Using the TPS2556EVM-423 and TPS2557EVM-423

User's Guide



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This user's guide describes the TPS2556EVM-423 and TPS2557EVM-423 evaluation modules (EVM). This guide contains the EVM schematic, list of materials, assembly drawing, and top and bottom board layouts.

1 Introduction

The TPS2556EVM-423 and TPS2557EVM-423 are evaluation modules (EVM) for Texas Instruments' power-distribution switches with adjustable current-limit. These EVMs operate over a 2.5-V to 6.5-V range. An on-board jumper sets the output current-limit to either 0.5 A or 1 A. The board is designed for the 5-A capability of the TPS2556 or TPS2557. Test points provide convenient access to all critical node voltages.

2 Description

The PCB top-side accepts a power-distribution switch in a SON-8 (DRB) package with a thermal pad. These switches have an enable input, an over-current status output, and over-temperature shutdown. The switches operate in current limit mode only.

TPS2556EVM-423 is enabled active lo. TPS2557 is enabled active hi.

2.1 Switches

Table 1. Switches

ENABLE	SWITCH POSITION
TPS2556	LO
TPS2557	HI

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2.2 Jumpers

Table 2. Jumpers

CURRENT	J2
0.1 A	ON
1.0 A	OFF

2.3 Test Points

Table 3. Test Points

TEST POINT	PIN
TP1	VIN
TP1	EN
TP3	$\overline{\text{FLT}}$
TP4	ILIM
TP5	VOUT
TP6	GND
TP7	GND
TP8	GND
TP9	GND

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3 Schematic

