10W LED Driver
User's Guide

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NOTES:

Product Version : Ver 1.1

Document Version : Ver 1.0

Chapter 1. Overview

1.1 Overview

Welcome to use LED driver series by Sure Electronics. This series provide users many choices: 0.5W, 1W, 3W, 5W and 10W, which integrate MBI6651 chips from Macroblock – 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.

This product consists of two same driver boards fixed in a tailored converter, which is also used to for connection with power supply and LEDs, outputting up to 10W power. This product features high efficiency, stability, long service time and easy installation. LED dimming can be controlled via an extra pulse width modulation (PWM) through DIM pin. More than 4 LEDs shall be connected in series.

FIGURE 1-1 FRONT VIEW OF ONE DRVIER BOARD

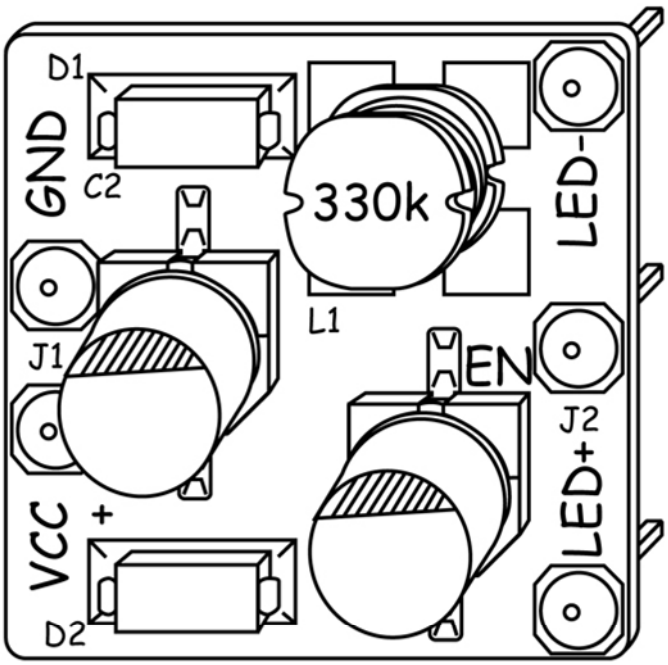


FIGURE 1-2 BACK VIEW OF ONE DRIVER BOARD

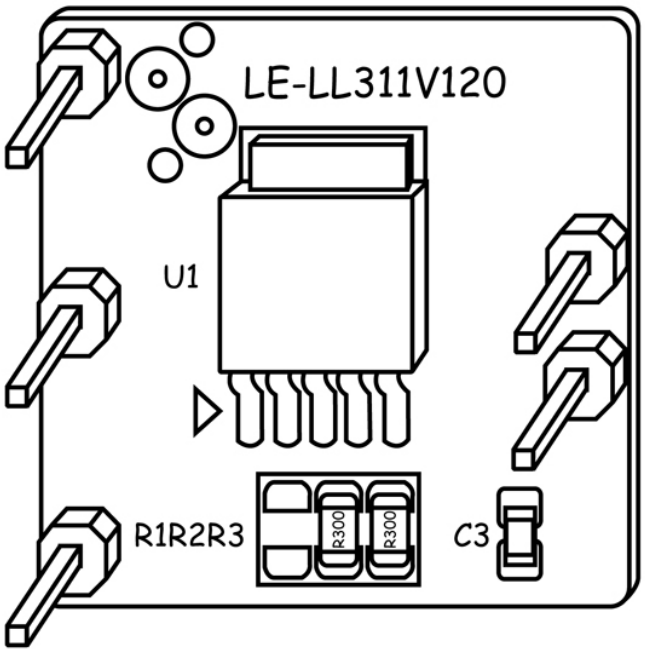
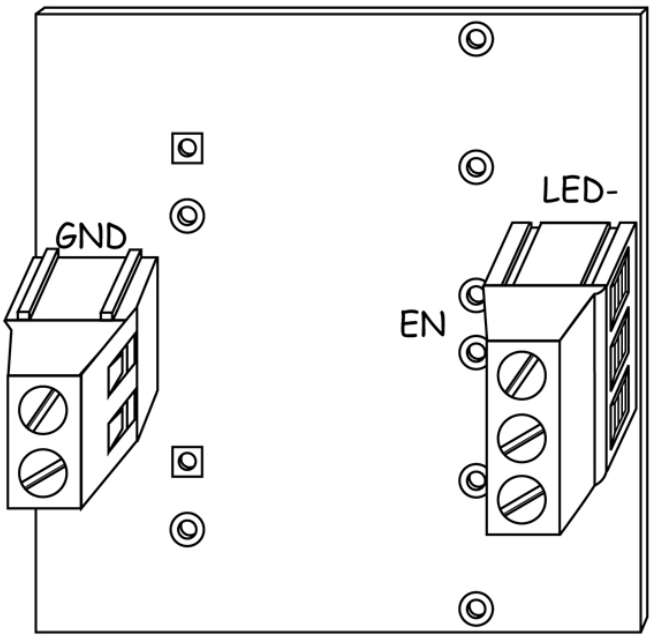


