TPS82740xEVM-617

This user's guide describes the characteristics, operation, and use of the Texas Instruments TPS82740x evaluation module (EVM). This EVM is designed to help the user easily evaluate and test the operation and functionality of the TPS82740x. The EVM converts a 2.2-V to 5.5-V input voltage to a regulated output voltage that is set between 1.8 V and 2.5 V (TPS82740A) or 2.6 V to 3.3 V (TPS82740B) at up to 200 mA. The TPS82740x also includes a load switch and features an ultra-low quiescent current of 360 nA. This user's guide includes setup instructions for the hardware, a printed-circuit board layout for the EVM, a schematic diagram, and a bill of materials.

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1 Introduction

The TPS82740x devices are a series of high-frequency, synchronous, step-down dc-dc converters optimized for battery-powered portable applications. Intended for low-power applications, the TPS82740x supports up to 200 mA and features a quiescent current of 360 nA typical.

1.1 Features

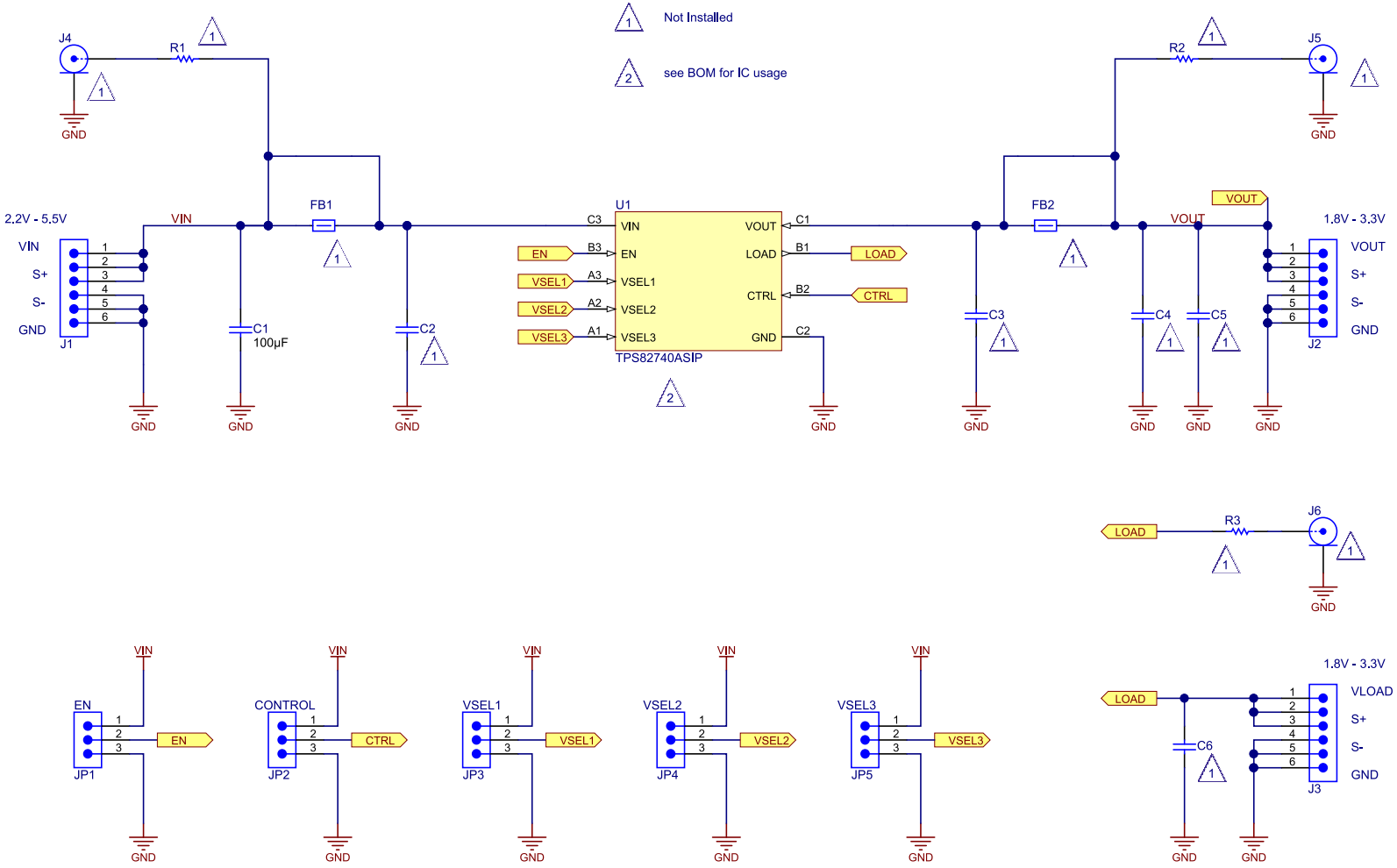
- Input voltage range: 2.2 V up to 5.5 V
- Adjustable output voltage
- 360-nA typical quiescent current
- Up to 200-mA output current
- Integrated slew rate controlled load switch
- RF-friendly DCS-control

1.2 Applications

- Bluetooth® low energy, RF4CE, ZigBee®
- Wearable electronics
- Energy harvesting

2 TPS82740xEVM-617 Schematic

Figure 1 illustrates the TPS82740xEVM-617 schematic.



