

## High Current LED Driver

### ■ Features

- 500mA Maximum Output Current.
- 2% Output Current Setting Accuracy.
- External Resistor Allows Designer to set Current.
- Output current limiting
- Built-in thermal shutdown
- Packages: SOT89-3L

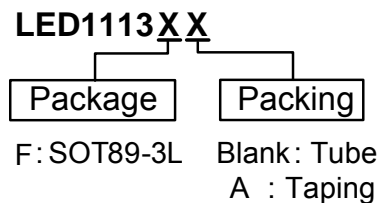
### ■ Applications

- High Power LED Driver

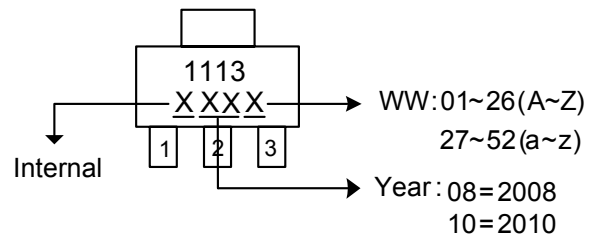
### ■ General Description

LED1113 is a low dropout current regulator for high current LED Driver. The output current was decided by external resistor. Build-in thermal shutdown and current limit protection function.

### ■ Ordering Information



### ■ Marking Information



### ■ Pin Descriptions

(Top view)		NAME	PIN #	FUNCTION
Tab is OUT	3	Iset		
	2	OUT		
	1	GND		
		GND	1	Ground
		OUT	2	Output pin. The LEDs are connected from these pins to VCC.
		I <sub>SET</sub>	3	Output current set input. Connect a resistor from I <sub>SET</sub> to GND to set LED current.

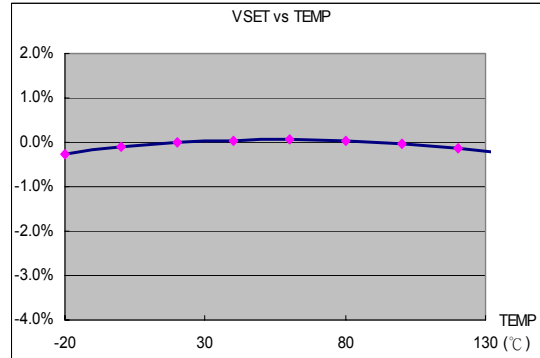
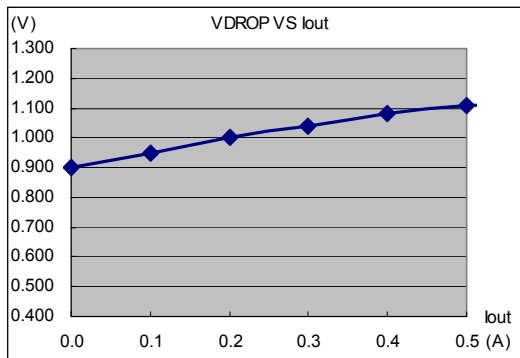
## ■ Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V <sub>OUT</sub>	Output Voltage	28	V
T <sub>OP</sub>	Operating Junction Temperature Range	0 to +125	°C
T <sub>J</sub>	Maximum junction Temperature	150	°C
P <sub>D</sub>	Power Dissipation (PCB=FR4,2 inch sq.) T <sub>A</sub> =25°C, T <sub>J</sub> =125°C SOT89	1110	mW
T <sub>ST</sub>	Storage Temperature	-65 to +150	°C

