TPS7B4250 Evaluation Module

1 Introduction

The Texas Instruments TPS7B4250EVM evaluation module (EVM) helps designers evaluate the operation and performance of the TPS7B4250-Q1 tracking-LDO. For more information on the TPS7B4250-Q1 device, see the data sheet, SLVSCA0.

The EVM contains one linear regulator (see Table 1).

Table 1. Device and Package Configurations

REGULATOR	IC	PACKAGE
U1	TPS7B4250QDBVRQ1	SOT23-5

2 Setup

This section describes the jumpers and connectors on the EVM as well as proper connection, set-up, and use of the TPS7B4250EVM.

2.1 Input and Output (I/O) Connector Descriptions

VIN— This connector is the protected power input for the regulator. The test point provides a power (VIN) connection to power the EVM.

GND, TP_GND— GND is the ground return for the regulator. The EVM provides one GND jumper and two GND test points (TP_GND) to allow the user to power the EVM, connect the load, and attach an oscilloscope ground-lead.

TP_VIN— TP_VIN is a power test point. The test point allows the user to measure the input voltage at a closer point to the VIN pin which applies a more accurate voltage to the device. The user can also apply power to the regulator through this test point.

ADJ— This connector is a reference input voltage for the regulator. The jumper provides a connection for the user to attach a reference voltage to the EVM.

TP_ADJ— TP_ADJ is the test point which allows the user to measure the input voltage of the ADJ pin. The user can also apply a reference voltage directly to this test point.

VOUT— This connector is the output for the regulator. The jumper provides a connection to attach a load to the EVM.

TP_VOUT— TP_VOUT is a power test point. The test point allows the user to measure the output voltage at a closer point to the VOUT pin which provides a more accurate measurement of the output voltage. The user can also connect a load to the EVM through this test point.

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2.2 Setup Steps

The input-voltage range for the tracker is 4 to 40 V. The EVM supports up to 50-mA of load current. Use the following steps to setup the EVM:

1. Set the input voltage supply voltage to 12 V and set the current-limit to 1 A.
2. Set the voltage of the input-reference voltage supply to 5 V and set the current-limit to 0.1 A.
3. Connect the positive lead of the input power supply to VIN and the return lead to GND.
4. Connect the positive lead of the input-reference power supply to ADJ and the return lead to GND.
5. Apply the load between VOUT and GND.

2.3 Operation

The TPS7B4250-Q1 device powers up after the VBAT voltage exceeds the VUVLO rising threshold. The PCB offers footprints for the TPS7B4250-Q1 device.

3 Board Layout

Figure 1, Figure 2, and Figure 3 show the board layout for the TPS7B4250EVM PCB.