FIGURE 1-3 THE CONVERTER



1.2 Feature

- Minimized size, high efficiency
- Constant current output, stable LED lighting
- Input voltage: 9V to 35V
- 94% efficiency @ input voltage 24V, 3 LEDs
- Number of LEDs allowed to be connected in series: 4 but not the least
- Full protection: Thermal/UVLO（Under Voltage Lock Out）/Start-Up/LED Open-/Short-Circuit
- Easy installation and long service life

1.3 Application

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

Chapter 2. Hardware Detail

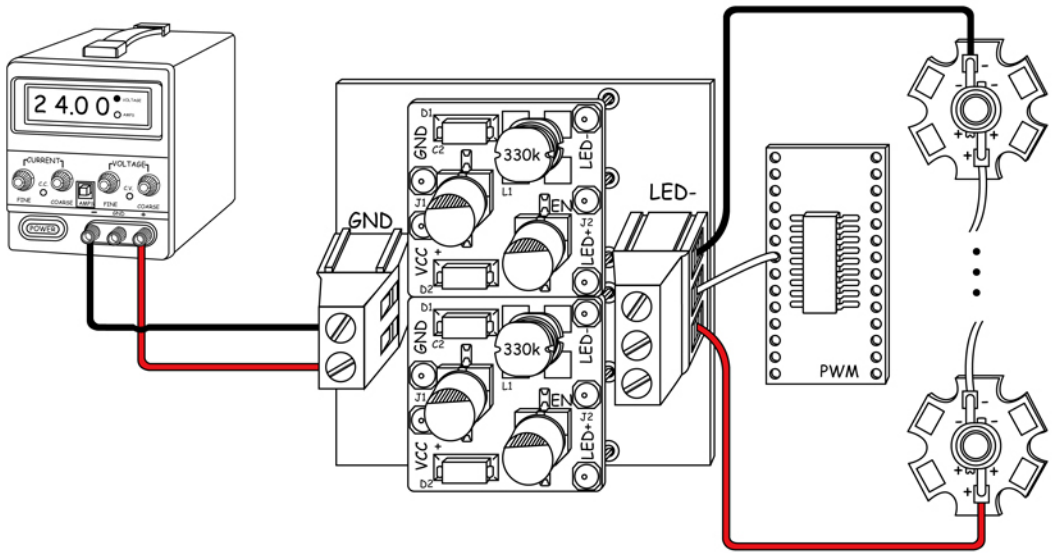
2.1 Port Definition

TABLE 2-1 PORT DEFINITION

Pin	Description
VIN	Positive terminal for 9V to 35V DC Power supply
GND	Power Ground
LED+	Positive of LED terminal
LED-	Negative of LED terminal
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

