

TPS7B4253-Q1 Evaluation Module

This user's guide describes the TPS7B4253-Q1 EVM evaluation module (EVM) and includes setup instructions, board layouts, schematics, and the bill of materials (BOM).

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1 Introduction

The Texas Instruments TPS7B4253-Q1 evaluation module (EVM) helps designers evaluate the operation and performance of the TPS7B4253-Q1 tracking LDO. For more information on the TPS7B4253-Q1 device, see the data sheet.

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

Table 1. Device and Package Configuration

REGULATOR	IC	PACKAGE
U1	TPS7B4253QPWRQ1	20-pin PWP-HTSSOP

2 Setup

This section describes the jumpers and connectors on the EVM as well and how to properly connect, set up, and use the TPS7B4253-Q1 EVM.

2.1 Input and Output (I/O) Connector Descriptions

TP1/VIN — This test point provides a power (VIN) connection to allow the user to power the EVM. This test point also allows the user to measure the input voltage.

TP2/EN — This test point is the enable input voltage for the regulator, which allows the user to enable the EVM through an external power supply.

J3/EN connector— This connector is the enable input voltage for the regulator. Connect pin 1 and pin 2 to set the EN voltage to the GND pin. Connect pin 2 and pin 3 to set the EN voltage to the VIN pin. Or, leave all pins open to set the EN voltage with the external power supply (TP8).

TP4/ADJ — This test point is a reference input voltage for the regulator which allows the user to attach a reference voltage to the EVM and measure the input voltage of ADJ pin.

TP5/VOUT — This test point provides the output of the regulator to allow the user to attach a load to the EVM. This test point also allows the user to measure the output voltage

TP3/TP6/GND — The GND test point is the ground return for the regulator. The EVM provides three GND test points to allow the user to power up the EVM, to connect the load, and to attach an oscilloscope ground lead.

J1/J2/Output voltage selection — These two connectors provide two different output-voltage modes to allow the user to select the output voltage. The two modes are described as follows:

- VOUT equals ADJ (default)
Connect pin 1 and pin 2 of J1, and leave J2 open. This connection sets the output voltage equal to the ADJ voltage with high accuracy.
- VOUT determined by resistor
Connect pin 1 and pin 2 of J2, and leave J1 open. This connection sets the output voltage with [Equation 1](#). The output voltage can be modified by changing resistors R1 and R2. With the EVM default setup, the output voltage should be 40 V when the reference input voltage ADJ is 5 V.

$$V_O = \left(1 + \frac{R1}{R2}\right) \times V_{FB} = \left(1 + \frac{R1}{R2}\right) \times V_{ADJ} \quad (1)$$

2.2 Equipment Setup

The input voltage range for the tracking-LDO TPS7B4253-Q1 device is 4 V to 40 V. The EVM can support up to 300-mA of load current. Use the following steps to setup the EVM:

- Step 1. Set the power supply for the input, VIN, to 12 V and set current-limit to 1.2 A.
- Step 2. Set the power supply for the reference, ADJ, to 5 V and set current-limit to 0.1 A.
- Step 3. Connect the input power-supply positive lead to the VIN pin and the negative lead to the GND pin.
- Step 4. Connect the reference power-supply positive lead to the ADJ pin and the negative lead to the GND pin.
- Step 5. Apply the load between the VOUT and GND pins.

2.3 Operation

The TPS7B4253-Q1 device powers-up after the VIN voltage exceeds the UVLO rising threshold.

3 Board Layout

The PCB offers footprints for the TPS7B4253-Q1 device as shown in [Figure 1](#), [Figure 2](#), and [Figure 3](#).

