

TLV61046A Evaluation Module

This user's guide describes the characteristics, operation, and use of the TLV61046A evaluation module (EVM). A complete schematic diagram, printed-circuit board layouts, and bill of materials (BOM) are included in this document.

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1 Introduction

The TLV61046A is a 28-V output voltage boost converter with power diode and isolation switch. It supports 1.8-V to 5.5-V input voltage and 3.3-V to 28-V output voltage. It features true disconnection, short-circuit protection, overvoltage protection, and thermal shutdown protection functions. the TLV61046AEVM-833 is built to evaluate the electrical and thermal performance of the TLV61046A.

[Table 1](#) provides the performance specifications of the EVM

Table 1. Performance Specification

Specification	Test Condition	MIN	TYP	MAX	UNIT
Input voltage		1.8	3.6	5.5	V
Output voltage	$V_{IN} = 3.6\text{ V}$, $I_{OUT} = 0.1\text{ A}$		12		V
Output current	$V_{IN} = 3.6\text{ V}$, $V_{OUT} = 12\text{ V}$			0.15	A
Switching frequency	$V_{IN} = 3.6\text{ V}$, $I_{OUT} = 0.1\text{ A}$		1050		KHz

1.1 Description

Some components in the EVM are just added to facilitate the TLV61046A evaluation. The C6 is used to provide stable input voltage for the TLV61046A when the power cable between the EVM and the power supply is long. The C6 can be removed in a real application. The C4 and C5 are provided for additional output capacitors, which are not required for proper operation but can be used to reduce the output voltage ripple and to improve the load transient performance. Feed-forward capacitor C3 can be used to speed up the response of the device when the output capacitance is much larger than the value in the EVM. When C3 is selected, at least a 100-Ω resistor R3 must be used to avoid switching noise coupling into the FB pin.

2 Test Setup

The functions of the connectors in the EVM are described in the following:

- J1 is used for power supply connection. Pin 1–pin 3 are for the negative node of the power supply and pin 4–pin 6 are for the positive node of the power supply. Pin 3 and pin 4 can also be used to measure the input voltage accurately when input current is large.
- J2 is used for the load connection. Pin 1–pin 3 are for the negative node of the load and pin 4–pin 6 are for the positive node of the load.
- J3 is to enable or disable the boost converter. The TLV61046A is enabled if pin 2 and pin 3 are shorted, and disabled when pin 2 and pin 1 are shorted.

3 Board Layout

The EVM is based on a 2-layer PCB. All the components are placed on the top layer. [Figure 1](#) shows the top layer of the PCB and [Figure 2](#) shows the bottom layer.

