

**ABSTRACT**

This user's guide describes the characteristics, operation, and use of the TPS22950 adjustable current limited load switch Evaluation Module (EVM). This document contains the complete EVM schematic diagram, printed-circuit board layouts, bill of materials, and necessary instructions on how to operate the EVM.

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1 Introduction

The TPS22950 EVM is a two-layer PCB containing the TPS22950 load switch device. The VIN and VOUT connections to the device and the PCB layout routing are capable of handling high continuous currents and provide a low-resistance pathway into and out of the device under test. Test point connections allow the EVM user to control the device with user-defined test conditions and make accurate R_{ON} measurements.

1.1 Description

[Table 1-1](#) lists a short description of the TPS22950 load switch performance specification. For additional details on load switch performance, application notes, and data sheet, see www.ti.com/loadswitch.

Table 1-1. TPS22950 Characteristics

EVM	Device	Rise Time Typical (μ s)	V_{IN} (V)	Output current limit (A)	Enable (ON Pin)	Fault Indication
PSIL123	TPS22950	Fixed	1.8 V to 5.5 V	Adjustable	Active High	Adjustable

1.2 Features

This EVM has the following features:

- V_{IN} input voltage range: 1.8 V to 5.5 V
- Access to the VIN, VOUT, ON, FLT, GND, and ILIM pins of the TPS22950 load switch
- Onboard CIN and COUT capacitors
- Adjustable current limiting

2 Electrical Performance

See the [TPS22950 5 V, 2 A, 40-mΩ Adjustable Current Limited Load Switch Data Sheet](#) for detailed electrical characteristics of the TPS22950.

3 Schematic

Figure 3-1 illustrates the TPS22950EVM schematic.

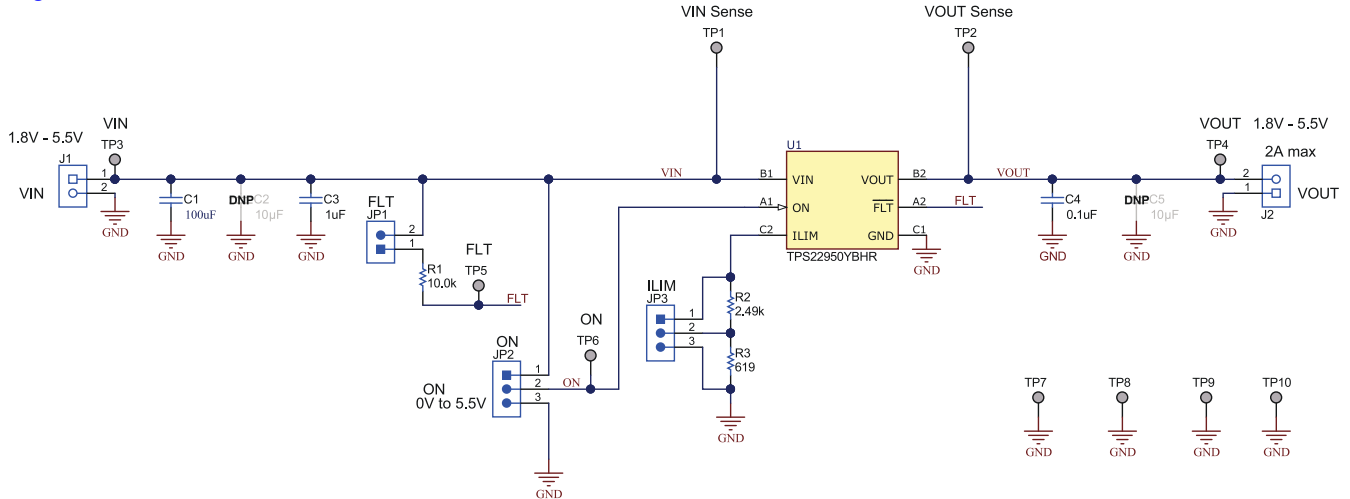


Figure 3-1. TPS22950EVM Schematic

4 PCB Layout

Figure 4-1 and Figure 4-2 show the PCB layout images.

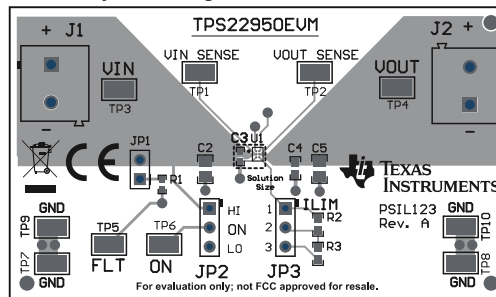


Figure 4-1. TPS22950EVM Top Layout

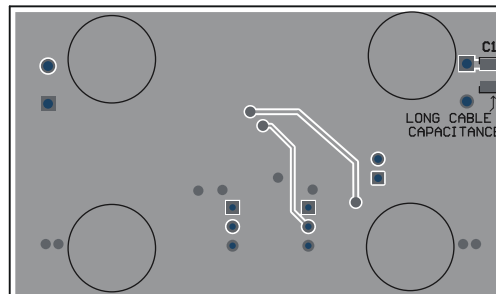


Figure 4-2. TPS22950EVM Bottom Layout

4.1 Setup

This section describes the jumpers and connectors on the EVM as well as how to properly connect, set up and use the EVM. [Table 4-1](#) describes the input and output connectors and jumpers. [Table 4-2](#) describes the different test points and functionality. [Table 4-3](#) describes the jumper functionality and configurations.

