User's Guide

SLVUBI7–August 2018

TPS62827EVM-063

The TPS62827EVM-063 facilitates the evaluation of the TPS62827 4-A step-down converters with DCS-Control™ in a 1.5-mm × 1.5-mm QFN package. The EVM output a 1.8-V output voltage with 1% accuracy from input voltages from 2.5 V to 5.5 V with a maximum solution height of 1 mm. The TPS62827 is a highly efficient and small solutions for point-of-load (POL) converters in all types of equipment, such as solid-state drives (SSDs), optical modules, and portable devices.

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1 Introduction

The TPS62827 is a synchronous, step-down converters in a small 1.5- × 1.5- × 1-mm QFN package and supports a maximum output current of 4 A. The TPS62827 is pin to pin compatible with two other devices in this family: TPS62825 and TPS62826 which support 2 A and 3 A of output current respectively.

1.1 Performance Specification

Table 1 provides a summary of the TPS62827EVM-063 performance specifications.

Table 1. Performance Specification Summary

Specification	Test Conditions	Min	Typ	Max	Unit
Input voltage		2.5	5	5.5	V
Output voltage setpoint			1.8		V
Output current	TPS62827EVM-063	0		4	A

1.2 Modifications

The printed-circuit board (PCB) for this EVM is designed to accommodate both the fixed and adjustable output voltage versions of this integrated circuit (IC). Additional input and output capacitors can also be added. Finally, the loop response of the IC can be measured.

1.2.1 Fixed Output Voltage Operation

U1 can be replaced with the fixed output voltage version of the IC for evaluation. For fixed output voltage version operation, replace R1 with a 0-Ω resistor and remove R2 and C3.

1.2.2 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.

C8 is 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 total output capacitance must remain within the recommended range in the data sheet for proper operation.

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2 Setup

This section describes how to properly use the TPS6282xEVM-794.

2.1 Input/Output Connector Descriptions

J1, Pin 1 and 2 – VIN	Positive input 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	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 ground on pin 2.
JP1 – EN	EN pin input 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.
JP2 – PG Pullup Voltage	PG pin pull up voltage jumper. Place the supplied jumper on JP3 to connect the PG pin pull up resistor to V_{IN}. Alternatively, the jumper can be removed and a different voltage can be supplied on pin 2 to pull up the PG pin to a different level. This externally applied voltage must remain below 5.5V.

2.2 Setup

To operate the EVM, set jumpers JP1 through JP2 to the desired position per Section 2.1. Connect the input supply to J1 and connect the load to J2.

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3 TPS62827EVM-063 Test Results

The TPS62827EVM-063 was used to take all the data in *TPS62827, 4-A Step-Down Converter with 1% Output Accuracy in 1.5-mm × 1.5-mm QFN Package*. See the device data sheet for the performance of this EVM.

Figure 1 shows the thermal performance of the EVM.

