User's Guide

TPS62A01EVM-190 and TPS62A01AEVM-190 Evaluation Modules User's Guide

ABSTRACT

This user's guide describes the characteristics, operation, and use of TI's TPS62A01 and TPS62A01A evaluation modules (EVM). These EVMs are designed to help the user to easily evaluate and test the operation and functionality of the TPS62A01 and TPS62A01A buck converters. The EVMs convert a 2.5-V to 5.5-V input voltage to a regulated 1.8-V output voltage that delivers up to 1-A maximum. This user's guide includes setup instructions for the following:

- Hardware
- A printed-circuit board (PCB) layout
- Schematic diagram
- Bill of materials (BOM)
- Test results of the EVM

Throughout this document, the TPS62A01EVM-190 is used as an abbreviation representing the TPS62A01EVM-190 (001) and also TPS62A01AEVM-190 (002).

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Trademarks

1 Introduction

The TPS62A01 and TPS62A01A are synchronous step-down buck DC-DC converters optimized for high efficiency and compact solution size. The TPS62A01 and TPS62A01A delivers an output current up to 1A. The TPS62A01A variant operates in forced PWM (FPWM) across the whole load current range. The TPS62A01EVM-190 and TPS62A01AEVM-190 are available in 1.6-mm × 1.6-mm SOT563 package.

1.1 Performance Specification

Table 1-1 provides a summary of the TPS62A01 and TPS62A01A performance specifications.

Table 1-1. Performance Specification Summary

Specification		Test Conditions	MIN	TYP	MAX	Unit
Input voltage			2.5		5.5	V
Output voltage setpoint				1.8		V
Output current	TPS62A01EVM-190		0		1	A
	TPS62A01AEVM-190		0		1	A

1.2 Modifications

The PCB for this EVM is designed to accommodate the adjustable voltage version of this IC. On the EVM, additional input and output capacitors can also be added. Finally, a feedforward capacitor can be added.

1.2.1 Input and Output Capacitors

C7 is provided for an additional input capacitor. This capacitor is not required for proper operation but can be used to reduce the input voltage ripple.

C5, C6, and C8 are provided for additional output capacitors. These capacitors are not required for proper operation but can be used to reduce the output voltage ripple and to improve the load transient response. The output capacitance must remain within the recommended range in the device data sheet for proper operation.

1.2.2 Feedforward Capacitor

C4 is a feedforward capacitor. This capacitor is not required for proper operation but can be used to improve the load transient performance.

2 Setup

This section describes how to properly use the TPS62A01EVM-190.

2.1 Connector Descriptions

J1, Pin 1 and 2 – VIN	Positive input voltage connection from the input supply for the EVM
J1, Pin 3 and 4 – S+/S–	Input voltage sense connections, measure the input voltage at this point
J1, Pin 5 and 6 – GND	Input return connection from the input supply for the EVM
J2, Pin 1 and 2 – VOUT	Positive output voltage connection
J2, Pin 3 and 4 – S+/S–	Output voltage sense connections, measure the output voltage at this point
J2, Pin 5 and 6 – GND	Output return connection
J3 – PG/GND	The PG output appears on pin 1 of this header with a convenient ground on pin 2.
JP1 – EN	EN pin jumper. Place the supplied jumper across ON and EN to turn on the IC. Place the jumper across OFF and EN to turn off the IC.
JP4 – GND	Convenient ground connection

2.2 Hardware Setup

To operate the EVM, set jumpers JP1 to the desired positions per Section 2.1. Connect the input supply to J1, and connect the load to J2.

3 TPS62A01EVM-190 Test Results

The TPS62A01EVM-190 and TPS62A01AEVM-190 was used to take the data in the TPS62A01 and TPS62A01A data sheet. See the device data sheet for the performance of this EVM.

4 Board Layout

This section provides the board layout and illustrations of TPS62A01EVM-190 which is valid for variant TPS62A01AEVM-190 also.

