

User's Guide

TPS5402 Step-Down Converter Evaluation Module User's Guide



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1 Introduction

This document presents the information required to operate the TPS5402 as well as the support documentation including schematic and bill of materials.

2 Background

The TPS5402 is designed to provide 1.7-A continuous current with an operational range of 4.5 V to 28 V and an external set switching frequency ranging from 50 kHz to 1.1 MHz.

As there are many possible options to set the converters, [Table 2-1](#) presents the performance specification summary for the EVM.

Table 2-1. Summary of Performance

TEST CONDITIONS	PERFORMANCE
$V_{IN} = 3.5 \text{ V to } 28 \text{ V}$ $f_{SW} = 300 \text{ kHz}$ $(25^{\circ}\text{C ambient})$	Buck: 3.3 V, up to 1.7 A

The evaluation module is designed to provide access to the features of the TPS5402. Some modifications can be made to this module to test performance at different input and output voltages, current and switching frequency. Please contact TI Field Applications Group for advice on these matters.

3 Board Layout

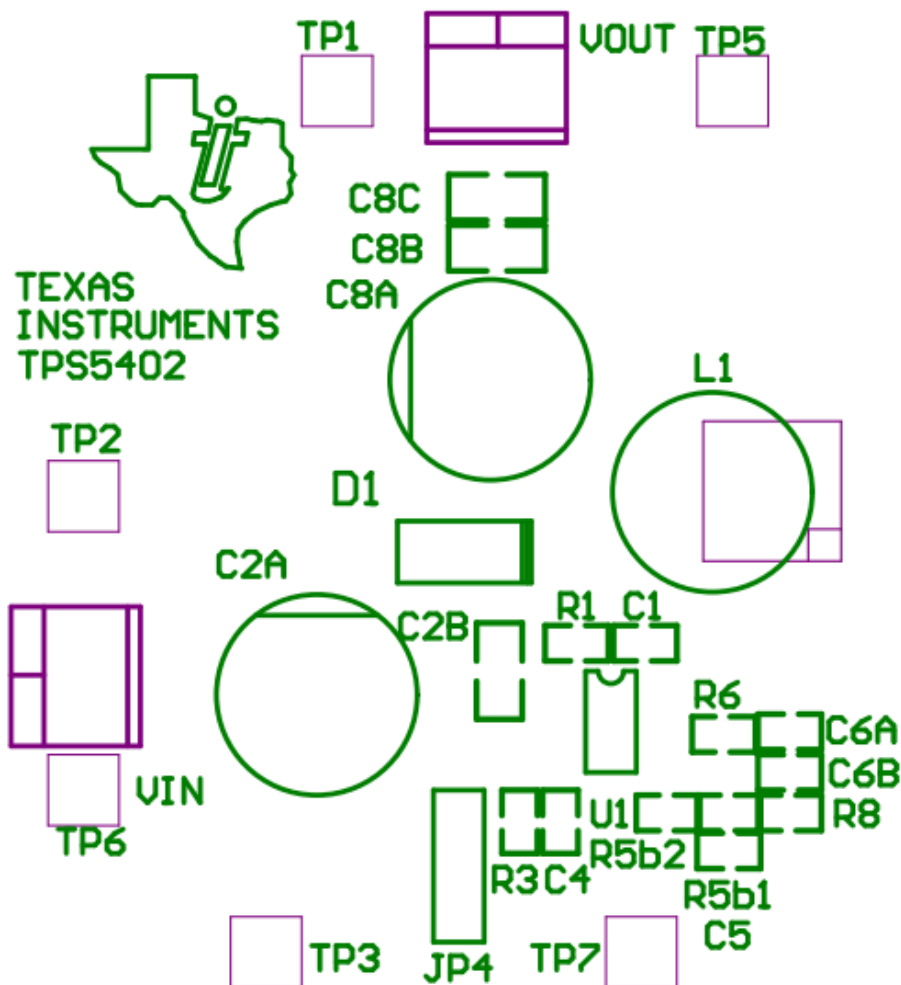


Figure 3-1. Placement (Top Layer)

