User's Guide

TPS6286x1EVM-109 Evaluation Module

ABSTRACT

TPS6286x1EVM-109 facilitates the evaluation of the TPS628601 family of 600-mA, step-down converters with 2.3-µA I_Q in a tiny 0.7-mm by 1.4-mm WCSP packages with 0.4-mm pitch. The EVM outputs a 1.0-V output voltage with 1% accuracy from input voltages between 1.8 V and 5.5 V. The TPS628x1 is a highly-efficient and tiny solution for point-of-load (POL) converters for space-constrained applications, such as wearables and smart phones.

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Trademarks

1 Introduction

The *TPS6286x1* is a synchronous, step-down converter in a 0.7-mm × 1.4-mm × 0.4-mm wafer chip-scale package (WCSP). The BSR109 EVMs support different IC version TPS62860 and TPS62861 families.

1.1 Background

The TPS628601EVM-109 is with the *TPS628601* integrated circuit (IC) and with a default output voltage of 1.0-V output voltage. The output voltage can be adjusted before or after the start-up phase using the jumper setting on VSEL1 and VSEL2. The EVM operates with an input voltage between 1.8 V and 5.5 V.

1.2 Performance Specification

Table 1-1 provides a summary of the *TPS6286x1*EVM performance specifications. All specifications are given for an ambient temperature of 25°C.

Table 1-1. Performance Specification Summary

SPECIFICATION	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input voltage		1.8	3.6	5.5	V
Output voltage		0.6		1.0	V
Output current	V_{IN} ≥ 1.8 V, V_{OUT} = 3.3 V			0.6	A

1.3 Modifications

The EVM can support variance of the TPS6286x1 IC family. Additional input and output capacitors can be added.

1.3.1 IC U1 Operation

This EVM requires an appropriate EN pin level to turn-on the TPS6286x1. The output voltage can be reconfigured between four programmable values using an onboard jumper (JP3 and JP4).

2 Setup

This section describes how to properly use the TPS62861xEVM.

2.1 Input and Output Connector Description

2.1.1 J1, Pin 1 and 2 – VIN

Positive input voltage connection from the input power supply for the EVM.

2.1.2 J1, Pin 3 and 4 – S+/S-

Input voltage sense connections. Measure the input voltage at this point.

2.1.3 J1, Pin 5 and 6 – GND

Input voltage GND return connection from the input power supply for the EVM.

2.1.4 J2, Pin 1 and 2 – VOUT

Positive output voltage connection

2.1.5 J2, Pin 3 and 4 – S+/S-

Output voltage sense connections. Measure the output voltage at this point.

2.1.6 J2, Pin 5 and 6 – GND

Output voltage GND return connection.

2.1.7 JP1 – EN

EN pin input jumper. Place the jumper across ON and EN to turn on the IC. Place the jumper across OFF and EN to turn off the IC.

2.1.8 JP3 – VSEL1

Placing a jumper across VSEL1 and either of the High or Low pins configured the output voltage.

2.1.9 JP4 - VSEL2

Placing a jumper across VSEL2 and either of the High or Low pins configured the output voltage.

2.1.10 JP5 – PG

Placing a jumper across PG and either of the VIN or VOUT pins provide a pull-up to PG pin.

2.2 Setup

Connect the input supply and the EVM by attaching the positive terminal to J1 (VIN pins), and the negative terminal to J1 (GND pins) to power the board. Link the positive terminal of the electronic load to J2 (VOUT pins) and the negative terminal to J2 (GND pins) of the EVM. Pull high the EN pin to turn on the device and pull low to disable the part.

3 Board Layout

This section provides the TPS6286x1EVM board layout and illustrations.

3.1 Layout

Figure 3-1 through Figure 3-5 show the component placement and PCB layout of the TPS6286x1EVM.

