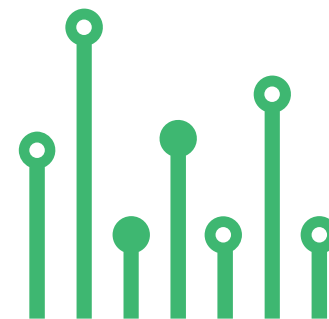


THE
electronics-lab
.com
**from ideas to
boards**

[electronics-lab](#) - [Projects](#) | [Embedded News](#) | [Online Community](#) | [e-Shop](#)

Open Source Hardware Electronics Projects

[electronics-lab.com](#) /[projects](#)





POWER SUPPLY



“ Multi Output Step-Down Converter – Input 18-24V and Output 3.3V, 5V, 12V



SKU: EL154163

Multi Output Step-Down Converter – Input 18-24V and Output 3.3V, 5V, 12V



This is a fantastic project for makers, offering multiple output options of 3.3V, 5V, and 12V, with an input of 18-24V DC. This project is built around the MP2451 high-frequency (2Mhz) step-down switching regulator, ensuring efficient and reliable power conversion. For added convenience, a header connector is provided for outputs and input supply, while a power LED indicator ensures easy power status monitoring. This project is particularly well-suited for low-current applications, and its compact PCB design occupies a minimal footprint, making it ideal for space-constrained projects.

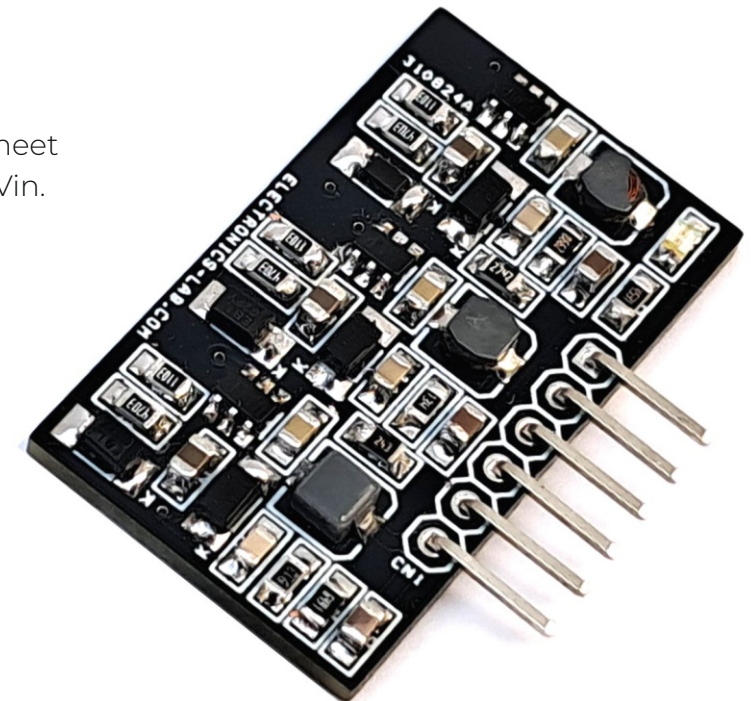
The output voltages of the three channels are set to 3.3V, 5V, and 12V using the following resistor combinations:

- 3.3V: R1 + R3
- 5V: R2 + R4
- 12V: R9 + R11

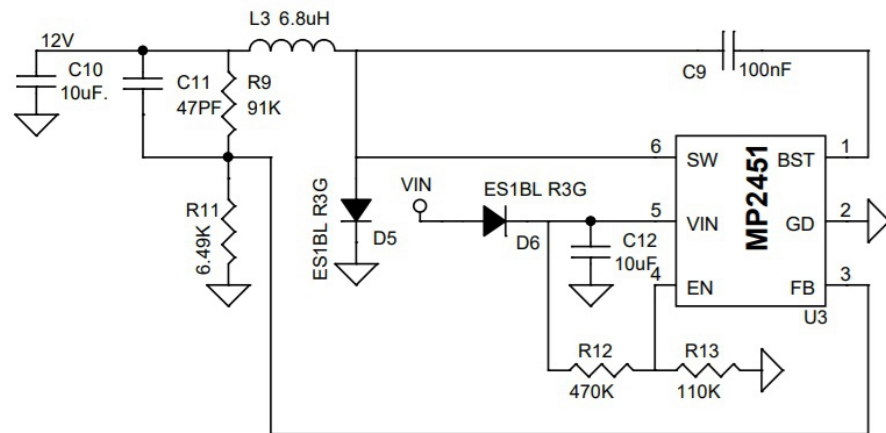
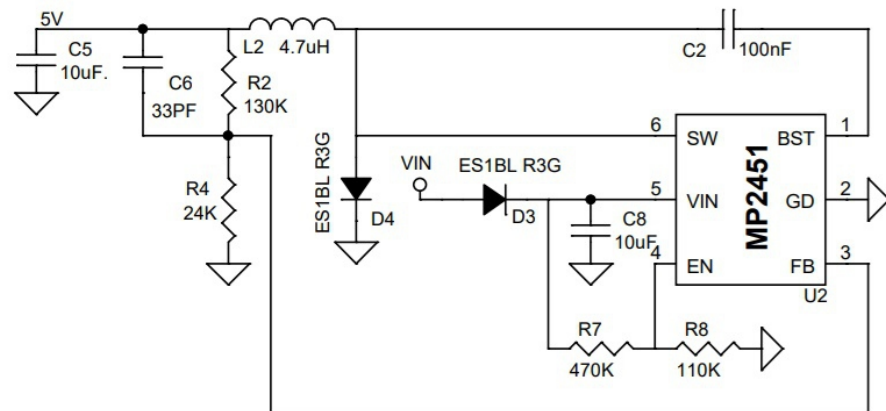
Users can modify the feedback divider resistor values to adjust the output voltages to meet their specific requirements. The output voltage range is adjustable from +0.8V to $0.8 \times V_{in}$. For the divider resistor formula, refer to the chip's datasheet.

