TLV62585PEVM-030 Evaluation Module

This user's guide describes the characteristics, operation, and use of TI's TLV62585DRL and TLV62585PDRL (TLV62585XDRL) evaluation module (EVM); also referred to hereafter in this document as TLV62585PEVM-030 (EVM). This EVM is designed to help the user easily evaluate and test the operation and functionality of the TLV62585XDRL 3-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 3 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).

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Trademarks

1 Introduction

The TLV62585XDRL device is a high-frequency, synchronous, step-down converter optimized for a small solution size and high efficiency. With an input voltage range of 2.5 V to 5.5 V, common battery technologies are supported. The devices focus on high-efficiency, step-down conversion over a wide output current range. At medium to heavy loads, the converter operates in PWM mode and automatically enters *Power Save Mode* operation at light load to maintain high efficiency over the entire load-current range. The internal compensation circuit allows a compact solution and small external components. Together with its adaptive off-time control architecture, excellent load transient performance, and output voltage regulation, accuracy is achieved. The device is available in a SOT-563 package.

1.1 Background

The TLV62585PEVM-030 uses the TLV62585XDRL step-down converter and it is set to 1.8-V output. The EVM operates with full-rated performance with an input voltage between 2.5 V and 5.5 V.

1.2 Performance Specification

Table 1 provides a summary of the TLV62585PEVM-030 performance specifications. All specifications are given for an ambient temperature of 25°C.

Table 1. Performance Specification Summary

Specification	Test Conditions	MIN	TYP	MAX	Unit
Input voltage		2.5		5.5	V
Output voltage			1.8		V
Output current		0		3	A

1.3 Modifications

The PCB for this EVM is designed to accommodate additional output capacitors C5 and C6 as well as an additional input capacitor C1.

1.3.1 Input and Output Capacitors

C5 and C6 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 *TLV62585 3-A High Efficiency Synchronous Buck Converter in 2-mm × 2-mm QFN Package* for proper operation.

1.3.2 Adjustable-Output IC U1 Operation

U1 is configured for evaluation of the adjustable-output version. This unit is set to 1.8 V. Resistors R1 and R2 can be used to set the output voltage between 0.6 V and Vin. For recommended values, see *TLV62585 3-A High Efficiency Synchronous Buck Converter in 2-mm × 2-mm QFN Package*.

2 Setup

This section describes how to properly use the TLV62585PEVM-030.

2.1 Connector Descriptions

J1, pin 1 and pin 2 – VIN	Positive input voltage connection from the input supply for the EVM
J1, pin 3 and pin 4 – S+/S–	Input voltage sense connections. Measure the input voltage at this point.
J1, pin 5 and pin 6 – GND	Input return connection from the input supply for the EVM
J2, pin 1 and pin 2 – VOUT	Positive output voltage connection
J2, pin 3 and pin 4 – S+/S–	Output voltage sense connections. Measure the output voltage at this point.
J2, pin 5 and pin 6 – GND	Output return connection
J7 – PG/GND	The PG output appears on pin 1 of this header with a convenient ground on pin 2
JP1 – EN	EN pin 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	Place the supplied jumper across both pins to reference the PG signal to VOUT
J8	Convenient ground connection

2.2 EVM Setup

To operate the EVM, set jumpers JP1 and JP2 to the desired positions per Section 2.1. Connect the input supply to J1, between VIN and GND and connect the load to J2 between VOUT and GND.

3 Board Layout

This section provides the TLV62585PEVM-030 board layout and illustrations. The Gerbers are available on the EVM product page: TLV62585PEVM-030.

