EVM User's Guide: TPS2068E TPS2069E TPS2000E TPS2001E

Single-Channel, Power-Distribution Switch Evaluation Module

TEXAS INSTRUMENTS

Description

TPS2001EEVM-247 evaluation module (EVM) is a simple, easy to use, maximum 2A operating current power switch module with enable switch and fault indication. The default mounted device is TPS2001E, and the EVM is also for TPS2068E, TPS2069E, TPS2000E to evaluate. The EVM operates from 2.7V to 5.5V and supports maximum 2A operating current.

Features

- 2.7 V to 5.5 V input and output voltage range
- 2 A maximum operating current with current limit
- Multiple package support for SOT23-5, MSOP-8 with thermal pad and MSOP-8 without thermal pad

Applications

- PC & notebooks
- TV
- Set-top box and streaming media
- Short-circuit protection
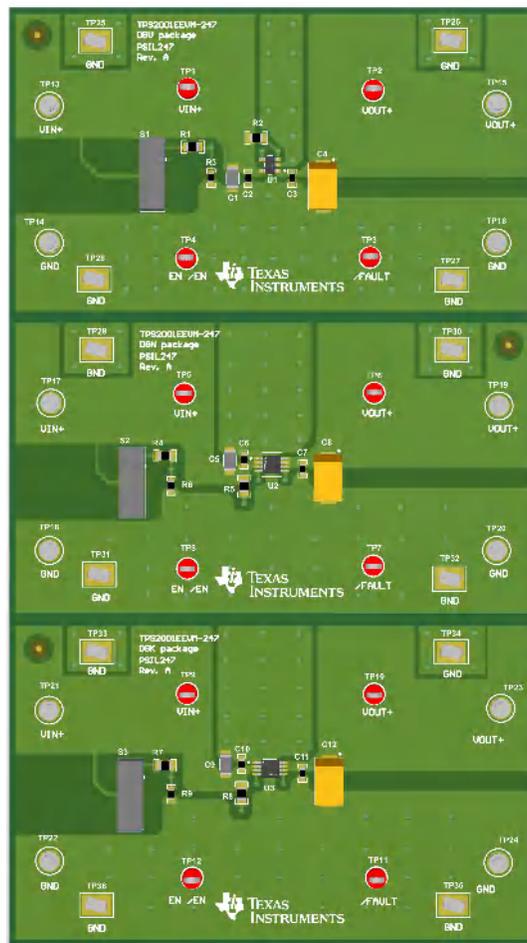
Figure 1-1. TPS2001EEVM-247 Hardware Image (Top View)

1 Evaluation Module Overview

This user's guide describes the TPS2001EEVM-247 evaluation modules (EVM). The default mounted device is TPS2001E, and the EVM is also for TPS2068E, TPS2069E, TPS2000E as well. This guide contains the EVM schematics, bill of materials, assembly drawings, and top and bottom board layouts.

1.1 Introduction

The TPS2001EEVM-247 is the evaluation module (EVM) for the Texas Instruments family of single-channel, current-limited, power distribution switches. The EVM operates over a 2.7 V to 5.5 V range and provides a continuous output current of up to 2 A (see Table 3-1). Test points provide convenient access to all critical node voltages.

The TPS2001EEVM-247 accepts an SOT23-5 packaged switch, and MSOP-8 packaged switches with or without a thermal pad. These switches have an enable input, fault status output, and overtemperature shutdown.

1.2 Kit Contents

Table 1-1. TPS2001EEVM-247 Kit Contents

Item	Description	Quantity
TPS2001EEVM-247	PCB	1

1.3 Device Information

The EVM is for TPS2001EDBV(SOT23-5), TPS2001EDGN(MSOP-8 with thermal pad), and TPS2001EDGK(MSOP-8 without thermal pad). And in view of the pin-to-pin device TPS2068E, TPS2069E, TPS2000E, the EVM is also available for these devices. The devices are in the USB power switch family for 1.5A or 2.0A operation current.The device family also has the current limit and thermal shutdown feature to help protect the main power path.

1.4 Specification

The TPS2001EEVM-247 has the following features:

- Multiple package support
- Easy to use and flexible evaluation

The EVM consists of three parts based on different packages (SOT23-5, MSOP-8 with thermal pad, MSOP-8 without thermal pad). The three parts can be separated from each other to do the evaluation for the different chip packages, respectively. For each package, the device has different enable logic (high enable or low enable). Thus, a switch is used to control the logic of enable. Based on this design, there are 12 devices (TPS2068E, TPS2069E, TPS2000E and TPS2001E; each part number has three different packages) that can be evaluated with this EVM.