NOTE: For reference only; see Table 1 for specific values.

Figure 1. TPS82740xEVM Schematic

3 Connector and Test Point Descriptions

3.1 J1 Input Connectors

3.1.1 Pin 1 and 2: VIN

This header is the positive connection to the input power supply. The power supply must be connected between these pins and pins 5 and 6 (GND). Twist the leads to the input supply and keep them as short as possible. The input voltage must be between 2.2 V and 5.5 V.

3.1.2 Pin 3: Input Sense VIN

This header is intended to measure the input voltage directly on the input capacitor close to the device. Therefore, a four-wire power and sense supply can be connected. Twist the leads to the sensing connector.

3.1.3 Pin 4: Input Sense GND

This header is intended to measure the GND close to the input of the device. Therefore, a four-wire power and sense supply can be connected. Twist the leads to the sensing connector.

3.1.4 Pin 5 and 6: GND

This header is the return connection to the input power supply. Connect the power supply between these pins and pins 1 and 2 (VIN). Twist the leads to the input supply and keep them as short as possible. The input voltage must be between 2.2 V and 5.5 V.

3.2 J2 Output Connector

3.2.1 Pin 1 and 2: VOUT

This header is the positive connection of the output voltage. Connect the load between these pins and pins 5 and 6 (GND).

3.2.2 Pin 3: Output Sense VOUT

This header is intended to measure the output voltage directly on the output capacitors.

3.2.3 Pin 4: Output Sense GND

This header is intended to measure the GND close to the output of the device.

3.2.4 Pin 5 and 6: GND

This is the return connection of the output voltage. Connect the load between these pins and pin 1 and 2 (VOUT).

3.3 J3 Load Connector

3.3.1 Pin 1 and 2: LOAD

This header is the positive connection of the load voltage. Connect the load between these pins and pins 5 and 6 (GND).

3.3.2 Pin 3: Output Sense LOAD

This header is intended to measure the output voltage directly on the output capacitors.

3.3.3 Pin 4: Output Sense GND

This header is intended to measure the GND close to the output of the device.

3.3.4 Pin 5 and 6: GND

This is the return connection of the output voltage. Connect the load between these pins and pin 1 and 2 (VOUT).

3.4 Other Connectors

3.4.1 J4: SMA Input Connector

This SMA connector is connected to the input voltage of the converter. It is used to easily analyze the noise spectrum of the input voltage with a spectrum analyzer. By default, J4 is not assembled on the EVM.

3.4.2 J5: SMA Output Connector

This SMA connector is connected to the output voltage of the converter. It is used to easily analyze the noise spectrum of the output voltage with a spectrum analyzer. By default, J5 is not assembled on the EVM.

3.4.3 J6: SMA Load Connector

This SMA connector is connected to the load switch voltage of the converter. It can be used to easily analyze the noise spectrum of the output voltage with a spectrum analyzer. By default, J6 is not assembled on the EVM.

3.5 Jumpers

3.5.1 JP1: Enable Jumper

Placing a jumper across pins EN and ON ties the EN pin to VIN and enables the device. Placing a jumper across pins EN and OFF ties the EN pin to GND which disables the device.

3.5.2 JP2: CTRL, Load Switch Control Jumper

Placing a jumper across pins ON and CTRL ties the CTRL pin to VIN and enables the internal load switch. Placing a jumper across pins OFF and CTRL ties the CTRL pin to GND, and disables the internal load switch.

3.5.3 JP2: CTRL, Load Switch Control Jumper

Placing a jumper across pins ON and CTRL ties the CTRL pin to VIN and enables the internal load switch. Placing a jumper across pins OFF and CTRL ties the CTRL pin to GND, and disables the internal load switch.

3.5.4 JP3: VSEL1, Output Voltage Selection Pin 1

Placing a jumper across pins VSEL1 and HIGH ties the VSEL1 pin to VIN and sets the device pin VSEL1 to HIGH. Placing a jumper across pins VSEL1 and LOW ties the VSEL1 pin to GND and sets the device pin VSEL1 to LOW.