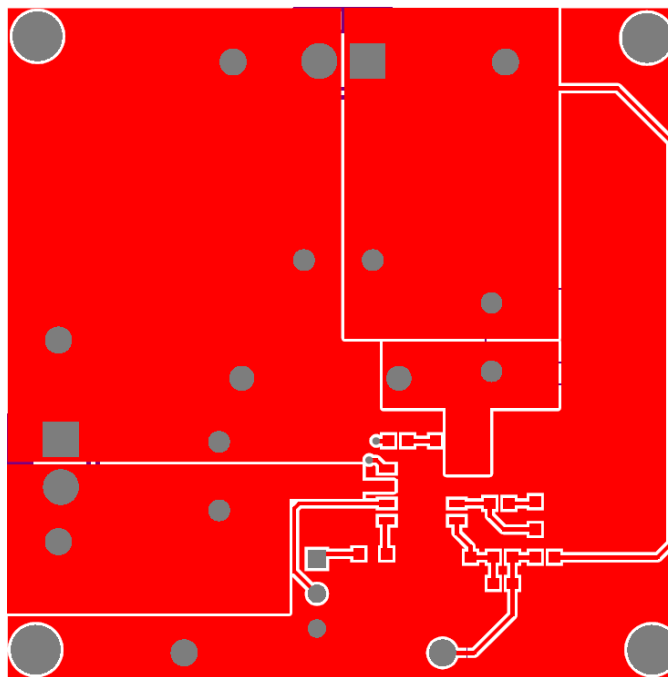


Figure 3-2. Board Layout (Top Layer)

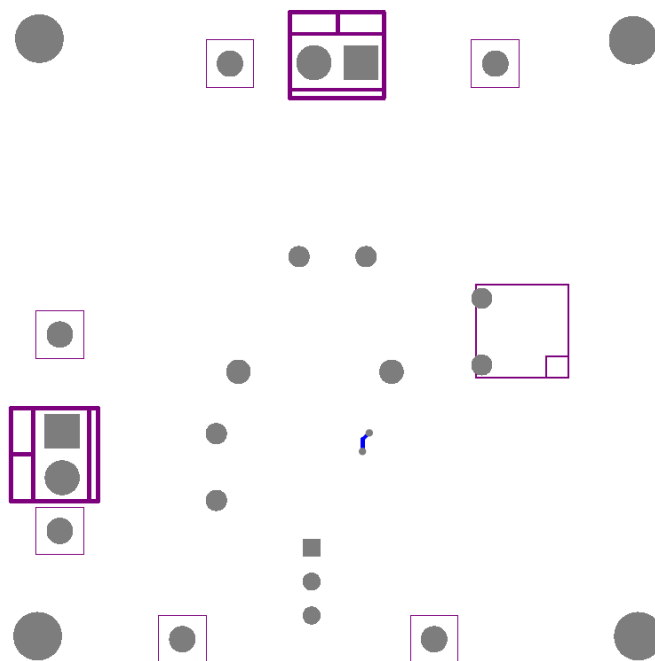


Figure 3-3. Board Layout (Bottom Layer)