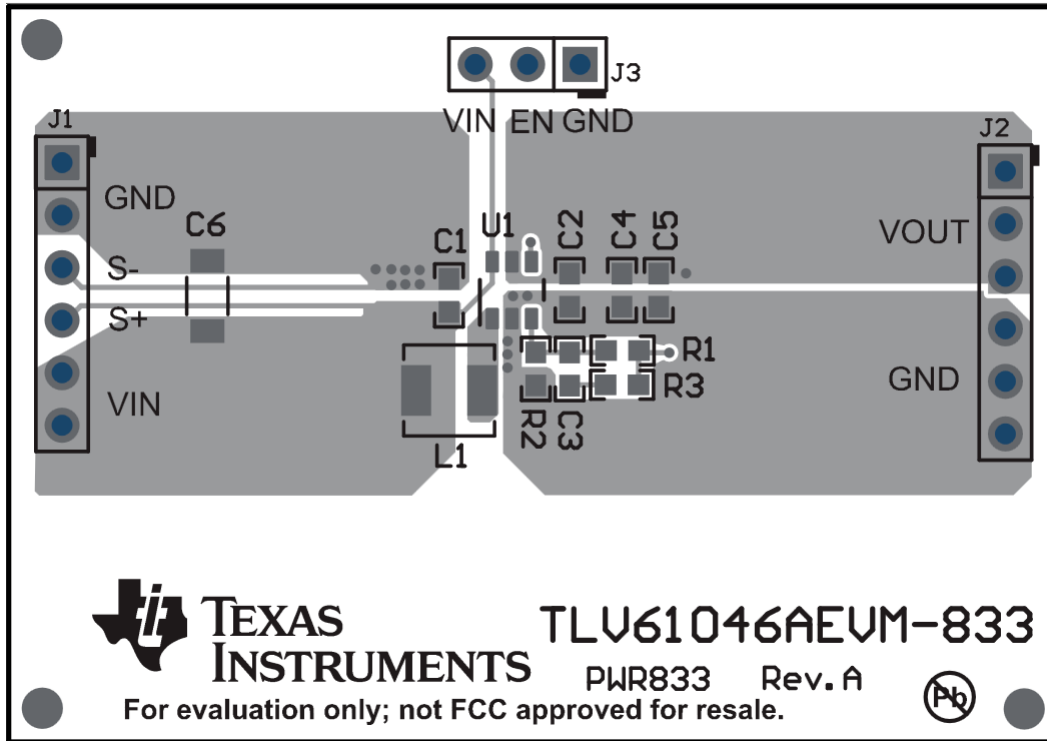


Figure 1. TLV61046A PCB Top Layer

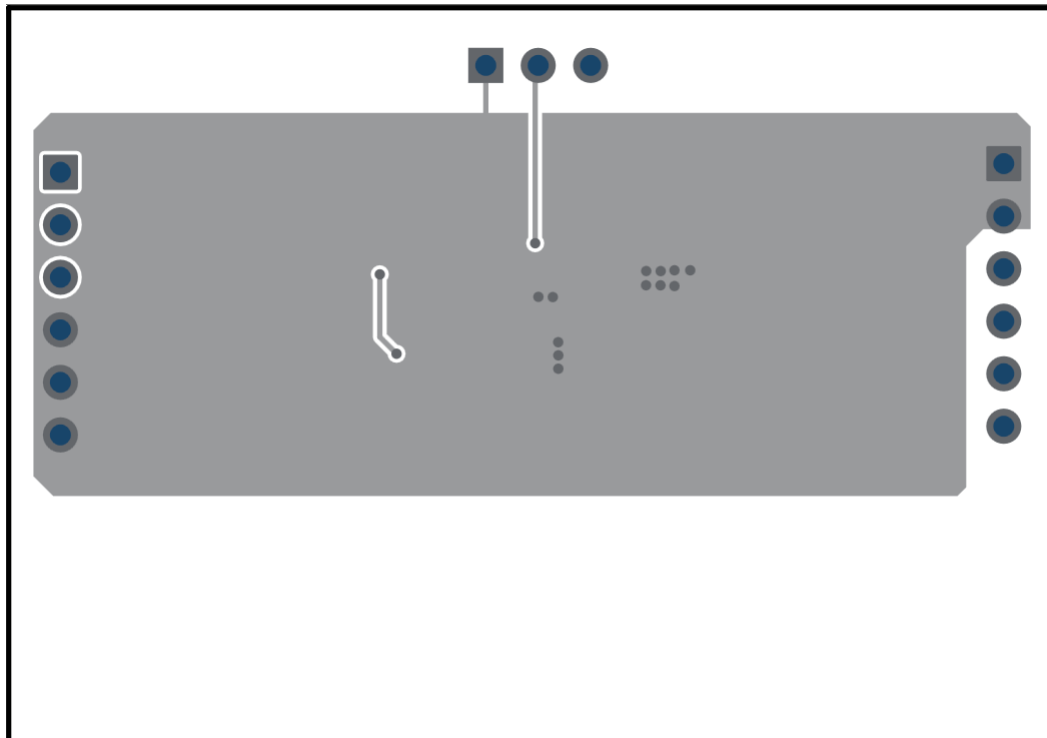
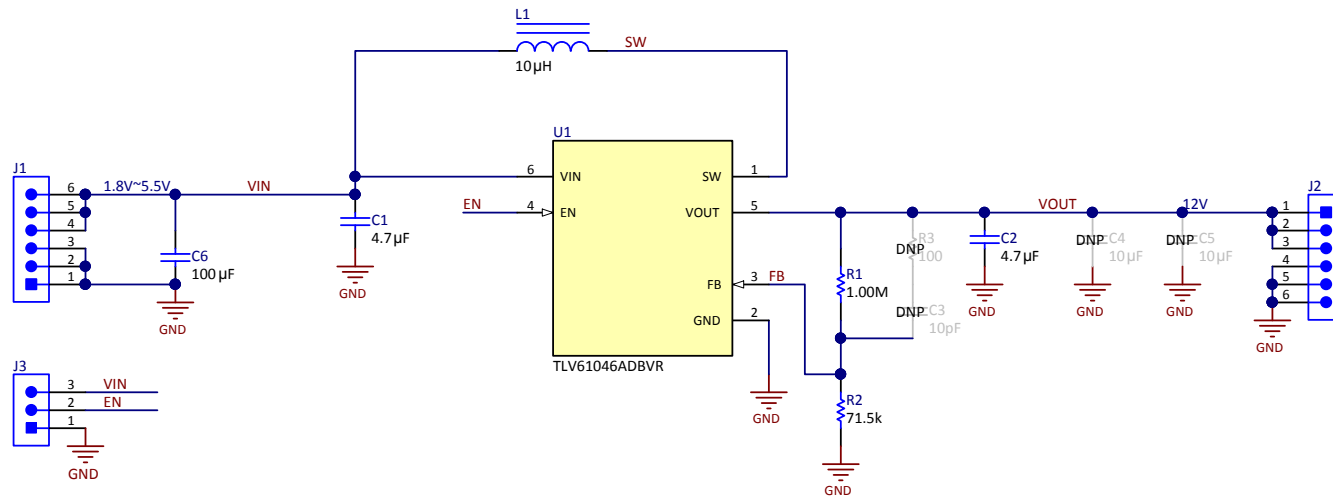