3.5.5 JP3: VSEL2, Output Voltage Selection Pin 2

Placing a jumper across pins VSEL2 and HIGH ties the VSEL2 pin to VIN and sets the device pin VSEL2 to HIGH. Placing a jumper across pins VSEL2 and LOW ties the VSEL2 pin to GND and sets the device pin VSEL2 to LOW.

3.5.6 JP3: VSEL3, Output Voltage Selection Pin 3

Placing a jumper across pins VSEL3 and HIGH ties the VSEL3 pin to VIN and sets the device pin VSEL3 to HIGH. Placing a jumper across pins VSEL3 and LOW ties the VSEL3 pin to GND and sets the device pin VSEL3 to LOW.

4 TPS82740xEVM Assembly Drawings and Layout

Figure 2 through Figure 6 show the design of the TPS82740xEVM-617 printed circuit boards. The EVM has been designed using a four-layer PCB with all components in an active area on the top side of the board. Moving components to both sides of the PCB or using additional internal layers can offer additional size reduction for space-constrained systems.

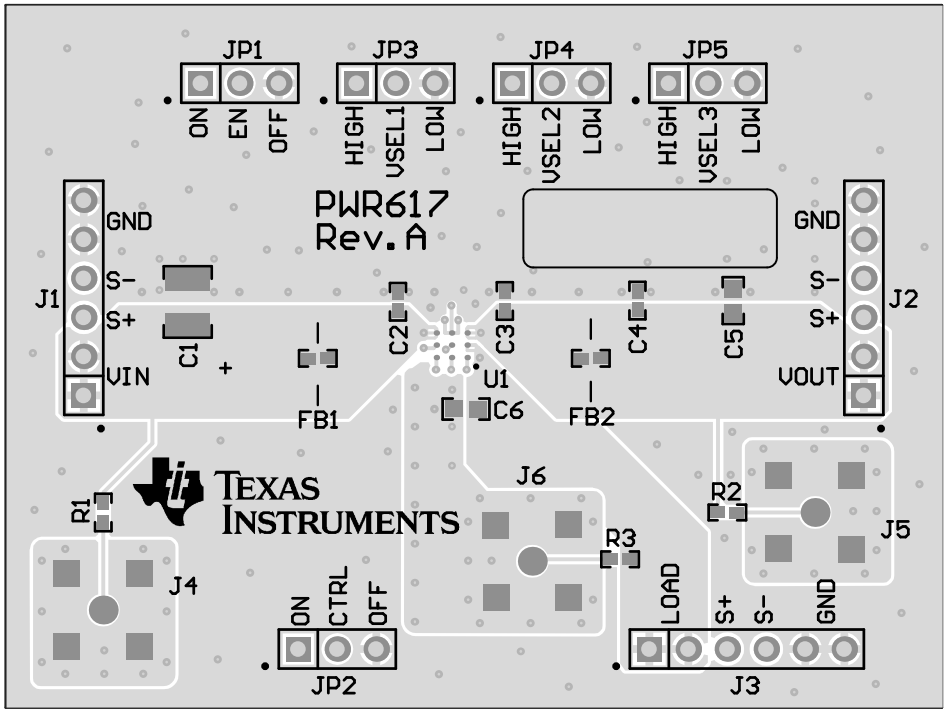


Figure 2. TPS82740xEVM Component Placement (Top View)

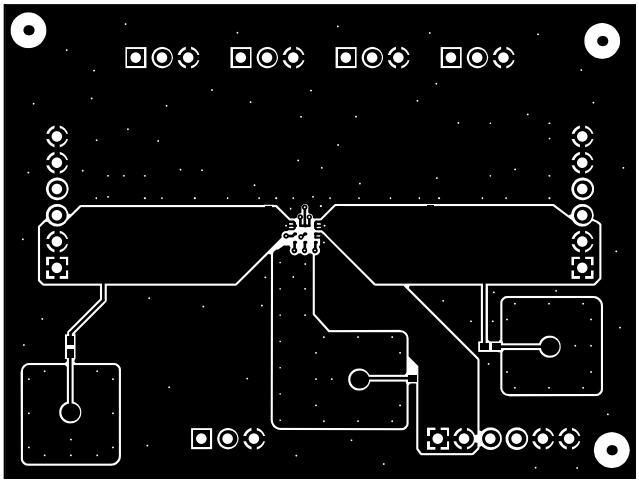


Figure 3. TPS82740xEVM Top-Side Copper (Top View)