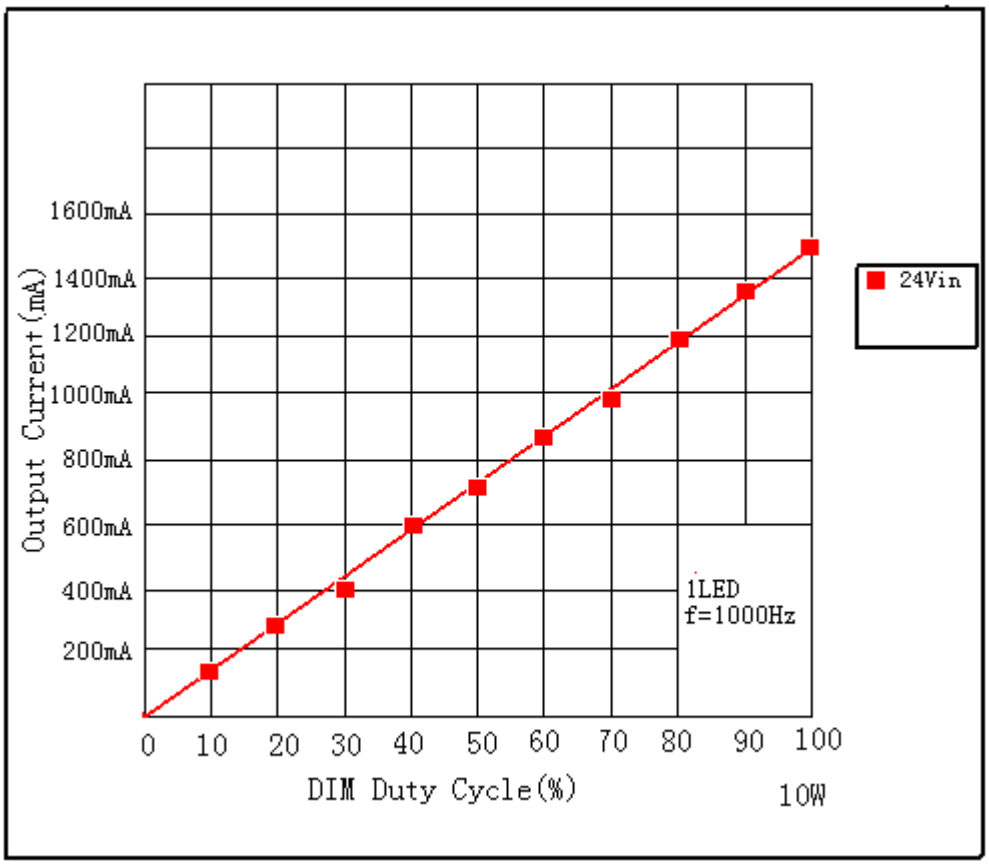
FIGURE 2-1 CONNECTION SCHEMATICS



Note: Supply voltage range is 9 to 35V.

2.3 PWM Control Settings

FIGURE 2-2 OUTPUT CURRENT/DIM DUTY CYCLE



Chapter 3. Electrical Characteristics

3.1 Specification

The typical parameters are listed in the table below.

Tested @ Vin=24V, 1 Luxeon White LED, tem 18℃ (unless noted otherwise)

TABLE 3-1 SPECIFICATION

Parameters		Test Condition	Min.	Typ.	Max.	Unit
Supply Voltage		-	9	-	35	V
Supply Current (no load)		Vin＝9V to 35V	-	2	5	mA
Output Current		I_{out}	1300	1500	1550	mA
Accuracy		-	-	±3	±10	%
Efficiency		Vin=24V, 3LEDs ,	-	94	-	%
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	℃
Over Temperature Protection Hysteretic State*		-	20	30	40	℃
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	%

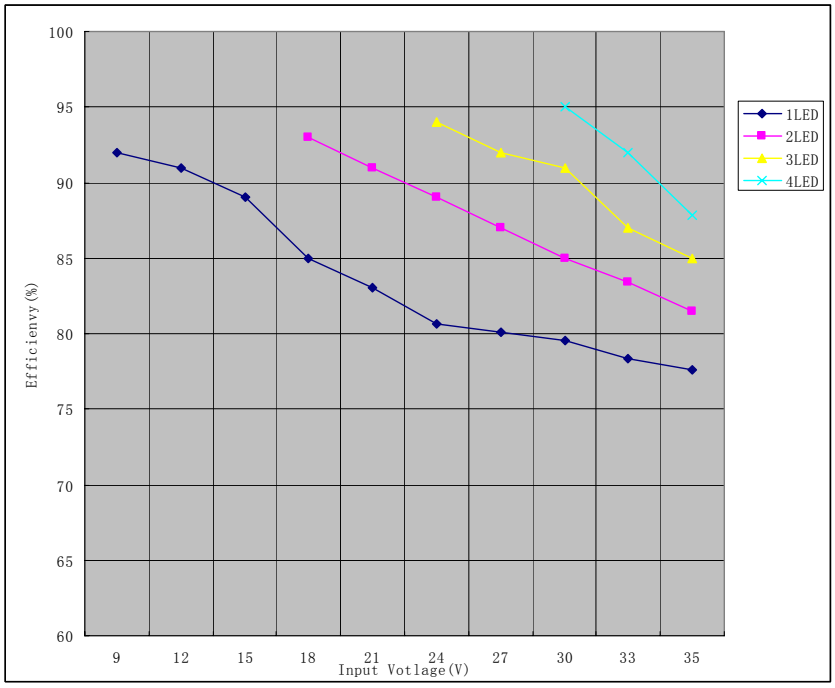
Operating Temperature	-	-10	20	50	℃
Storage Temperature	-	-55	20	+150	℃