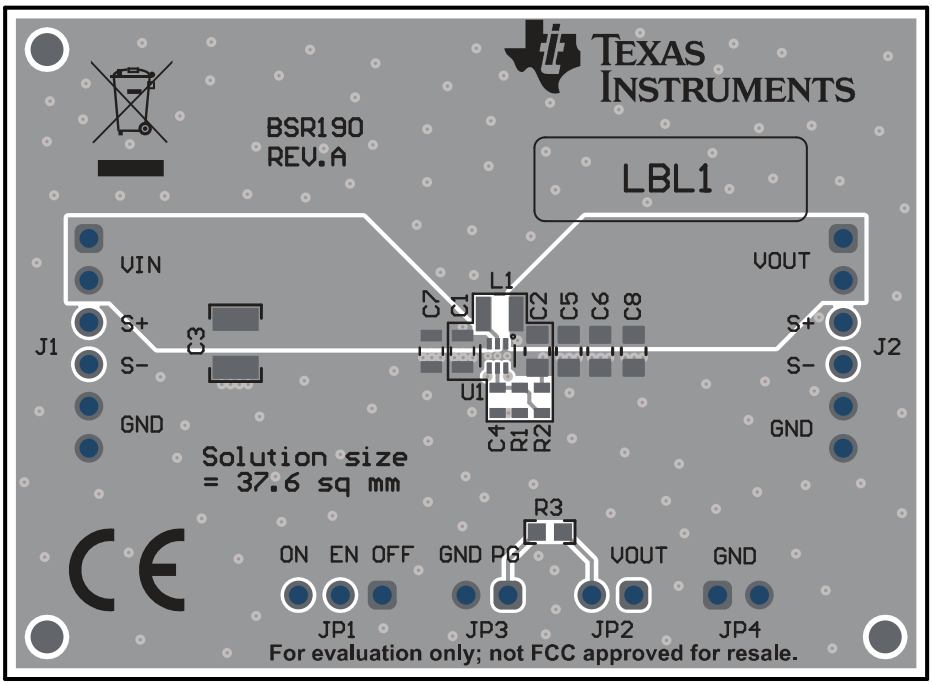

Figure 4-1. Top View Mask

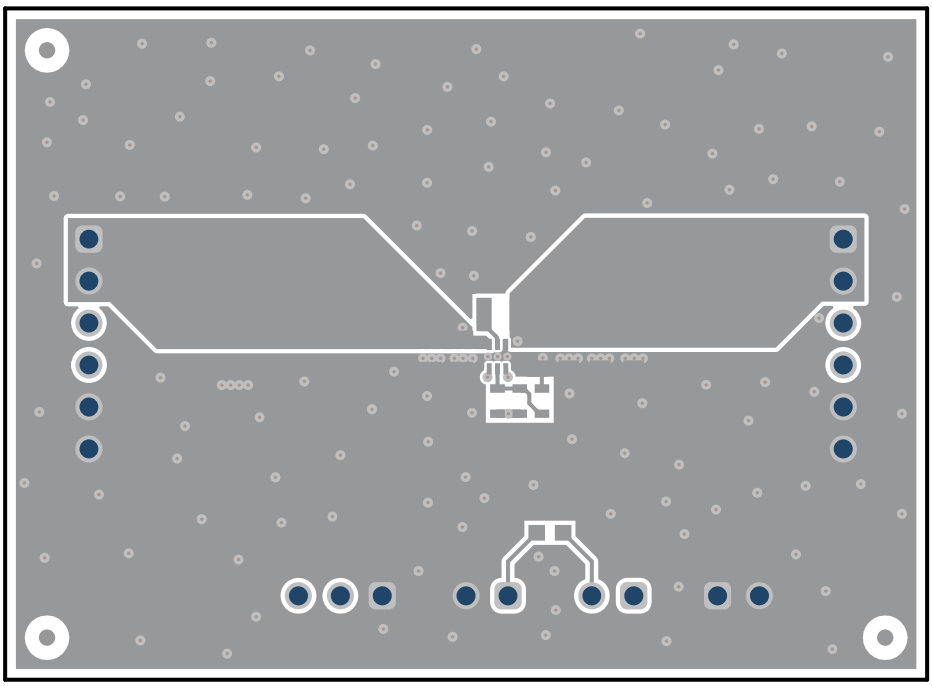

Figure 4-2. Top Layer

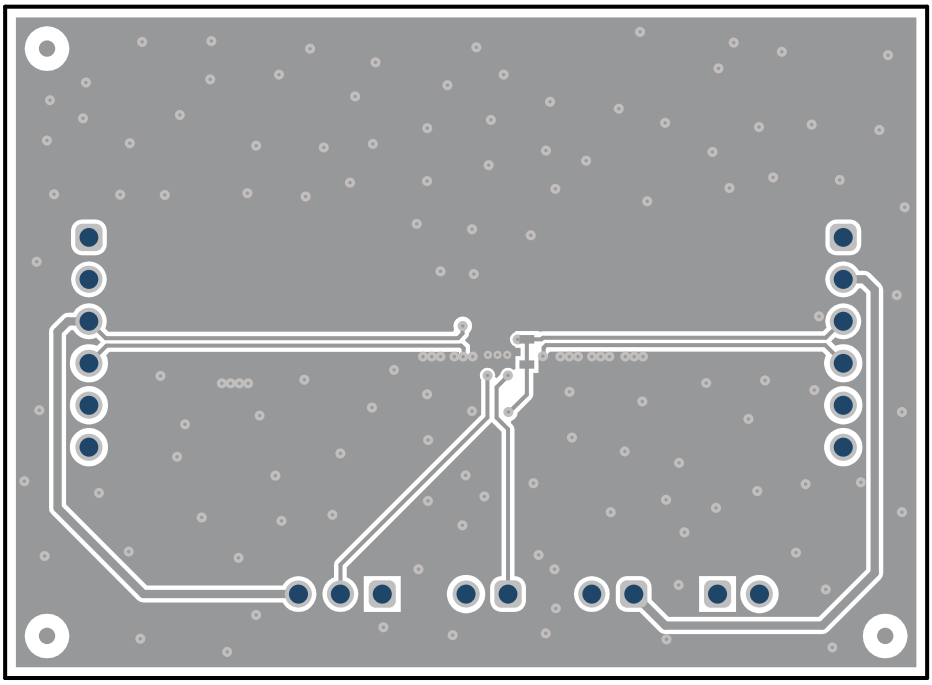

Figure 4-3. Bottom Layer

5 Schematic and Bill of Materials

This section provides the TPS62A01EVM-190 schematic and bill of materials.

5.1 Schematic

Figure 5-1 illustrates the EVM schematic of TPS62A01EVM-190 which is valid for variant TPS62A01AEVM-190 also.

