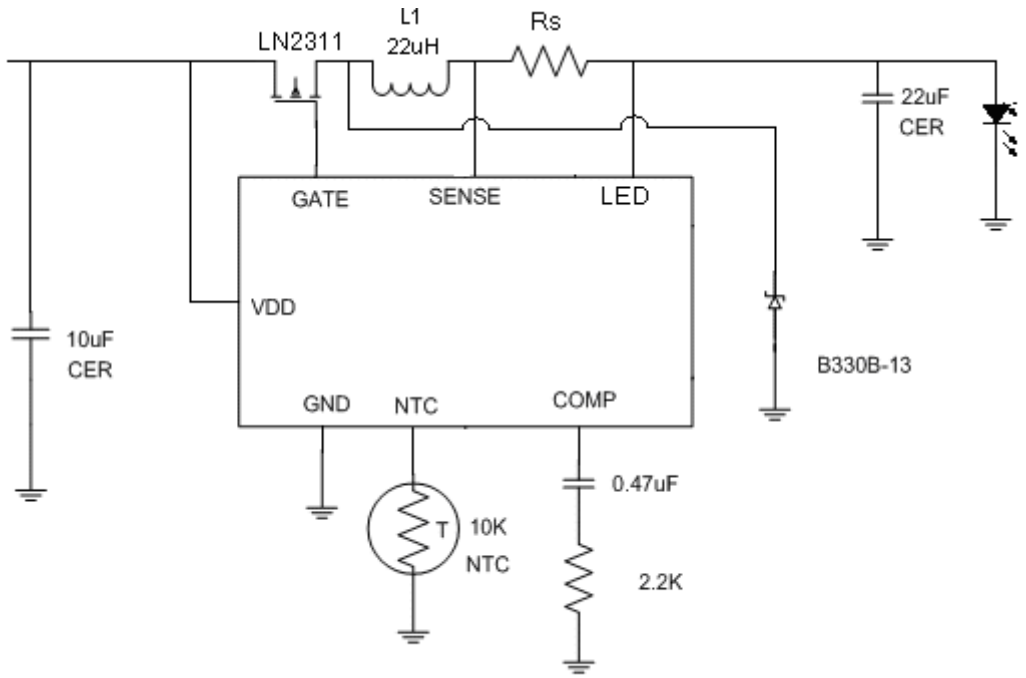
Parameter	Symbol	Maximum Rating	Unit
Input Voltage	V_{cc}	V_{SS}-0.3～V_{SS}+22	V
GATE pin voltage	Vgate	V_{SS}-0.3～V_{cc}+0.3	
LED pin voltage	V_{LED}	Vss-0.3～20	
SENSE pin voltage	Vsense	V_{SS}-0.3～20	
COMP pin voltage	Vcomp	V_{SS}-0.3～7	
NTC pin voltage	Vntc	V_{SS}-0.3～7	
Operating Ambient Temperature	Topr	-40～+85	°C
Storage Temperature	Tstr	-65～+125	
Reflow Temperature(soldeing,10s)		300	°C

■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Vcc Supply Voltage	Vcc		6.0		20	V
Vcc Supply Current	Icc	Operating Mode		3	5	mA
		Protection Mode		3	5	mA
Current detection voltage	Vsns		90	100	110	mV
LED pin protection overvoltage	Vovp		4.0	4.2	4.4	V
COMP Pin Current	Icomp			100		μA
NTC Pin Current	Intc			85		μA
NTC Pin Threshold Voltage(Hot)	Vntc-hot		340	355	370	mV
NTC Pin Threshold Voltage(Cold)	Vntc-cold		2.291	2.35	2.386	V
Switching Frequency	Fosc	RL=100mA	450	500	550	KHZ
Temperature Proctection	T_HOT			155		℃

