

Using the TPS2560EVM-424 and TPS2561EVM-424

User's Guide



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This user's guide describes the TPS2560EVM-424 and TPS2561EVM-424 evaluation modules (EVM). This guide contains the EVM schematic, list of materials, assembly drawing, and top and bottom board layouts.

1 Introduction

The TPS2560EVM-424 and TPS2561EVM-424 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 TPS2560 or TPS2561. Test points provide convenient access to all critical node voltages.

2 Description

The PCB top-side accepts a power-distribution switch in a SON-10 (DRC) package with a thermal pad. These switches have dual enable, outputs and over-current status outputs. They have a single over-temperature shutdown and operate in current limit mode only. Outputs may be connected in parallel for twice the current output.

TPS2560 is enabled active LO while TPS2561 is enabled active HI.

2.1 Switches

Table 1. Switches

ENABLE	S2 POSITION – OUT1	S1 POSITION –OUT2
TPS2560	LO	LO
TPS2561	HI	HI

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
TP2	EN2
TP3	FLT2
TP4	ILIM
TP5	VOUT2
TP6	GND
TP	GND
TP8	GND
TP9	GND
TP10	EN1
TP11	FLT1
TP12	VOUT1

3 Schematic

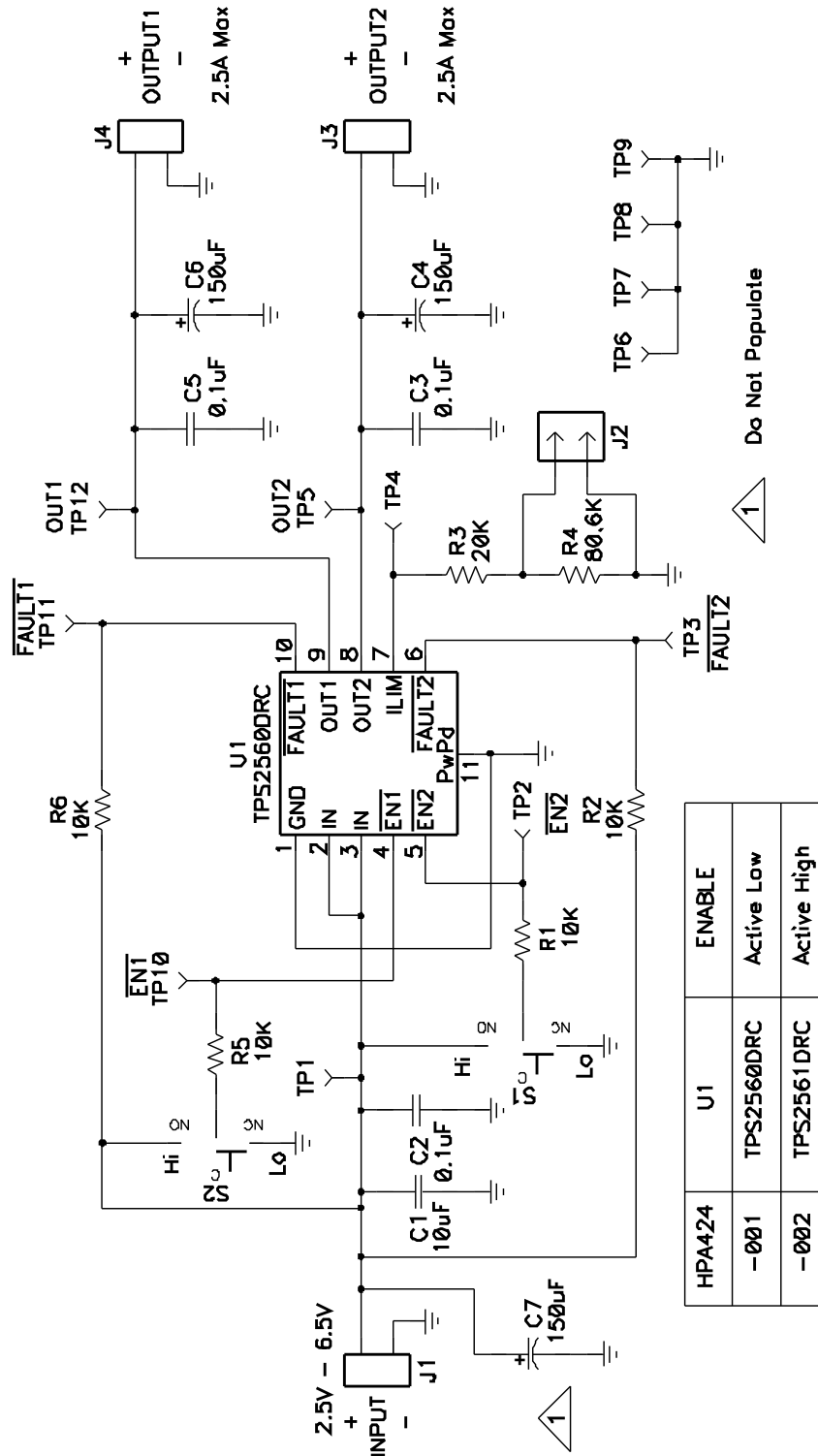


Figure 1. Schematic

4 Getting Started

Preset the power supply to 5 V and turn off. Connect the power supply output to the input terminals of the HPA424. Remove jumper J2.

