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# **High Power LED Driver Series**

## **User's Guide**

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# High Power LED Driver Series

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## NOTES:

Product Version : Ver 1.0

Document Version : Ver 1.0

## Chapter 1. Overview

### 1.1 Overview

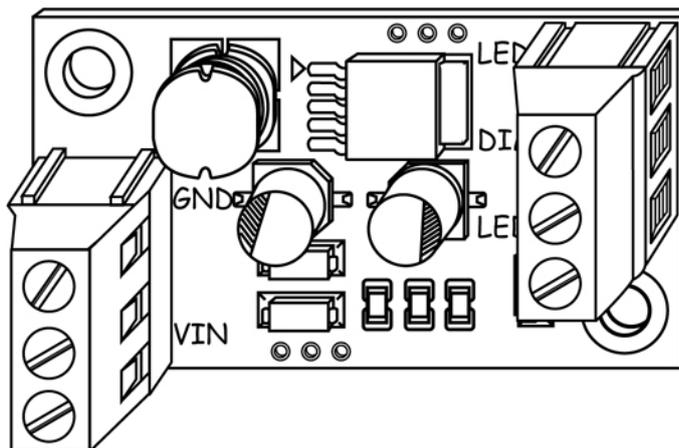
Thanks for using high power LED driver series by Sure Electronics. This series provide users many choices: 0.5W, 1W, 3W, 5W and 10W, which integrate a MBI6651 chip (packaging TO252) – a high efficiency, constant current and step-down DC/DC converter. Featuring under voltage lock out (UVLO), over temperature protection, LED open-circuited protection and LED short-circuited protection, MBI6651 makes the drivers' application safer. Additionally, to ensure the system reliability, the MBI6651 builds thermal protection (TP) function inside. This function protects IC from overheating in various applications. Thus LED drivers shall serve for longer time.

**TABLE 1-1 HIGH POWER LED DRIVER SERIES**

Product No.	Product Name	Typical Output Current(mA)
LE-LL15113	High Power 0.5W LED Driver	147
LE-LL11114	High Power 1W LED Driver	333
LE-LL12113	High Power 3W LED Driver	813
LE-LL13113	High Power 5W LED Driver	1000
LE-LL14113	High Power 10W LED Driver	1626

The driver series features small size, high efficiency, stability, long service time and easy installation. LED dimming can be controlled via an extra pulse width modulation (PWM) through DIM pin.

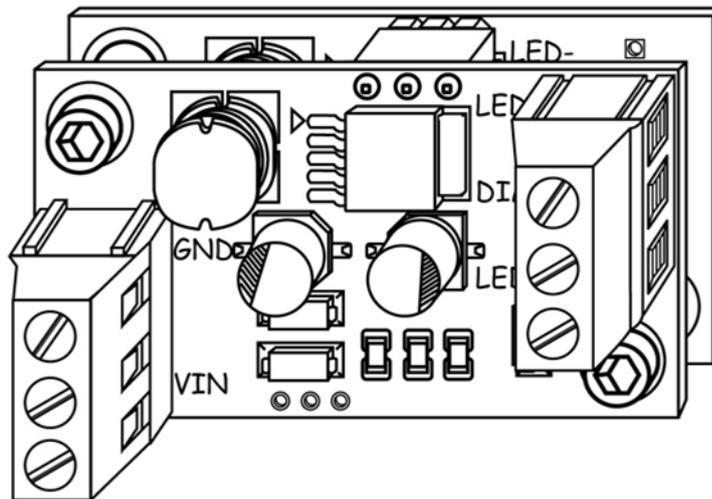
**FIGURE 1-1 OVERVIEW (0.5W, 1W, 3W, 5W)**



# High Power LED Driver Series

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FIGURE 1-2 OVERVIEW OF (10W)



**Note:** All the diagrams in this manual are for reference only.

## 1.2 Features

- Input voltage: 9V to 35V
- PWM frequency: 100HZ to 1KHZ
- Step-down DC/DC
- Constant current output
- TO252 packaging of MBI6651 helps heat dissipation
- Untested under conditions of more than 6 LEDs
- Easy installation and long service life

## 1.3 Applications

- Signage and Decorative LED Lighting
- Automotive LED Lighting
- High Power LED Lighting
- Constant Current Source

