TPS61230AEVM-767 Evaluation Module

This user's guide describes the characteristics, operation, and use of the TPS61230A evaluation module (EVM). The operating voltage range of the EVM is 2.5 V to 4.5 V. The output voltage is set to 5 V, which can be modified through the feedback resistor.

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1 Performance Specification

Table 1 provides a summary of the TPS61230AEVM-767 performance specifications. All specifications are given for an ambient temperature of 25°C

Table 1. Performance Specification Summary

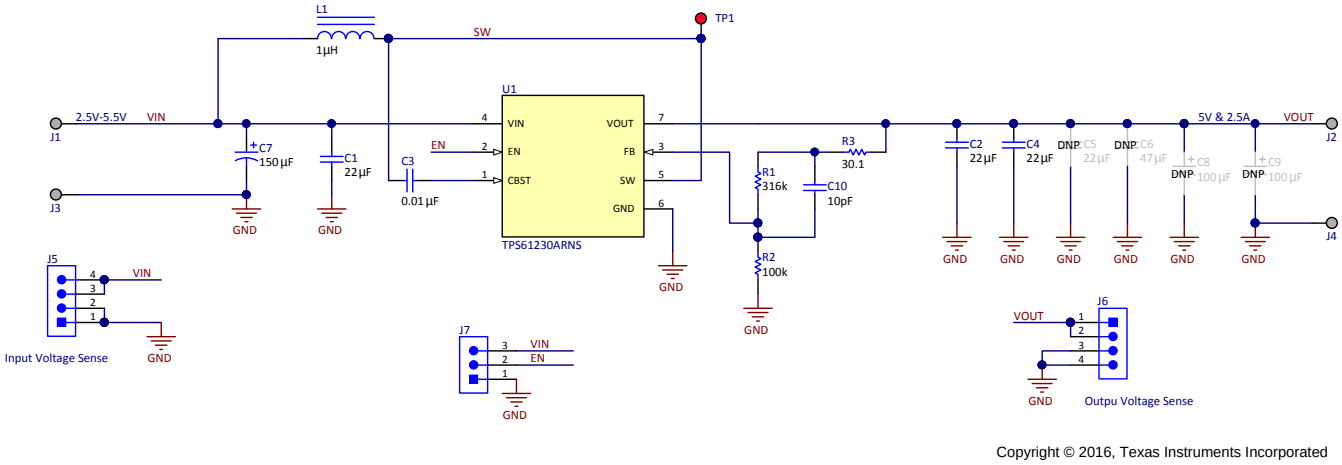
Specification	Test Condition	MIN	TYP	MAX	Unit
Input Voltage		2.5		4.5	V
Output Voltage	V_{IN} ≥ 3 V, I_{OUT} ≤ 2.4 A		5.0		V
Output Current	V_{IN} ≥ 3 V		2.4		A

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2 Schematic

The schematic of the EVM is shown in Figure 1. The function of the connectors is described following:

J1: Positive power input
J2: Positive power output
J3: Negative power input, short to ground panel
J4: Negative power output, short to ground panel
J5: Input voltage sensing point when measure the efficiency
J6: Output voltage sensing point when measure the efficiency
J7: EN pin signal selection. Short the EN pin to V_{IN} or GND.
TP1: Test point of the SW pin waveform



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Figure 1. Schematic of TPS61230A Evaluation Module

2.1 External Components

Some external passive components in the schematic of the EVM are unnecessary in the real application. They are populated for evaluating the TPS61230A easily.

A 150-µF tantalum capacitor is added as the input capacitor, as C7 in Figure 1. The ESR of the tantalum capacitor helps to damp the ringing in the input voltage when the EVM is powered by a power supply with long cable. In the real application without the long cable, this capacitor is unnecessary.

C5, C6, 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 total output capacitance must remain within the recommended range in the TPS61230A data sheet (SLVSCZ5) for proper operation.

R3 in series with the feedback resistor is used for bode plot measurement to evaluate the stability margin. This resistor can be removed in a real application.

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3 Layout

There are two layers in the PCB and the copper thickness is 2 oz. The top and bottom sides of the PCB layout are shown in Figure 2 and Figure 3, respectively.