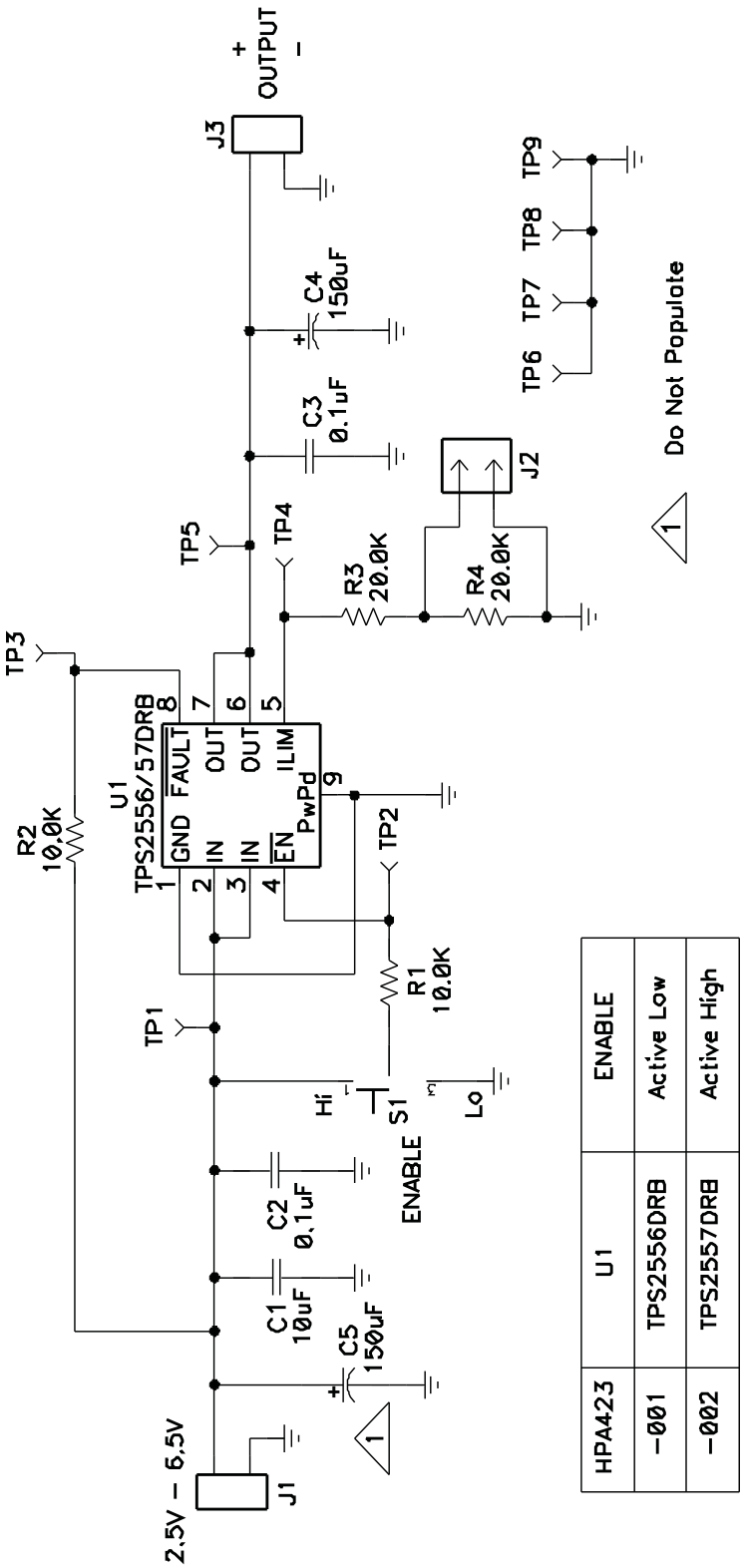


Figure 1. Schematic

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4 Getting Started

Preset the power supply to 5 V and turn off. Connect the power supply output to the input terminals of the HPA423.

Slide S1 to disable the TPS2556 or TPS2557. Turn on the power supply to apply 5.0 V to the EVM input-power terminals. VOUT should be 0 V.

Slide S1 to enable the device. For TPS2556, set S1 to LO; for TPS2557, set S1 to HI. VOUT should be VIN + / - 0.3 V.

Set the oscilloscope to auto trigger mode and the horizontal-sweep to 4 ms/div. Set all vertical channels for 2 V/div except the current probe set for 200 mA/div

4.1 Monitor

1. Input voltage at TP1
2. Output voltage at TP5
3. EVM input current
4. FAULT# status voltage at test point TP3

4.2 Verify EVM Output

1. Set the scope for normal trigger, single sweep. Trigger on VOUT, negative slope at about a 3.5-V level.
2. Momentarily short the output connector. A sample scope trace is shown in . Observe VOUT drops to 0 V
3. Input current rises to an amplitude of 400 mA + / - 50 mA, within 0 to 4 ms after VOUT low.
4. FAULT signal is low 2 ms to 20 ms after VOUT low.

5 Performace Data and Characteristics Curves

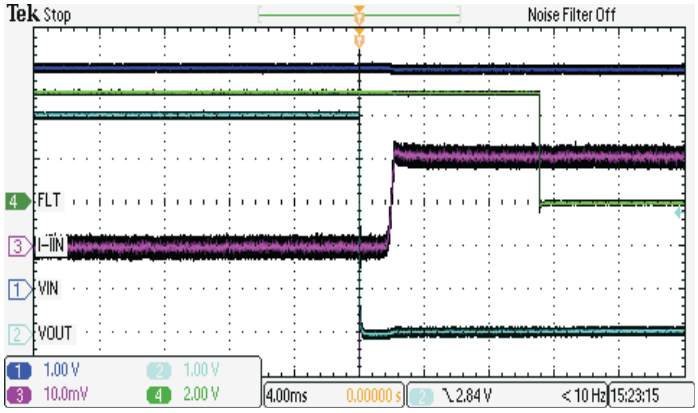


Figure 2. 100-kΩ R_{ILIM} Enabled Into a Short Circuit

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6 EVM Assembly Drawing and PCB Layout