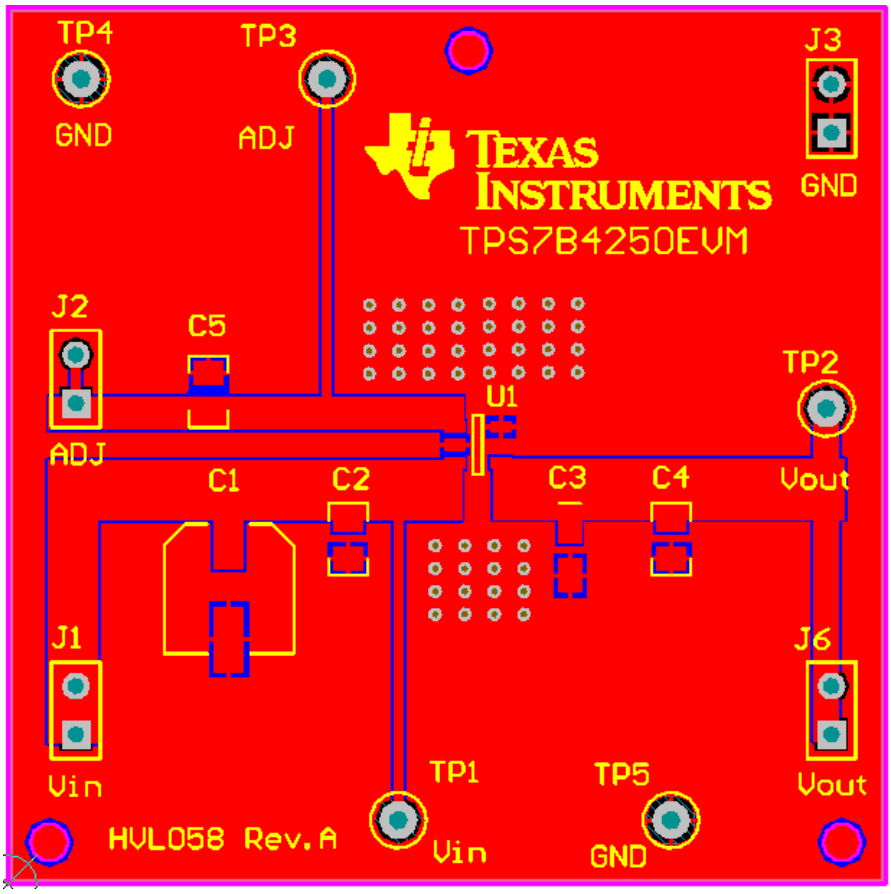


Figure 1. Top Assembly Layer

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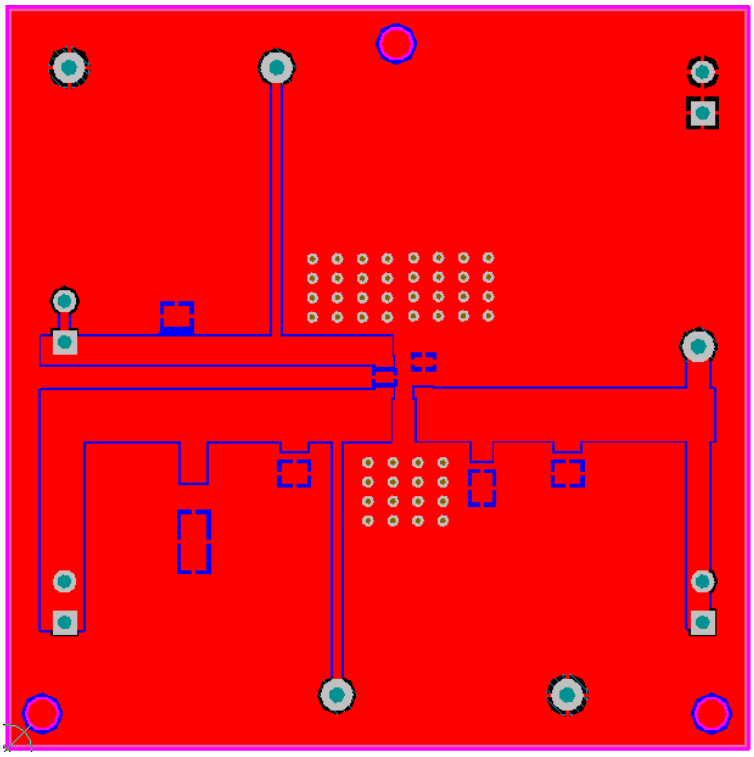


Figure 2. Top Layer Routing

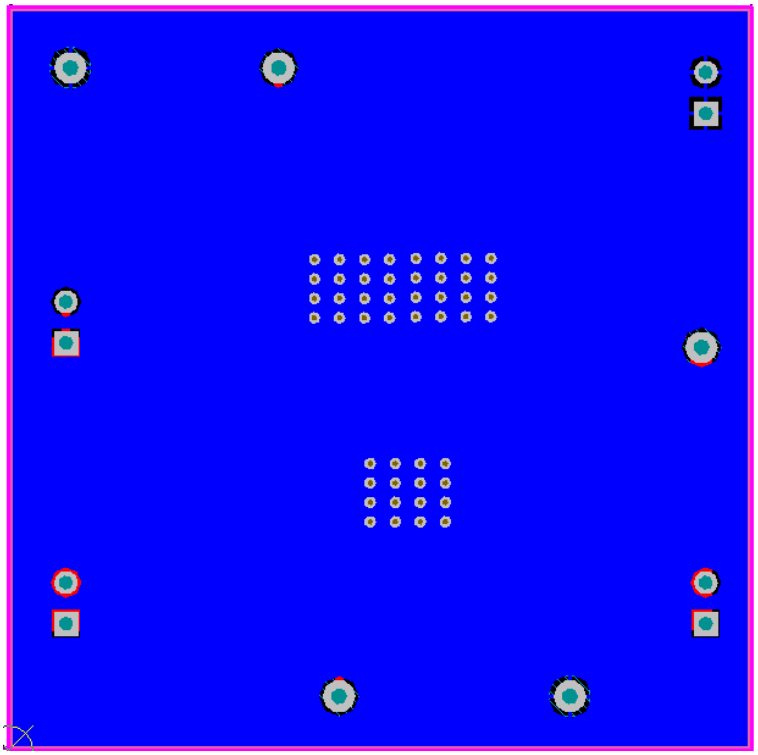


Figure 3. Bottom Layer Routing

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4 Schematic and Bill of Materials