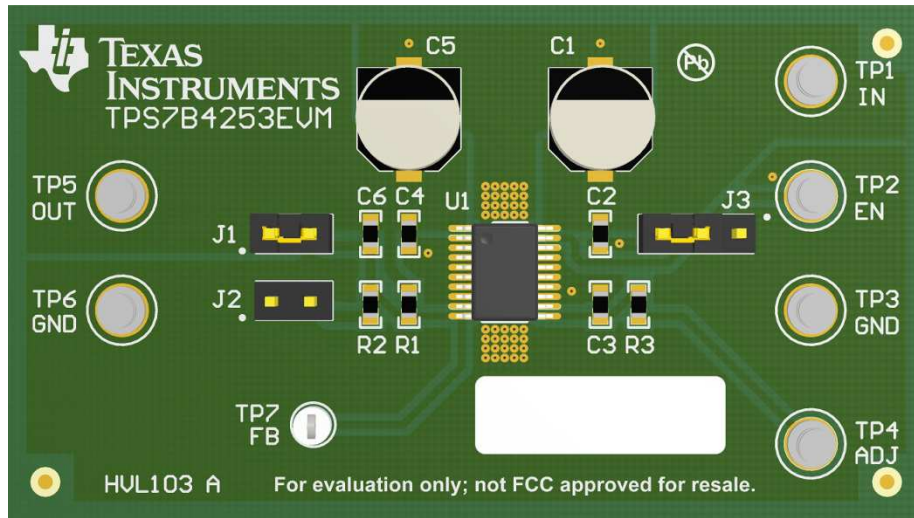


Figure 1. TPS7B4253-Q1 EVM Component Placement (Assembly Top View)

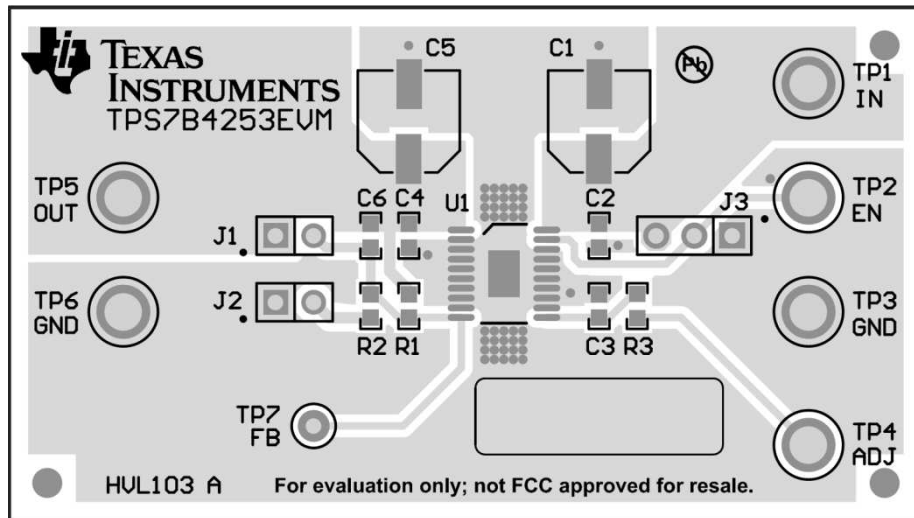


Figure 2. TPS7B4253-Q1 EVM Top Layer Routing

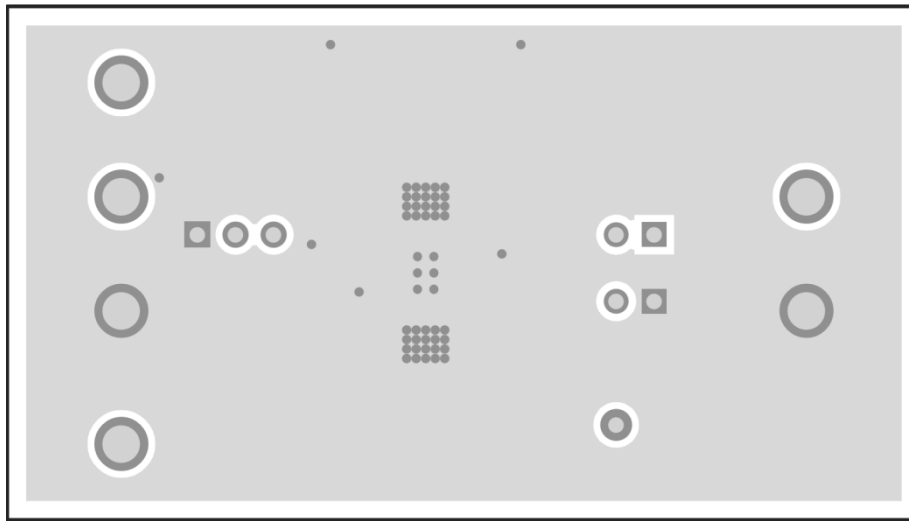


Figure 3. TPS7B4253-Q1 EVM Bottom Layer Routing

4 Schematic and Bill of Materials

Figure 4 illustrates the TPS7B4253QPWPRQ1 EVM schematic.