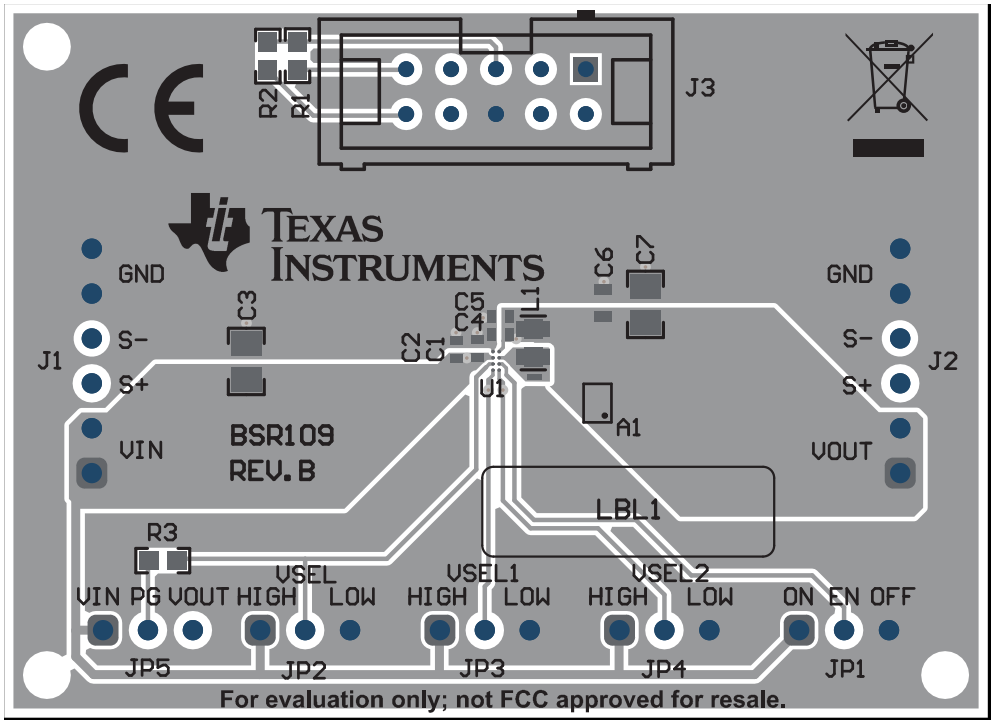

Figure 3-1. TPS6286x1EVM PCB - Assembly Layer

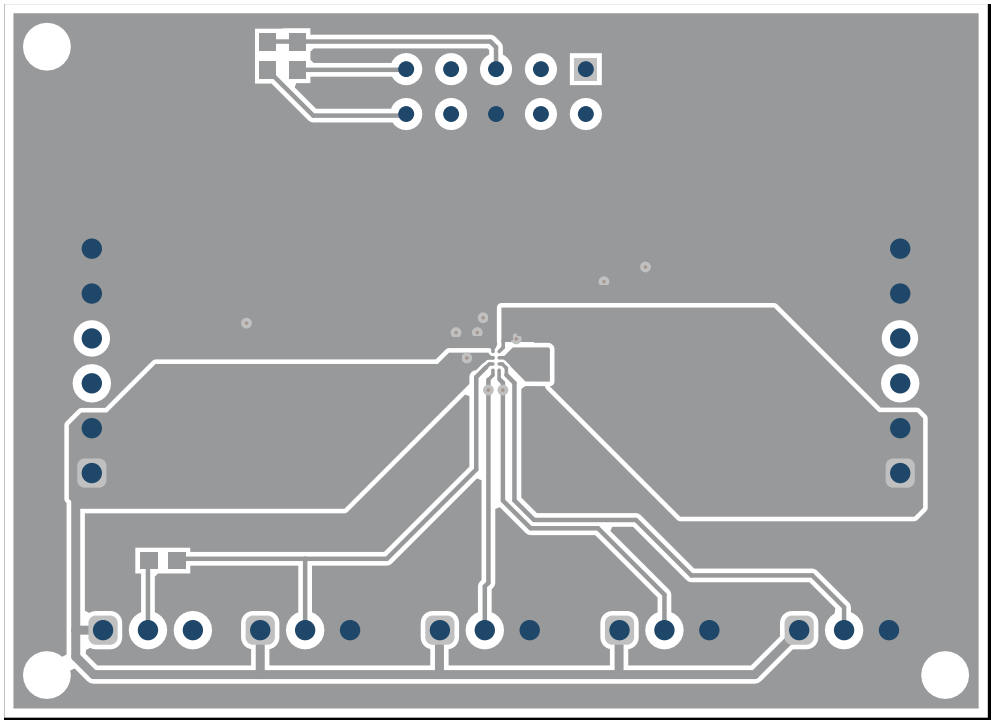

