



ABSTRACT

The TLV62595EVM-130 facilitates the evaluation of the TLV62595 4-A step-down converters with DCS-Control™ in a 1.5-mm × 1.5-mm QFN package. The EVM outputs 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 TLV62595 is a highly efficient and small solution for point-of-load (POL) converters in all types of equipment, such as solid-state drives (SSDs), optical modules, and portable devices.

Table of Contents

1 Introduction	2
1.1 Performance Specification.....	2
1.2 Modifications.....	2
2 Setup	3
2.1 Input/Output Connector Descriptions.....	3
2.2 Setup.....	3
3 TLV62595EVM-130 Test Results	4
4 Board Layout	5
5 Schematic and Bill of Materials	6
5.1 Schematic.....	6
5.2 Bill of Materials.....	7

List of Figures

Figure 3-1. Efficiency - $V_{IN} = 5\text{ V}$	4
Figure 3-2. Thermal Performance ($V_{IN} = 5\text{ V}$, $I_{OUT} = 4\text{ A}$).....	4
Figure 4-1. Top Assembly.....	5
Figure 4-2. Top Layer.....	5
Figure 4-3. Signal Layer 1.....	5
Figure 4-4. Signal Layer 2.....	5
Figure 4-5. Bottom Layer.....	5
Figure 5-1. TLV62595EVM-130 Schematic.....	6

List of Tables

Table 1-1. Performance Specification Summary.....	2
Table 5-1. TLV62595EVM-130 Bill of Materials.....	7

Trademarks

DCS-Control™ is a trademark of Texas Instruments.
All trademarks are the property of their respective owners.

1 Introduction

The TLV62595 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.

1.1 Performance Specification

[Table 1-1](#) provides a summary of the TLV62595VM-130 performance specifications.

Table 1-1. 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	TLV62595EVM-130	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 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.

2 Setup

This section describes how to properly use the TLV62595EVM-130.

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 GND 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 GND 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 JP2 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 5.5 V.

2.2 Setup

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

3 TLV62595EVM-130 Test Results

The TLV62595EVM-130 was used to take all the data in [TLV62595, 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 IC.