■ Typical Application Circuit

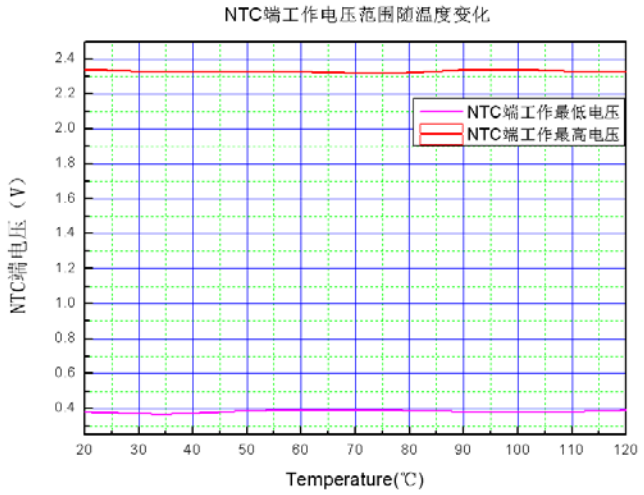
- **LED Application**



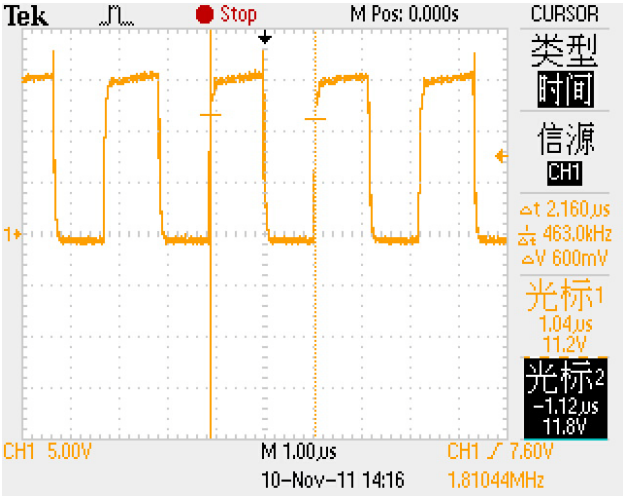
Note: Rs set the LED current resistor, the LED current $I_{LED} = \frac{100mV}{R_s}$, NTC pin can directly connect to ground.

■ Typical Performance Characteristics

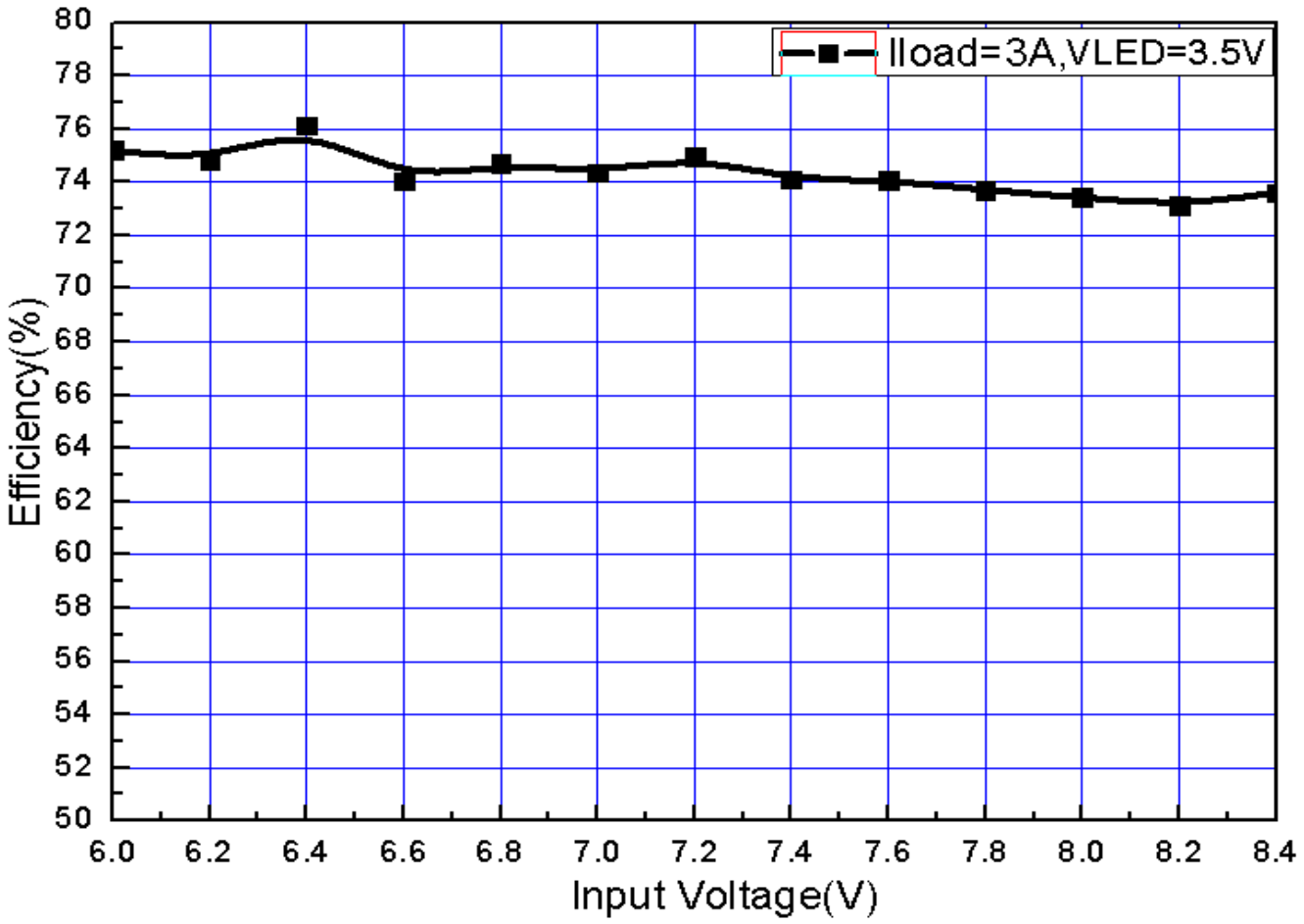
- **NTC Pin Operating Range VS Temperature**



