

High Voltage Multi-Topology LED Driver

General Description

The RT8453 is a current mode PWM controller designed to drive high current LED applications. With a current sense amplifier threshold of 180mV, the LED current is programmable with one external current sense resistor and the power loss is minimized. With the maximum operating input voltage of 40V, the RT8453 is ideal for buck application. The unique built-in clamping comparator and filter allow easy low noise analog dimming conversion from PWM signal with only one external capacitor. PWM dimming control is made easy with a built in FET driver dedicated for the external dimming MOSFET.

IC Part Number	RT8453
Board Number	RT8453_SOP-8L_V0

Features

- ◆ High Voltage : V_{IN} Up to 40V
- ◆ Buck Operation
- ◆ Current Mode PWM with 1MHz Switching Frequency
- ◆ Easy Dimming : Analog, PWM Digital or PWM Converting to Analog with One External Capacitor
- ◆ Programmable Soft Start to Avoid Inrush Current
- ◆ Programmable Over Voltage Protection to Limit Output Voltage

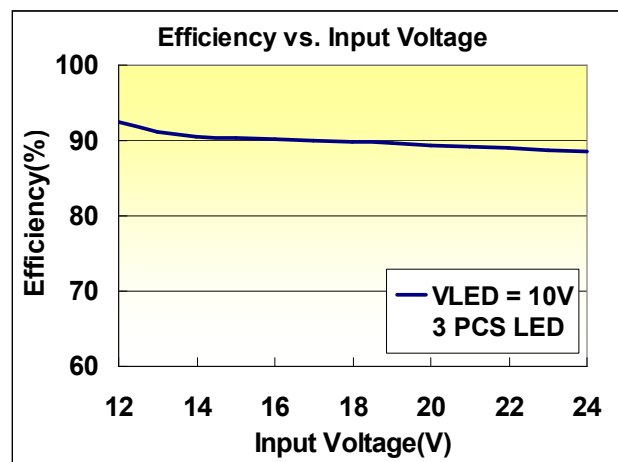
Application

- ◆ General Industrial High Power LED Lighting
- ◆ Industrial Display Backlight
- ◆ Building and Street Lighting

