TPS63025xEVM-668

This user's guide describes the characteristics, operation, and use of the TPS63025xEVM-668 evaluation module (EVM). This EVM is designed to help the user easily evaluate and test the operation and functionality of the TPS630250 VQFN. The EVM converts a 2.5-V to 5.5-V input voltage to a regulated 3.3-V output voltage that delivers up to 2 A. This document includes setup instructions for the hardware, a schematic diagram, a bill of materials (BOM), and printed-circuit board (PCB) layout drawings for the evaluation module. Throughout this document, the abbreviations *EVM*, *TPS63025xEVM-668*, and the term *evaluation module* are synonymous with the TPS630250, unless otherwise noted.

Contents

List of Figures

List of Tables

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1 Introduction

TI's TPS63025x are highly efficient, single-inductor, buck-boost converters in a 2.5 mm × 3 mm, 14-pin VQFN package. TPS630250 is an adjustable output voltage converter.

1.1 Background

The TPS63025xEVM-668 uses the TPS630250 adjustable output voltage device version that is programmed with an external feedback divider to an output voltage of 3.3 V.

1.2 Performance Specification

Table 1 provides a summary of the TPS63025xEVM-668 performance specifications. All specifications are given for operating in a free-air environment of 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	PWM Mode	3.267	3.3	3.33	V
Output current		0		2000	mA

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2 Setup

This section describes how to properly use the TPS63025xEVM-668.

2.1 Input/Output Connector and Header Descriptions

2.1.1 J1 – VIN

This header is the positive connection to the input power supply. The power supply must be connected between J1 and J3 (GND). The leads to the input supply should be twisted and kept as short as possible. The input voltage must be between 2.5 V and 5.5 V.

2.1.2 J2 – S+/S–

Header J2 can be used to measure the input voltage directly on the input capacitor. Therefore, a 4-wire power and sense supply can be connected. The leads to the sensing connector should also be twisted.

2.1.3 J3 – GND

This header is the return connection to the input power supply. Connect the power supply between J3 and J1 (VIN). The leads to the input supply should be twisted and kept as short as possible. The input voltage has to be between 2.5 V and 5.5 V.

2.1.4 J4 – VOUT

This header is the positive connection of the output voltage. The load has to be connected between J4 and J6 (GND).

2.1.5 J5 – S+/S–

Header J5 can be used to measure the output voltage directly on the output capacitor.

2.1.6 J6 – GND

This header is the return connection of the output voltage. Connect the load between J6 and J4 (VOUT).

2.1.7 JP1 – EN

This jumper enables or disables the TPS63025 on the EVM. Place the jumper across ON and EN to enable the converter. Place the jumper across OFF and EN to disable the converter. A 1-MΩ pullup resistor can be connected between VIN and EN.

2.1.8 JP2 – PFM/PWM (MODE)

This jumper controls the operating mode of the TPS630250 on the EVM. Place the jumper across PWM and MODE to enable forced PWM mode with a constant switching frequency. Place the jumper across PFM and MODE to enable power-save mode with higher efficiency.

2.1.9 J10 - L1 Testpoint header

This header can be placed to measure the switch pin L1 respective to ground.

2.1.10 J11 - L2 Testpoint header

This header can be placed to measure the switch pin L2 respective to ground.

2.2 Setup

To operate the EVM, simply connect an input supply between J1 and J3. Connect a load between J4 and J6. An input supply voltage of 2.5 V to 5.5 V is recommended.

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3 Board Layout

This section provides the TPS630250EVM-668 board layout and illustrations.

