

TPS55332EVM

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1 Introduction

The Texas Instruments TPS55332EVM evaluation module (EVM) helps designers evaluate the operation and performance of the TPS55332 Switch Mode Power Supply – Boost Regulator. The device offers configurability and can be setup to operate at a switching frequency from 80kHz to 2.2MHz.

The EVM contains one DC / DC converter (See [Table 1](#)).

Table 1. Device and Package Configurations

CONVERTER	IC	PACKAGE
U1	TPS55332QPWPQ1	PWP-20

2 Setup

This section describes the jumpers and connectors on the EVM as well and how to properly connect, set up and use the TPS55332EVM.

2.1 Input/Output Connector Description

J1 – Input is the power input terminal for the converter. The terminal block provides a power (V_{bat}) and ground (GND) connection to allow the user to attach the EVM to a cable harness.

J2 – Output is the regulated output voltage for the converter. The terminal block provides a power (V_{OUT}) and ground (GND) connection to allow the user to attach the EVM to a cable harness.

J3 – Sync is the input terminal for an optional external input clock to the converter. The external clock can be used to synchronize the switching frequency for multiple devices. The external clock frequency must meet the $F_{sw} < F_{ext} < 2 \times F_{sw}$ guideline, if used.

JP1 – Enable is the jumper used to enable the converter. The converter will be enabled when the Enable is high and disabled when low. The jumper placement allows the converter to be enabled or disabled.

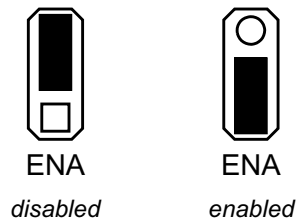


Figure 1. Enable Jumper Settings

2.2 Setup

The input voltage range for the converter is 3.6 volts to 24 volts. A load should be applied to the Output terminal for proper operation.

2.3 Operation

For proper operation of the TPS55332, JP1 should be properly configured. The recommended setting, using shorting blocks.

JP1 to Enabled

In this configuration, the device will power up when power is applied.

2.4 EMC Filter

The EVM has a pi filter input stage to provide improved EMC performance. A reverse battery protection diode, D2, is also installed. The diode and pi filter are not required for normal operation of the boost regulator.

3 Board Layout

[Figure 2](#), [Figure 3](#) and [Figure 4](#) show the board layout for the TPS55332EVM PWB. A jumper is provided to Enable the device.

The TPS55332 are high efficiency, but does dissipate power. The PowerPAD™ package offers an exposed thermal pad to enhance thermal performance. This must be soldered to the copper landing on the PCB for optimal performance. The PCB provides 2 oz copper planes on the top and bottom to dissipate heat.