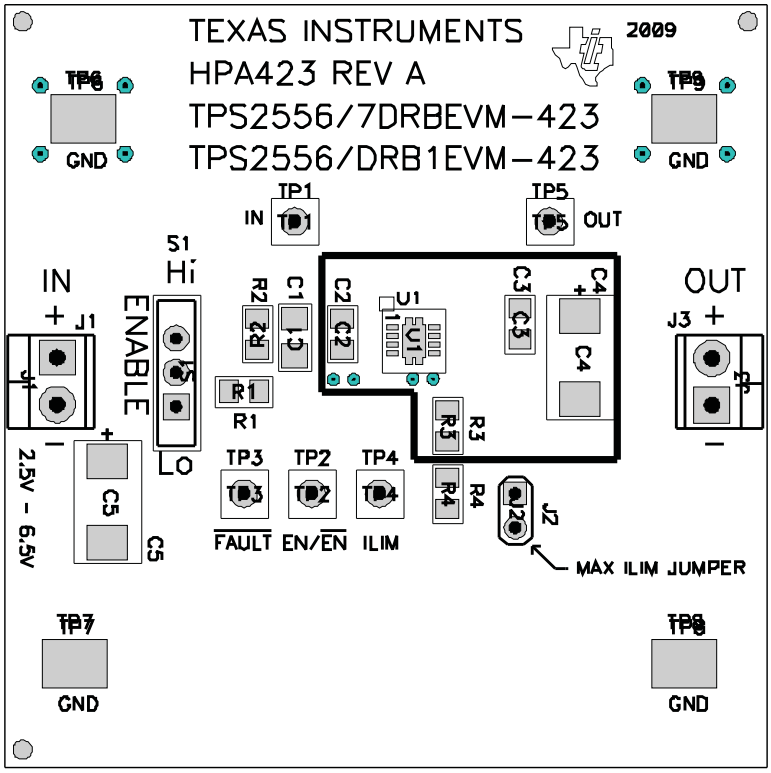


Figure 3. Top Layer Assembly (top view)

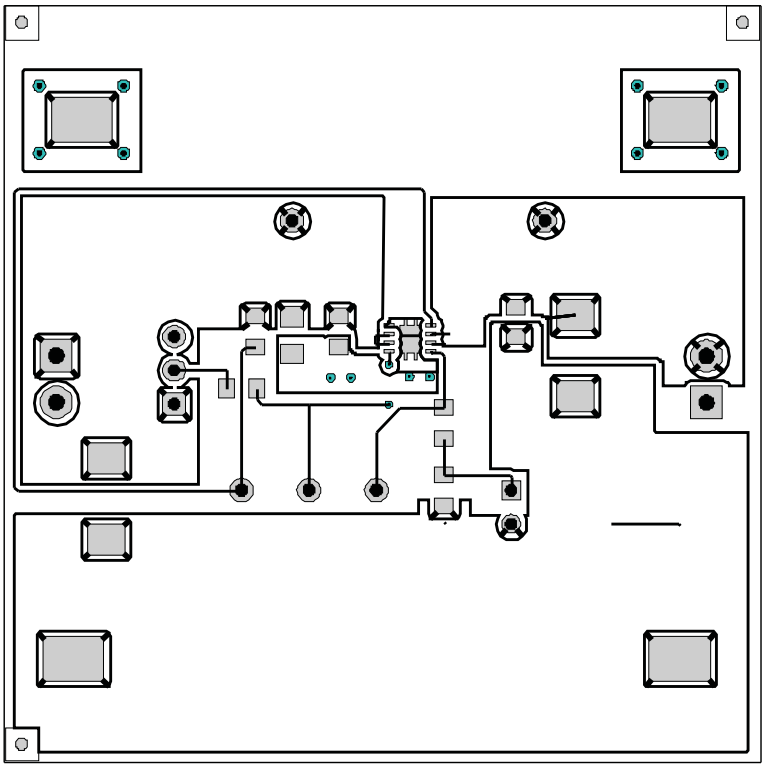


Figure 4. Top Copper (top view)