Evaluation Board



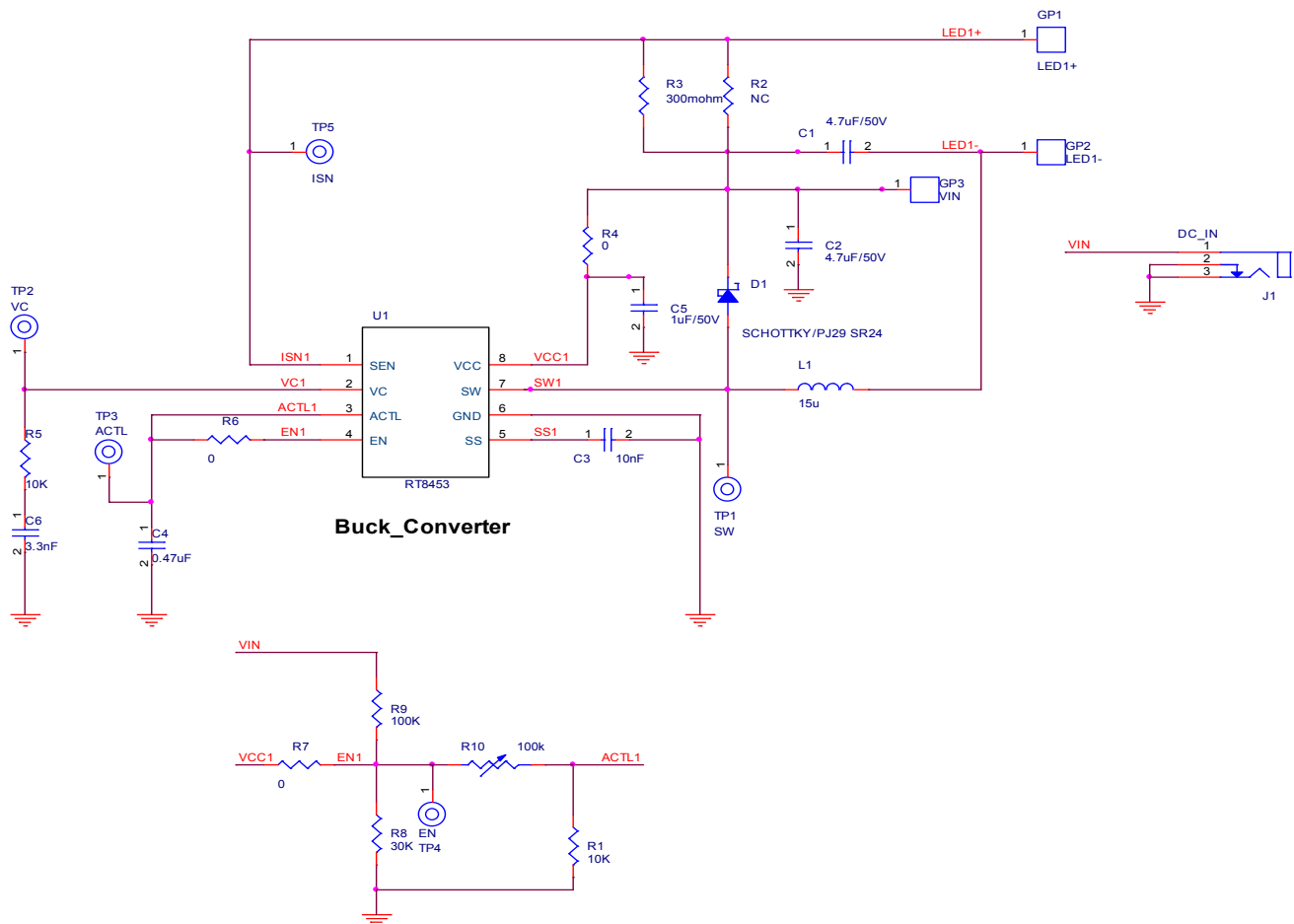
RT8453 Boost Converter



Operating Specification

Parameter	Symbol	Min	Typ	Max	Units
Operation voltage Range	V _{IN}	12	24	40	V
Enable Threshold voltage	V _{EN}	-	1.4	-	V
LED current (R _{SENS} =300mΩ)	I _{LED}			0.6	A
V _{ACTL} Threshold voltage	V _{ACTL}	-	200	-	mV
Current Sense Amplifier Input Threshold Voltage	V(I _{SP} -I _{SN})		180		mV
Operation Frequency	F _{OSC}	-	900K	-	Hz
PWM Switch Current Limit	I _{SW_LIM}	-	1.5	-	A

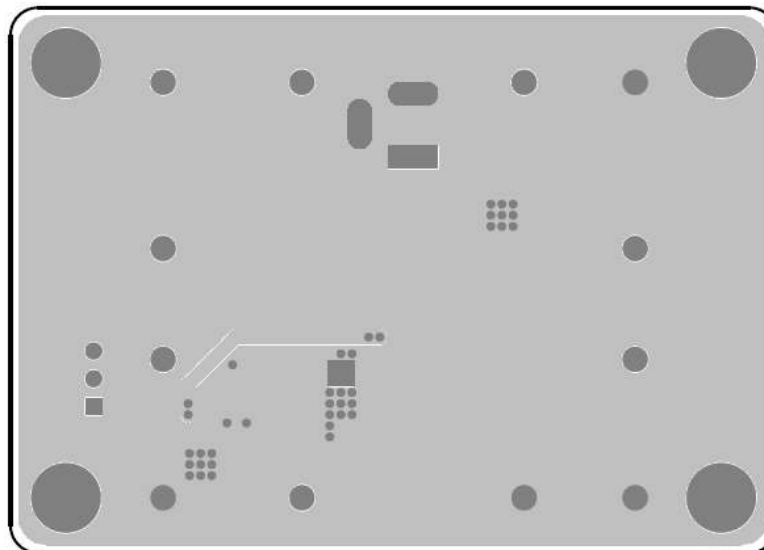
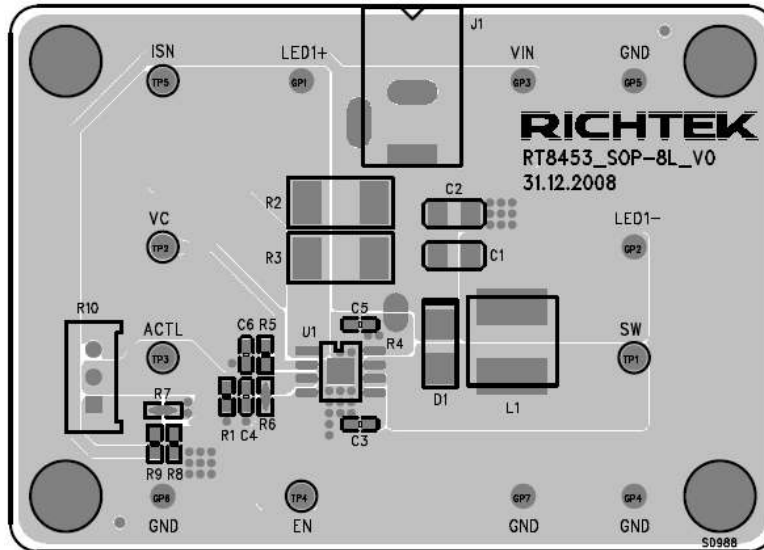
Schematic



Bill of Materials

Reference	Qty.	Part Number	Description	Package	Manufacture
U1	1	RT8453	High Voltage Multi-Topology LED Driver	SOP-8L	RichTek
C1,C2	2	GRM32ER71H475KA88	4.7uF/50V	1210	Murata
C3	1	GRM188R71H103K	10nF/25V/X7R	0603	Murata
C4	1	GRM188R71H474K	0.47uF/25V/X7R	0603	Murata
C5	1	GRM188R71H105K	1uF/50V/X7R	0603	Murata
C6	1	GRM188R71H332K	3.3nF/25V/X7R	0603	Murata
D1	1	SR26	Schottky Barrier Rectifiers	DO-214C	PANJIT
L1	1	NR8040T150M	15uH	8mm*8mm	TAIYO YUDEN
R2(RSENS)	1	CS12FTE300	300mohm	2512	Viking
R3	0		NC	2512	Viking
R1,R5	1	WR06X1002F	10k	0603	Walsin
R4,R6	2	WR06X0F	0	0603	Walsin
R7	1		NC	0603	Walsin
R8	1	WR06X3002F	30K	0603	Walsin
R9	1	WR06X1003F	100K	0603	Walsin
R10	0		NC		

PCB Layout



Operating Guideline

1. For driving 6 serial pieces of LED in the Buck converter application, connect input power ($24V < V_{IN} < 40V$) and input ground to VIN and GND pins respectively.
2. Connect control voltage to EN pin to enable the LED driver.
3. Connect control voltage or PWM signal to ACTL pin to control LED brightness.
4. Connect LED strings positive and negative to LED1+ and LED1- respectively.
5. The maximum output current of LED strings can be set by R_{SENS} .

$$I_{LED} = (180mV / R_{SENS})$$

More Information

For more information, please find the related datasheet or application notes from Richtek website:

<http://www.richtek.com>

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