TLV62095EVM-840 Evaluation Module

This user's guide describes the characteristics, operation, and use of TI's TLV62095 evaluation module (EVM). This EVM is designed to help the user easily evaluate and test the operation and functionality of the TLV62095 4-A buck converter. The EVM converts a 2.5-V to 5.5-V input voltage to a regulated 1.8-V output voltage that delivers up to 4 A. This user's guide includes setup instructions for the hardware, a printed-circuit board (PCB) layout, a schematic diagram, and a bill of materials (BOM) of the EVM.

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Trademarks

1 Introduction

The TLV62095 is a 4-A, synchronous, step-down converter in a 3- × 3-mm, 16-pin QFN package. It contains a programmable soft-start, a power good output, and several other safety features.

1.1 Performance Specification

Table 1 provides a summary of the TLV62095EVM-840 performance specifications.

Table 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		0		4	A

1.2 Modifications

The printed-circuit board (PCB) for this EVM is designed to accommodate the adjustable voltage version of this integrated circuit (IC). On the EVM, a feedforward capacitor can be added, additional output capacitors can be added and the softstart time can be changed. The output voltage may be changed by adjusting the values of R1 and R2.

1.2.1 Output Capacitors

C8 and C9 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 (SLVSDD3) for proper operation.

1.2.2 Feedforward Capacitor

C6 is provided for the installation of an optional feedforward capacitor. This capacitor is not required for proper operation.

1.2.3 Soft-Start Time

C4 sets a soft-start time of about 1.7 ms. This capacitor can be changed to set other soft-start times. See the device data sheet (SLVSDD3) for details.

2 Setup

This section describes how to properly use the TLV62095EVM-840.

2.1 Input and Output 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 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 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 terminal 1 of this header with a convenient ground on terminal 2.
JP1 – EN	EN terminal 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.

2.2 Hardware Setup

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

3 TLV62095EVM-840 Test Results

The TLV62095EVM-840 was used to take the data in the TLV62095 data sheet (SLVSDD3). See the device data sheet for the performance of this EVM.

4 Board Layout

This section provides the TLV62095EVM-840 board layout and illustrations. The Gerber files are available on the EVM product page: TLV62095EVM-840.