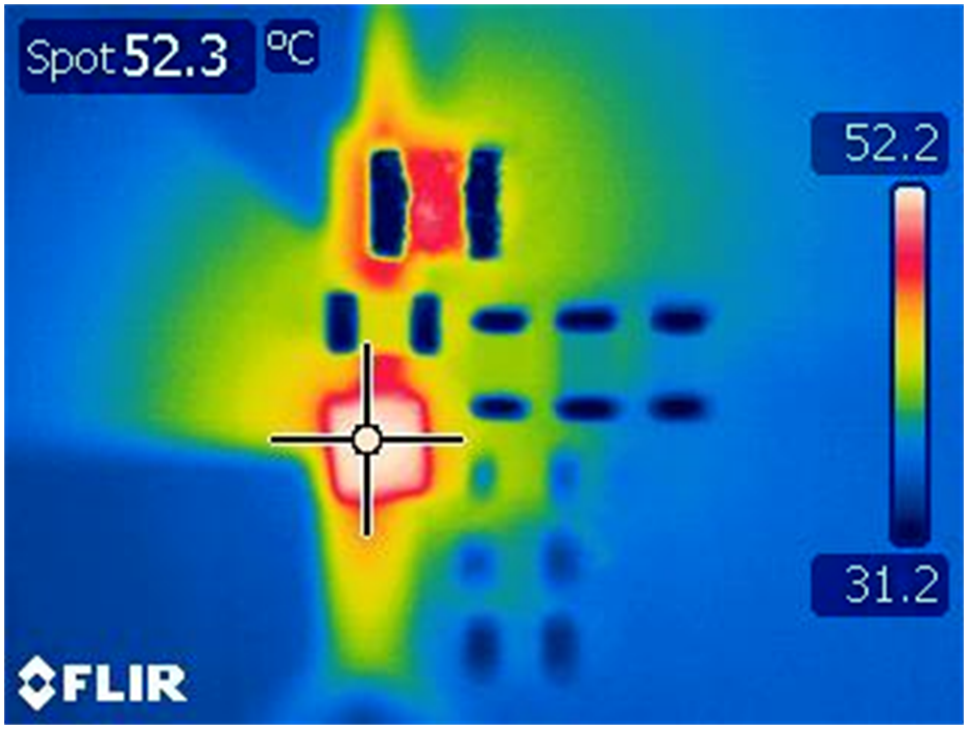


Figure 1. Thermal Performance (V_{IN} = 5 V, I_{OUT} = 4 A)

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4 Board Layout

This section provides the TPS62827EVM-063 board layout and illustrations in Figure 2 through Figure 6. The Gerbers are available on the EVM product page: TPS62825EVM-794.