Figure 2. TLV61046A PCB Bottom Layer

4 Schematic and Bill of Materials

4.1 Schematic

Figure 3 illustrates the EVM schematic.



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Figure 3. TLV61046A Schematic

4.2 Bill of Materials

Table 2 lists the TLV61046A EVM BOM.

Table 2. TLV61046A Bill of Materials

Designator	Qty	Value	Description	Package Reference	Part Number	Manufacturer	Alternate Part Number	Alternate Manufacturer	
IPCB	1		Printed Circuit Board		PWR833	Any	-	-	
C1	1	4.7uF	CAP, CERM, 4.7 μ F, 6.3 V, +/- 10%, X5R, 0603	0603	GRM188R60J475KE19D	Murata			
C2	1	4.7uF	CAP, CERM, 4.7 μ F, 35 V, +/- 10%, X5R, 0603	0603	GRM188R6YA475KE15D	Murata			
C6	1	100uF	CAP, CERM, 100 μ F, 6.3 V, +/- 20%, X5R, 1206	1206	GRM31CR60J107ME39L	Murata			
J1, J2	2		Header, 100mil, 6x1, Gold, TH	6x1 Header	TSW-106-07-G-S	Samtec			
J3	1		Header, 100mil, 3x1, Gold, TH	3x1 Header	TSW-103-07-G-S	Samtec			
L1	1	10uH	Inductor, Shielded, Powdered Iron, 10 μ H, 2 A, 0.2 ohm, SMD	4.2x4.2mm	FDSD0420-H-100M	Murata Toko			
R1	1	1.00Meg	RES, 1.00 M, 1%, 0.1 W, 0603	0603	CRCW06031M00FKEA	Vishay-Dale			
R2	1	71.5k	RES, 71.5 k, 1%, 0.1 W, 0603	0603	CRCW060371K5FKEA	Vishay-Dale			
SH-JP1	1	1x2	Shunt, 100mil, Gold plated, Black	Shunt	969102-0000-DA	3M	SNT-100-BK-G	Samtec	
U1	1		28-V Output Voltage Boost Converter with Power Diode and Isolation Switch, DBV0006A (SOT-6)	DBV0006A	TLV61046ADBVR	Texas Instruments	TLV61046ADBVT	Texas Instruments	
C3	0	10pF	CAP, CERM, 10 pF, 100 V, +/- 5%, C0G/NP0, 0603	0603	GRM1885C2A100JA01D	Murata			
C4	0	10uF	CAP, CERM, 10 μ F, 35 V, +/- 20%, X5R, 0603	0603	GRM188R6YA106MA73	Nichicon			
C5	0	10uF	CAP, CERM, 10 μ F, 35 V, +/- 20%, X5R, 0603	0603	GRM188R6YA106MA73D	Murata			
FID1, FID2, FID3	0		Fiducial mark. There is nothing to buy or mount.	Fiducial	N/A	N/A			
R3	0	100	RES, 100, 1%, 0.1 W, 0603	0603	CRCW0603100RFKEA	Vishay-Dale			
		Notes: Unless otherwise noted in the <i>Alternate Part Number</i> or <i>Alternate Manufacturer</i> columns, all parts may be substituted with equivalents.							

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- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
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