4 Bench Test Setup Conditions

4.1 Headers Description and Jumper Placement

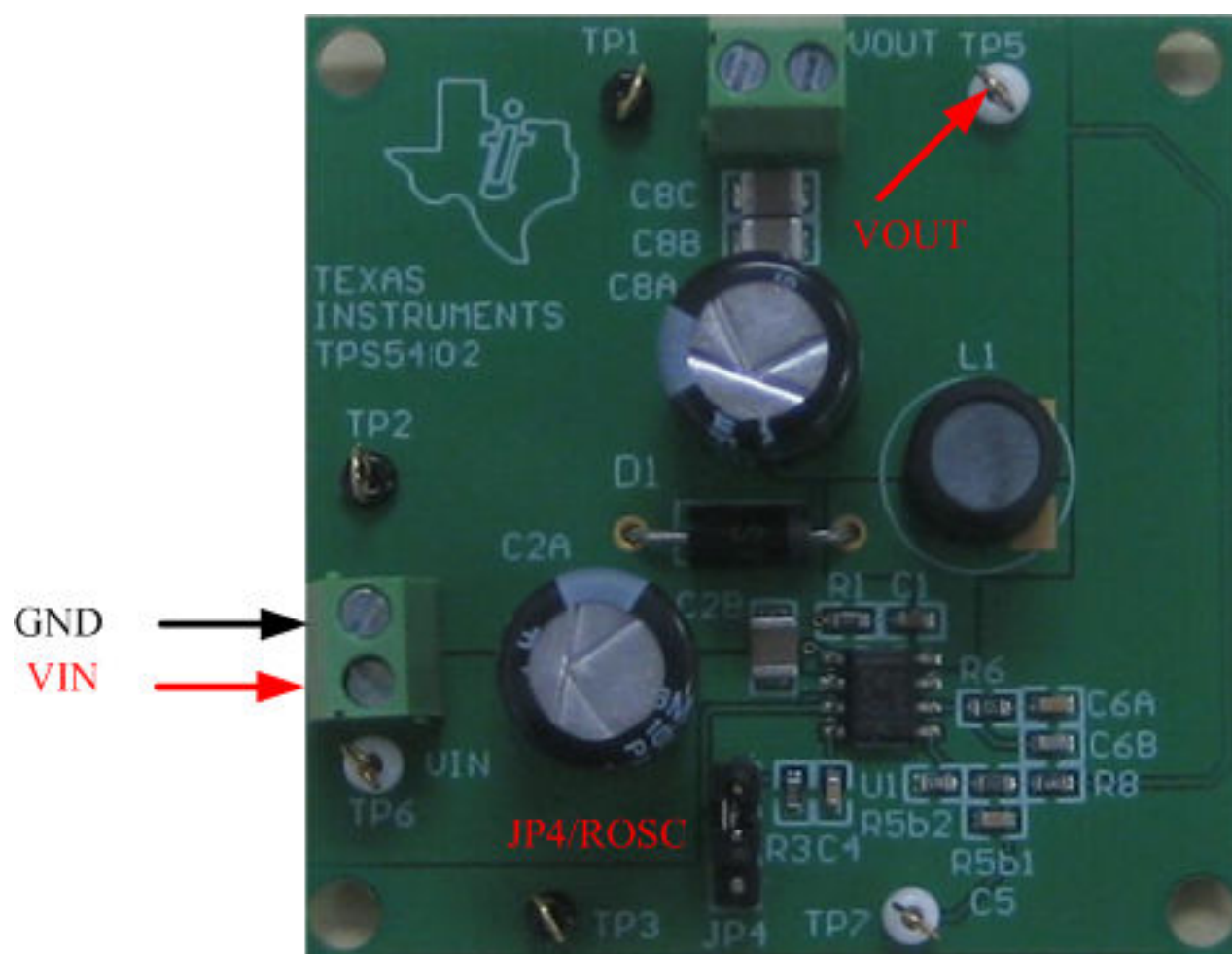


Figure 4-1. Headers Description and Jumper Placement

Test points:

1. LX, VIN, VOUT

4.2 Jumpers and Switches

Table 4-1. Jumpers and Switches

NO.	FUNCTION	PLACEMENT	COMMENT
JP4	Switching Frequency	Connect JP4 to GND and set the switching frequency to 50 kHz; Leave it open and set switching frequency to 120 kHz; Connect a resistor to set the switching frequency	See datasheet (SLVSBF7) for the resistor value corresponding to specific switching frequency.

5 Power-Up Procedure

1. Apply 4.5 V – 28 V to JP1.
2. Apply load to the output connector.

6 Schematic and Bill of Materials

The following pages contain the TPS5402EVM schematic and bill of materials.

