TPS7A26EVM-021 Evaluation Module

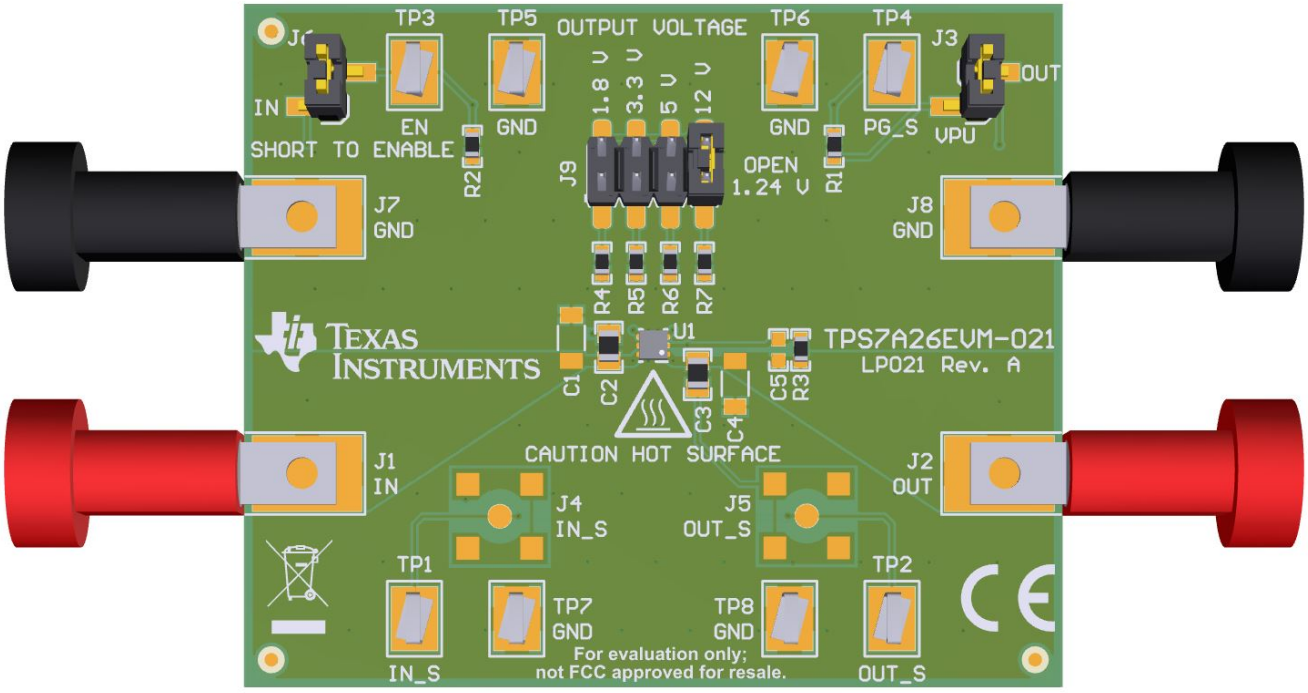

Figure 1. TPS7A26EVM-021 Evaluation Module

This user's guide describes the operational use of the TPS7A26EVM-021 evaluation module (EVM) as a reference design for engineering demonstration and evaluation of the TPS7A2601DRV, low-dropout linear regulator (LDO). Included in this user's guide are setup and operating instructions, thermal and 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 TPS7A26EVM-021.

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

Table 1. Related Documentation

Device	Literature Number
TPS7A26	SBVS290

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Trademarks

1 Introduction

Texas Instruments' TPS7A26EVM-021 EVM helps design engineers evaluate the operation and performance of the TPS7A26 family of linear regulators for possible use in their own circuit application. This particular EVM configuration contains a single low-noise, high-PSRR linear regulator for high-speed communication systems. The regulator is capable of delivering up to 500 mA to the load with low V_{IN} to V_{OUT} dropout voltage. For stability, use a 0.47-µF (or larger) output capacitor for the TPS7A26.

1.1 Before You Begin

The following warnings and cautions are noted for the safety of anyone using or working close to the TPS7A26EVM-021. 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 TPS7A26EVM-021, 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 – VPU

Pullup-voltage selector for PG. This EVM is designed so that PG can be pulled up either to VOUT by shorting J3, or pulled up to another voltage by applying an external voltage to the VPU post.

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.

2.1.7 J7 – GND

Input ground return connector.

2.1.8 J8 – GND

Output ground return connector.

2.1.9 J9 – OUTPUT VOLTAGE Set

For convenience, the EVM is prepopulated with four resistor divider options. Place a shunt on J9 next to the silkscreen label of your desired output voltage.