## ■ Electrical Characteristics (Under Operating Conditions, T<sub>J</sub>=25°C)

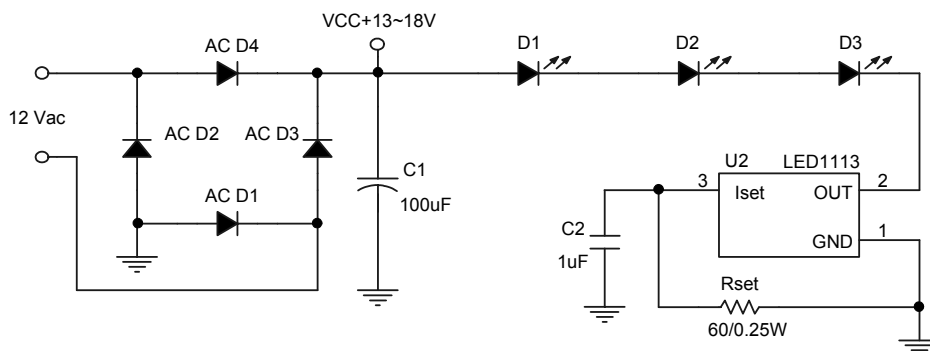
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	I <sub>OUT</sub> =5mA	2.45	-	26	V
Output Sink Current	V <sub>CC</sub> -V <sub>LED</sub> =V <sub>OUT</sub> >2.5V, I <sub>OUT</sub> =5mA	500			mA
V <sub>SET</sub> Voltage	V <sub>CC</sub> -V <sub>LED</sub> =V <sub>OUT</sub> >2.5V, I <sub>OUT</sub> =5mA	1.225	1.250	1.275	V
Dropout Voltage (V <sub>OUT</sub> -V <sub>SET</sub> )	I <sub>OUT</sub> = 500mA, ΔV <sub>SET</sub> =2%V <sub>SET</sub>	-	1.1	1.2	V
Output Current (Note 1,2)	1W LED      R <sub>SET</sub> =3.6Ω / 0.5W	340	347	354	mA
	0.5W LED    R <sub>SET</sub> =7.2Ω	170	174	177	mA
	20mA LED    R <sub>SET</sub> =60Ω	20.4	20.8	21.3	mA
Current Limit	V <sub>OUT</sub> > 5V	0.8	-	-	A
θ <sub>JA</sub> Thermal Resistance Junction-to-Ambient	SOT89	-	300	-	°C/W
θ <sub>JC</sub> Thermal Resistance Junction-to-Case	SOT89(PCB=FR4,2 inch sq.)	-	90	-	°C/W

## Typical Performance Characteristics



## Typical Circuit

### A.AC Input



$$I_{OUT} = 1.25V / 60 = 21mA$$

$$V_{OUT} \geq 2.5V$$

$$1. 13V - V_{LED} - V_{SET} = 1.25V$$

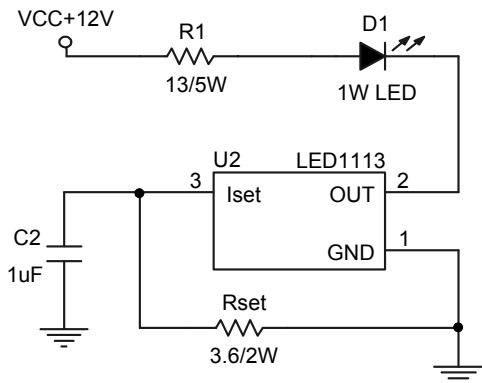
$$IC's PD = (1.25 * 0.02) = 0.03W$$

$$2. 18V - V_{LED} - V_{SET} = 6.25V$$

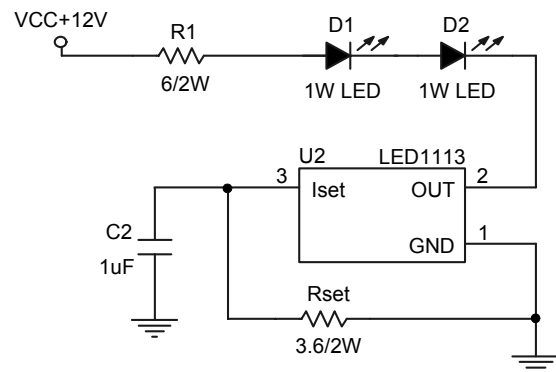
$$IC's PD = (6.25 * 0.02) = 0.13W$$

$$V_{LED} = 10.5V (3.5V * 3LED)$$

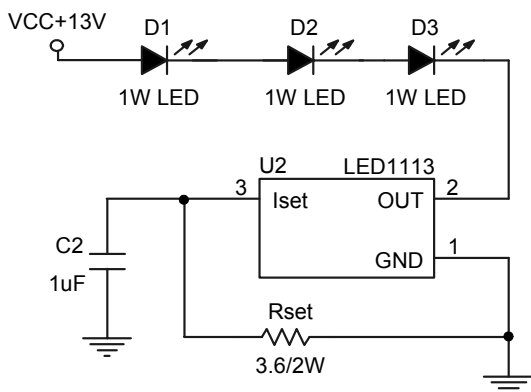
## B.DC Input



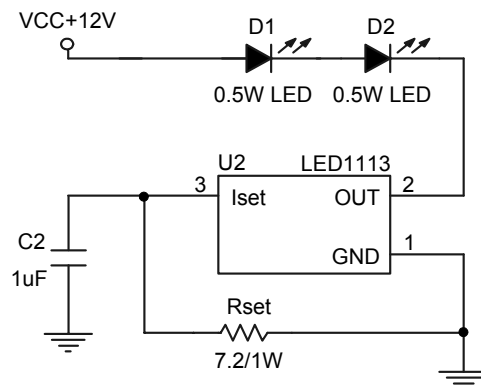
$I_{OUT} = 1.25V / 3.6 = 347mA$   
 $V_{OUT} \geq 2.5V$   
 1.  $R1 = 13, VR1 = 4.51V$   
 $R1's PD = 4.51 * 0.347 = 1.57W$   
 2.  $12V - VR1 - V_{LED} - V_{SET} = 2.74V$   
 $IC's PD = (2.74 * 0.347) = 0.95W$   
 $V_{LED} = 3.5V$



