

TPS61099 Evaluation Module

This document describes the characteristics, operation, and use of the TPS61099 evaluation module (EVM). The TPS61099 provides an ultra-low quiescent power supply solution for products powered by either a single-cell or two-cell alkaline, one-cell coin cell battery. The EVM only consumes 800-nA quiescent current under light-load conditions and can achieve up to 80% efficiency at a 10- μ A load. It also supports the true shutdown function when disabled.

This EVM is also compatible for TPS61099x, which is a fixed V_{OUT} version. In this case, remove the feedback resistors and short the FB pin to GND.

Contents

1	Introduction	1
2	Setup	2
3	Schematic and Bill of Materials	3

List of Figures

1	TPS61099 Schematic	3
2	TPS61099 Silk Screen (Viewed From Top)	4
3	TPS61099 Top Layer (Viewed From Top)	5
4	TPS61099 Bottom Layer (Viewed From Top)	5

List of Tables

1	Available Device Version	1
2	TPS61099 Bill of Materials	4

1 Introduction

1.1 Performance Specification

The TPS61099 EVM helps designers evaluate the operation and performance of the TPS61099x boost converter. The TPS61099 is an adjustable output version and the TPS61099x family is a fixed output version. See [Table 1](#) for detailed information of each version. To achieve better performance, use a 1.0- μ H inductor when output voltage is less than 3 V. Note that a 9- μ F effective output capacitor is required for stability.

Table 1. Available Device Version

Part Number	V_{OUT} (V)	L (μ H)	C_{OUT} (μ F, Effective)
TPS61099	Adjustable	2.2 ⁽¹⁾	9
TPS610994	3.3	2.2	9
TPS610997	5.0	2.2	9

⁽¹⁾ When adjusting output voltage to less than 3 V, use a 1.0- μ H inductor for better performance.

1.2 Application

This EVM is used in the following applications:

1. Memory LCD bias
2. Optical heart rate monitor LED bias
3. Wearable applications
4. Low-power wireless applications
5. Portable consumer or medical products
6. Battery-powered systems

2 Setup

This section describes how to properly use the TPS61099.

2.1 I/O Connector Descriptions

The following list describes the I/O connections:

J1/J3	VIN / GND	Positive input connection from the input supply for the EVM
J2	S+ / S-	Input voltage sense connections. Measure the input voltage at this point
J4/J6	V_{OUT} / GND	Output connection of boost converter for the EVM
J5	S+ / S-	V _{OUT} output voltage sense connection, measure the output voltage
S+ / S-	EN	EN connection of IC. Short to Vin enables IC. Short to GND disables IC.

3 Schematic and Bill of Materials

This section provides the TPS61099 schematic and bill of materials (BOM).

3.1 Schematic

Figure 1 illustrates the EVM schematic.