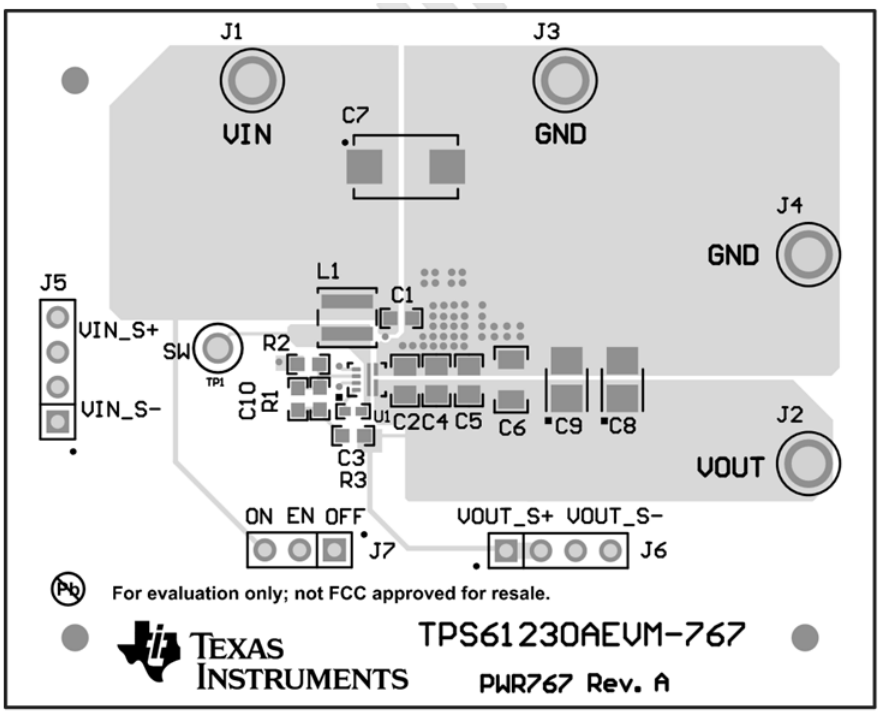


Figure 2. Top Side of the TPS61230A Evaluation Module

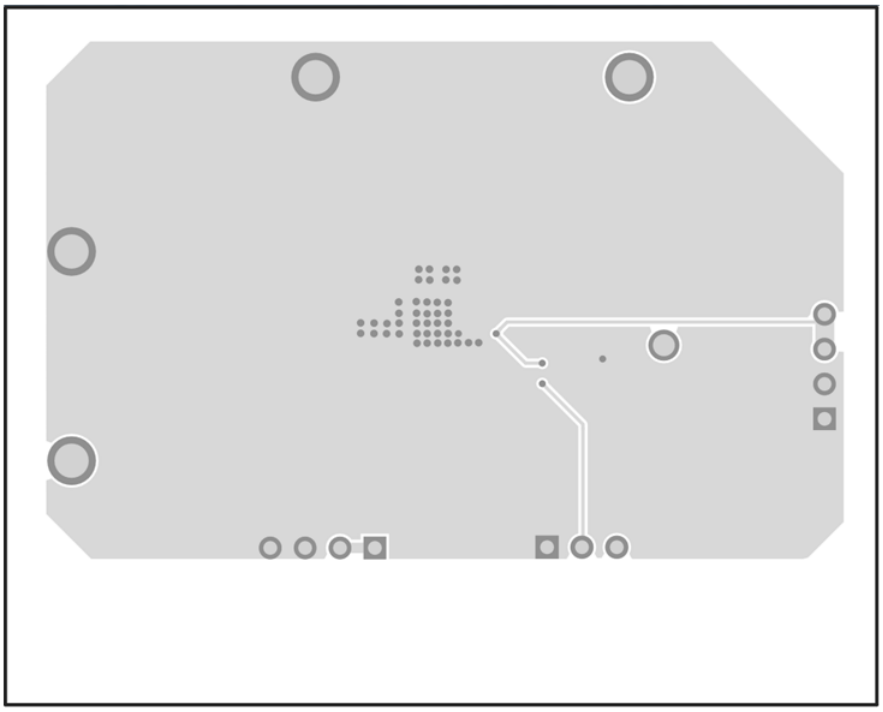


Figure 3. Bottom Side of the TPS61230A Evaluation Module

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4 Bill of Material

The TPS61230A evaluation module BOM is shown in Table 2.

Table 2. Bill of Material of the TPS61230AEVM

Designator	Qty	Value	Description	Package Reference	Part Number	Manufacturer
C1	1	22uF	CAP, CERM, 22 µF, 10 V, +/- 20%, X5R, 0603	0603	GRM188R61A226ME15D	Murata
C2, C4	2	22uF	CAP, CERM, 22 µF, 10 V, +/- 20%, X5R, 0805	0805	GRM21BR61A226ME44	Murata
C3	1	0.01uF	CAP, CERM, 0.01 µF, 10 V, +/- 10%, X5R, 0402	0402	GRM155R61A103KA01D	Murata
C7	1	150uF	CAP, TA, 150uF, 10V, +/-10%, 0.1 ohm, SMD	7343-31	T495D157K010ATE100	Kemet
C10	1	10pF	CAP, CERM, 10 pF, 50 V, +/- 5%, C0G/NP0, 0603	0603	GRM1885C1H100JA01D	Murata
L1	1	1uH	Inductor, Shielded, Composite, 1 µH, 8.75 A, 0.01 ohm, SMD	4x2.1x4mm	XAL4020-102MEB	Coilcraft
R1	1	316k	RES, 316 k, 1%, 0.1 W, 0603	0603	CRCW0603316KFKEA	Vishay-Dale
R2	1	100k	RES, 100 k, 1%, 0.1 W, 0603	0603	CRCW0603100KFKEA	Vishay-Dale
R3	1	30.1	RES, 30.1, 1%, 0.1 W, 0603	0603	CRCW060330R1FKEA	Vishay-Dale
U1	1		TPS61230A, Boost Converter	RNS0007A	TPS61230ARNS	Texas Instruments

Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Original (July 2016) to A Revision **Page**

- Changed operating voltage range maximum from *5.5 V* to *4.5 V* in the Abstract 1
- Deleted second paragraph of the Abstract..... 1
- Changed input voltage maximum from *5.5 V* to *4.5 V* in the *Performance Specification Summary* table. 1

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- *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.*
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