

# 12V to 24V @ 1A Step-up switching regulator using Lm2585

This is a DC-DC step-up converter based on LM2585-ADJ regulator manufactured by Texas Instruments. This IC was chosen for its simplicity of use, requiring minimal external components and for its ability to control the output voltage by defining the feedback resistors (R1,R2). NPN switching/power transistor is integrated inside the regulator and is able to withstand 3A maximum current and 65V maximum voltage. Switching frequency is defined by internal oscillator and it's fixed at 100KHz.

The power switch is a 3-A NPN device that can standoff 65 V. Protecting the power switch are current and thermal limiting circuits and an under-voltage lockout circuit. This IC contains a 100-kHz fixed-frequency internal oscillator that permits the use of small magnetics. Other features include soft start mode to reduce in-rush current during start-up, current mode control for improved rejection of input voltage, and output load transients and cycle-by-cycle current limiting. An output voltage tolerance of  $\pm 4\%$ , within specified input voltages and output load conditions, is specified for the power supply system.

## Features

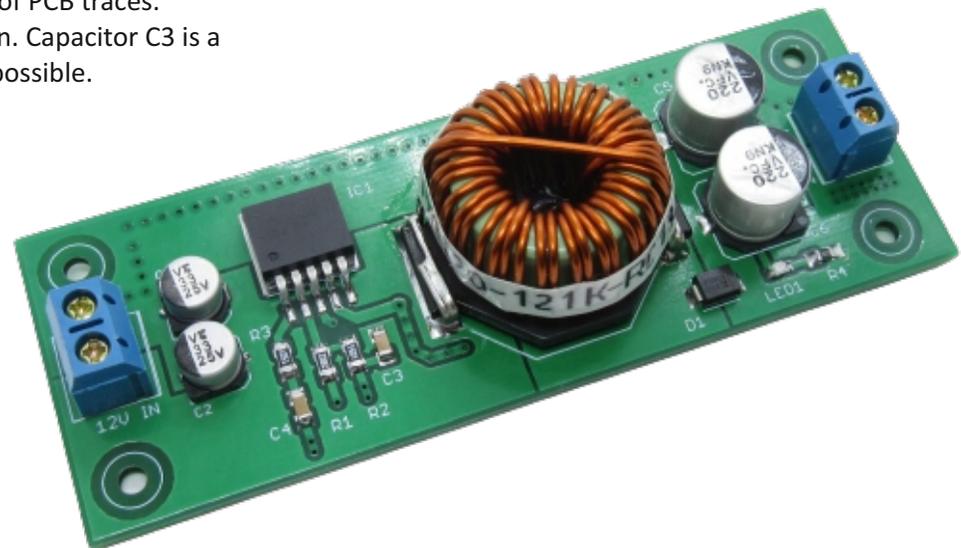
- Vin: 10-15V DC
- Vout: 24V DC
- Iout: 1A (can go up to 1.5A with forced cooling)
- Switching Frequency: 100KHz

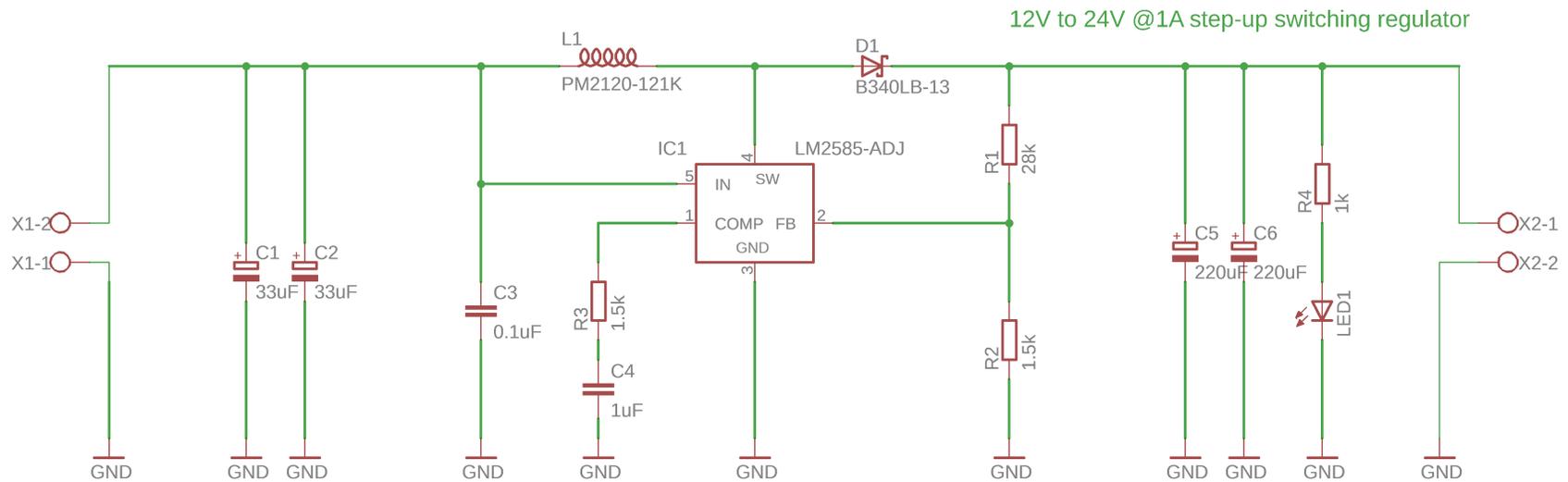
Schematic is a simple boost topology arrangement based on datasheet. Input capacitors and diode should be placed close enough to the regulator to minimize the inductance effects of PCB traces.