## Chapter 2. Hardware Detail

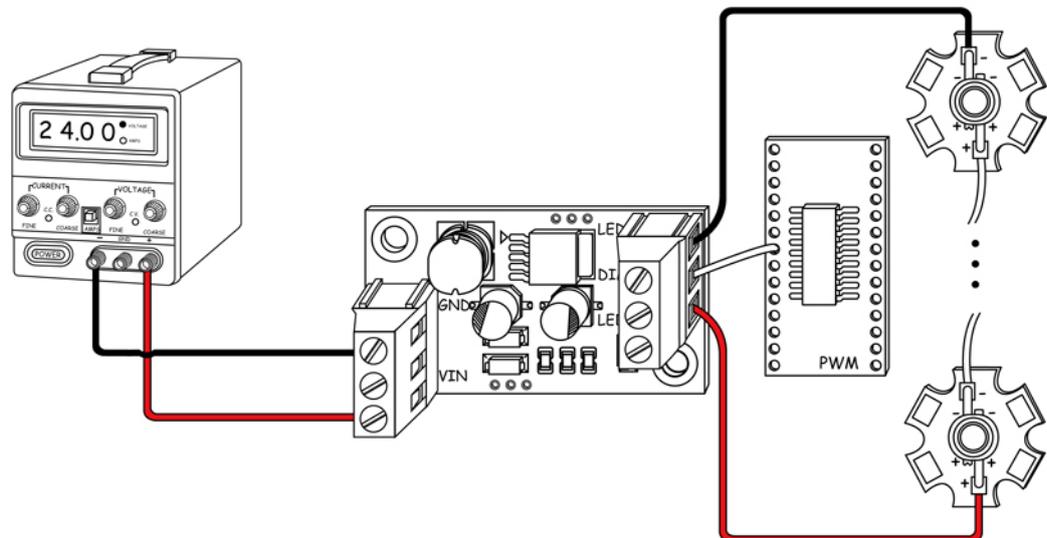
### 2.1 Port Definition

**TABLE 2-1 PORT DEFINITION**

Pin	Description
VIN	Connect to the positive of 9V-35V DC supply
GND	Power Ground
LED+	Connect to the anode of LED
LED-	Connect to the cathode of LED
EN	PWM terminal. When applied with +5V or suspended, full amount of current will be output and when connected with ground, output current will be 0.

### 2.2 Connection

**FIGURE 2-1 CONNECTION SCHEMATIC**



**Note:** Supply voltage range is 9 to 35V.

## Chapter 3. Electrical Characteristics

### 3.1 Basic Characteristics

The typical parameters are listed in the table below.

**TABLE 3-1 TYPICAL PARAMETERS**

Parameters		Test Condition	Min.	Typ.	Max.	Unit
Supply Voltage		-	9	-	35	V
Supply Current (no load)		V <sub>in</sub> =9V-35V	-	2	5	mA
Input Voltage* (EN)	High Potential	-	3.5	-	-	V
	Low Potential	-	-	-	0.5	V
Minimum Turn-on Time*		-	100	350	450	ns
Minimum Closing Time*		-	100	350	450	ns
Maximum Operating Frequency* (Internal Frequency)		-	40	-	1000	KHz
Over Temperature Protection*		-	145	165	175	°C
Over Temperature Protection Hysteretic State*		-	20	30	40	°C
Under Voltage Lock Out*		-	7.7	8	8.3	V
Restart Voltage*		-	7.85	8.2	8.65	V
Duty Cycle of Running via PWM through DIM pin		PWM Frequency 1KHz	1	-	100	%
Operating Temperature		-	-10	20	50	°C
Storage Temperature		-	-55	20	+150	°C

**Note:** \*from Data Sheet of MBI6651 chip. Please refer to the relevant documents for the details.

# High Power LED Driver Series

## 3.2 Efficiency

**TABLE 3-2 EFFICIENCY**

Product	Number of LED	Input Voltage	Input Current	Output Current	Output Voltage	Efficiency
0.5W	1	9V	0.06A	154mA	2.85V	81%
	6	24V	0.1A	132mA	16.41V	90%
1W	1	9V	0.14A	339mA	3.07V	83%
	6	24V	0.25A	317mA	17.55V	93%
3W	1	9V	0.4A	818mA	3.43V	78%
	6	24V	0.7A	812mA	19.11V	92%
5W	1	9V	0.53A	1012mA	3.55V	75%
	2	24V	0.36A	1023mA	6.89V	82%
10W	1	9V	1.5A	1491mA	7.63V	84%

**Note:** A diode has been cascaded between DC input and voltage input of the chip to prevent power polarities from wrong connection. Efficiency will be higher if the diode is removed.