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 – PG_S

PG 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.

2.2 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 shown in the following steps:

1. Set the input power supply up to 18 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 500-mA load between OUT and GND.
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 illustrate the PCB layout for this EVM.

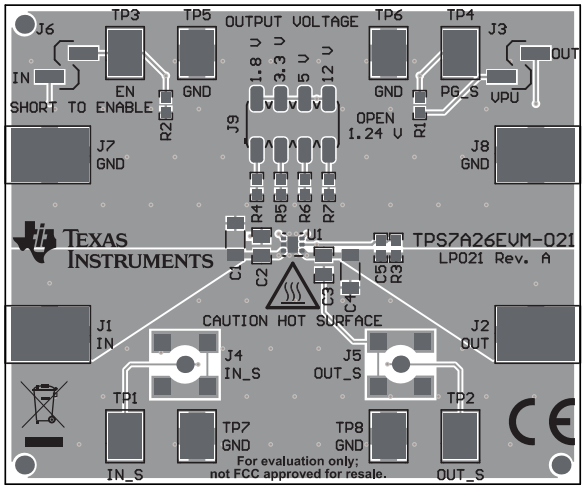

Figure 2. Assembly Layer

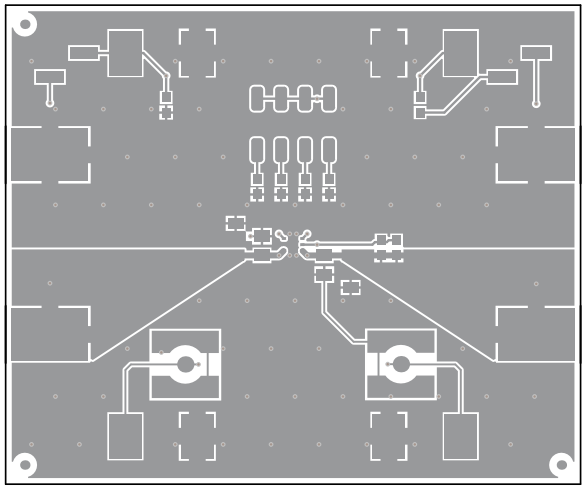

Figure 3. Top Layer Routing

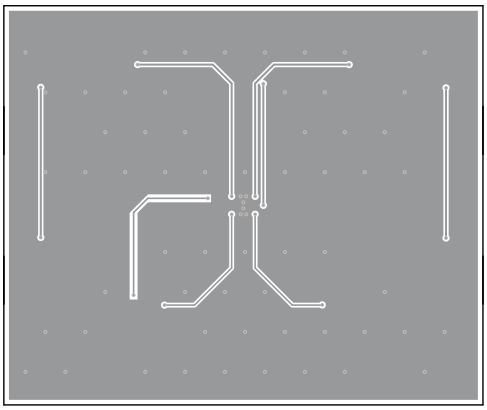

Figure 4. Bottom Layer Routing

5 Schematic

Figure 5 is the schematic for this EVM.