3.1 Layout

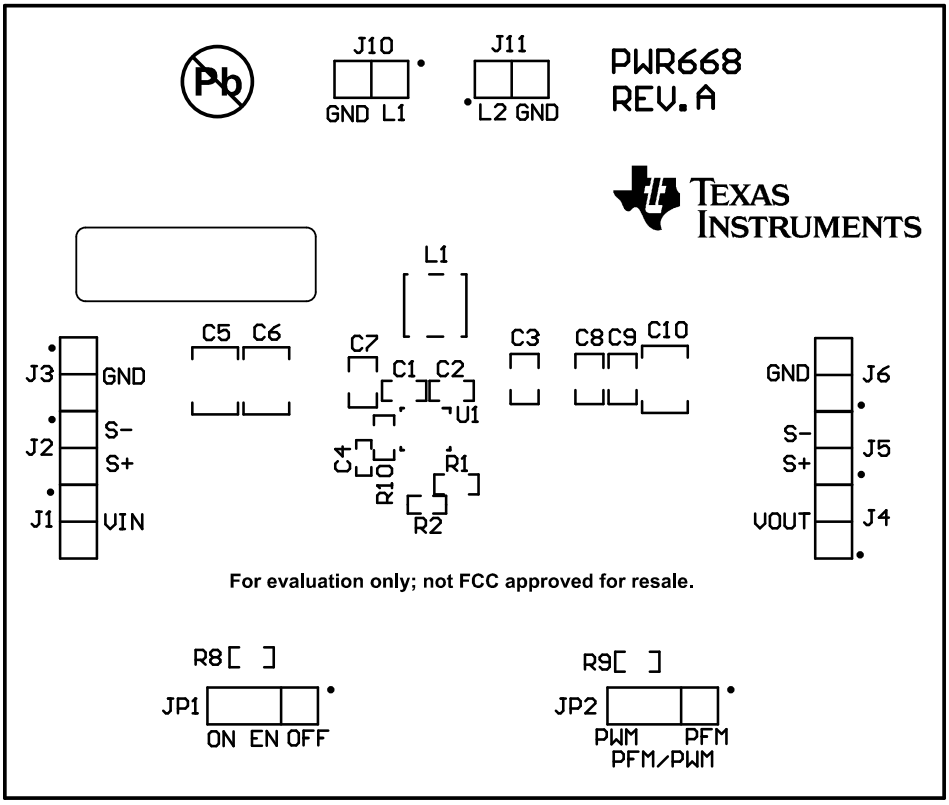

Figure 1. Assembly Layer

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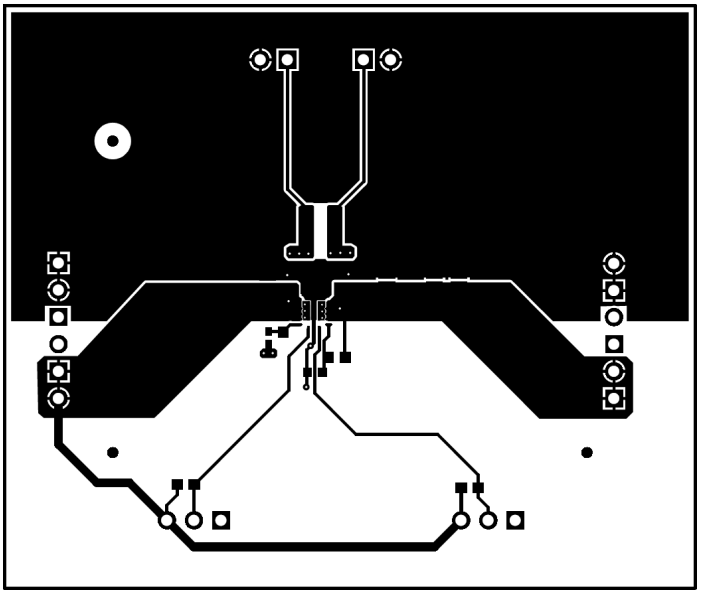

Figure 2. Top Layer Routing

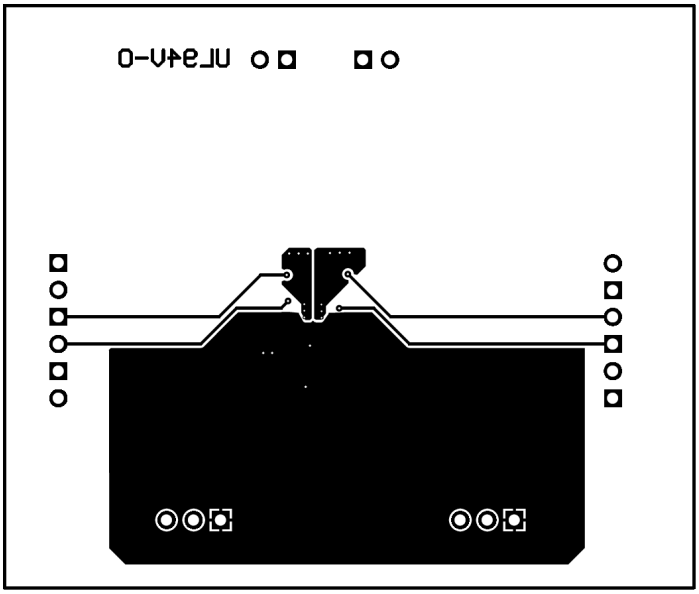

Figure 3. Bottom Layer Routing

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4 Bill of Materials and Schematic

This section provides the TPS63025xEVM-668 bill of materials and schematic.

4.1 Bill of Materials

Table 2 lists the TPS63025xEVM-668 BOM.