Figure 3-2. TPS6286x1EVM PCB - Top Layer

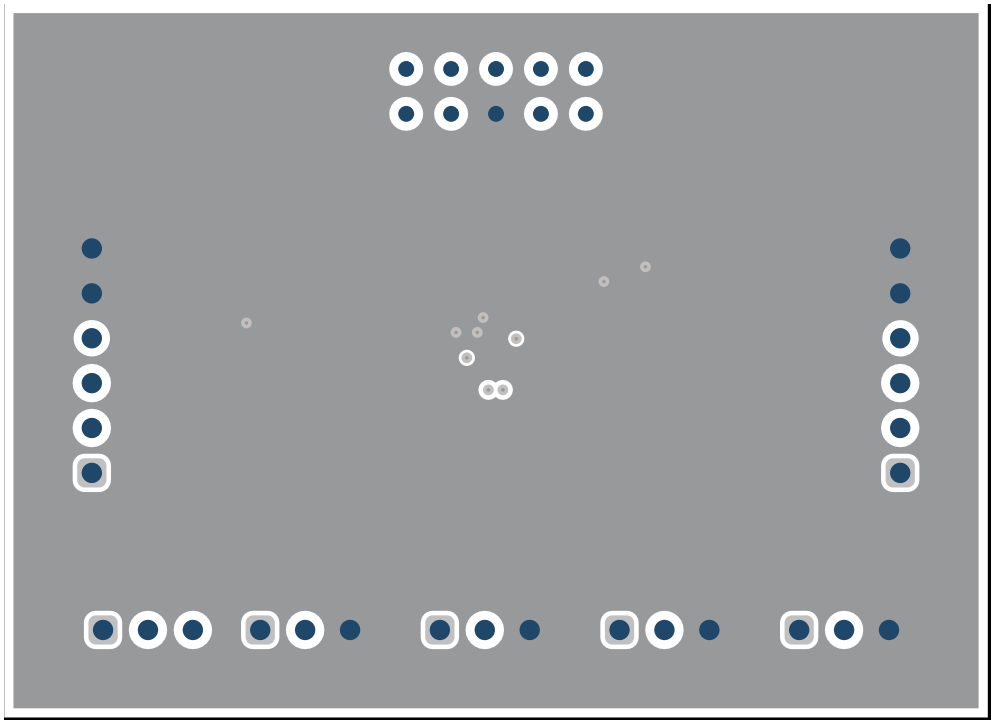

Figure 3-3. TPS6286x1EVM PCB - Signal Layer 1 (Top View)