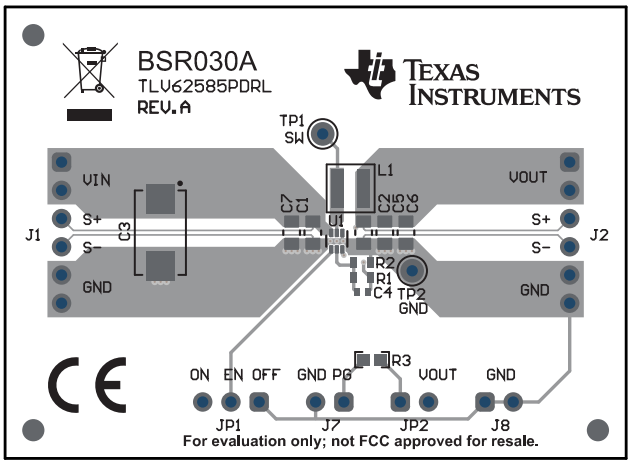

Figure 1. Assembly Layer

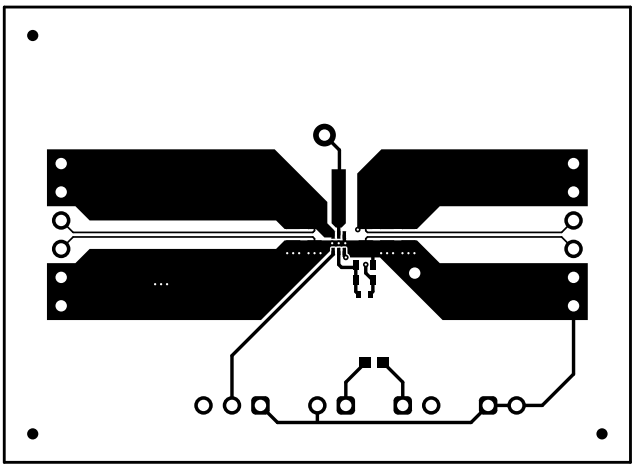

Figure 2. Top Layer

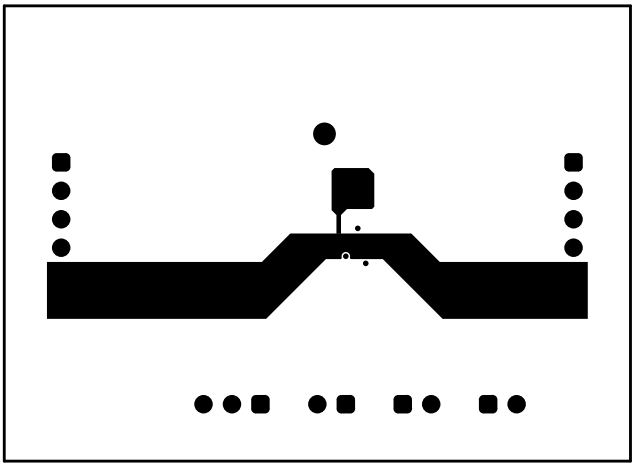

Figure 3. Internal Layer-1 Routing

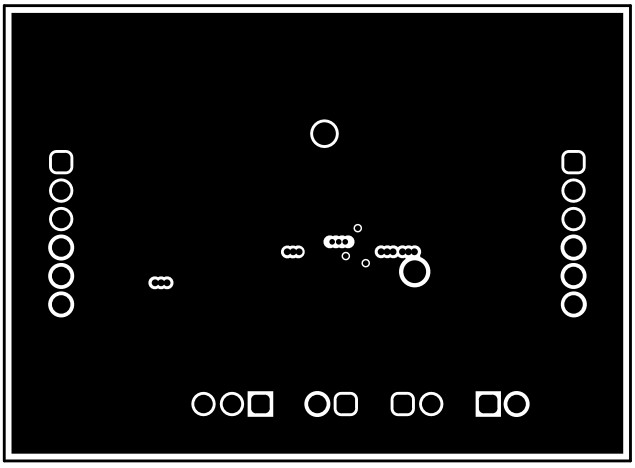

Figure 4. Internal Layer-2 Routing

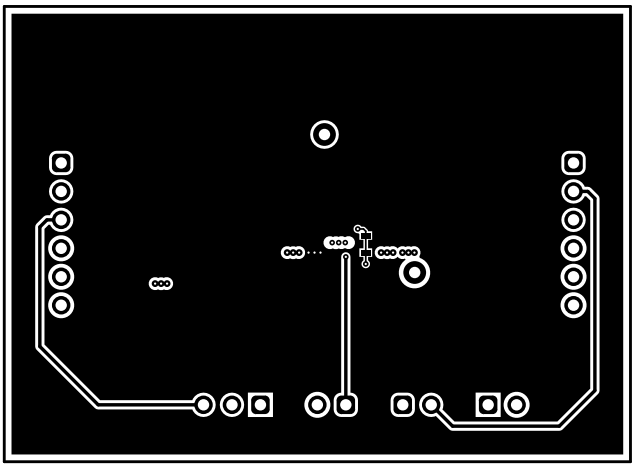

Figure 5. Bottom Layer

4 Schematic and Bill of Materials

This section provides the TLV62585PEVM-030 schematic and bill of materials.

4.1 Schematic

Figure 6 illustrates the TLV62585PEVM-030 schematic.