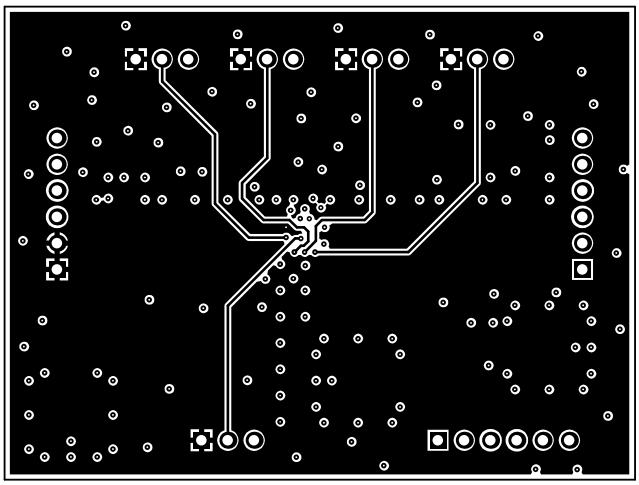


Figure 4. TPS82740xEVM Inner Layer 1 Copper (Top View)

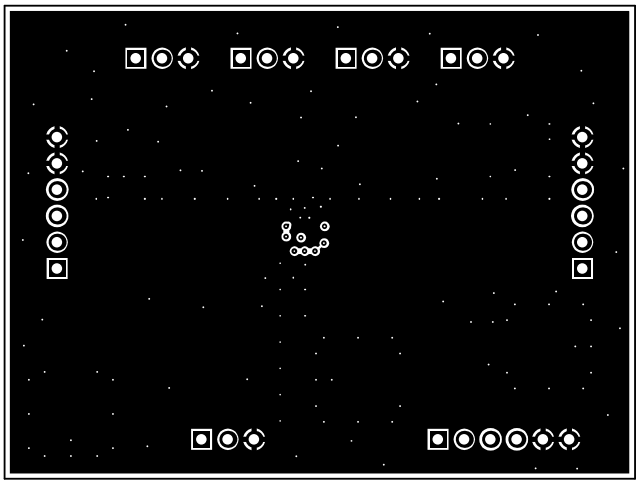


Figure 5. TPS82740xEVM Inner Layer 2 Copper (Top View)

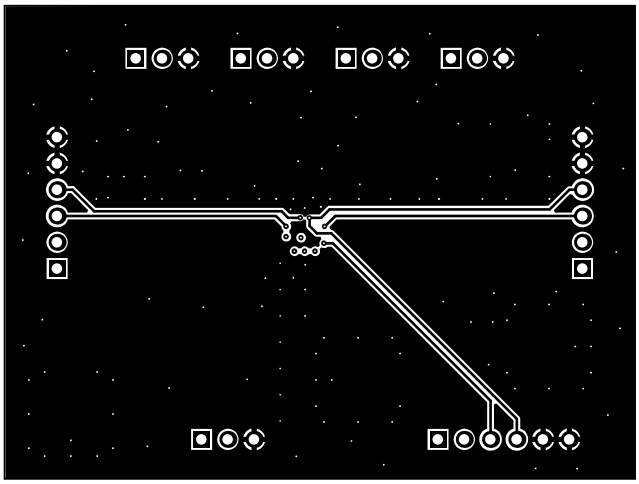


Figure 6. TPS82740xEVM Bottom-Side Copper (Top View)

5 Bill of Materials

Table 1 lists the bill of materials for the TPS82740xEVM.

Table 1. TPS82740xEVM-617 Bill of Materials

Count		RefDes	Value	Description	Size	Part Number	MFR
-001	-002						
1		C1	100uF	Capacitor, Ceramic, 6.3V, X5R	1210	GRM32ER60J107ME20L	muRata
0		C2, C3, C4, C5	open	Capacitor, Ceramic	0603	Std	Std
3		J1, J2, J3		Header, 100mil spacing , 6x1	0.100 inch x 6	TSW-106-07-G-S	Samtec
5		JP1, JP2, JP3, JP4, JP5		Header, 100mil spacing , 3x1	0.210 inch x 3	TSW-103-07-G-S	Samtec
0		J4, J5, J6		Connector, SMA Jack	SMA	142-0711-201	Emerson
0		FB1, FB2		Ferrite Bead,	0603	Std	Std
0		R1, R2, R3	49.9	Resistor, SMD	0402	Std	Std
1	0	U1	TPS82740A	SIP-Module, 200-mA, 360nA Iq Step-Down Converter	SIP-9	TPS82740ASIP	TI
0	1	U1	TPS82740B	SIP-Module, 200-mA, 360nA Iq Step-Down Converter	SIP-9	TPS82740BSIP	TI

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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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