## 3.3 Input Voltage

**TABLE 3-3 INPUT VOLTAGE OF 0.5W, 1W, 3W AND 5W LED DRIVER**

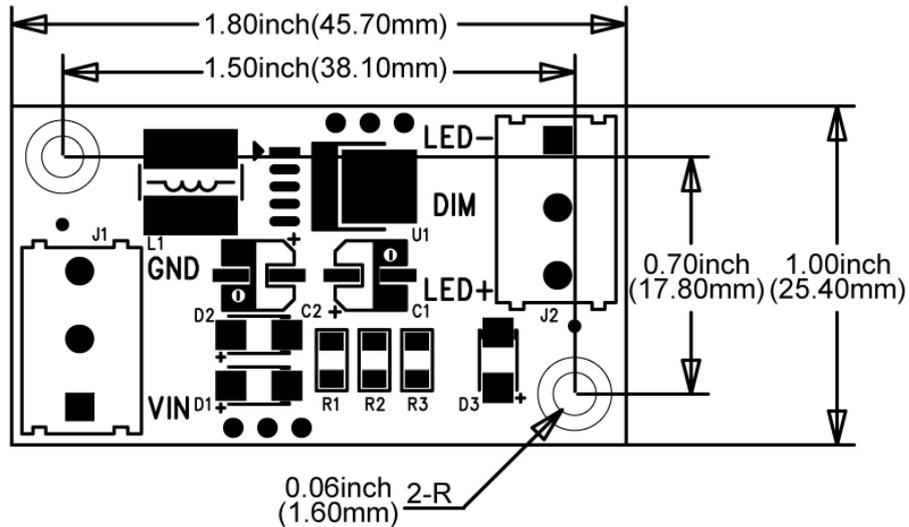
Number of LEDs	Input Voltage	
	LED(Red, Yellow, Amber)	LED(White, Green, Blue)
1	9V-12V	9V-12V
2	9V-12V	9V-12V
3	12V-24V	15V-24V
4	15V-24V	19V-24V
5	19V-35V	24V-35V
6	24V-35V	27V-35V

**TABLE 3-4 INPUT VOLTAGE OF 10W LED DRIVER**

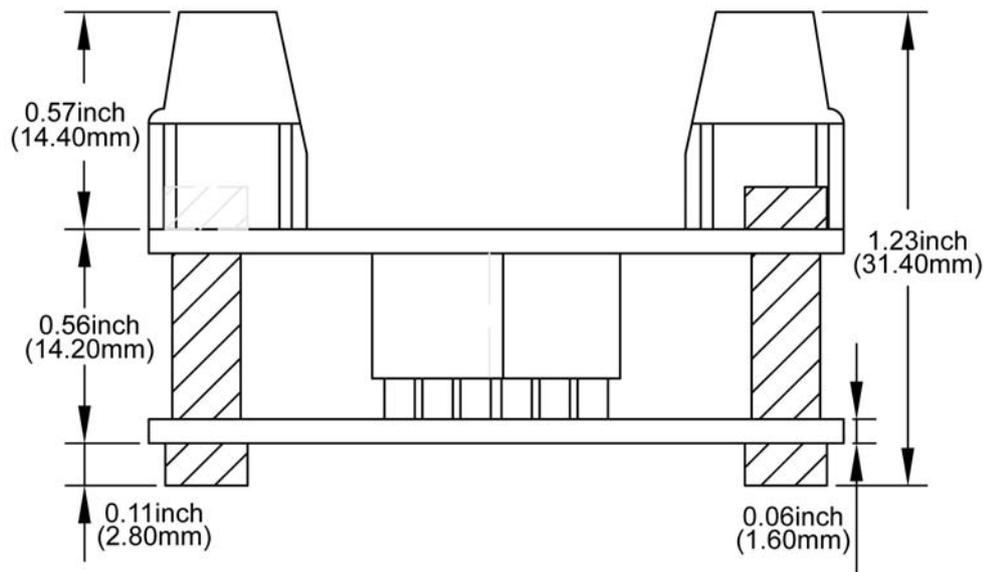
Number of LEDs	1	2	3	4
Input Voltage	9V-12V	18V-24V	24V-35V	30V-35V

### Chapter 4. Mechanical Drawing

**FIGURE 4-1 TOP VIEW (0.5W, 1W, 3W, 5W,10W)**



**FIGURE 4-2 FRONT VIEW (10W)**



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## Chapter 5. Contact Us

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