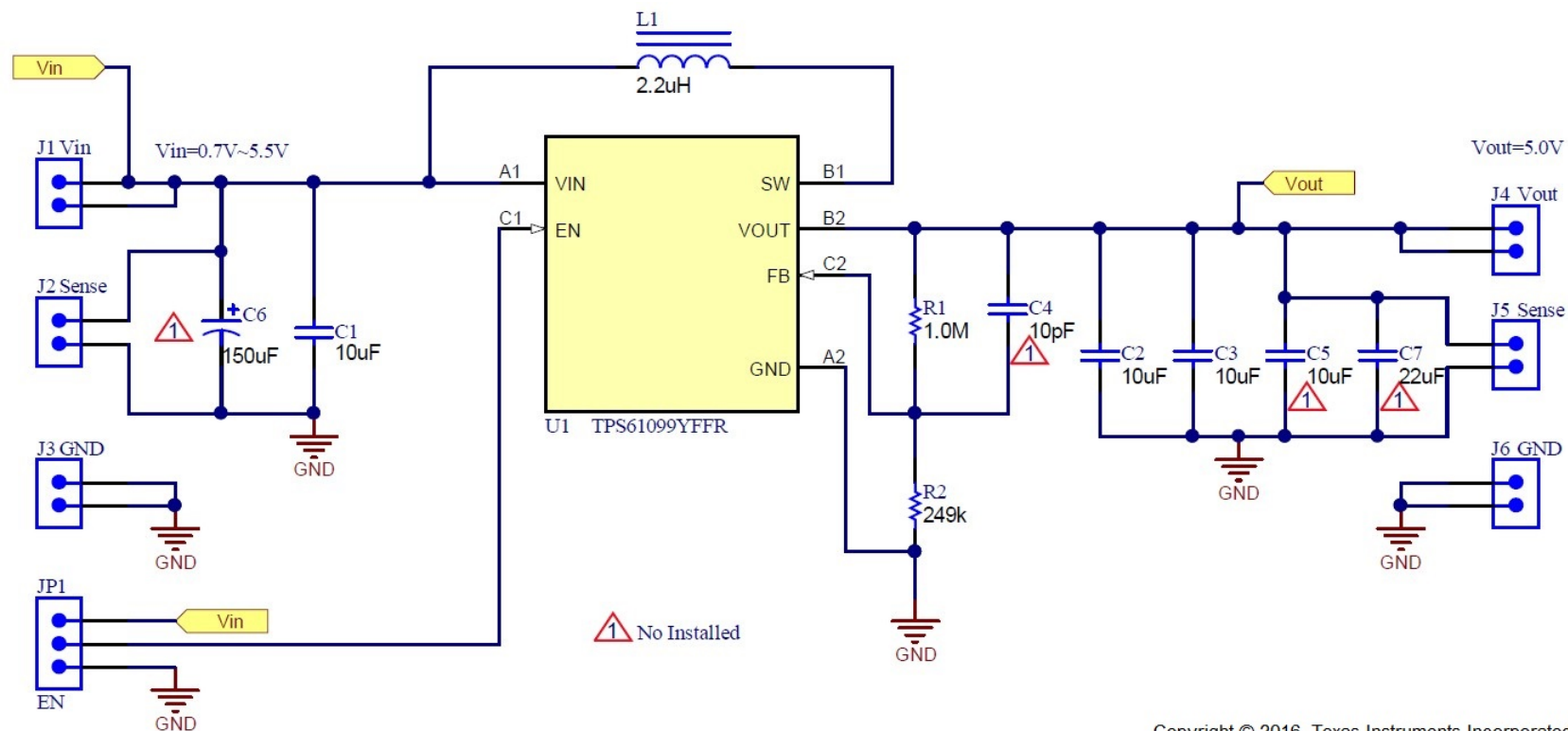


Figure 1. TPS61099 Schematic

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3.2 TPS61099 Bill of Materials

Table 2 lists the TPS61099 BOM.

Table 2. TPS61099 Bill of Materials

Designator	Footprint	PartNumber	Description	Value
C1	0603	GRM188R61E106MA73	CAP, CERM, 10 μ F, 25 V, $\pm$ 20%, X5R, 0603	10 μ F
C2	0603	GRM188R61E106MA73	CAP, CERM, 10 μ F, 25 V, $\pm$ 20%, X5R, 0603	10 μ F
C3	0603	GRM188R61E106MA73	CAP, CERM, 10 μ F, 25 V, $\pm$ 20%, X5R, 0603	10 μ F
C4	0402	GRM1555C1H100JA01D	CAP, CERM, 10 pF, 50 V, $\pm$ 5%, C0G/NP0, 0402	10 pF
C5	0603	GRM188R61E106MA73	CAP, CERM, 10 μ F, 25 V, $\pm$ 20%, X5R, 0603	10 μ F
C6	7343-28	16TQC150MYF	CAP, TA, 150 μ F, 16V, $\pm$ 20%, 0.05 ohm, SMD	150 μ F
C7	0805_HV	GRM21BR61A226ME44	CAP, CERM, 22 μ F, 10 V, $\pm$ 20%, X5R, 0805	22 μ F
L1	1008	DFE252012P-2R2M=P2	Inductor, Shielded, 2.2 μ H, 2.6 A, 0.07 ohm, SMD	2.2 μ H
R1	0402	CRCW04021M00JNED	RES, 1.0 M, 5%, 0.063 W, 0402	1.0 Meg
R2	0402	CRCW0402249KFKED	RES, 249 k, 1%, 0.063 W, 0402	249 k Ω
U1	YFF0006AFAD	TPS61099YFFR	TPS61099, YFF0006AFAD	

3.3 Modification With Different Versions

In case of an adjustable version, a 1.0- μ H inductor is recommended for $V_{OUT} < 3$ -V applications and a 2.2- μ H inductor is recommended for other V_{OUT} cases.

In the case of fixed versions of TPS610994 and TPS610997, remove divider resistor R1 and R2 and connect FB pin to GND.

3.4 Board Layout

Figure 2 through Figure 4 show the design of the TPS61099 EVM PCB layout. It is designed using a 2-layer PCB. Poor layout could lead to stability problems as well as EMI problems. Place the input and output capacitor, as well as the inductor, as close as to the IC as possible.