Features

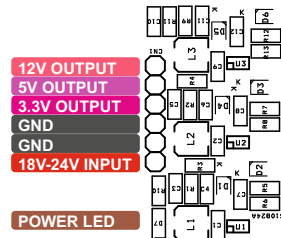
- Input 18-24V DC
- Outputs 3.3V, 5V, 12V, Load Current 300mA Each (Max 600mA)
- On Board Power LED
- Header Connector for Outputs and Input
- 2MHz fixed Switching Frequency
- Internal Soft-Start
- Precision Current Limit Without Current Sensing Resistor
- Thermal shutdown
- PCB Dimensions 32.07X19.37MM



The MP2451 is a high frequency (2MHz) step-down switching regulator with integrated internal high-side high voltage power MOSFET. It provides a single 0.6A (or less) highly efficient output with current mode control for fast loop response. The wide 3.3V to 36V input range accommodates a variety of step-down applications in the automotive input environment. A 3 μ A shutdown mode quiescent current allows use in battery-powered applications. High power conversion efficiency over a wide load range is achieved by scaling down the switching frequency at light load conditions to reduce the switching and gate-driving losses. Frequency fold-back helps prevent inductor current runaway during start-up. Thermal shutdown provides reliable, fault-tolerant operation.



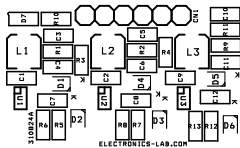
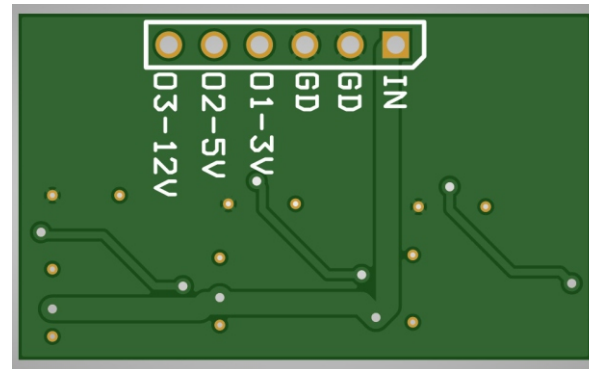
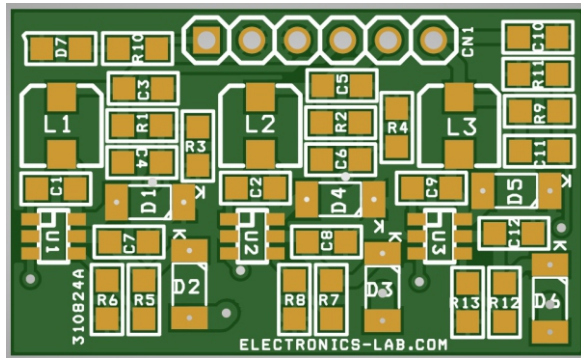
Connections



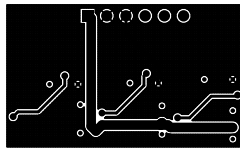
Connection

- CN1: Pin 1 = DC Input 18V to 24V, Pin 2 = GND, Pin 3 = GND, Pin 4 = 3.3V, Pin 5 = 5V, Pin 6 = 12V
- D7: Power LED (Input)

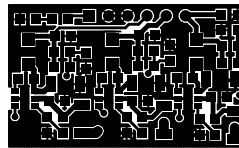
PCB



SILK SCREEN TOP



BOTTOM LAYER



TOP LAYER

PCB DIMENSIONS 32.07X19.37MM

Parts List

BOM						
NO.	QNTY.	REF.	DESC.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	6 PIN MALE HEADER PITCH 2.54MM RIGHT ANGLE	WURTH	DIGIKEY	732-5319-ND
2	3	C1,C2,C9	100nF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
3	3	C3,C5,C10	10uF/16V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
4	2	C4,C6	33PF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
5	3	C7,C8,C12	10uF/35V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
6	1	C11	47PF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
7	6	D1,D2,D3,D4,D5,D6	ES1BL R3G	TAIWAN SEMI	DIGIKEY	1801-ES1BLCT-ND
8	1	D7	LED RED SMD SIZE 0805	OSRAM	DIGIKEY	475-1278-1-ND
9	2	L1,L2	4.7uH/2A - 3.7X3.9MM	MURATA	DIGIKEY	490-14184-1-ND
10	1	L3	6.8uH/1.9A - 3.5MMX3.2MM	BOURNS INC	DIGIKEY	SRP3020TA-6R8MCT-ND
11	1	R1	86.6K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
12	1	R2	130K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
13	1	R3	27.4K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
14	1	R4	24K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
15	3	R5,R7,R12	470K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
16	3	R6,R8,R13	110K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
17	1	R9	91K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
18	1	R10	4.7K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
19	1	R11	6.49K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
20	3	U1,U2,U3	MP2451 SOT23-6	MPS	DIGIKEY	1589-1893-1-ND

Notes



APP

Android App

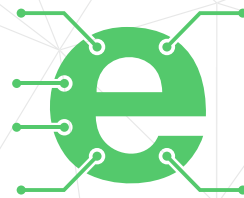
DOWNLOAD



Android App launched in 2017 and has 100k+ downloads - rated with 4.5 stars.

SCAN QR CODE





Keep
In touch..

electronics-lab
.com

info@electronics-lab.com
www.electronics-lab.com

from ideas to **boards**