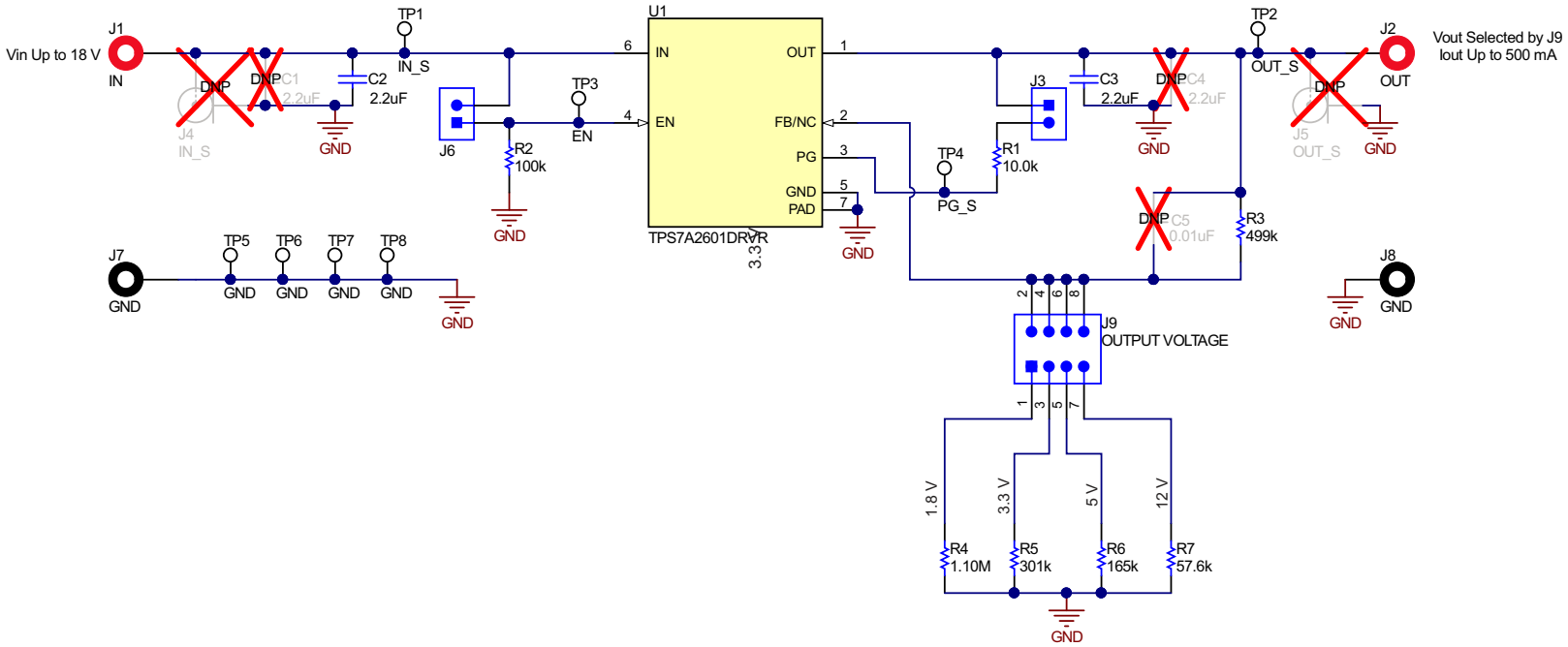

Figure 5. TPS7A26EVM-021 Schematic

6 Bill of Materials

The BOM for this EVM is shown in Table 2.

Table 2. TPS7A26EVM-021 BOM(1)(2)(3)(4)

Designator	QTY	Value	Description	Package Reference	Part Number	Manufacturer	Alternate Part Number	Alternate Manufacturer
!PCB1	1		Printed Circuit Board		LP021	Any		
C2, C3	2	2.2uF	CAP, CERM, 2.2 uF, 50 V, +/- 20%, X7R, 0805	0805		TDK		
J1, J2	2		Standard Banana Jack, Insulated, Red	6091	6091	Keystone		
J3, J6	2		Header, 2.54 mm, 2x1, Gold, R/A, SMT	Header, 2.54 mm, 2x1, R/A, SMT	878980204	Molex		
J7, J8	2		Standard Banana Jack, Insulated, Black	6092	6092	Keystone		
J9	1		Header, 2.54mm, 4x2, Gold, SMT	Header, 2.54mm, 4x2, SMT	95278-801A08LF	FCI		
R1	1	10.0k	RES, 10.0 k, 1%, 0.1 W, 0603	0603	RCG060310K0FKEA	Vishay Draloric		
R2	1	100k	RES, 100 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603100KFKEA	Vishay-Dale		
R3	1	499k	RES, 499 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603499KFKEA	Vishay-Dale		
R4	1	1.10Meg	RES, 1.10 M, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW06031M10FKEA	Vishay-Dale		
R5	1	301k	RES, 301 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603301KFKEA	Vishay-Dale		
R6	1	165k	RES, 165 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603165KFKEA	Vishay-Dale		
R7	1	57.6k	RES, 57.6 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW060357K6FKEA	Vishay-Dale		
SH-J1, SH-J2, SH-J3	3	1x2	Shunt, 100mil, Gold plated, Black	Shunt	969102-0000-DA	3M	SNT-100-BK-G	Samtec
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8	8		Test Point, Compact, SMT	Testpoint_Keystone_Compact	5016	Keystone		
U1	1		500mA, 18V, Ultra-Low-IQ, Low Drop-Out Linear Voltage Regulator With Power Good, DRV0006A (WSON-6)	DRV0006A	TPS7A2601DRVR	Texas Instruments	TPS7A2601DRVT	Texas Instruments
C1, C4	0	2.2uF	CAP, CERM, 2.2 uF, 50 V, +/- 10%, X7R, 1206	1206	C3216X7R1H225K160AB	TDK		
C5	0	0.01uF	CAP, CERM, 0.01 uF, 50 V, +/- 10%, X7R, 0603	0603	C1608X7R1H103K080AA	TDK		
FID1, FID2, FID3	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A		
J4, J5	0		Connector, SMA Jack, Vertical, Gold, SMD	SMA	142-0711-201	Cinch Connectivity		

(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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