- **GATE Pin Waveform**



- **Drive 10W LED efficiency**



■ Operation

XT2111 is a LED driver controller, the controller through the current mode DC-DC topology which controlled by PWM to achieve, the charging current of the controller is set by a small resistor which connect between the LED and SENSE pin, and this current accuracy is controlled by a high-precision reference. The LED current is determined by the following formula:

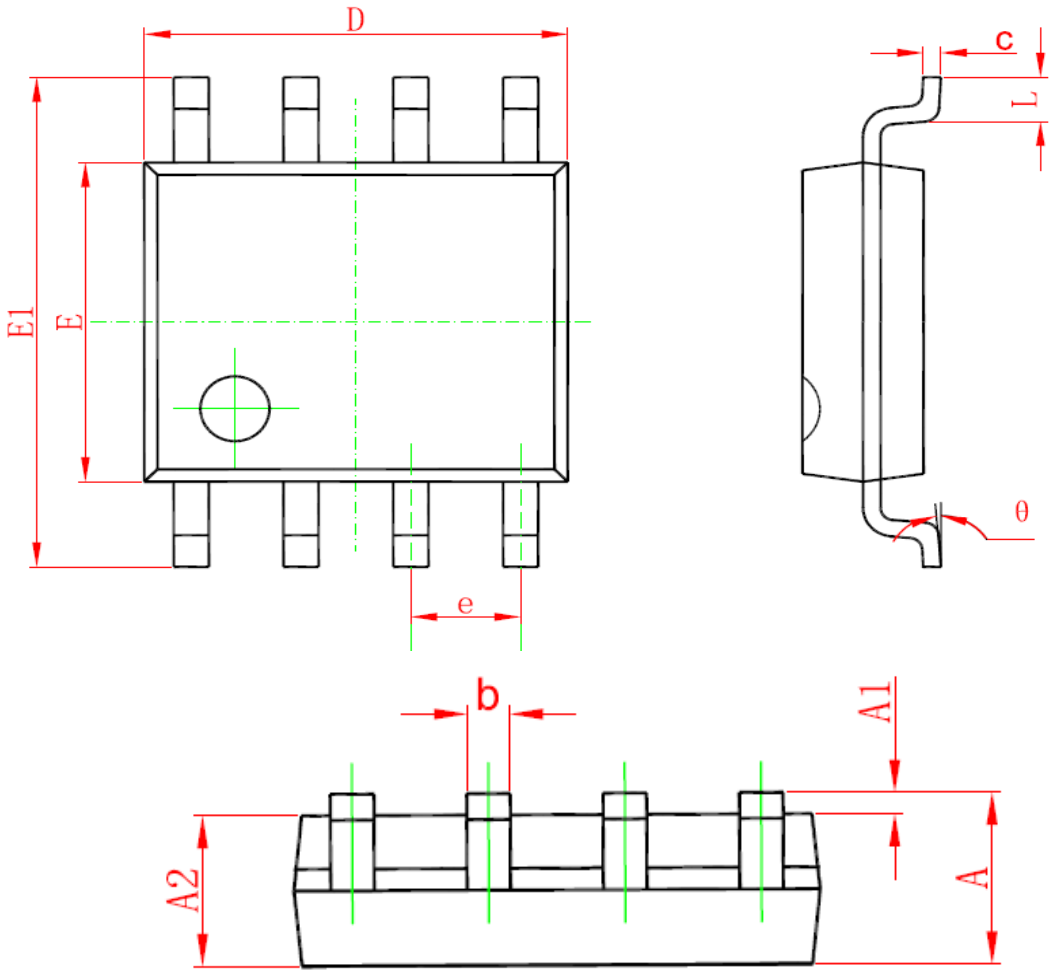
$$I_{LED} = \frac{100mV}{R_s}$$

When the LED voltage is higher than the output Vovp, chip into protected mode , the PMOS LN2311 and LED off;

Chip with the temperature detection function, this function is achieved through the NTC pin, connect to the NTC pin with a negative the 10KΩ thermistor (DALE NTHS 1206N02), as the temperature increases to 50degree, the resistance value is about 4.1KΩ, voltage of the pin is 350Mv; for the low temperature reaches 0 degrees, the voltage is 2.35V, only premise voltage in the range of the two voltage values, chip to work properly, otherwise the charge is stopped, the LED off. This pin can be directly connected to shield the temperature detection function.

■ Package Information

- **SOP-8**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	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
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°