Table 2. TPS63025xEVM-668 Bill of Materials

-001	RefDes	Value	Description	Size	Part Number	MFR
TPS63025x Power Solution Components						
2	C1, C2	10uF	Capacitor, Ceramic Chip, 6.3V, ±20%, X5R	0603	GRM188R60J106ME84	Murata
1	C3	47uF	Capacitor, Ceramic Chip, 6.3V, ±20%, X5R	0805	GRM219R60J476ME44D	Murata
1	L1	1.0uH	Inductor, Shielded, Composite, 8.75A, 10mOhm	XAL4020	XAL4020-102MEB	Coilcraft
1	R1	560k	Resistor, Chip, 1/10W, 1%	0603	STD	STD
1	R2	180k	Resistor, Chip, 1/10W, 1%	0603	STD	STD
1	U1	–	IC, TPS630250 High Current, High Efficiency Single Inductor Buck-Boost Converter	VQFN (14)	TPS630250RMW	TI
PWR668 Evaluation Module Components						
1	R10	0	Resistor, Chip, 1/10W, 1%	0603	STD	STD
0	C4	Open	Capacitor, Ceramic Chip, 6.3V, ±20%, X5R	0603		
1	C5	100uF	Capacitor, Ceramic Chip, 6.3V, ±20%, X5R	1210	GRM32ER60J107ME20L	Murata
0	C6, C7	Open	Capacitor, Ceramic Chip, 6.3V, ±20%, X5R	0603		
0	R8, R9	Open	Resistor, Chip, 1/10W, 1%	0603		
8	J1 ... J6, J10, J11		Header, 2x1, 100 mil spacing		TSW-102-07-G-S	Samtec
2	JP1, JP2		Header, 3x1, 100mil spacing		TSW-103-07-G-S	Samtec

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4.2 Schematic

Figure 4 illustrates the schematic for this EVM.

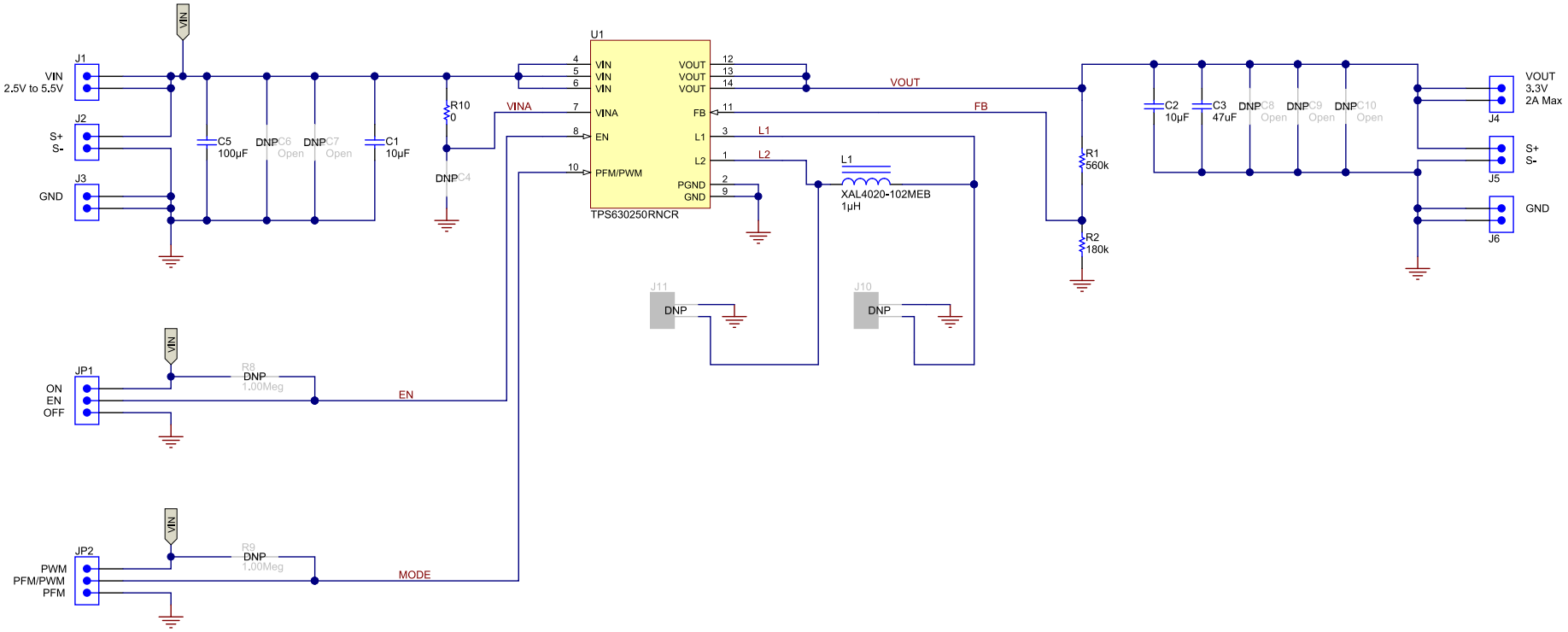

Figure 4. TPS63025xEVM-668 Schematic

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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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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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