Table 4-1. TPS22950EVM Input and Output Connector Functionality

Input	Connector and Test Point	Label	Description
VIN	J1	+/-	Input block header for VIN
	TP1	VIN Sense	Sense test point for VIN
	TP3	VIN	Input test point for VIN
VOUT	J2	+/-	Output block header for VOUT
	TP2	VOUT Sense	Sense test point for VOUT
	TP4	VOUT	Output test point for VOUT
GND	TP7, TP8, TP9, TP10	GND	Test point for GND

Table 4-2. TPS22950EVM Test Point Description

Input	Test Point	Label	Description
VIN	TP5	ON	Enable signal test point
	TP6	FLT	Fault test point

Table 4-3. TPS22950EVM Jumper Configuration

Input	Jumper	Label	Description
VIN	JP1	JP1	FLT signal pull up resistor
	JP2	ON	ON-pin enable signal <ul style="list-style-type: none"> Position 1 and 2 sets ON-pin HI Position 2 and 3 sets ON-pin LO
ILIM	JP3	ILIM	Current limit control <ul style="list-style-type: none"> Position 1 and 2 sets 2A limit Position 2 and 3 sets 0.5A limit

5 Operation

Connect the VIN power supply to the J1 terminal (VIN). The input voltage range of the TPS22950EVM is 1.8 V to 5.5 V.

External output loads can be applied to the switch by using the J2 terminal (VOUT). Adjust the current limit on the TPS22950EVM accordingly. When the ON pin is asserted high, the output of the TPS22950 is enabled.

6 Test Configurations

6.1 On-Resistance (R_{on}) Test Setup

[Figure 6-1](#) shows the typical setup for measuring on-resistance. The voltage drop across the switch is measured using the sense connections, and this can be divided by the load current to calculate the R_{on} resistance.

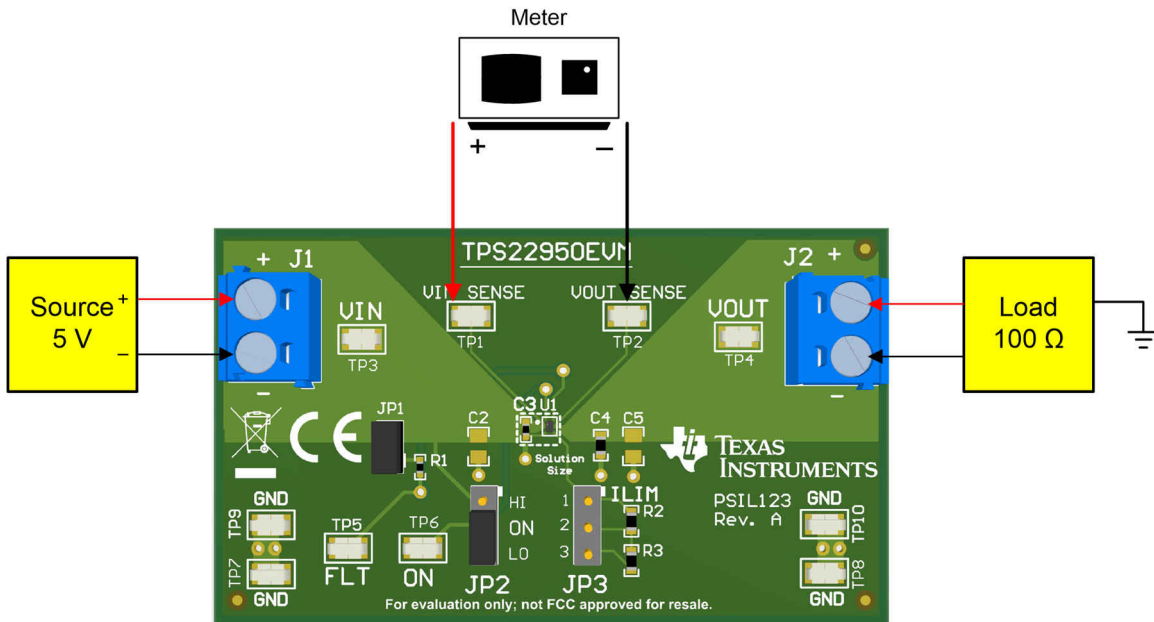


Figure 6-1. R_{on} Test Setup

6.2 Rise Time Test Setup

Figure 6-2 shows the test setup for measuring the rise time of the TPS22950. Apply a squarewave to the ON pin of the switch using a function generator and apply a voltage to the VIN terminal using a power supply. Observe the waveform at VOUT Sense (TP2) with an oscilloscope to measure the slew rate and rise time of the switch with a given input voltage.