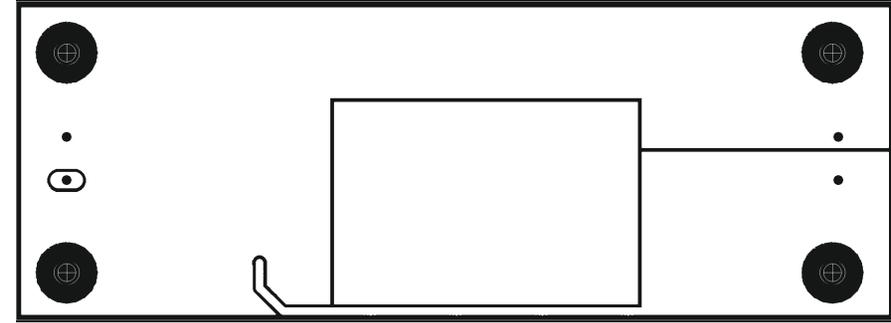
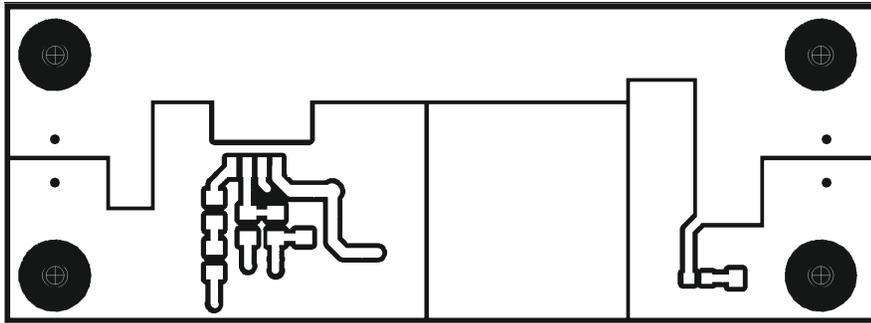
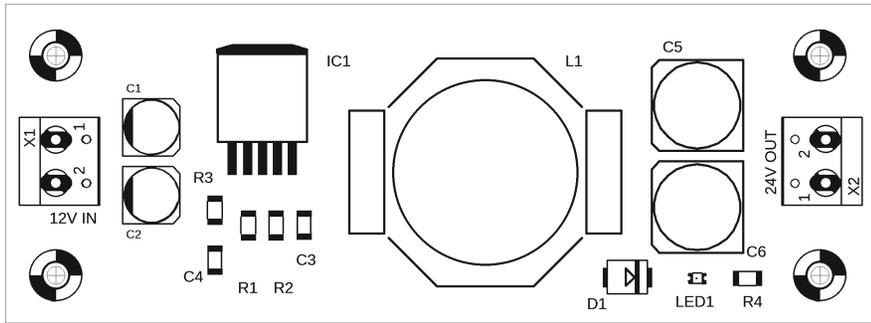
IC1, L1, D1, C1,C2 and C5,C6 are the main parts used in voltage conversion. Capacitor C3 is a high-frequency bypass capacitor and should be placed as close to IC1 as possible.

All components are selected for their low loss characteristics. So capacitors selected have low ESR and inductor selected has low DC resistance.

At maximum output power, there is significant heat produced by IC1 and for that reason, we mounted it directly on the ground plane to achieve maximum heat dissipation.







Part	Value	Package	MPN	Mouser No
C1 C2	33uF 25V 1Ω	6.3 x 5.4mm	UWX1E330MCL1GB	647-UWX1E330MCL1
C3	0.1uF 50V 0Ω	1206	C1206C104J5RACTU	80-C1206C104J5R
C4	1uF 25V	1206	C1206C105K3RACTU	80-C1206C105K3R
C5 C6	220uF 35V 0.15Ω	10 x 10.2mm	EEE-FC1V221P	667-EEE-FC1V221P
D1	0.45 V 3A 40V Schottky	SMB	B340LB-13-F	621-B340LB-F
IC1	LM2585S-ADJ	TO-263	LM2585S-ADJ/NOPB	926-LM2585S-ADJ/NOPB
L1	120 uH 0.04Ω	30.5 x 25.4 x 22.1 mm	PM2120-121K-RC	542-PM2120-121K-RC
R1	28 KΩ	1206	ERJ-8ENF2802V	667-ERJ-8ENF2802V
R2 R3	1.5 KΩ	1206	ERJ-8ENF1501V	667-ERJ-8ENF1501V
R4	1 KΩ	1206	RT1206FRE07931KL	603-RT1206FRE07931KL
LED1	RED LED 20mA 2.1V	0805	599-0120-007F	645-599-0120-007F