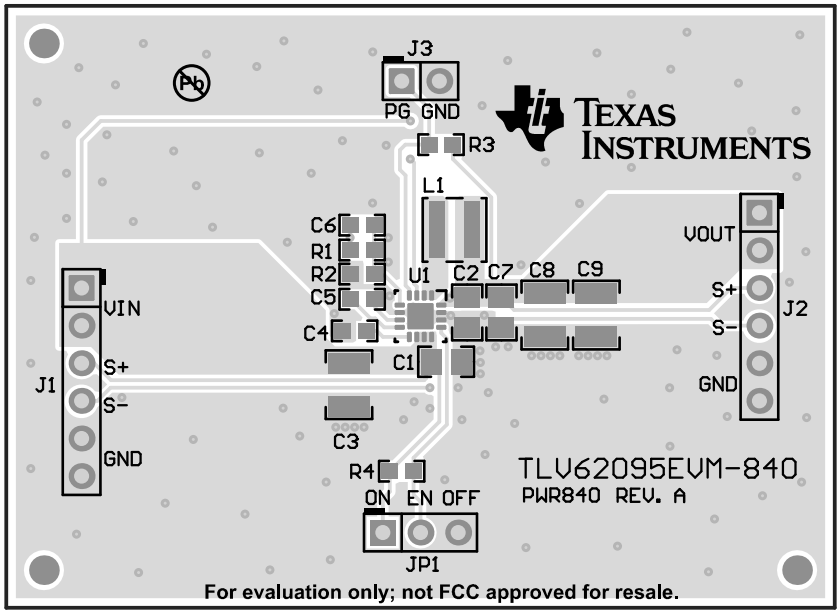

Figure 1. Top Assembly

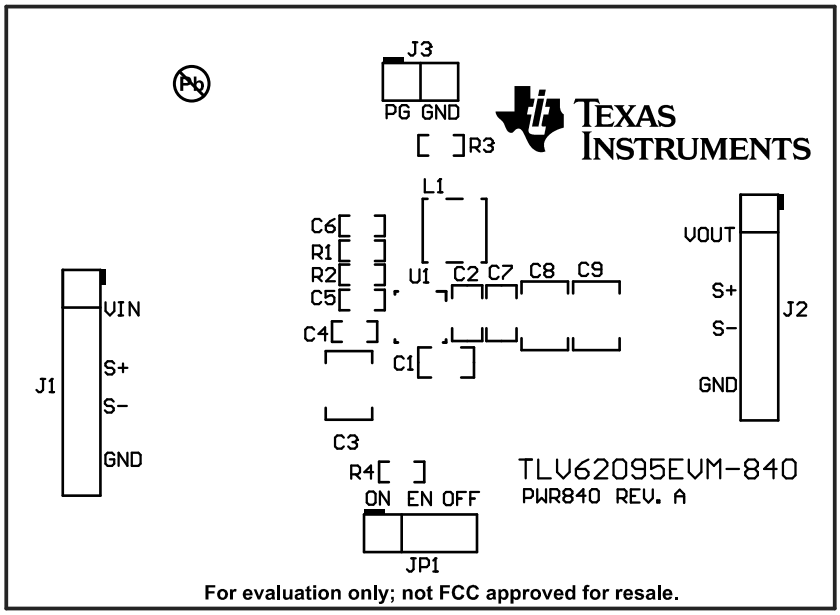

Figure 2. Top Overlay

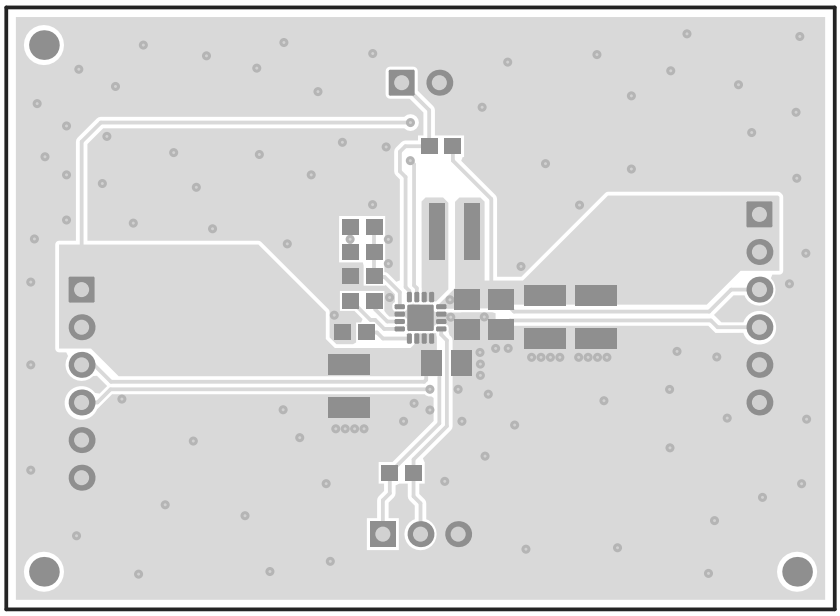

Figure 3. Top Layer

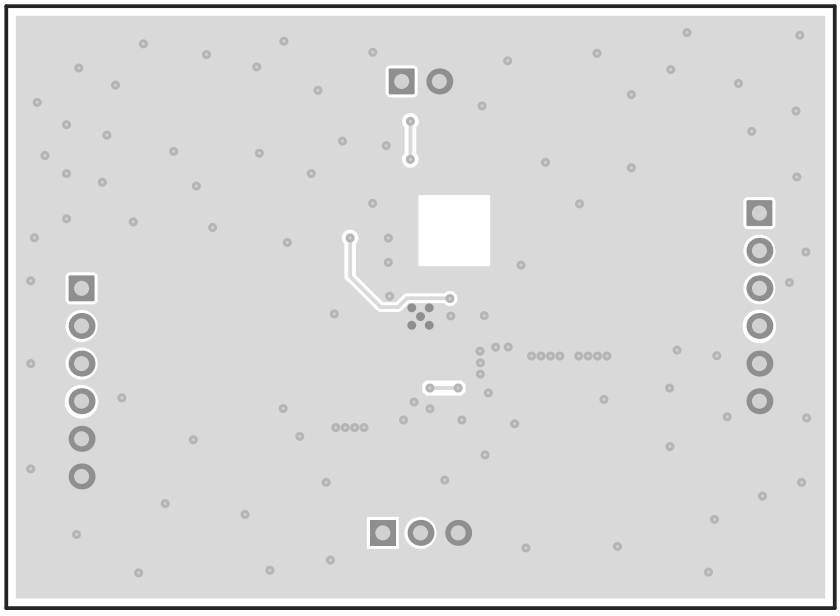

Figure 4. Bottom Layer

5 Schematic and Bill of Materials

This section provides the TLV62095EVM-840 schematic and bill of materials (BOM).