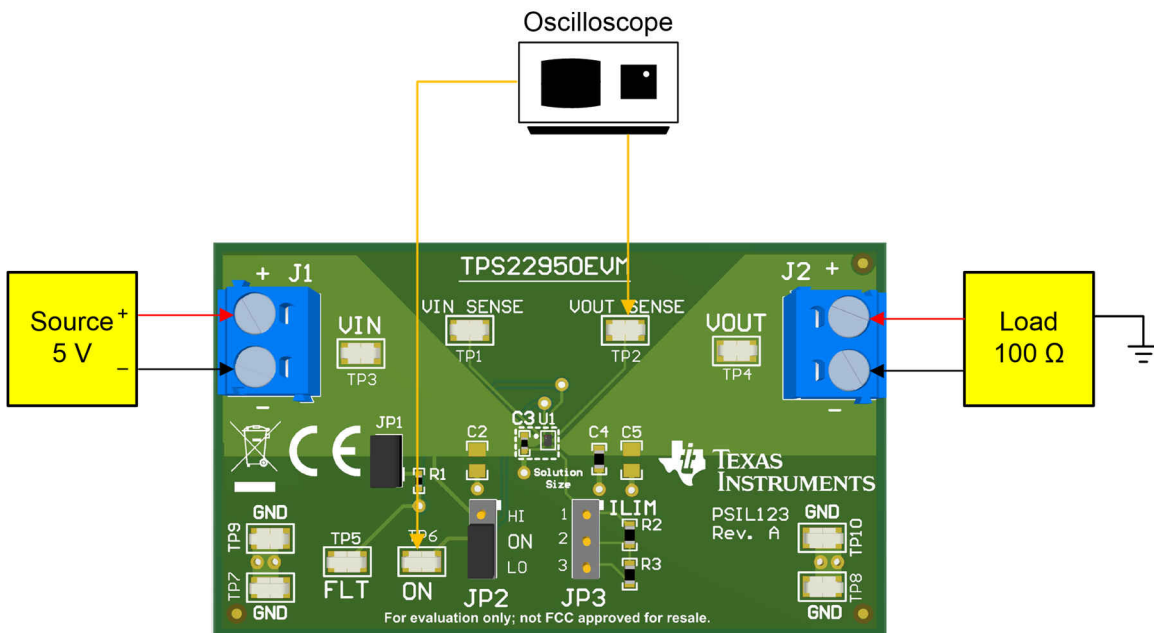


Figure 6-2. Rise Time Test Setup

7 Bill of Materials (BOM)

Table 7-1 lists the TPS22950EVM BOM.

Table 7-1. TPS22950EVM BOM

Designator	QTY	Value	Description	Package Reference	Part Number	Manufacturer
!PCB1	1		Printed Circuit Board		PSIL123	Any
C1	1	100uF	CAP, CERM, 100 uF, 16 V, +/- 20%, X5R, 1210	1210	C1210C107M4PAC7800	Kemet
C2, C5	2	10uF	CAP, CERM, 10 uF, 20 V, +/- 10%, X5R, 0805	0805	GRM21BR61D106KE15L	MuRata
C3	1	1uF	CAP, CERM, 1 uF, 16 V, +/- 10%, X5R, 0402	0402	EMK105BJ105KVHF	Taiyo Yuden
C4	1	0.1uF	CAP, CERM, 0.1 uF, 25 V, +/- 10%, X7R, 0603	0603	06033C104KAT2A	AVX
FID1, FID2, FID3	3		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
H1, H2, H3, H4	4		Bumpon, Hemisphere, 0.44 X 0.20, Clear	Transparent Bumpon	SJ-5303 (CLEAR)	3M
J1, J2	2		Terminal Block, 5 mm, 2x1, Tin, TH	Terminal Block, 5 mm, 2x1, TH	691 101 710 002	Wurth Elektronik
JP1	1		Header, 100mil, 2x1, Tin, TH	Header, 2 PIN, 100mil, Tin	PEC02SAAN	Sullins Connector Solutions
JP2, JP3	2		Header, 100mil, 3x1, TH	Header, 3x1, 100mil, TH	800-10-003-10-001000	Mill-Max
R1	1	10.0k	RES, 10.0 k, 0.1%, 0.063 W, 0402	0402	MCR01MRTF1002	Rohm
R2	1	2.49k	RES, 2.49 k, 0.1%, 0.1 W, 0603	0603	RG1608P-2491-B-T5	Susumu Co Ltd
R3	1	619	RES, 619, 1%, 0.1 W, 0603	0603	CRCW0603619RFKEA	Vishay-Dale
SH-J1, SH-J2	2	1x2	Shunt, 100mil, Flash Gold, Black	Closed Top 100mil Shunt	SPC02SYAN	Sullins Connector Solutions
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10	10		Test Point, Miniature, SMT	Test Point, Miniature, SMT	5019	Keystone
U1	1		5V, 2A, 40-mΩ Adjustable Current Limited Load Switch	DSBGA6	TPS22950YBHR	Texas Instruments

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