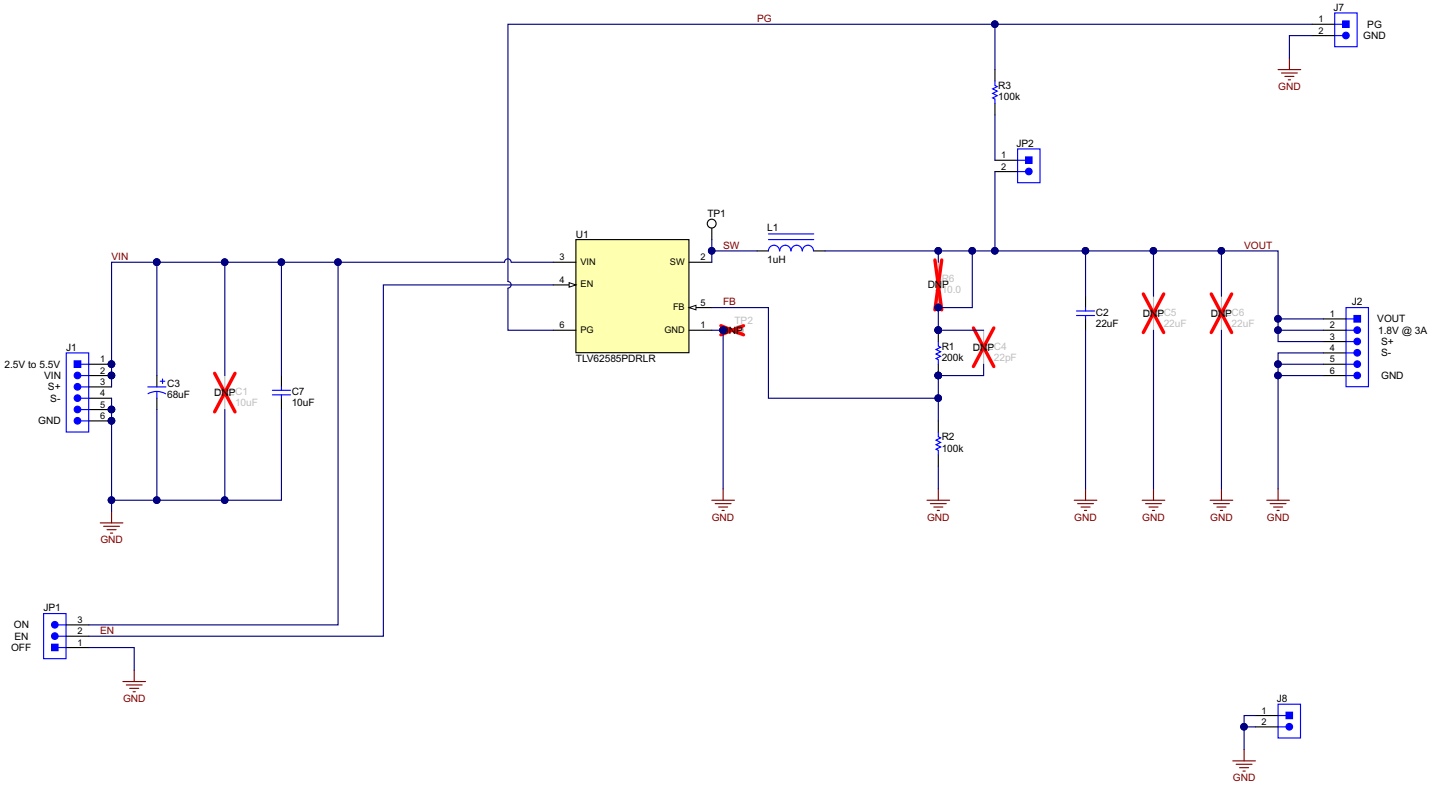

Figure 6. TLV62585PEVM-030 Schematic

4.2 Bill of Materials

Table 2 lists the TLV62585PEVM-030 BOM.

Table 2. TLV62585PEVM-030 Bill of Materials

Count	Ref Des	Value	Description	Size	Part Number	Manufacturer
1	C2	22uF	CAP, CERM, 22 uF, 6.3 V, +/- 20%, X7T, 0805	0805	GRM21BD70J226ME44L	MuRata
1	C3	68uF	CAP, TA, 68 uF, 10 V, +/- 10%, 0.07 ohm, SMD	7343-20	T495V686K010ATE070	Kemet
1	C7	10uF	CAP, CERM, 10 uF, 10 V, +/- 20%, X7R, 0805	0805	GRM21BR71A106ME51L	MuRata
1	L1	1uH	Inductor, Shielded, Composite, 1 uH, 5.4 A, 0.01 ohm, SMD	4x2x4mm	XFL4020-102MEB	Coilcraft
1	R1	200k	RES, 200 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603200KFKEA	Vishay-Dale
1	R2, R3	100k	RES, 100 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603100KFKEA	Vishay-Dale
1	U1		3-A High Efficiency Synchronous Buck Converter (SOT- 563)	DRL0006A	TLV62585PDRLR or TLV62585PDRLT	Texas Instruments

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      This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

      Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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      NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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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.*

3.2 *Canada*

3.2.1 *For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247*

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Concernant les EVMs avec appareils radio:

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http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_01.page

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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
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