TPS6282xEVM-794 Evaluation Module

The TPS6282xEVM-794 facilitates the evaluation of the TPS62825 and TPS62826 2-A and 3-A pin-to-pin compatible step-down converters with DCS-Control™ in a 1.5-mm × 1.5-mm QFN package. The PWR794-001 uses the 2-A TPS62825, and the PWR794-002 uses the 3-A TPS62826. The EVMs output a 1.8-V output voltage with 1% accuracy from input voltages from 2.4 V to 5.5 V with a maximum solution height of 1 mm. The TPS62825 and TPS62826 are 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 TPS62825 and TPS62826 are synchronous, step-down converters in a small 1.5- × 1.5- × 1-mm QFN package. Two different devices in this family support 2 A or 3 A of output current.

1.1 Performance Specification

Table 1 provides a summary of the TPS6282xEVM-794 performance specifications.

Table 1. Performance Specification Summary

Specification	Test Conditions	Min	Typ	Max	Unit
Input voltage		2.4	5	5.5	V
Output voltage setpoint			1.8		V
Output current	TPS62825EVM-794	0		2	A
	TPS62826EVM-794	0		3	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.

C5 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 total output capacitance must remain within the recommended range in the data sheet for proper operation.

1.2.3 Loop Response Measurement

The loop response of the TPS6282xEVM-794 can be measured by lifting both R1 and C3 and inserting a 50-Ω resistor in series with these two components to inject the measurement signal across. The results of this test are shown in Figure 2.

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 pullup voltage jumper. Place the supplied jumper on JP3 to connect the PG pin pullup 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 6 V.

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.

3 TPS6282xEVM-794 Test Results

The TPS6282xEVM-794 was used to take all the data in *TPS6282x, 2-, 3-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.

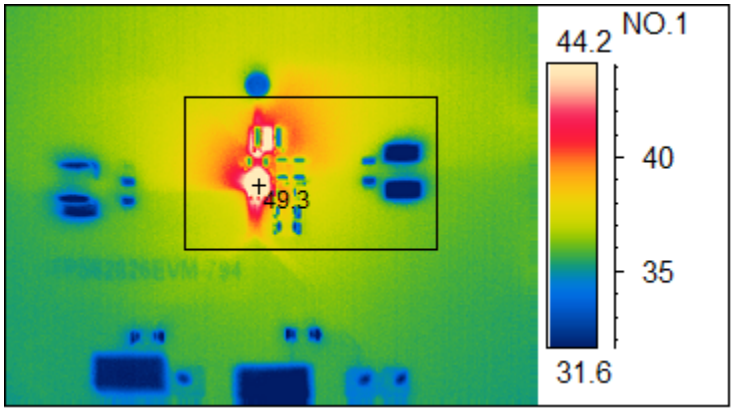

Figure 1. Thermal Performance (V_{IN} = 5 V, I_{OUT} = 3 A)

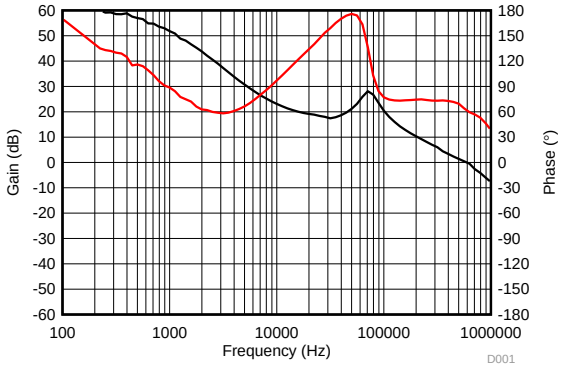

Figure 2. Loop Response Measurement (V_{IN} = 5 V, Load = 3 A)

4 Board Layout

This section provides the TPS6282xEVM-794 board layout and illustrations in Figure 3 through Figure 7. The Gerbers are available on the EVM product page: TPS62825EVM-794.