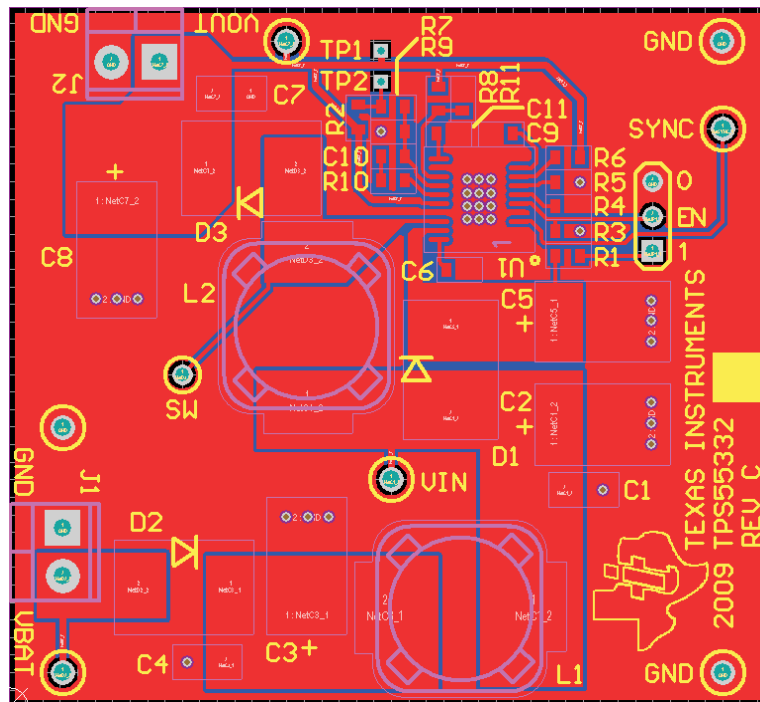


Figure 2. Top Assembly Layer

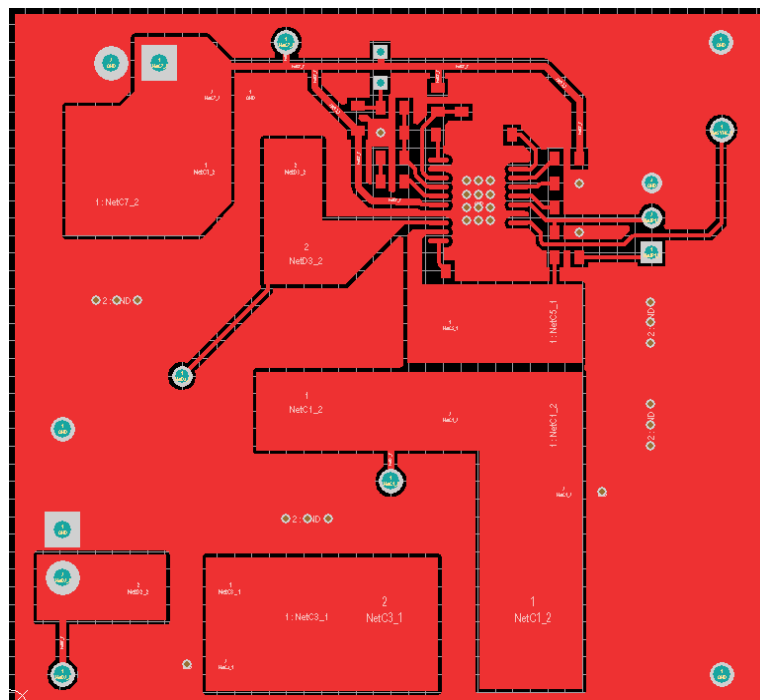


Figure 3. Top Layer Routing

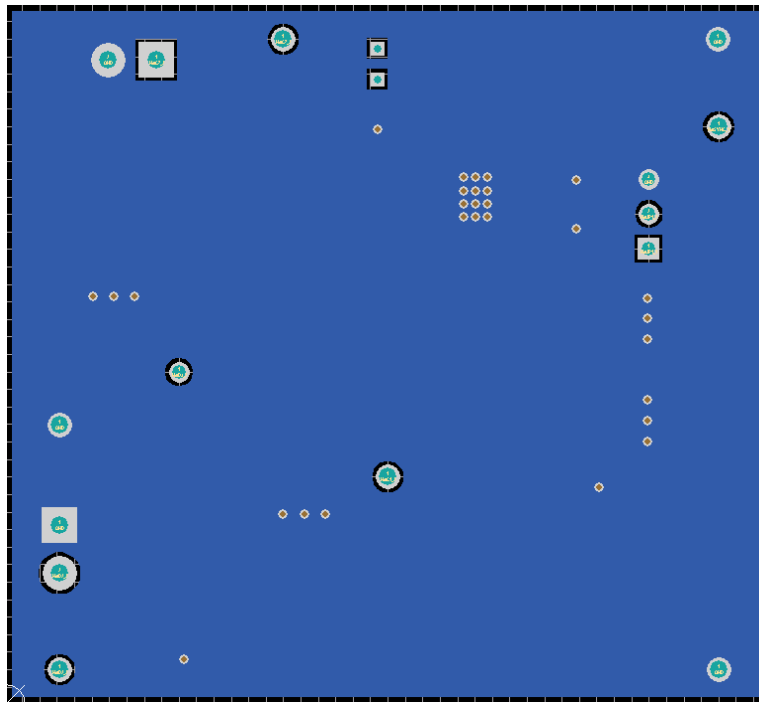


Figure 4. Bottom Layer Routing

4 Schematic and Bill of Materials

4.1 Schematic

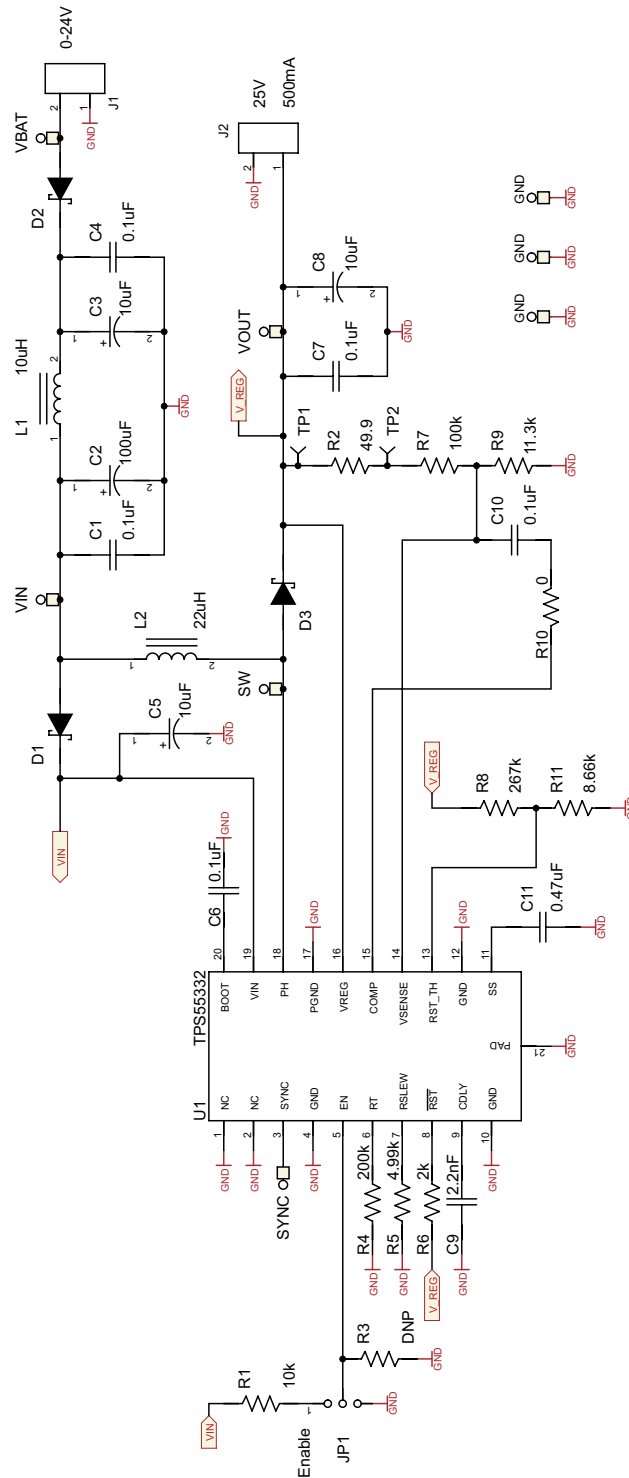


Figure 5. TPS55332EVM Schematic

4.2 Bill of Materials

Table 2. TPS55332EVM Bill of Materials

COUNT	REF DES	DESCRIPTION	SIZE	MFR	PART NUMBER
3	C1, C4, C7	Capacitor, ceramic, 0.1uF, 50V, 10%	1206	KEMET	C1206C104K5RACTU
1	C2	Capacitor, electrolytic, 100uF, 50V, 20%	8.3mm x 8.3mm	Panasonic	EEV-FK1H101P
2	C3, C5	Capacitor, electrolytic, 10uF, 50V, 20%	5.0mm x 5.8mm	Panasonic	EEV-FK1H100UR
2	C6, C10	Capacitor, ceramic, 0.1uF, 50V, 10%	0603	muRata	GCM188R71H104KA57B
1	C8	Capacitor, ceramic, 10uF, 50V, 10%	2220	TDK	C5750X7R1H106M
1	C9	Capacitor, ceramic, 2.2nF, 50V, 10%	0603	muRata	GCM1885C1H222JA16B
1	C11	Capacitor, ceramic, 0.47uF, 16V, 10%	0603	muRata	GCM188R71C474KA55B
3	D1, D2, D3	Diode, Schottky, 3A, 100V	SMC	IR	30BQ100
2	J1, J2	Terminal block, 2-pin, 6A, 3.5mm	0.25 × 0.27	OST	ED1514
5	SW, SYNC, VBAT, VIN, VOUT	Test point, 52-mil	0.052	Kobiconn	151-103-RC
1	EN	Header, 3-pin, 100-mil spacing, (36-pin strip)	0.100 × 3	Sullins	PEC03SAAN
1	EN	Connector jumper, shorting, 100-mil spacing	0.100	Sullins	SPC02SYAN