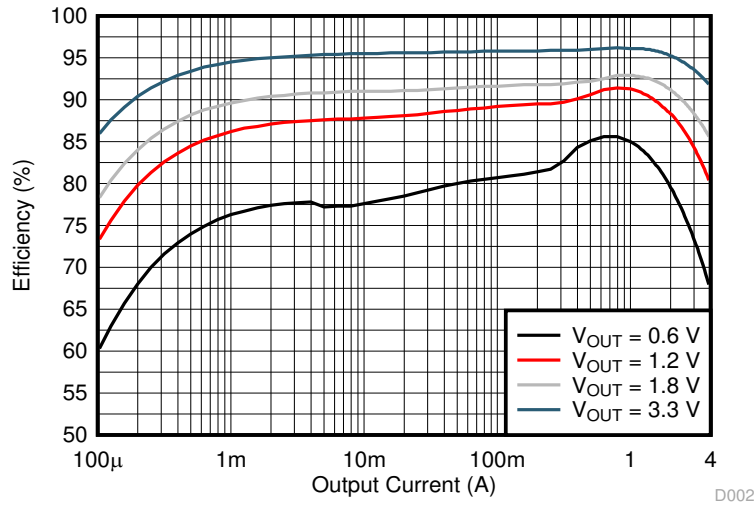


Figure 3-1. Efficiency - $V_{IN} = 5\text{ V}$

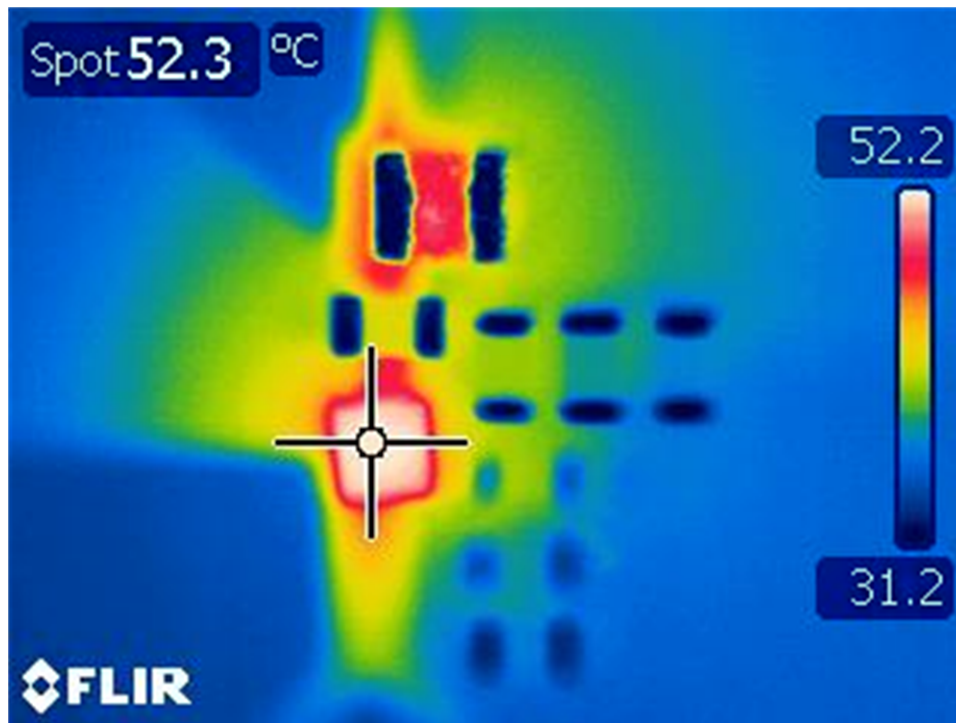


Figure 3-2. Thermal Performance ($V_{IN} = 5\text{ V}$, $I_{OUT} = 4\text{ A}$)

4 Board Layout

This section provides the TLV62595EVM-130 board layout and illustrations in [Figure 4-1](#) through [Figure 4-5](#).

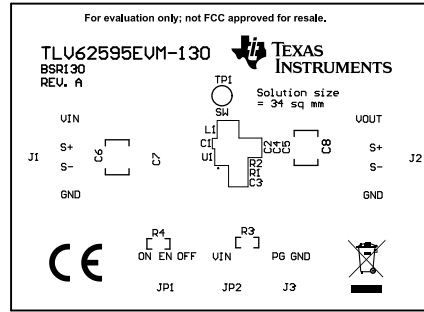


Figure 4-1. Top Assembly

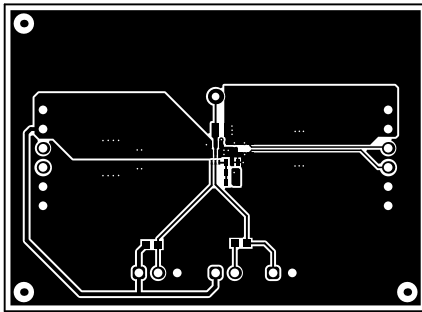


Figure 4-2. Top Layer

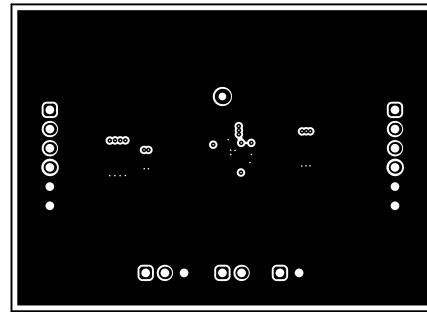


Figure 4-3. Signal Layer 1

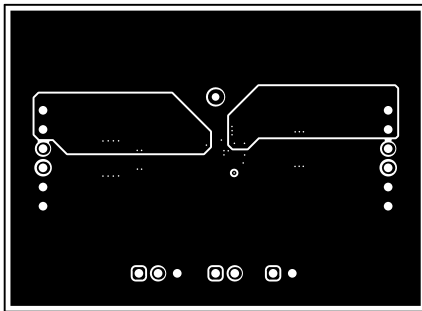


Figure 4-4. Signal Layer 2

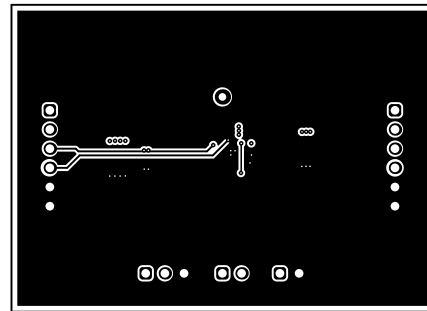


Figure 4-5. Bottom Layer

5 Schematic and Bill of Materials

This section provides the TLV62595EVM-130 schematic and Bill of Materials (BOM).