Slide S1 and S2 to disable the TPS2556 or TPS2557. Turn on the power supply to apply 5.0 V to the EVM input-power terminals. VOUT1 should be 0 V.

Slide S2 to enable the device. For TPS2556, set S1 to LO; for TPS2557, set S1 to HI. VOUT1 should be $V_{IN} + / - 0.3$ 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 500 mA/div.

4.1 Monitor

1. Input voltage at TP1
2. Output voltage at TP12
3. EVM input current
4. FAULT# status voltage at test point TP11

4.2 Verify EVM Output

1. Set the scope for normal trigger, single sweep. Trigger on VOUT1, negative slope at about a 3.5-V level.
2. Momentarily short the output connector. A sample scope trace is shown in [Figure 2](#). Observe VOUT1 drops to 0 V.
3. Input current rises to an amplitude of 1.25 A \pm 0.25 A, within 0 to 4 ms after VOUT low.
4. FAULT1 signal is low 2 ms to 20 ms after VOUT low.

5 Performance Data and Typical Characteristics Curves

VOUT2 can be verified the same way as VOUT1.

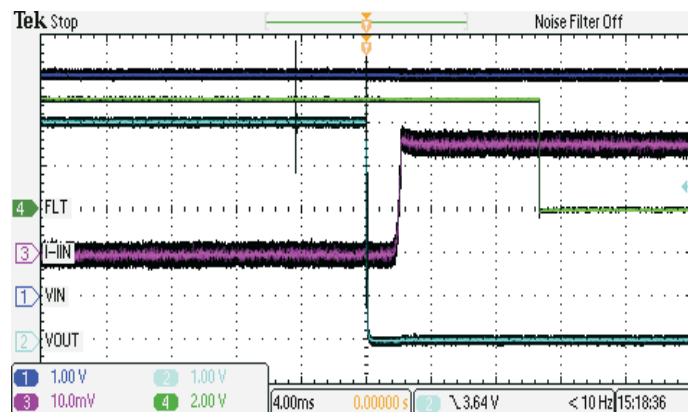


Figure 2. 100-k Ω R_{ILIM} Enabled into a Short Circuit

6 EVM Assembly Drawing and PCB Layout

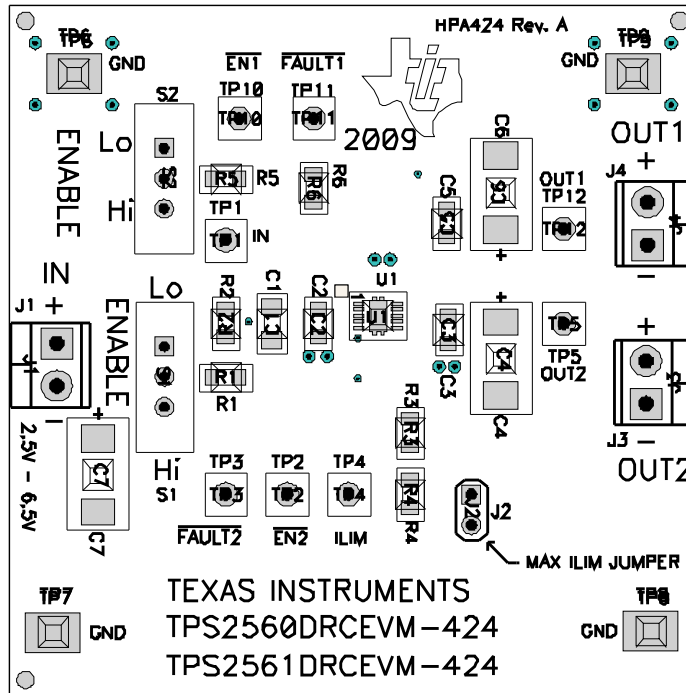


Figure 3. Top Layer Assembly (top view)