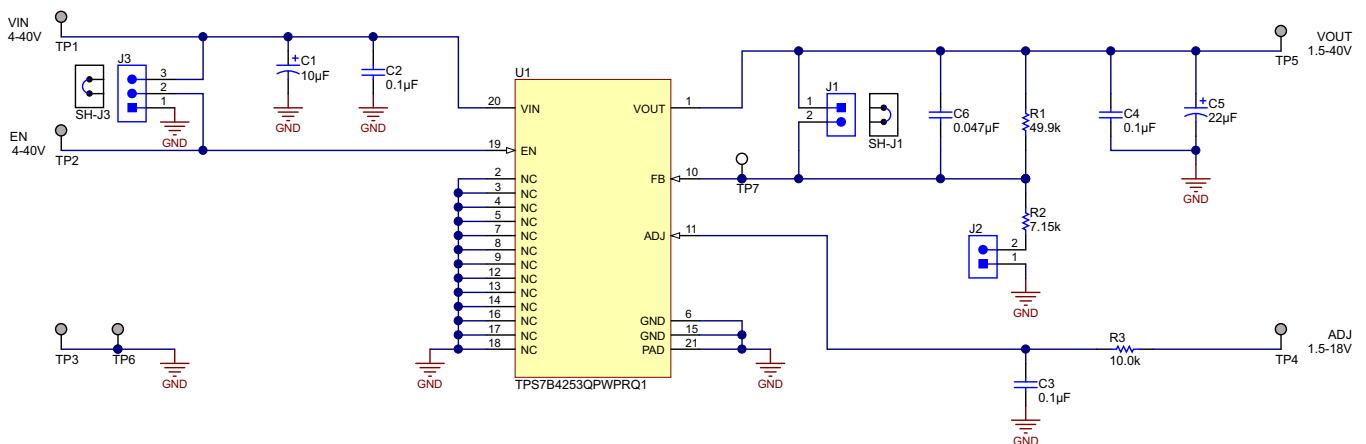


Figure 4. TPS7B4253QPWPRQ1 EVM Schematic

Table 2 lists the TPS7B4253-Q1 EVM BOM.

Table 2. Bill of Materials⁽¹⁾

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer	Alternate Part Number	Alternate Manufacturer
!PCB	1		Printed Circuit Board		HVL103	Any		
C1	1	10uF	CAP, AL, 10 µF, 63 V, +/- 20%, 1.5 ohm, SMD	SMT Radial D	EEE-FK1J100P	Panasonic		
C2, C3, C4	3	0.1uF	CAP, CERM, 0.1 µF, 50 V, +/- 10%, X7R, 0603	0603	GRM188R71H104KA93D	MuRata		
C5	1	22uF	CAP, AL, 22 µF, 50 V, +/- 20%, 0.88 ohm, SMD	SMT Radial D	EEE-FK1H220P	Panasonic		
C6	1	0.047uF	CAP, CERM, 0.047 µF, 50 V, +/- 10%, X7R, 0603	0603	GRM188R71H473KA61D	MuRata		
J1, J2	2		Header, 100mil, 2x1, Gold, TH	2x1 Header	TSW-102-07-G-S	Samtec		
J3	1		Header, 100mil, 3x1, Gold, TH	3x1 Header	TSW-103-07-G-S	Samtec		
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650"H x 0.200"W	THT-14-423-10	Brady		
R1	1	49.9k	RES, 49.9 k, 1%, 0.1 W, 0603	0603	CRCW060349K9FKEA	Vishay-Dale		
R2	1	7.15k	RES, 7.15 k, 1%, 0.1 W, 0603	0603	CRCW06037K15FKEA	Vishay-Dale		
R3	1	10.0k	RES, 10.0 k, 1%, 0.1 W, 0603	0603	CRCW060310K0FKEA	Vishay-Dale		
SH-J1, SH-J3	2	1x2	Shunt, 100mil, Gold plated, Black	Shunt	969102-0000-DA	3M	SNT-100-BK-G	Samtec
TP1, TP2, TP3, TP4, TP5, TP6	6	Double	Terminal, Turret, TH, Double	Keystone1502-2	1502-2	Keystone		
TP7	1	White	Test Point, Miniature, White, TH	White Miniature Testpoint	5002	Keystone		
U1	1		300mA Low Dropout Voltage Tracking LDO, PWP0020D	PWP0020D	TPS7B4253QPWPRQ1	Texas Instruments		None
FID1, FID2, FID3	0		Fiducial mark. There is nothing to buy or mount.	Fiducial	N/A	N/A		

⁽¹⁾ Unless otherwise noted in the Alternate Part Number and/or Alternate Manufacturer columns, all parts may be substituted with equivalents.

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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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