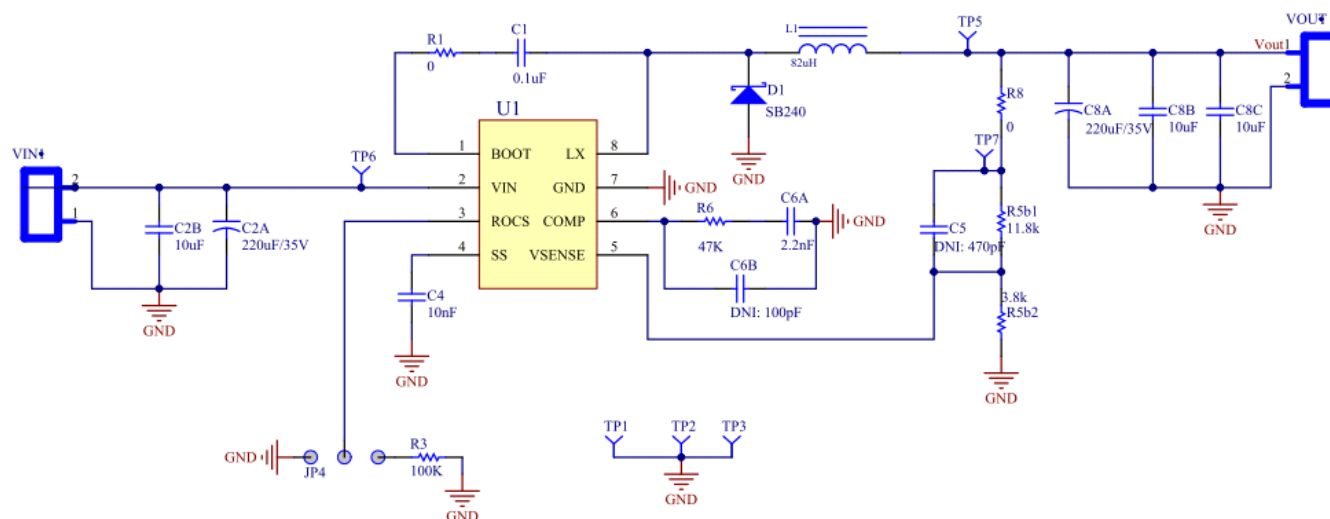


Figure 6-1. TPS5402EVM Schematic

Table 6-1. TPS5402EVM Bill of Materials

ITEM NO.	QTY	DESIGNATOR	VALUE	MANUFACTURER	PART NO.	DESCRIPTION
1	1	C1	0.1 μ F	Generic		Capacitor, 0.1 μ F, 35 V, Ceramic, X7R, 0603
2	3	C2, C8B, C8C	10 μ F	Generic		Capacitor, 10 μ F, 35 V, Ceramic, X5R, 0805
3	2	C2A, C8A	220 μ F	Rubycon	5YXF220MEFC	220 μ F/35 V 10x12.5
4	1	C4	10 nF	Generic		Capacitor, 10 nF, 35 V, Ceramic, X7R, 0603
5		C5	470 pF	Generic		Capacitor, 470 pF, 50 V, Ceramic, X7R, 0603
6	1	C6A	2.2 nF	Generic		Capacitor, 2.2 nF, 50 V, Ceramic, X7R, 0603
7	DNI	C6B	100 pF	Generic		Capacitor, 100 pF, 50 V, Ceramic, X7R, 0603
8	1	D1		Comchip	SB240E	Comchip SB240E 2-A/40-V Schottky Rectifier
9	1	JP4		Mill-Max Manufacturing Corp.	800-10-064-10-001000	Three Pin Jumper, SIP HEADER 64 POS STRAIGHT PCB
10	1	L1	82 μ H	Bourns	RL622-820K-RC	Magnetic-Core Inductor
11	2	R1, R8	0	Generic		Resistor, 1%, 1/10W, 0603, SMD
12	1	R3	100 K	Generic		Resistor, 1%, 1/10W, 0603, SMD
13	1	R6	30 K	Generic		Resistor, 1%, 1/10W, 0603, SMD
14	1	R5b1	11.8 k	Generic		Resistor, 1%, 1/10W, 0603, SMD
15	1	R5b2	3.8 k	Generic		Resistor, 1%, 1/10W, 0603, SMD
16	2	TP1, TP2	5001	Generic	5001	Keystone Electronics, Test Point, Black
17	3	TP5, TP6, TP7	5002	Generic	5002	Keystone Electronics, Test Point, White
18	1	U1		Texas Instruments	TPS5402	SOIC8
19 ⁽¹⁾	1			Sullins Connector Solutions	SPC02SYAN	SPC02SYAN, CONN JUMPER SHORTING GOLD FLASH

(1) Install item 19 on item 8 to the inner side.

7 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision * (September 2012) to Revision A (November 2021)	Page
• Updated the numbering format for tables, figures, and cross-references throughout the document.	2
• Updated the user's guide title.....	2

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