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

3.2 The General Performance Specifications

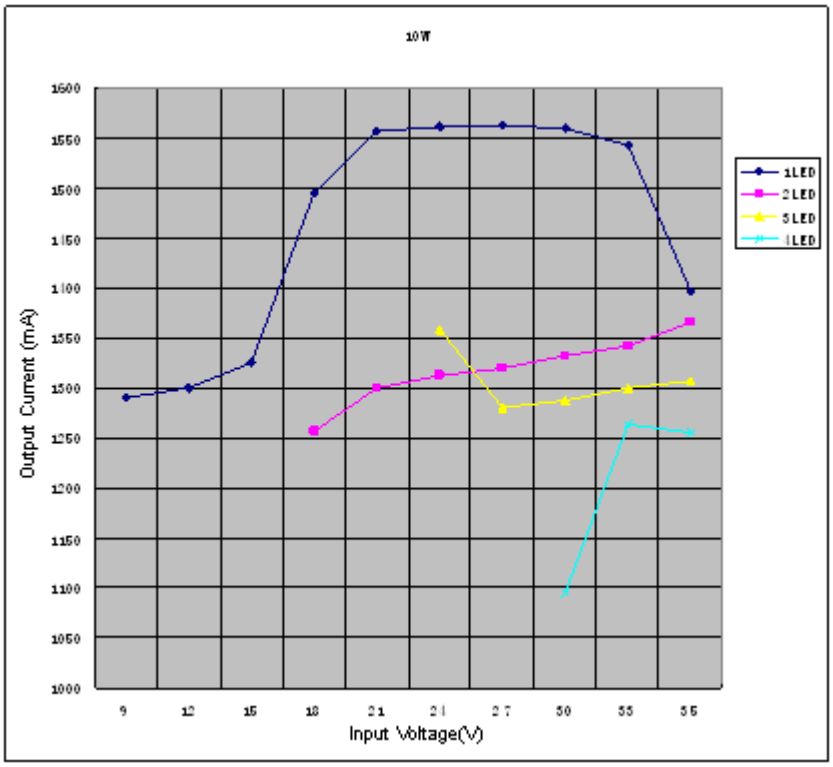
1. Efficiency Vs Input Voltage @ different number of LEDs connected in series

FIGURE 3-1 EFFICIENCY VS INPUT VOLTAGE @ DIFFERENT NUMBER OF LEDS CONNECTED IN SERIES



2. Output Current Vs Input Voltage @ different number of LEDs connected in series

FIGURE 3-2 OUTPUT CURRENT VS INPUT VOLTAGE @ DIFFERENT NUMBER OF LEDS CONNECTED IN SERIES



Note: Above are the actual measured values. There may be tolerance between different patches of LED driver boards.