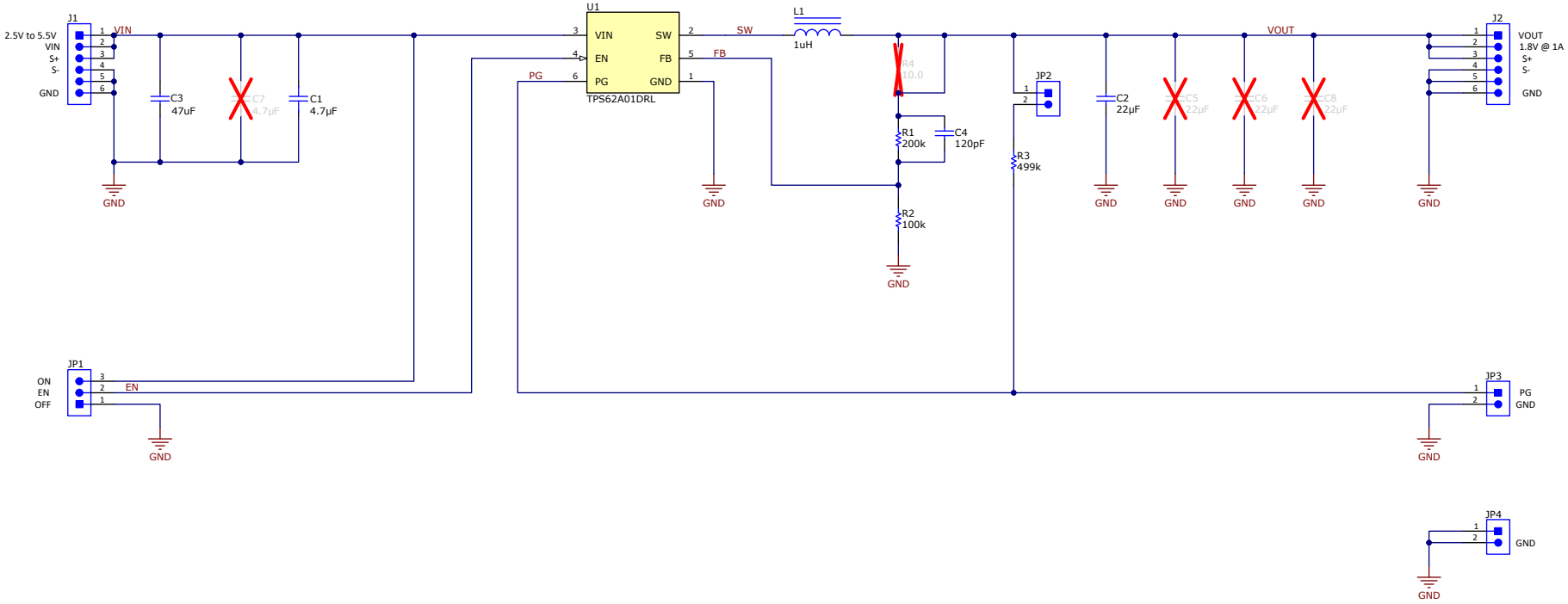

Figure 5-1. TPS62A01EVM-190 Schematic

5.2 Bill of Materials

Table 5-1 lists the BOM for this EVM.

Table 5-1. TPS62A01EVM-190 and TPS62A01AEVM-190 Bill of Materials

QUANTITY		REF DES	VALUE	DESCRIPTION	SIZE	PART NUMBER	MFR
TPS62A01EVM-190	TPS62A01AEVM-190						
1	1	C1	4.7 µF	Capacitor, Ceramic, 10 V, X7R, ±10%	0805	GRM21BR71A475KE51L	Murata
1	1	C2	22 µF	Capacitor, Ceramic, 10 V, X7R, ±20%	0805	GRM21BZ71A226ME15L	Murata
1	1	C3	47 µF	Capacitor, Ceramic, 10 V, X7R, ±20%	1210	GRM32ER71A476ME15L	Murata
1	1	C4(1)	120 pF	Capacitor, Ceramic, 50 V, C0G/NP0, ±5%	0603	GRM1885C1H121JA01D	Murata

Table 5-1. TPS62A01EVM-190 and TPS62A01AEVM-190 Bill of Materials (continued)

QUANTITY		REF DES	VALUE	DESCRIPTION	SIZE	PART NUMBER	MFR
TPS62A01EVM-190	TPS62A01AEVM-190						
1	1	L1	1 µH	Inductor, Shielded, 3.3 A, 0.04 Ω	2.5 × 1.2 × 2 mm	DFE252012F-1R0M=P2	Murata
1	1	R1	200 k	Resistor, Chip, 0.1 W, 1%	0603	Std	Std
1	1	R2	100 k	Resistor, Chip, 0.1 W, 1%	0603	Std	Std
1	1	R3	499 k	Resistor, Chip, 0.1 W, 1%	0603	Std	Std
1	0	U1	TPS62A01	IC, 5.5-V, 1-A Step-Down Converter	1.6 × 1.6 mm	TPS62A01DRL	TI
0	1	U1	TPS62A01A	IC, 5.5-V, 1-A Step-Down Converter with forced PWM operation	1.6 × 1.6 mm	TPS62A01ADRL	TI

(1) C4 is feedforward capacitor which is optional. Device is fully functional without C4 also.

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