2 Hardware

2.1 EVM Setup

2.1.1 Recommended Test Equipment

The following test equipment is recommended:

- Two-channel storage oscilloscope
- Current probe
- Voltage probe
- 5 V at 5-A power supply
- Volt-ohm meter
- A passive or active load

2.1.2 Measuring Current Limit

The user is advised to read the applicable data sheet (SLVSGZ7) before using the EVM.

Figure 2-1 shows the EVM test setup for measuring current limit. The power distribution switch is enabled into a short circuit for this measurement.
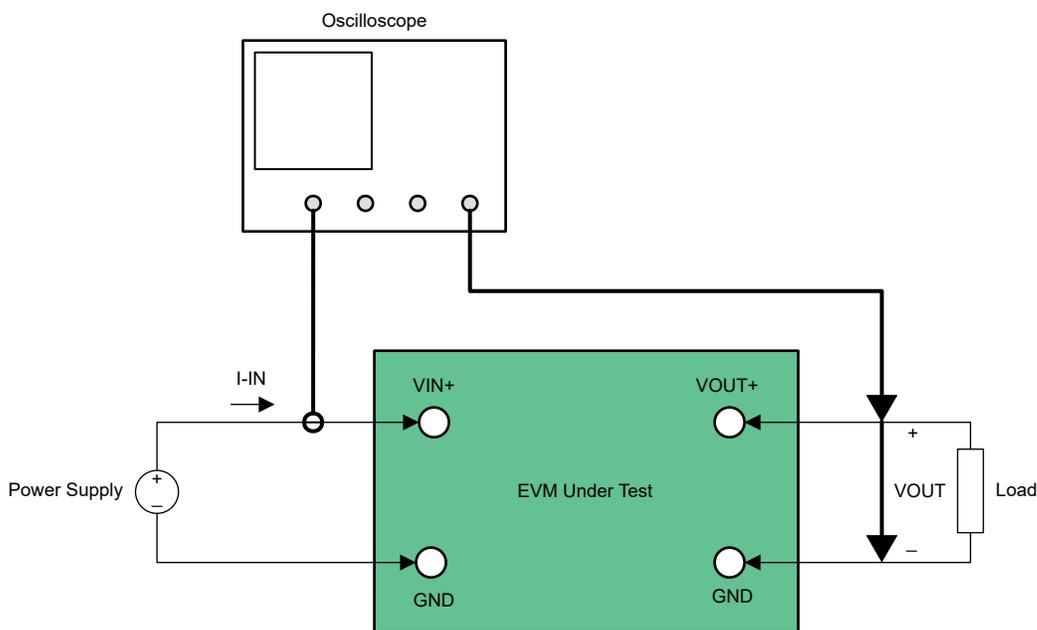
Figure 2-1. EVM Setup For Measuring Current Limit

3 Hardware Design Files

Users can request the design files at https://www.ti.com.

3.1 EVM Options

Table 3-1. TPS2001EEVM-247 Options

Device	Continuous Output Current (A)	Enable Method	Package
TPS2068EDBV	1.5	Low enable	SOT23-5
TPS2068EDBN			MSOP-8, thermal pad
TPS2068EDGK			MSOP-8, no thermal pad
TPS2069EDBV		High enable	SOT23-5
TPS2069EDGN			MSOP-8, thermal pad
TPS2069EDGK			MSOP-8, no thermal pad
TPS2000EDBV	2	Low enable	SOT23-5
TPS2000EDGN			MSOP-8, thermal pad
TPS2000EDGK			MSOP-8, no thermal pad
TPS2001EDBV		High enable	SOT23-5
TPS2001EDGN			MSOP-8, thermal pad
TPS2001EDGK			MSOP-8, no thermal pad