5.1 Schematic

Figure 5-1 illustrates the EVM schematic.

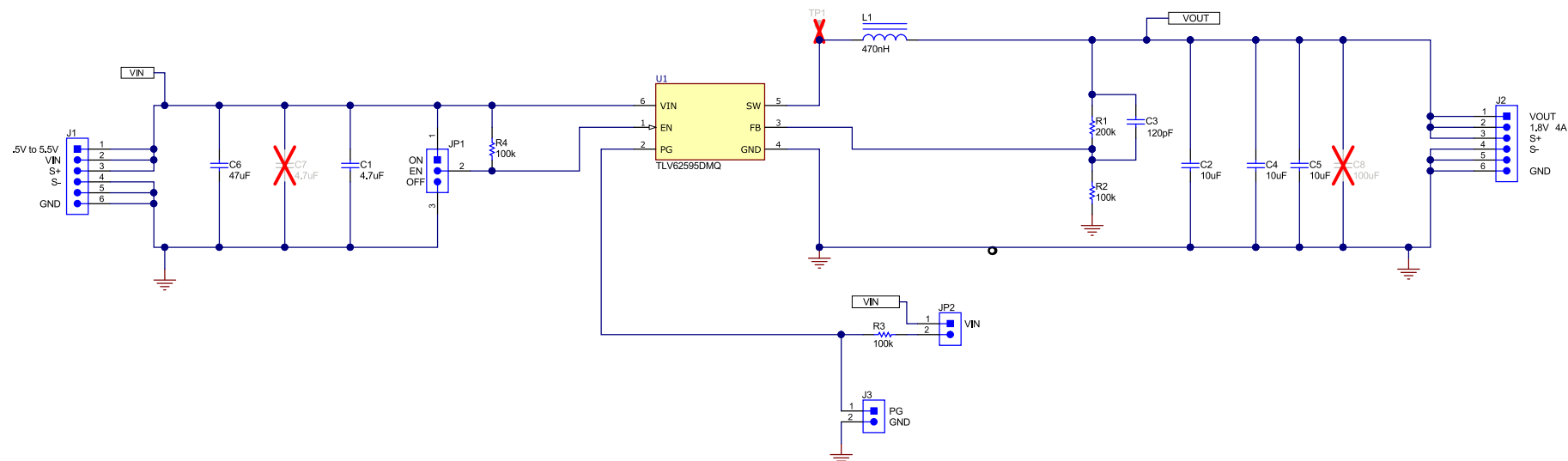


Figure 5-1. TLV62595EVM-130 Schematic

5.2 Bill of Materials

Table 5-1 lists the BOM for this EVM.

Table 5-1. TLV62595EVM-130 Bill of Materials

Count	Designator	Value	Description	Package Reference	Part Number	Manufacturer
1	C1	4.7 μ F	CAP, CERM, 4.7 μ F, 6.3 V, \pm 10%, X7R, 0603	0603	JMK107BB7475MA-T	Taiyo Yuden
2	C2, C4, C5	10 μ F	CAP, CERM, 10 μ F, 10 V, \pm 20%, X7R, 0603	0603	GRM188Z71A106MA73D	Murata
1	C3	120 pF	CAP, CERM, 120 pF, 50 V, \pm 5%, COG/NP0, 0603	0603	C0603C121J5GACTU	Kemet
1	C6	47 μ F	CAP, CERM, 47 μ F, 10 V, \pm 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 \times 1.5-mm QFN	1.5 x 1.5 mm	TPS62827DMQ	Texas Instruments

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2022, Texas Instruments Incorporated