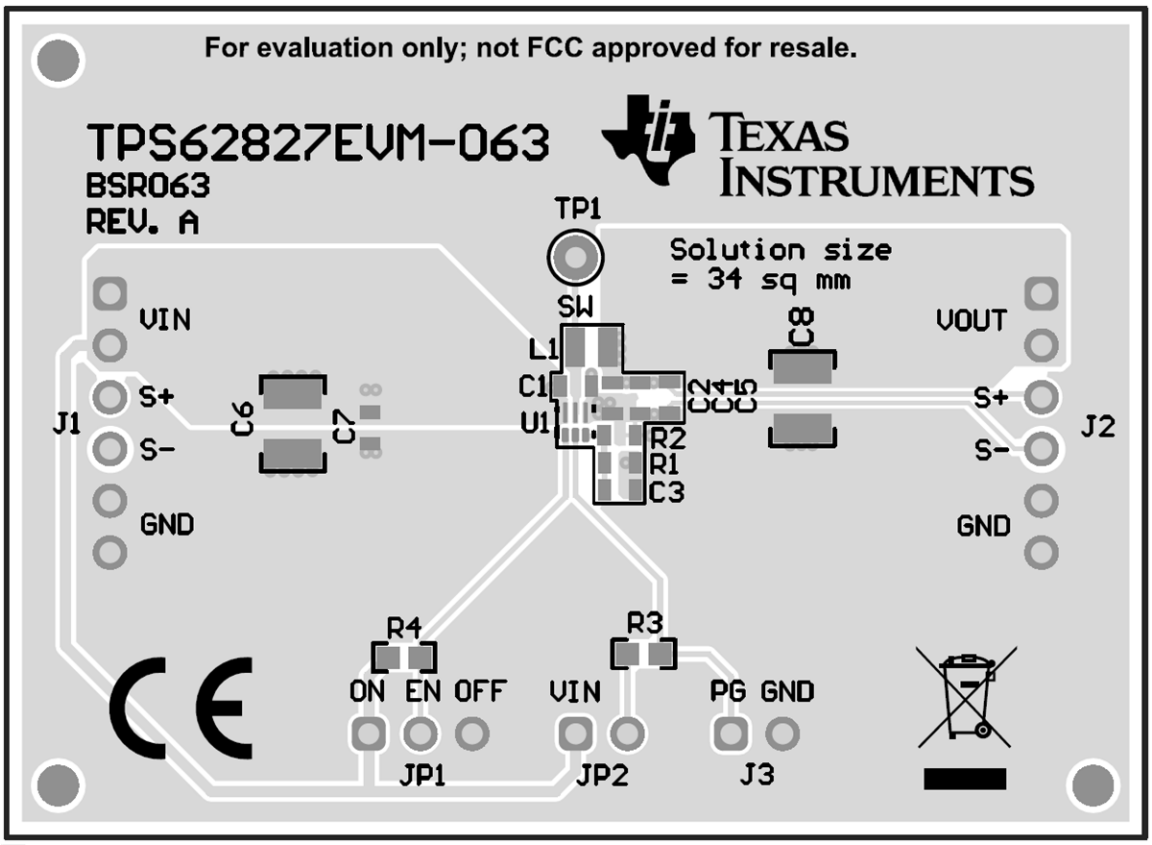


Figure 2. Top Assembly

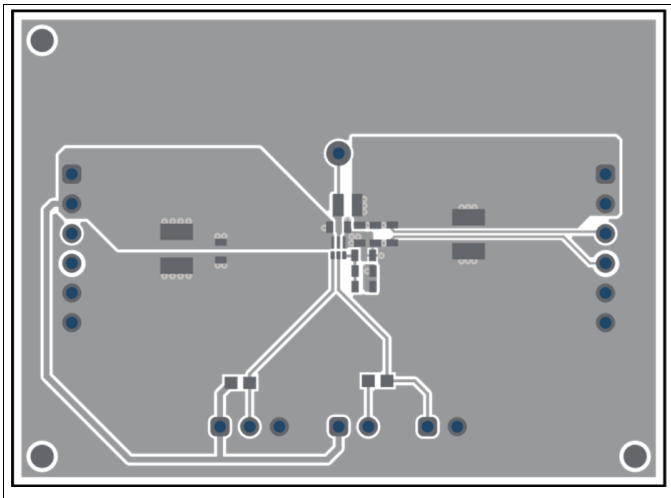


Figure 3. Top Layer

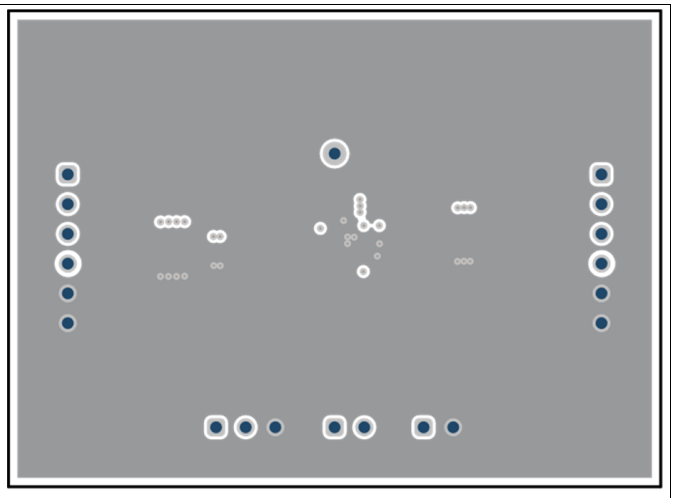


Figure 4. Signal Layer 1

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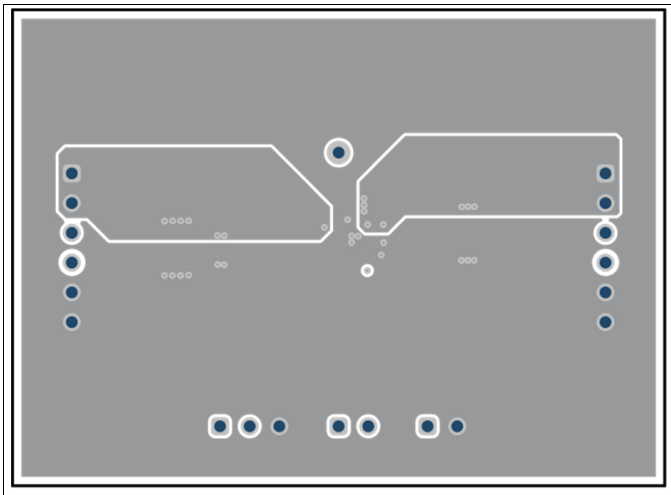


Figure 5. Signal Layer 2

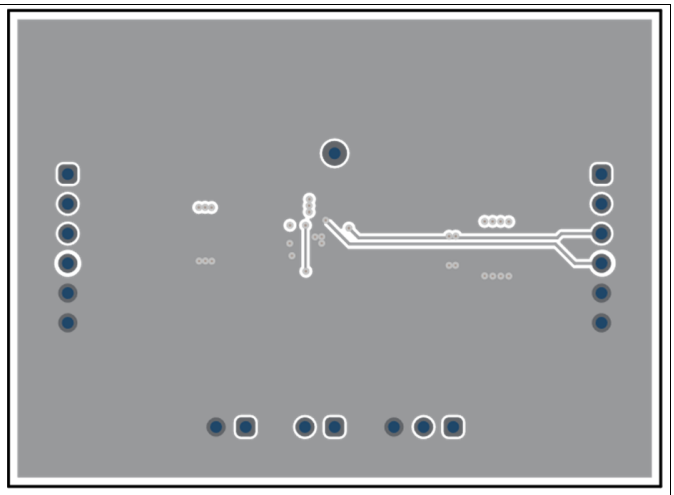


Figure 6. Bottom Layer

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5 Schematic and Bill of Materials

This section provides the TPS62827EVM-063 schematic and Bill of Materials (BOM).