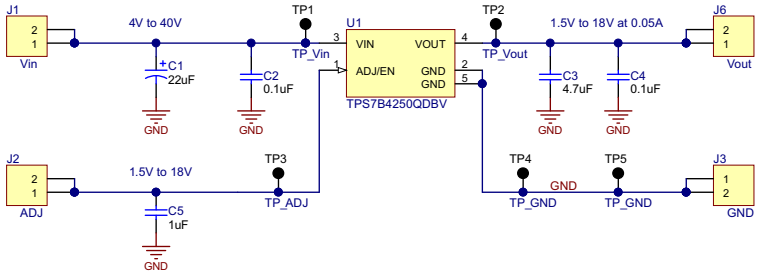


Figure 4. TPS7B4250EVM Schematic

Table 2. Bill of Materials

Designator	Quantity	Value	Description	Package Reference	PartNumber	Manufacturer
C1	1	22 µF	Capacitor, aluminum, 22 µF, 50 V, ±20%, surface-mounted device	F60	EMVE500ADA220MF60G	Nippon Chemi-Con
C2, C4	2	0.1 µF	Capacitor, ceramic, 0.1 µF, 50 V, ±20%, X7R, 0805	0805	08055C104MAT2A	AVX
C3	1	4.7 µF	Capacitor, ceramic, 4.7 µF, 25 V, ±20%, X7R, 1206	1206	C3216X7R1E475M	TDK
C5	1	1 µF	Capacitor, ceramic, 1 µF, 25 V, ±10%, X5R, 0805	0805	08053D105KAT2A	AVX
J1, J2, J3, J6	4		Header, 100 mil, 2 × 1, tin plated, TH	Header, 2 pin, 100 mil, tin	PEC02SAAN	Sullins Connector Solutions
TP1, TP2, TP3, TP4, TP5	5	Black	Test Point, TH, miniature, black	Keystone5001	5001	Keystone
U1	1		Low-dropout-voltage tracking LDO, DBV0005A	DBV0005A	TPS7B4250QDBV	TI

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As noted in the EVM User's Guide and/or EVM itself, this EVM and/or accompanying hardware may or may not be subject to the Federal Communications Commission (FCC) and Industry Canada (IC) rules.

For EVMs **not** subject to the above rules, this evaluation board/kit/module is intended for use for ENGINEERING DEVELOPMENT, DEMONSTRATION OR EVALUATION PURPOSES ONLY and is not considered by TI to be a finished end product fit for general consumer use. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC or ICES-003 rules, which are designed to provide reasonable protection against radio frequency interference. Operation of the equipment may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

General Statement for EVMs including a radio

User Power/Frequency Use Obligations: This radio is intended for development/professional use only in legally allocated frequency and power limits. Any use of radio frequencies and/or power availability of this EVM and its development application(s) must comply with local laws governing radio spectrum allocation and power limits for this evaluation module. It is the user's sole responsibility to only operate this radio in legally acceptable frequency space and within legally mandated power limitations. Any exceptions to this are strictly prohibited and unauthorized by Texas Instruments unless user has obtained appropriate experimental/development licenses from local regulatory authorities, which is responsibility of user including its acceptable authorization.

For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant

Caution

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- 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.

For EVMs annotated as IC – INDUSTRY CANADA Compliant

This Class A or B digital apparatus complies with Canadian ICES-003.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Concerning EVMs including radio transmitters

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concerning EVMs including detachable antennas

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Cet appareil numérique de la classe A ou B est conforme à la norme NMB-003 du Canada.

Les changements ou les modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner l'équipement.

Concernant les EVMs avec appareils radio

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

【Important Notice for Users of EVMs for RF Products in Japan】

This development kit is NOT certified as Confirming to Technical Regulations of Radio Law of Japan

If you use this product in Japan, you are required by Radio Law of Japan to follow the instructions below with respect to this product:

1. Use this product in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use this product only after you obtained the license of Test Radio Station as provided in Radio Law of Japan with respect to this product, or
3. Use of this product only after you obtained the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to this product. Also, please do not transfer this product, unless you give the same notice above to the transferee. Please note that if you could not follow the instructions above, you will be subject to penalties of Radio Law of Japan.

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