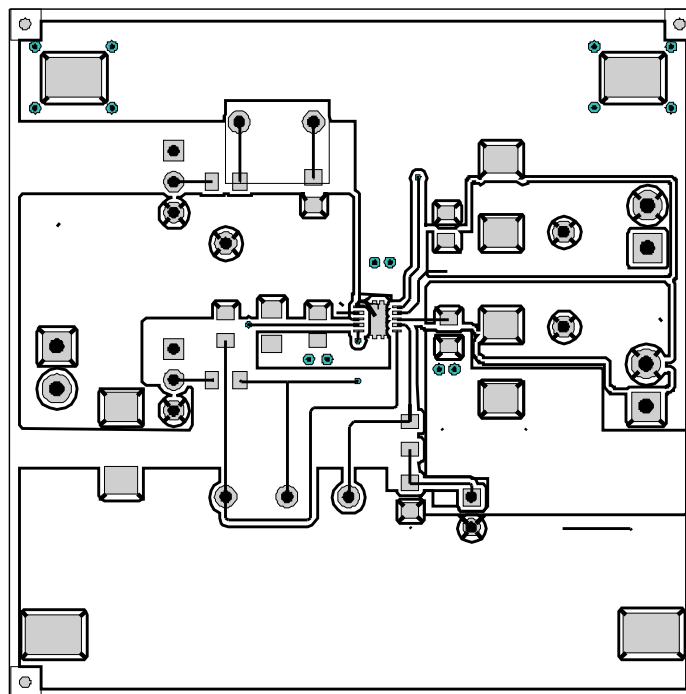


Figure 4. Top Copper (top view)

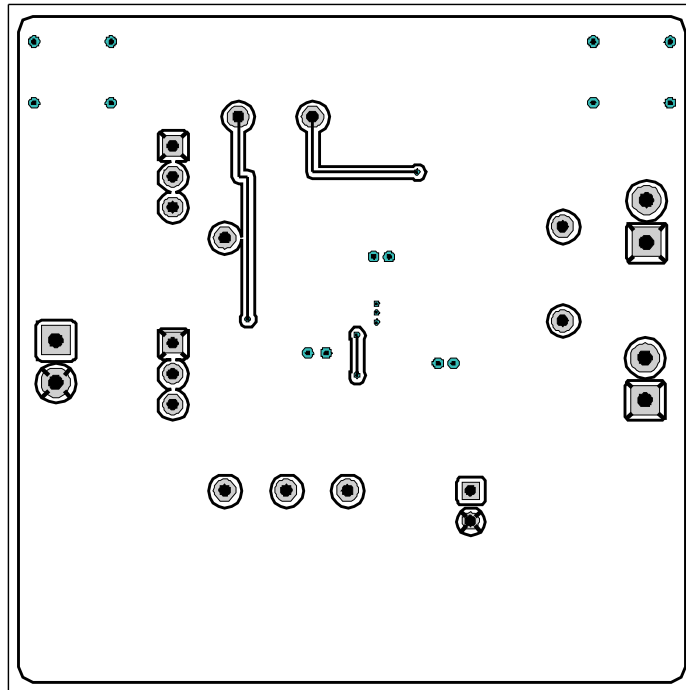


Figure 5. Bottom Copper (top view)

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 μ F, 1206	STD	STD
3	3	C2, C3, C5	Capacitor, ceramic, 16 V, X7R, 10%, 0.1 μ F, 0805	STD	STD
2	2	C4, C6,	Capacitor, tantalum, 10 V, 100 m Ω , 10%, 150 μ F, 7343 (D)	B45197A2157K409	KEMET
0	0	C7	Capacitor, tantalum, 10 V, 100 m Ω , 10%, 150 μ F, 7343 (D)	B45197A2157K409	KEMET
3	3	J1, J3, J4	Terminal block, 2 pin, 6 A, 3.5 mm, 0.27 x 0.25 inch	ED555/2DS	OST
1	1	J2	Header, male 2 pin, 100-mil spacing, 0.100 inch x 2	PEC02SAAN	Sullins
4	4	R1, R2, R5, R6	Resistor, chip, 1/10 W, 1%, 10 k Ω , 0805	STD	STD
1	1	R3	Resistor, chip, 1/10 W, 1%, 20 k Ω , 0805	STD	STD
1	1	R4	Resistor, chip, 1/10 W, 1%, 80.6 k Ω , 0805	STD	STD
2	2	S1, S2	Switch, SPDT, slide, PC mount, 500 mA, 0.457 x 0.157 inch	EG1218	E-SWITCH
8	8	TP1, TP2, TP3, TP4, TP5, TP10, TP11, TP12	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 x 0.135 inch	5016	Keystone
0	1	U1	Current-Limited, Power-Distribution Switches	TPS2560DRC	TI
1	0	U1	Current-Limited, Power-Distribution Switches	TPS2561DRC	TI
1	1	--	PCB, 2.25 In x 2.22 In x 0.062 In	HPA424	Any
1	1	--	Shunt, 100-mil, black	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 6.25 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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