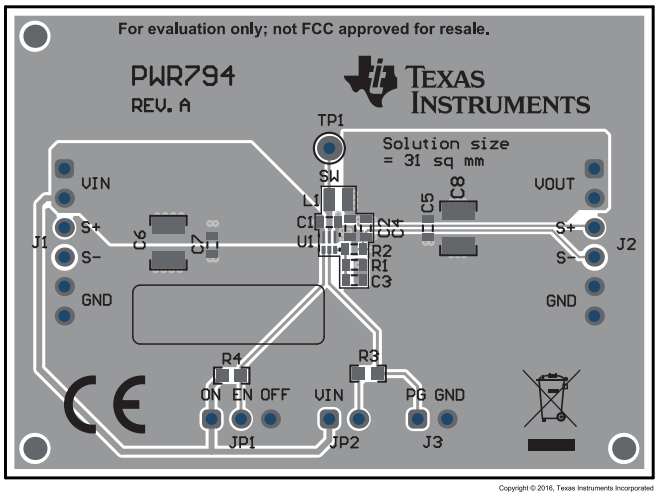

Figure 3. Top Assembly

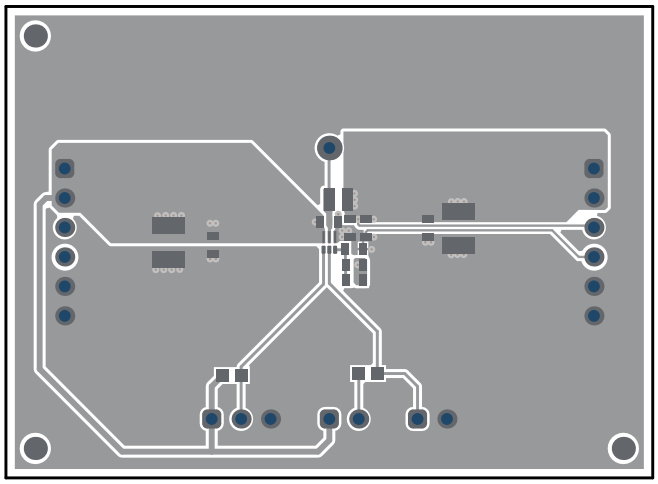

Figure 4. Top Layer

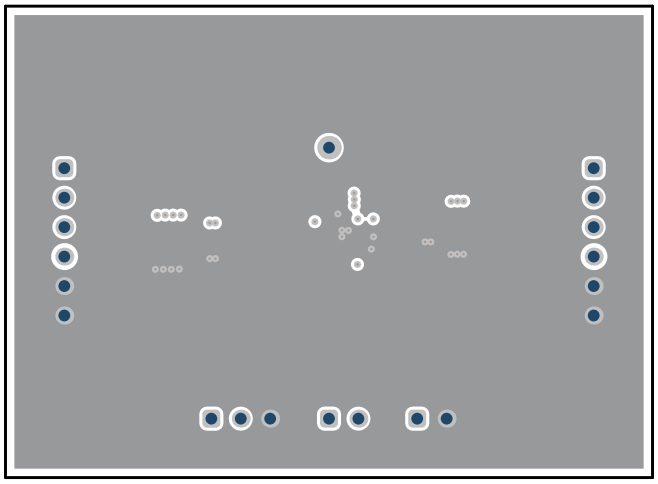

Figure 5. Signal Layer 1

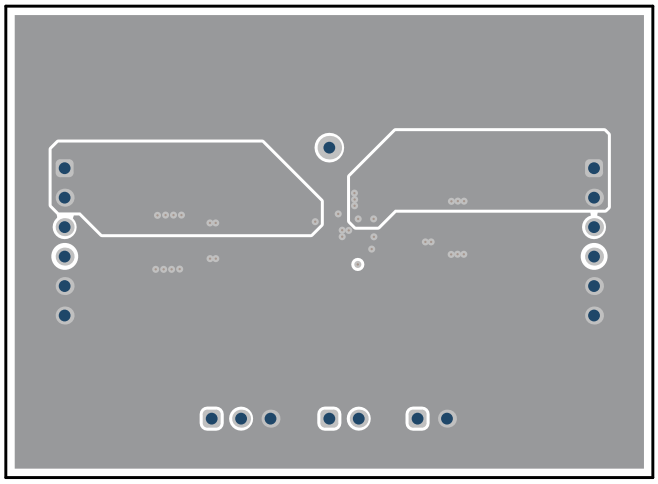

Figure 6. Signal Layer 2

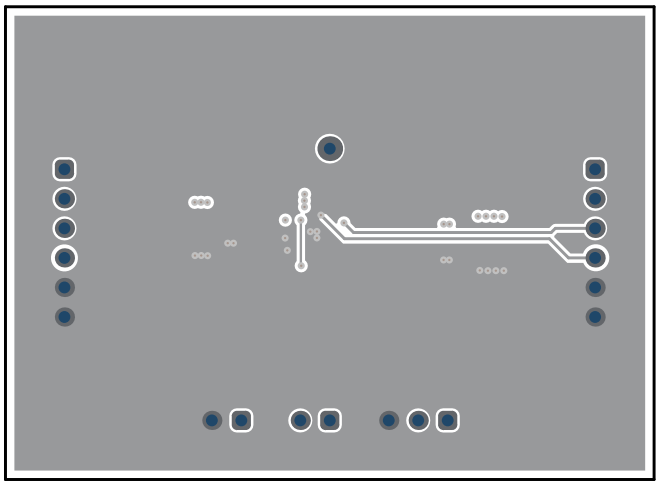

Figure 7. Bottom Layer

5 Schematic and Bill of Materials

This section provides the TPS6282xEVM-794 schematic and bill of materials (BOM).