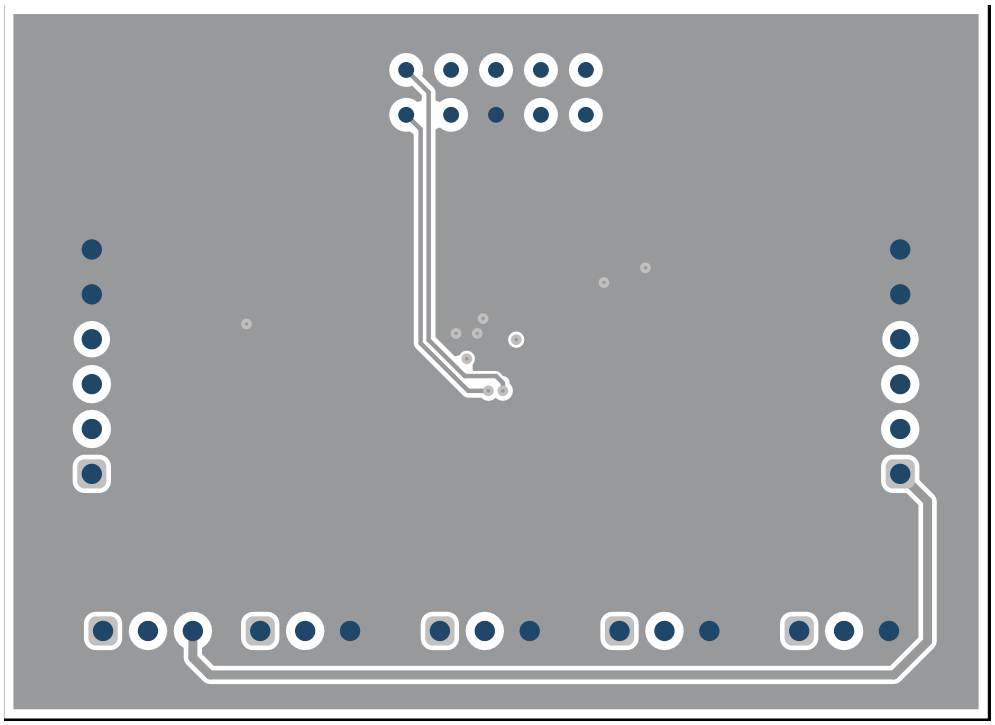

Figure 3-4. TPS6286x1EVM PCB - Signal Layer 2 (Top View)

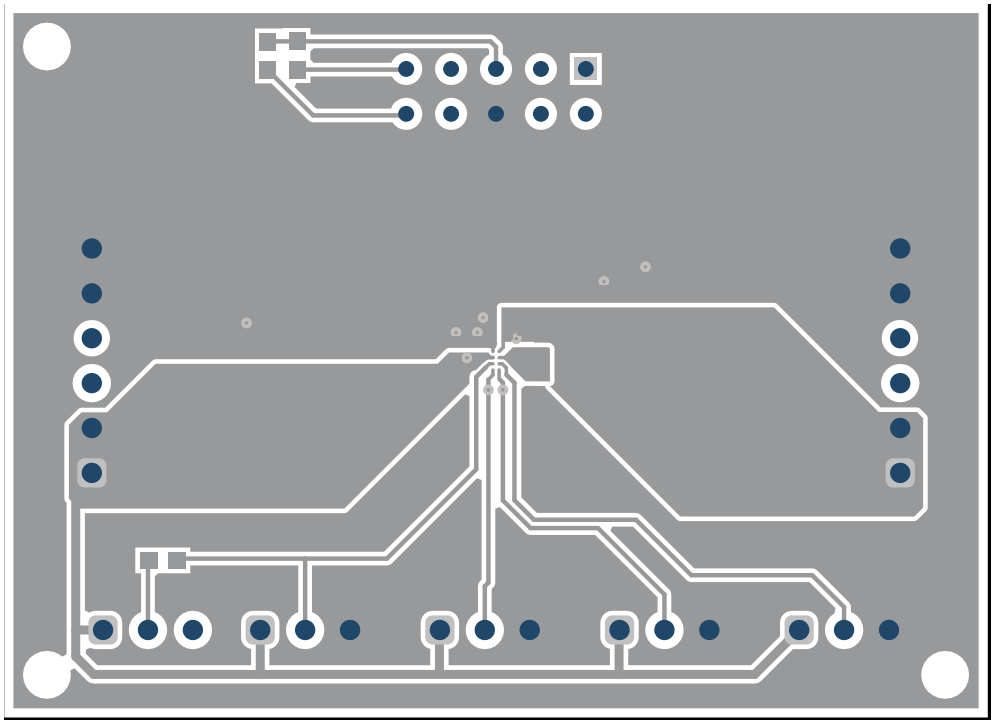

Figure 3-5. TPS6286x1EVM PCB - Bottom Layer (Top View)