5.1 Schematic

Figure 7 illustrates the EVM schematic.

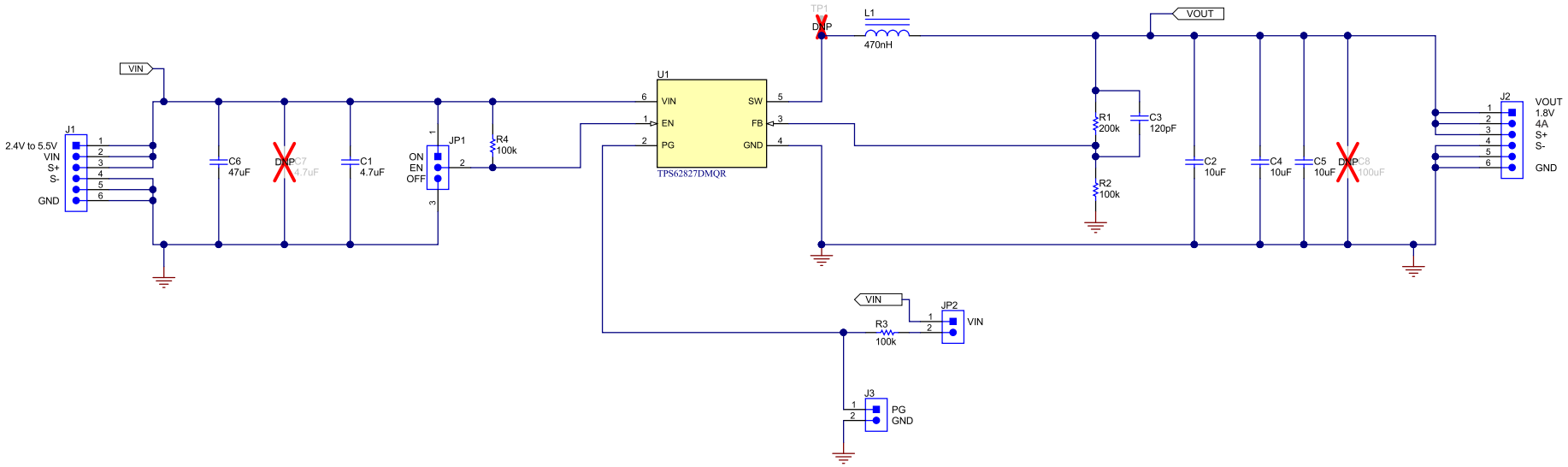


Figure 7. TPS62827EVM-063 Schematic

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5.2 Bill of Materials

Table 2 lists the BOM for this EVM.

Table 2. TPS62827EVM-063 Bill of Materials

Count	Designator	Value	Description	Package Reference	Part Number	Manufacturer
1	C1	4.7 µF	CAP, CERM, 4.7 µF, 6.3 V, ±10%, X7R, 0603	0603	JMK107BB7475MA-T	Taiyo Yuden
2	C2, C4,C5	10 µF	CAP, CERM, 10 µF, 10 V, ±20%, X7R, 0603	0603	GRM188Z71A106MA73D	Murata
1	C3	120 pF	CAP, CERM, 120 pF, 50 V, ±5%, C0G/NP0, 0603	0603	Std	Std
1	C6	47 µF	CAP, CERM, 47 µF, 10 V, ±20%, X7R, 1210	1210	GRM32ER71A476ME15L	Murata
1	L1	470 nH	Inductor, Shielded, 470 nH, 3.6 A, 0.032 ohm, SMD	2016	DFE201610E-R47M=P2	Murata
1	R1	200 k	RES, 200 k, 1%, 0.1 W, 0603	0603	Std	Std
3	R2, R3, R4	100 k	RES, 100 k, 1%, 0.1 W, 0603	0603	Std	Std
1	U1		4-A Step-Down Converter with 1% Output Accuracy in 1.5-mm × 1.5-mm QFN	1.5 x 1.5 mm	TPS62827DMQ	Texas Instruments

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