3.3 The Number of LEDs Connected in Series VS Input Voltage

TABLE 3-3 THE QUANTITY OF LEDS CONNECTED IN SERIES VS INPUT VOLTAGE

LED	1	2	3	4	>4
Vin	9 to 12V	18 to 35V	24 to 35V	30 to 35V	Untested

Chapter 4. Mechanical Drawing

FIGURE 4-1 MECHANICAL DRAWING OF ONE DRIVER BOARD

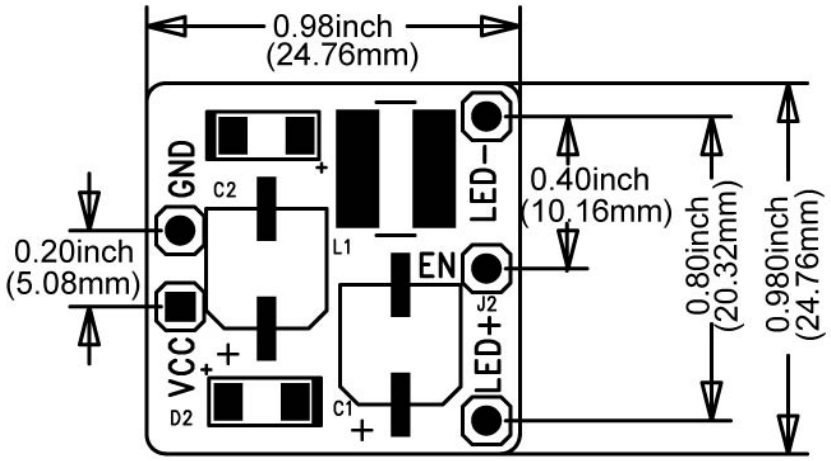
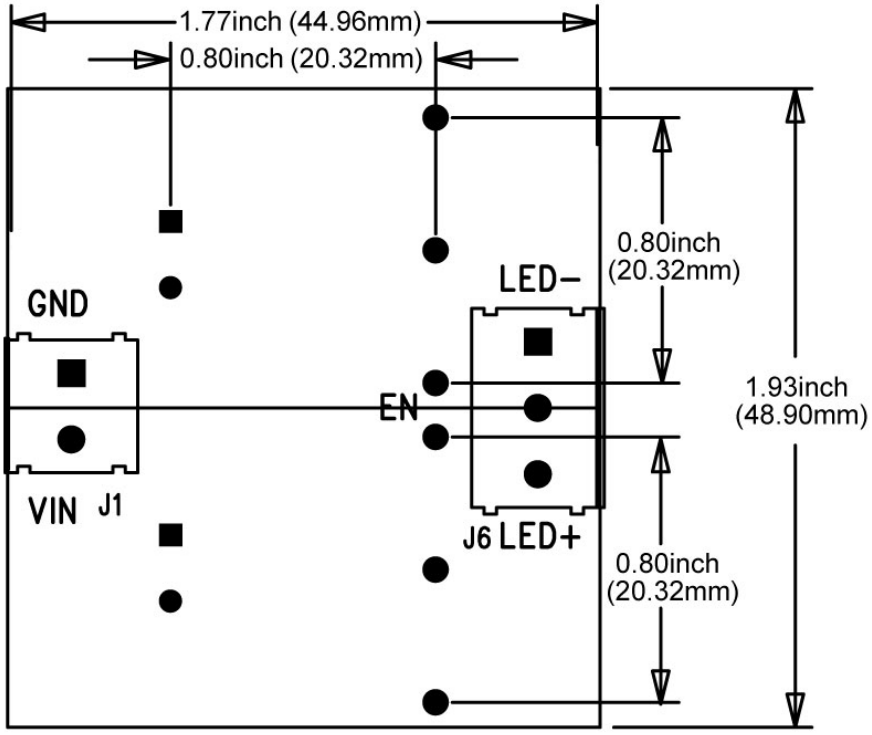
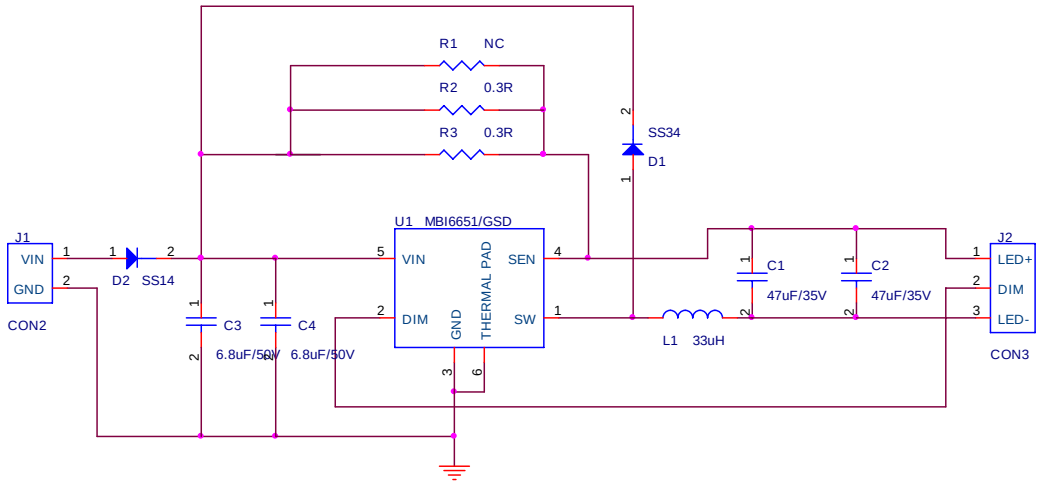


FIGURE 4-2 MECHANICAL DRAWING OF THE CONVETER



Chapter 5. Appendix

FIGURE 5-1 SCHEMATIC OF ONE DRIVER BOARD



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