3.2 Schematics
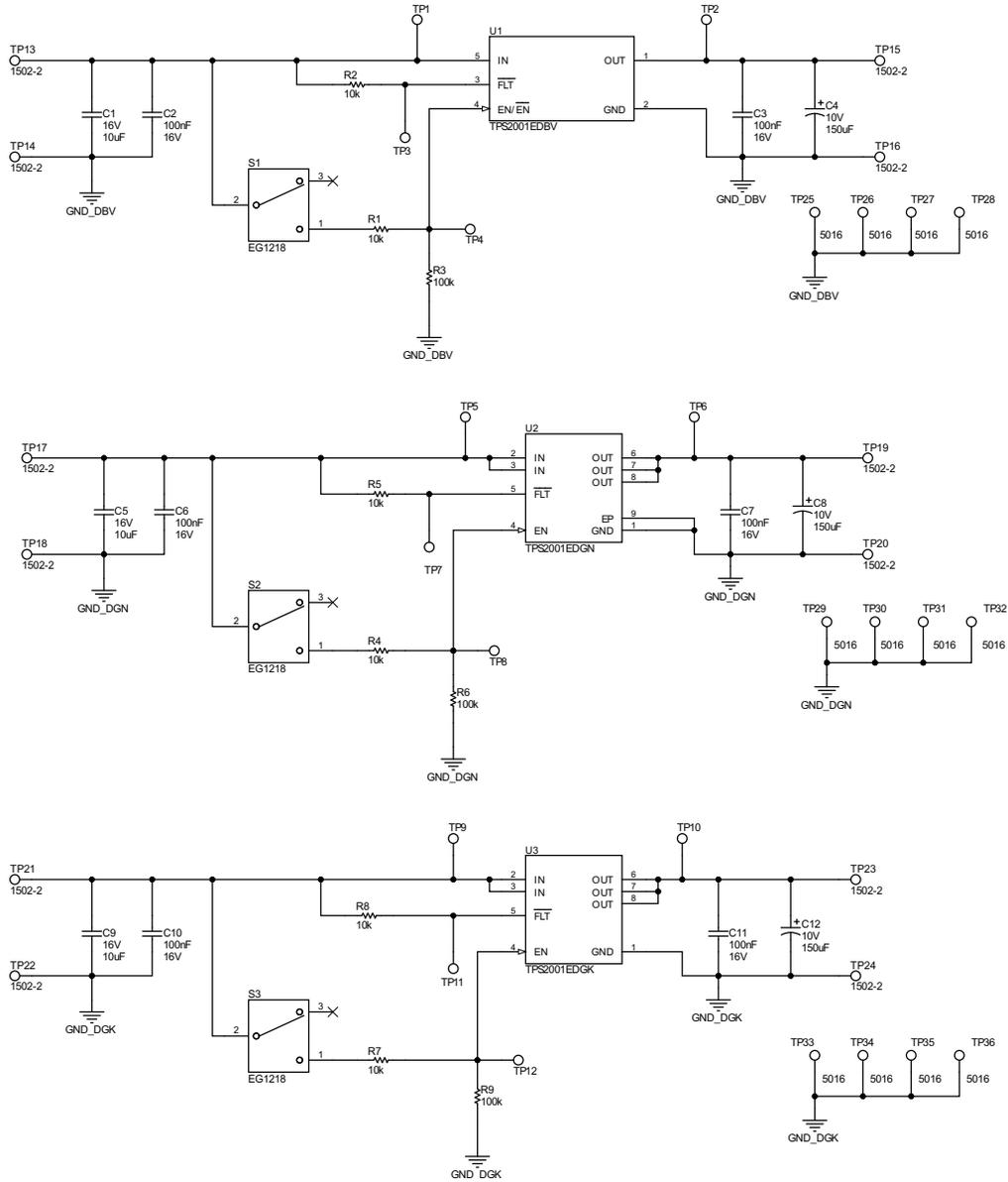
Figure 3-1. TPS2001EEVM-247 Schematic

3.3 Board Layout

This section contains three views of the TPS2001EEVM-247 evaluation boards as well as some layout considerations.

