This user’s guide describes the operational use of the TPS7B82EVM-024 evaluation module (EVM) as a reference design for engineering demonstration and evaluation of the TPS7B8233QKVURQ1, low-dropout linear regulator (LDO). Included in this user’s guide are setup and operating instructions, layout guidelines, a printed circuit board (PCB) layout, a schematic diagram, and a bill of materials (BOM).

Throughout this document, the terms demonstration kit, evaluation board, and evaluation module are synonymous with the TPS7B82EVM-024.

Table 1 lists the related documentation available through the Texas Instruments web site at www.ti.com.

Table 1. Related Documentation

<table>
<thead>
<tr>
<th>Device</th>
<th>Literature Number</th>
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<tbody>
<tr>
<td>TPS7B82-Q1</td>
<td>SLVSDQ0</td>
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</table>
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Trademarks

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1 Introduction

Texas Instruments’ TPS7B82EVM-024 EVM helps design engineers evaluate the operation and performance of the TPS7B82-Q1 linear regulator for possible use in their own circuit application. This particular EVM configuration contains a single 300-mA, high-voltage, ultra-low-I\textsubscript{Q}, low-dropout regulator for automotive systems. The regulator is capable of delivering up to 300 mA to the load with a wide V\textsubscript{IN} range of up to 40 V (45 V transient). For stability, use a 2.2-µF (or larger) output capacitor for the TPS7B82-Q1.

1.1 Before You Begin

The following warnings and cautions are noted for the safety of anyone using or working close to the TPS7B82EVM-024. Observe all safety precautions.

**Warning**

Warning Hot surface. Contact may cause burns. Do not touch.

**CAUTION**

The circuit module may be damaged by over temperature. To avoid damage, monitor the temperature during evaluation and provide cooling, as needed, for your system environment.

**CAUTION**

Some power supplies can be damaged by application of external voltages. If using more than one power supply, check your equipment requirements and use blocking diodes or other isolation techniques, as needed, to prevent damage to your equipment.

**CAUTION**

The circuit module is not a finished product or electrical appliance. The module does not contain current or voltage thresholds for circuit protection. It must be used by qualified personnel with additional equipment for evaluation only.
2 EVM Setup

This section describes how to properly connect and setup the TPS7B82EVM-024, including the jumpers and connectors on the EVM board.

2.1 Input/Output Connectors and Jumper Descriptions

2.1.1 J1: IN
Input power-supply voltage connector. Twist together the positive input lead and ground return lead from the input power supply, and keep them as short as possible to minimize input inductance.

2.1.2 J2: OUT
Regulated output voltage connector.

2.1.3 J3: Diode Bypass
Diode D1 bypass. To bypass diode D1, connect a jumper to short the two terminals of J3.

2.1.4 J4: IN_S
Input sense.

2.1.5 J5: OUT_S
Output sense.

2.1.6 J6: Short to Enable
Output enable. To enable the output, connect a jumper to short V_{IN} to EN.
There is a pulldown resistor, R1, between EN and GND so that the output is disabled when EN is not driven to a higher voltage. If making I_{GND} measurements, be sure to remove R1.

2.1.7 J7: GND
Input ground return connector.

2.1.8 J8: GND
Output ground return connector.

2.1.9 J9: Unpopulated Through-Hole Test Points
Through-hole test points that are unpopulated for debugging purposes.

2.1.10 TP1: IN_S
Input sense test point.

2.1.11 TP2: OUT_S
Output sense test point.

2.1.12 TP3: EN
Enable test point.

2.1.13 TP4: VIN
V_{IN} test point.
2.1.14 TP5: GND
Ground test point.

2.1.15 TP6: GND
Ground test point.

2.1.16 TP7: GND
Ground test point.

2.1.17 TP8: GND
Ground test point.

2.1.18 TP9: VOUT
V_{OUT} test point.

2.2 **Soldering Guidelines**
To avoid damaging the integrated circuit (IC), use a hot-air system for any solder rework to modify the
EVM for the purpose of repair or other application reasons.

2.3 **Equipment Connection**
Connect the equipment as described in the following steps:
1. Set the input power supply up to 40 V (max) and turn the power supply off.
2. Connect the positive voltage lead from the input power supply to IN at the J1 connector of the EVM.
3. Connect the ground lead from the input power supply to GND at the J7 connector of the EVM.
4. Connect a 0-A to 300-mA load between OUT at the J2 and GND at the J8 connector of the EVM.
5. Disable the output by floating J6.

3 **Operation**
Operate the equipment using the following steps:
1. Turn on the power supplies.
2. Enable the output by jumping J6 (the EN pin) to VIN.
3. Vary the respective load and input voltage, as necessary, for test purposes.
4 PCB Layout

Figure 2 to Figure 4 show the PCB layout for this EVM.

Figure 2. Assembly Layer

Figure 3. Top Layer Routing

Figure 4. Bottom Layer Routing
5 Schematic

Figure 5 is the schematic for this EVM.

Figure 5. TPS7B82EVM-024 Schematic
## Bill of Materials

Table 2 lists the BOM for this EVM.

Table 2. TPS7B82EVM-024 BOM\(^{(1)}(2)(3)(4)\)

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<th>QTY</th>
<th>Value</th>
<th>Description</th>
<th>Package Reference</th>
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<th>Manufacturer</th>
<th>Alternate Part Number</th>
<th>Alternate Manufacturer</th>
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<td>GRM21BC71E106ME11L</td>
<td>MuRata</td>
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<td>B260A-13-F</td>
<td>Diodes Inc.</td>
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<td></td>
<td>Fiducial mark. There is nothing to buy or mount.</td>
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<td>N/A</td>
<td>N/A</td>
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<tr>
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<td>Sullins Connector Solutions</td>
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</tbody>
</table>

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\(^{(1)}\) These assemblies are ESD sensitive, observe ESD precautions.

\(^{(2)}\) These assemblies must be clean and free from flux and all contaminants. Use of no-clean flux is not acceptable.

\(^{(3)}\) These assemblies must comply with workmanship standards IPC-A-610 Class 2.

\(^{(4)}\) Unless otherwise noted in the Alternate Part Number or Alternate Manufacturer columns, all parts may be substituted with equivalents.
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