5.1 Schematic

Figure 8 illustrates the EVM schematic.

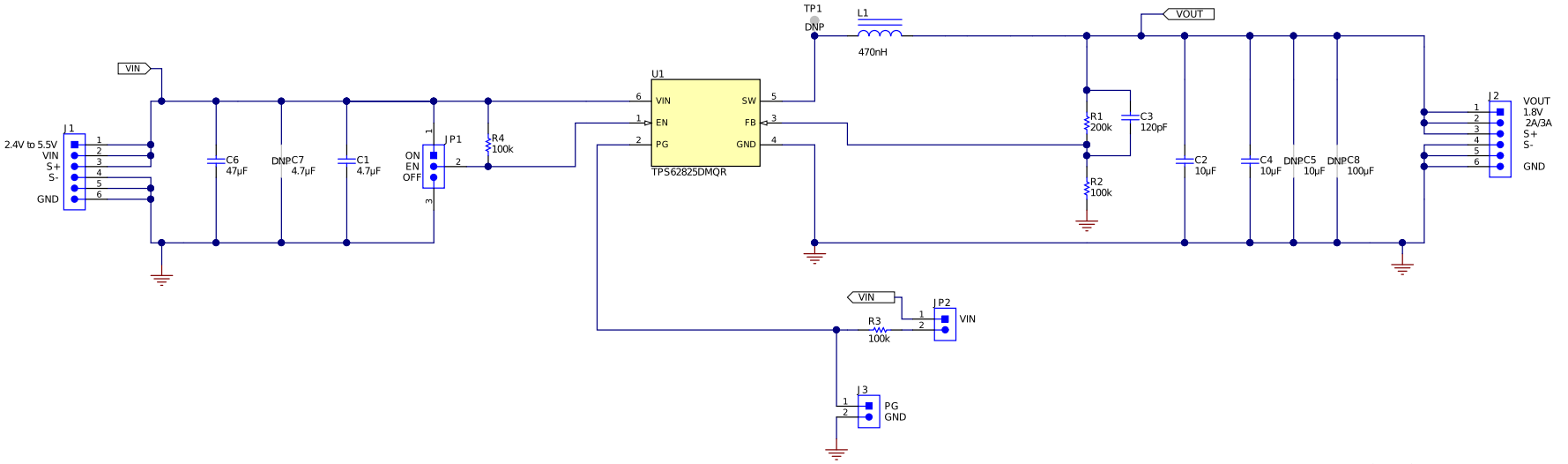

Figure 8. TPS6282xEVM-794 Schematic

5.2 Bill of Materials

Table 2 lists the BOM for this EVM.

Table 2. TPS6282xEVM-794 Bill of Materials

Count		Designator	Value	Description	Package Reference	Part Number	Manufacturer
-001	-002						
1	1	C1	4.7µF	CAP, CERM, 4.7 µF, 6.3 V, ±10%, X7R, 0603	0603	JMK107BB7475MA-T	Taiyo Yuden
2	2	C2, C4	10µF	CAP, CERM, 10 µF, 10 V, ±20%, X7R, 0603	0603	GRM188Z71A106MA73D	Murata
1	1	C3	120pF	CAP, CERM, 120 pF, 50 V, ±5%, C0G/NP0, 0603	0603	Std	Std
1	1	C6	47µF	CAP, CERM, 47 µF, 10 V, ±20%, X7R, 1210	1210	GRM32ER71A476ME15L	Murata
1	1	L1	470nH	Inductor, Shielded, 470 nH, 3.6 A, 0.032 ohm, SMD	2016	DFE201610E-R47M=P2	Murata
1	1	R1	200k	RES, 200 k, 1%, 0.1 W, 0603	0603	Std	Std
3	3	R2, R3, R4	100k	RES, 100 k, 1%, 0.1 W, 0603	0603	Std	Std
1	0	U1		2-A Step-Down Converter with 1% Output Accuracy in 1.5-mm × 1.5-mm QFN	1.5x1.5mm	TPS62825DMQ	Texas Instruments
0	1	U1		3-A Step-Down Converter with 1% Output Accuracy in 1.5-mm × 1.5-mm QFN	1.5x1.5mm	TPS62826DMQ	Texas Instruments

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