3.3.1 TPS2001EEVM-247 Board
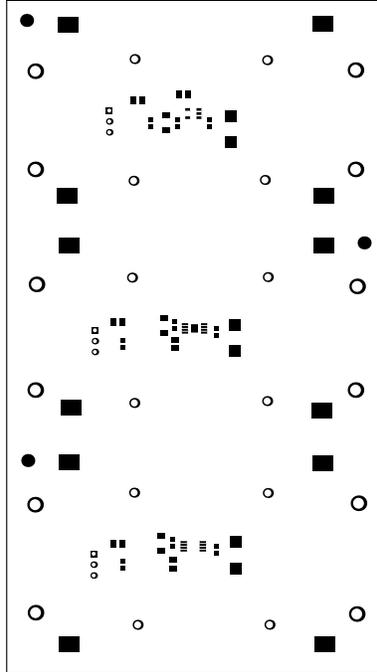
Figure 3-2. TPS2001EEVM-247 Component Placement
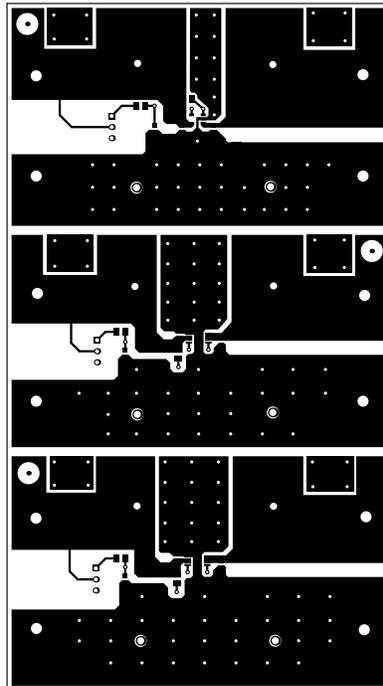
Figure 3-3. TPS2001EEVM-247 Top-Side Layout
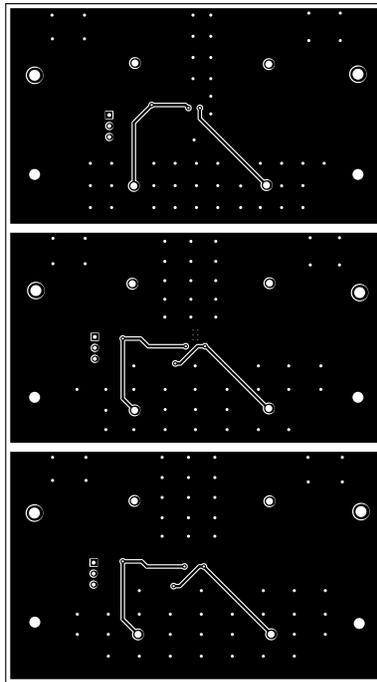
Figure 3-4. TPS2001EEVM-247 Bottom-Side Layout

3.3.2 Layout Considerations

The IN and OUT pins of U1, U2 or U3 can carry significant current, so traces to these pins must be of acceptable length and width to minimize the voltage drop to the load. Locate the 0.1-µF bypass capacitors close to the IN and OUT pins of U1, U2 or U3.

3.4 Bill of Materials

Table 3-2. TPS2001EEVM-247 Bill of Materials

Count	RefDes	Value	Description	Size	Part Number	MFR
3	C1, C5, C9	10 µF	CAP, CERM, 10 uF, 16 V, +/- 10%, X7R, 1206	1206	GRM31CR71C106KAC7L	MuRata
6	C2, C3, C6, C7, C10, C11	0.1 µF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0603	0603	CL10B104KO8NNNC	Samsung Electro-Mechanics
3	C4, C8, C12	150 µF	CAP, TA, 150 uF, 10 V, +/- 10%, 0.1 ohm, SMD	7343-31	T495D157K010ATE100	Kemet
6	R1, R2, R4, R5, R7, R8	10k	RES, 10 k, 5%, 0.125 W, 0805	0805	CRCW080510K0JNEA	Vishay-Dale
3	R3, R6, R9	100k	RES, 100 k, 5%, 0.1 W, 0603	0603	CRCW0603100KJNEA	Vishay-Dale
3	S1, S2, S3	-	Switch, SPDT, Slide, On-On, 2 Pos, TH	4x11.6mm	EG1218	E-Switch
12	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12	-	Test Point, Compact, Red, TH	Red Compact Testpoint	5005	Keystone
12	TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP23, TP24	-	Terminal, Turret, TH, Double	Keystone1502-2	1502-2	Keystone
12	TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36	-	Test Point, Compact, SMT	Testpoint_Keystone_Compact	5016	Keystone
1	U1	-	Current Limited, Power-Distribution Switch	SOT23-5	TPS2001EDBV	Texas Instruments
1	U2	-	Current Limited, Power-Distribution Switch	HVSSOP8	TPS2001EDGN	Texas Instruments
1	U3	-	Current Limited, Power-Distribution Switch	VSSOP8	TPS2001EDGK	Texas Instruments

4 Additional Information

Trademarks

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