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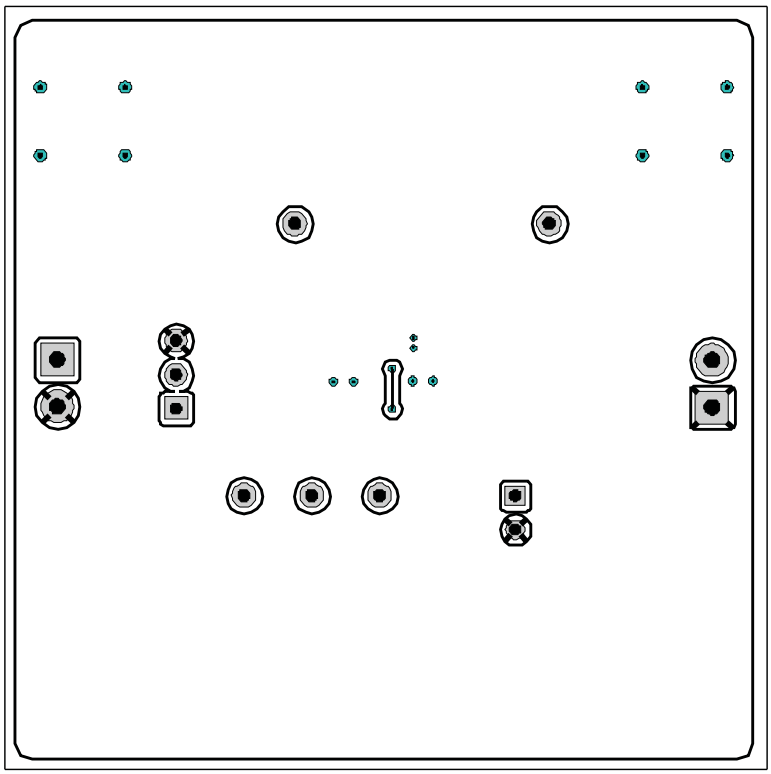


Figure 5. Bottom Copper (top view)

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7 List of Materials

Table 4. List of Materials

-002	-001	REF DES	DESCRIPTION	PART NUMBER	MFR
1	1	C1	Capacitor, ceramic, X7R, 10 V, 10%, 10 µF, 1206	STD	STD
2	2	C2, C3	Capacitor, ceramic, 16 V, X7R, 10%, 0.1 µF, 0805	STD	STD
1	1	C4	Capacitor, tantalum, 10 V, 100 mΩ, 10%, 150 µF, 7343 (D)	B45197A2157K409	KEMET
0	0	C5	Capacitor, tantalum, 10 V, 100 mΩ, 10%, 150 µF, 7343 (D)	B45197A2157K409	KEMET
2	2	J1, J3	Terminal block, 2 pin, 6 A, 3.5 mm, 0.27 inch x 0.25 inch	ED555/2DS	OST
1	1	J2	Header, male 2 pin, 100-mil spacing, 0.100 inch x 2 inch	PEC02SAAN	Sullins
2	2	R1, R2	Resistor, chip, 1/10 W, 1%, 10 kΩ, 0805	STD	STD
2	2	R3	Resistor, chip, 1/10 W, 1%, 24.9 kΩ, 0805	STD	STD
1	1	R4	Resistor, chip, 1/10 W, 1%, 75 kΩ, 0805	STD	STD
1	1	S1	Switch, SPDT, slide, PC-mount, 500 mA, 0.457 inch x 0.157 inch	EG1218	E-SWITCH
5	5	TP1, TP2, TP3, TP4, TP5	Test point, white, thru hole color keyed, 0.100 x 0.100 inch	5002	Keystone
4	4	TP6, TP7, TP8, TP9	Test point, SM, 0.150 x 0.090, 0.185 inch x 0.135 inch	5016	Keystone
0	1	U1	Current-Limited, Power-Distribution Switches, DRB	TPS2556DRB	TI
1	0	U1	Current-Limited, Power-Distribution Switches, DRB	TPS2557DRB	TI
1	1		PCB, 2.25 inch x 2.22 inch x 0.062 inch	HPA423	Any
1	1		Shunt, 100 mil, black, 0.100	929950-00	3M

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EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of 2.5 V_{DC} to 6.23 V_{DC} and the output current of 5 A .

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 100 °C. The EVM is designed to operate properly with certain components above as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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