1	L1	Inductor, SMT, 10-uH	12.3mm × 12.3mm	Coilcraft	MSS1278T-103
1	L2	Inductor, SMT, 22-uH	12.3mm × 12.3mm	Coilcraft	MSS1278T-223
1	R1	Resistor, chip, 10-kΩ , 1/16W, 1%	0603	Panasonic	ERJ-3EKF1004V
1	R2	Resistor, chip, 49.9-Ω , 1/16W, 1%	0603	Panasonic	ERJ-3EKF49R9V
1	R3	Do not populate			
1	R4	Resistor, chip, 200-kΩ , 1/16W, 1%	0603	Panasonic	ERJ-3EKF2003V
1	R5	Resistor, chip, 4.99-kΩ , 1/16W, 1%	0603	Panasonic	ERJ-3EKF4991V
1	R6	Resistor, chip, 2-kΩ , 1/16W, 1%	0603	Panasonic	ERJ-3EKF2001V
1	R7	Resistor, chip, 100-kΩ , 1/16W, 1%	0603	Panasonic	ERJ-3EKF1003V
1	R8	Resistor, chip, 267-kΩ , 1/16W, 1%	0603	Panasonic	ERJ-3EKF2673V
1	R9	Resistor, chip, 11.3- kΩ, 1/16W, 1%	0603	Panasonic	ERJ-3EKF1132V
1	R10	Resistor, chip, 0-Ω, 1/16W, 1%	0603	Panasonic	ERJ-3GEY0R00V
1	R11	Resistor, chip, 8.66-kΩ, 1/16W, 1%	0603	Panasonic	ERJ-3EKF8661V
1	U1	IC, TPS55332-Q1PWPR		TI	TPS55332QPWP
1	-	PCB, 2.2-inch x 2.0-inch x 0.062		Any	TPS55332, REV C

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EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of 0V to 40V and the output voltage range of 2.5V to 50V.

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 85°C. The EVM is designed to operate properly with certain components above 85°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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