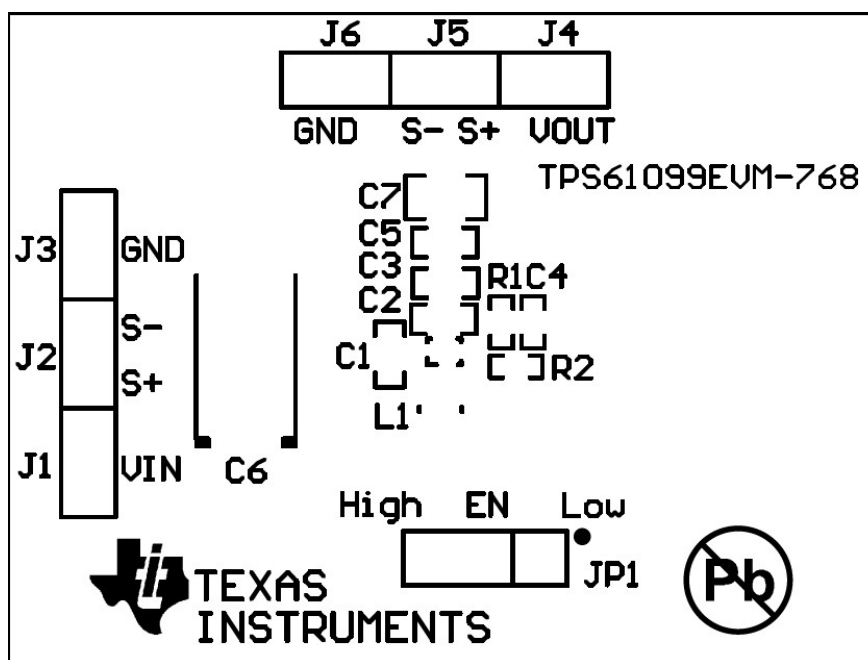


Figure 2. TPS61099 Silk Screen (Viewed From Top)

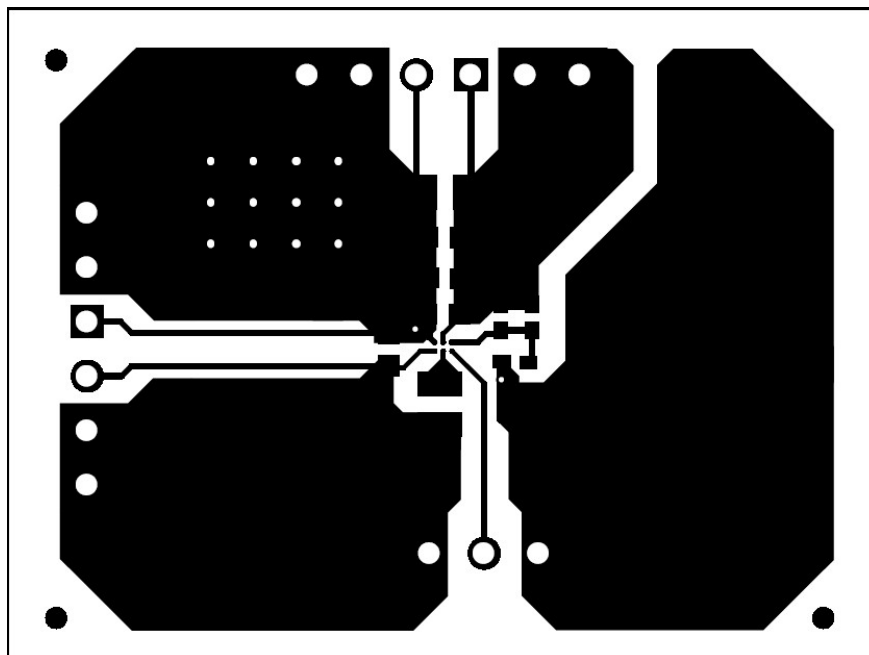


Figure 3. TPS61099 Top Layer (Viewed From Top)

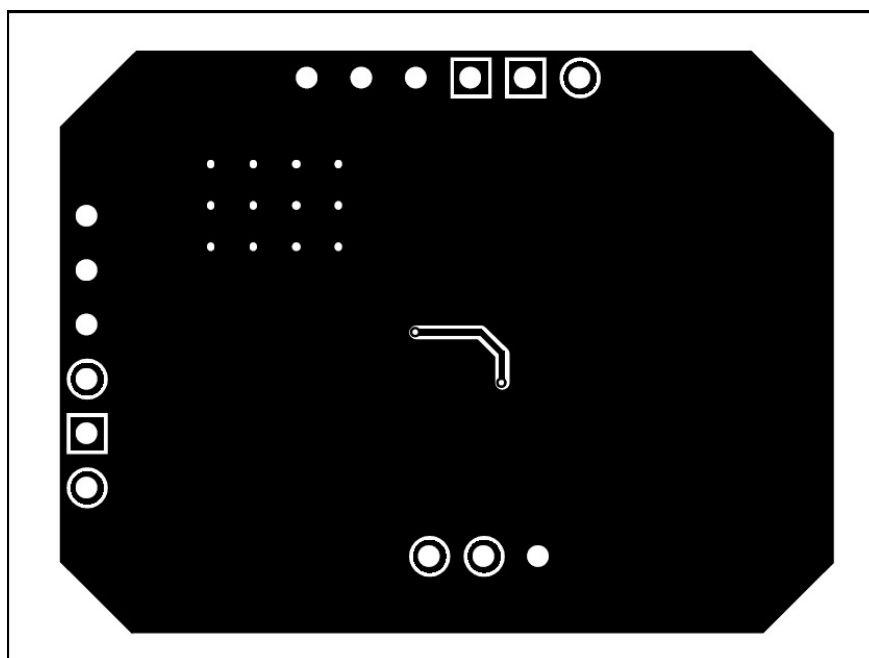


Figure 4. TPS61099 Bottom Layer (Viewed From Top)

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 L1 row in the <i>TPS61099 Bill of Materials</i> .	4

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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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