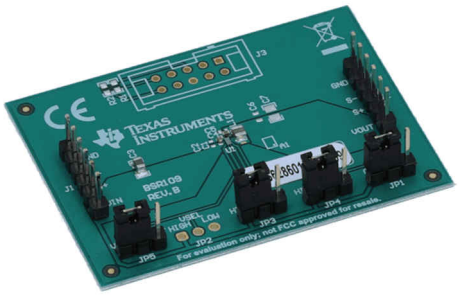

Figure 3-6. TPS628601EVM Angled View

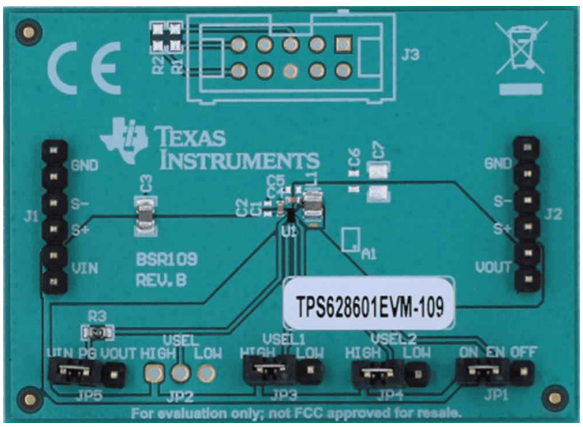

Figure 3-7. TPS628601EVM Overhead View

4 Schematic and Bill of Materials

This section provides the TPS6286x1EVM schematic and bill of materials.

4.1 Schematic

Figure 4-1 illustrates the EVM schematic.

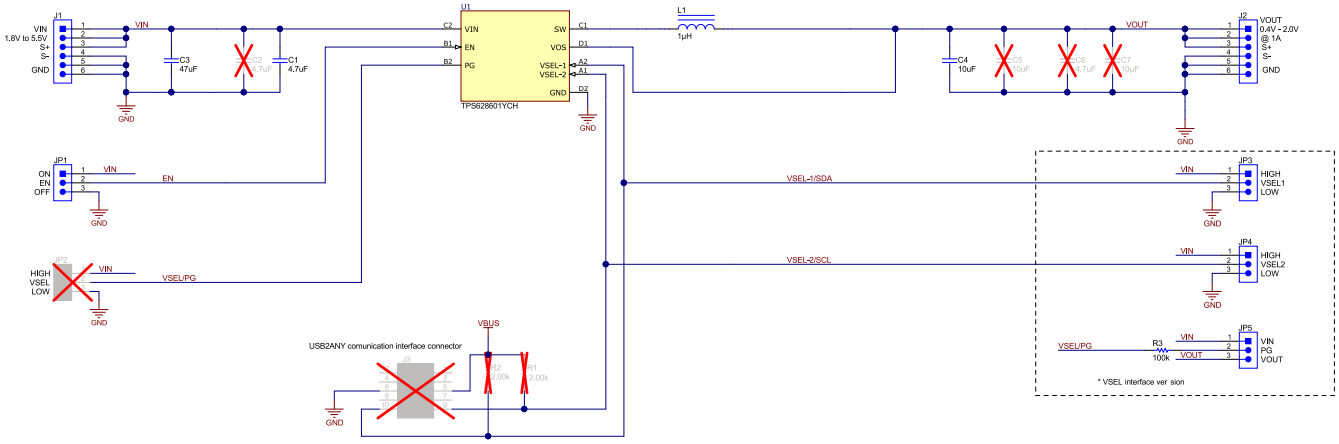

Figure 4-1. TPS6286x1EVM Schematic

4.2 Bill of Materials

Table 4-1 lists the EVM bill of materials.

Table 4-1. TPS628601EVM-1 09 Bill of Materials (BOM)

Designator	Quantity	Value	Description	Package Reference	PartNumber	Manufacturer
C1	1	4.7 µF	CAP, CERM, 4.7 µF, 6.3 V, ± 20%, X5R, 0402	0402	GRM155R60J475ME47D	MuRata
C3	1	47 µF	CAP, CERM, 47 µF, 6.3 V, ± 20%, X5R, 0805	0805	GRM21BR60J476ME15L	MuRata
C4	1	10 µF	CAP, CERM, 10 µF, 6.3V, +/- 20%, X5R, 0402	0402	GRM155R60J106ME15D	MuRata
L1	1	1 µH	Inductor, Shielded, MetalComposite, 1 µH, 2.7 A,0.057 Ω, SMD	1.6x2mm	DFE201610E-1R0M=P2	MuRata
R3	1	100k	RES, 100 k, 5%, 0.1 W,0603	0603	CRCW0603100KJNEAC	Vishay-Dale
U1	1		1.8-V to 5.5-V Input,0.6A Synchronous Step- Down Converter with VSEL Interface	DSBGA8	TPS628601YCH	Texas Instruments

5 Revision History

Changes from Revision * (July 2020) to Revision A (April 2022) **Page**

- Changed TPS628601EVM Angled View image....4
- Changed TPS628601EVM Overhead View image....4

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