5.1 Schematic

Figure 5 illustrates the EVM schematic.

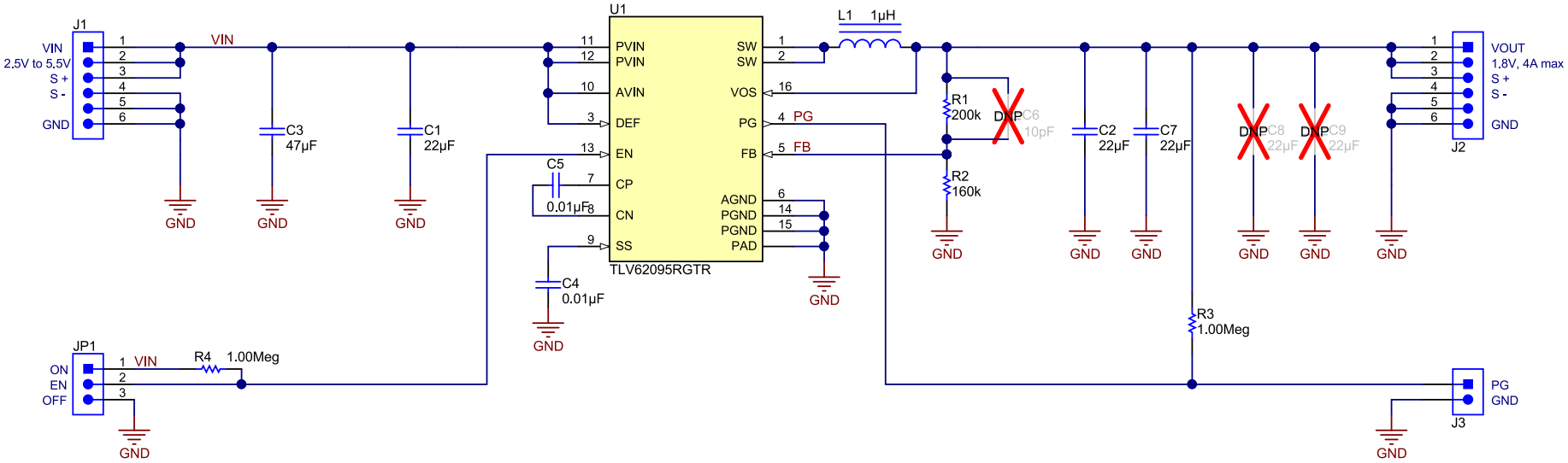

Figure 5. TLV62095EVM-840 Schematic

5.2 Bill of Materials

Table 2 lists the BOM for this EVM.

Table 2. TLV62095EVM-840 Bill of Materials

Count	RefDes	Value	Description	Size	Part Number	Manufacturer
3	C1, C2, C7	22 µF	Capacitor, Ceramic Chip, 16 V, X5R, ±20%	0805	GRM21BR61C226ME44	Murata
1	C3	47 µF	Capacitor, Ceramic Chip, 16 V, X5R, ±20%	1210	GRM32ER61C476ME15L	Murata
2	C4, C5	0.01 µF	Capacitor, Ceramic Chip, 50 V, X5R, ±10%	0603	GRM188R61H103KA01D	Murata
1	L1	1 µH	Inductor, Shielded Power, 8.7 A, ±20%	4×4x2 mm	XAL4020-102MEB	Coilcraft
1	R1	200 kΩ	Resistor, Chip, 1/16 W, 1%	0603	Std	Std
1	R2	160 kΩ	Resistor, Chip, 1/16 W, 1%	0603	Std	Std
2	R3, R4	1 MΩ	Resistor, Chip, 1/16 W, 1%	0603	Std	Std
1	U1	TLV62095	IC, 4-A High Efficiency Step Down Converter	3×3 mm	TLV62095RGT	TI

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- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

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3.2.1 *For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210*

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Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

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2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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