$I_{OUT} = 1.25V / 3.6 = 347mA$   
 $V_{OUT} \geq 2.5V$   
 1.  $R1 = 6, VR1 = 2.08V$   
 $R1's PD = 2.08 * 0.347 = 0.73W$   
 2.  $12V - VR1 - V_{LED} - V_{SET} = 1.67V$   
 $IC's PD = 1.67 * 0.347 = 0.58W$   
 $V_{LED} = 7V$

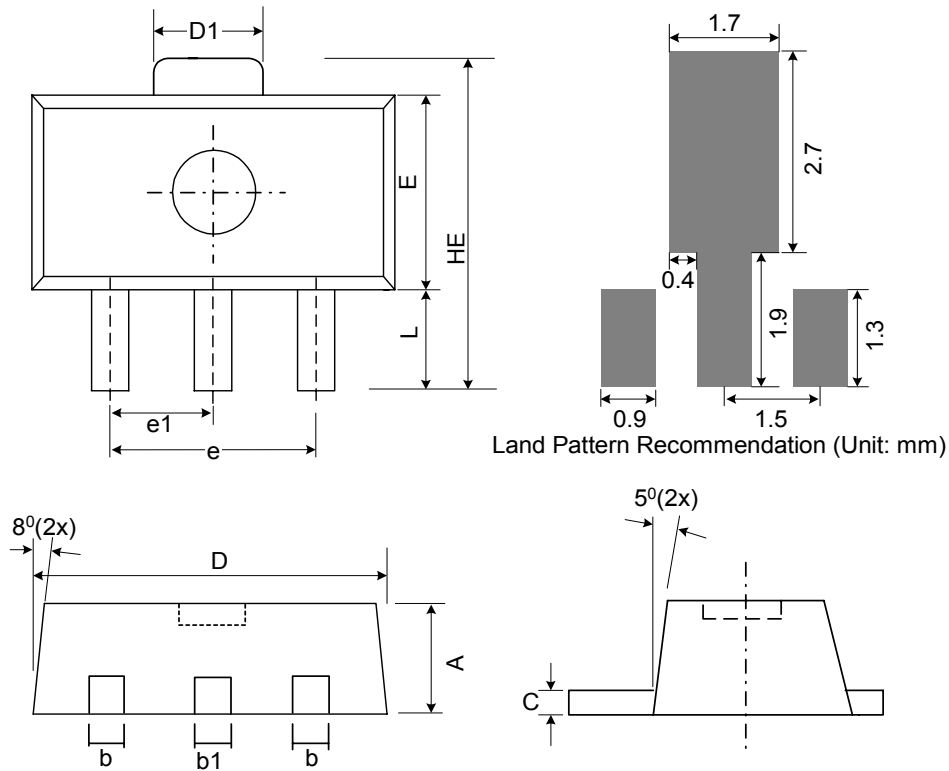


$I_{OUT} = 1.25V / 3.6 = 347mA$   
 $V_{OUT} \geq 2.5V$   
 $13V - V_{LED} - V_{SET} = 2.02V$   
 $IC's PD = 1.25 * 0.347 = 0.4W$   
 $V_{LED} = 10.5V (3.5V * 3LED)$



$I_{OUT} = 1.25V / 7.2 = 174mA$   
 $V_{OUT} \geq 2.5V$   
 $12V - V_{LED} - V_{SET} = 3.75V$   
 $IC's PD = 3.75 * 0.174 = 0.65W$   
 $V_{LED} = 7V$

## ■ Package Dimension



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.40	1.50	1.60	0.055	0.059	0.063
B	0.36	0.42	0.48	0.014	0.016	0.018
b1	0.41	0.47	0.53	0.016	0.043	0.051
C	0.35	0.39	0.43	0.014	0.015	0.017
D	4.40	4.50	4.60	0.173	0.177	0.181
D1	1.40	1.60	1.75	0.055	0.062	0.069
e	2.90	3.00	3.10	0.114	0.118	0.122
e1	1.45	1.50	1.55	0.057	0.059	0.061
E	2.35	2.48	2.60	0.093	0.098	0.102
HE	3.94	-	4.25	0.155	-	0.167
L	0.80	-	1.20	0.031	-	0.047