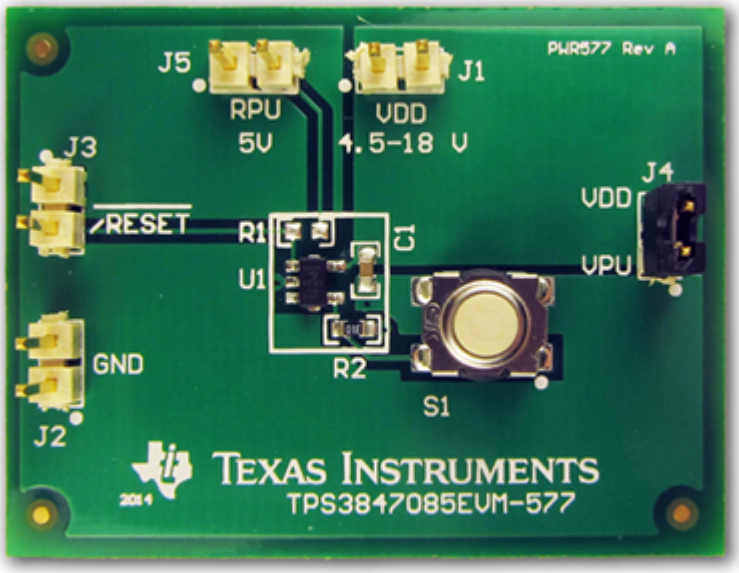
TPS3847085EVM-577 Evaluation Module



This user's guide describes the operational use of the TPS3847085EVM-577 evaluation module (EVM) as a reference design for engineering demonstration and evaluation of the TPS3847085, an ultralow-power, wide supply voltage, supervisory circuit. Included in this user's guide are setup instructions, a schematic diagram, printed circuit board (PCB) layout drawings, and a bill of materials for the EVM.

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1 Introduction

The Texas Instruments TPS3847085EVM-577 EVM helps design engineers to evaluate the operation and performance of the TPS3847xxx family of supervisors for possible use in their own circuit applications. This particular EVM configuration contains the TPS3847085 supervisor with an internal push-pull $\overline{\text{RESET}}$ output, in a 5-pin, DBV (SOT-23) package. The TPS3847xxx is an ultralow quiescent current, supervisory circuit with a fixed threshold voltage. The threshold voltage is indicated by the last three digits of the part number. In this case, 085 indicates the 8.5-V, fixed-threshold version; other values indicate various fixed thresholds. This document describes the configuration and setup of the TPS3847085EVM-577 EVM board.

2 Hardware

This section describes the connectors on the EVM, as well as how to properly connect, set up, and use the TPS3847085EVM-577.

2.1 Input and Output Connectors

2.1.1 J1—VDD

The power-supply connection and the signal that is being monitored by the TPS3847085. $\overline{\text{RESET}}$ transitions low when the power-supply voltage drops below the threshold. Two pins are provided to allow space for multiple connections. Note that the device data sheet uses VCC to denote the power supply. In this case, VCC and VDD are functionally equivalent.

2.1.2 J2—GND

Return connector for the input power supply. Two pins are provided to allow space for multiple connections.

2.1.3 J3—$\overline{\text{RESET}}$

This connector is the $\overline{\text{RESET}}$ output. Connect this output to a multimeter, oscilloscope, or external circuit to verify that $\overline{\text{RESET}}$ goes low when VDD goes below the threshold. Two pins are provided to allow space for multiple connections.

2.1.4 J4—VPU

VPU is the test point connection to the $\overline{\text{MR}}$ pin. If manual reset is required, then an external source is required. Connect this external source to the VPU terminal. If manual reset is not required, place a shorting jumper on J4 connecting VPU (and thus $\overline{\text{MR}}$) to VDD.

2.1.5 J5—RPU

This connector is used for the pull-up version of the TPS3847, and is not connected for the push-pull version. Connect the RPU terminal to a power supply; the voltage on this power supply is the logic-high value for $\overline{\text{RESET}}$. Two pins are provided to allow space for multiple connections.

2.2 Components

2.2.1 S1

This switch is normally open and connected to $\overline{\text{MR}}$ and GND. Use this switch to trigger a manual reset event instead of using an external supply.

2.2.2 C1

This 100-nF input capacitor is connected to VDD and GND. Although not required for proper device operation, this capacitor helps reduce the impedance of the input supply line. Use this capacitor in order to reduce the effects of the periodic increased quiescent current when the reference voltage is refreshed.

2.2.3 R1

This 47-kΩ resistor is used only for the pull-up version of the TPS3847, and is not installed on this EVM.

2.2.4 R2

This 1-MΩ resistor connects the VPU jumper (J4) to the $\overline{MR}$ pin and S1. This resistor allows $\overline{MR}$ to be shorted to GND without drawing excessive amounts of current from the power supply connected to VPU.

3 Setup and Test

- Set the input power supply voltage to 0 V. Connect the positive voltage lead from the power supply to J1 (VDD). Connect the ground lead from the power supply to J2 (GND).
- Short VPU to VDD using a jumper, or connect it to a separate power supply.
- Connect a voltmeter across J3 ($\overline{RESET}$) and J2 (GND).
- Vary the input power-supply voltage as necessary for test purposes.
- Vary the power supply connected to VPU as necessary, or use S1 to short $\overline{MR}$ to GND in order to test the manual reset functionality.

4 Operation

The TPS3847085EVM-577 is a fixed, single-rail monitor, and triggers a reset when its own supply rail VDD falls below the set threshold of 8.5 V. An internal push-pull $\overline{RESET}$ circuit eliminates the need for a pull-up resistor.

5 Board Layout

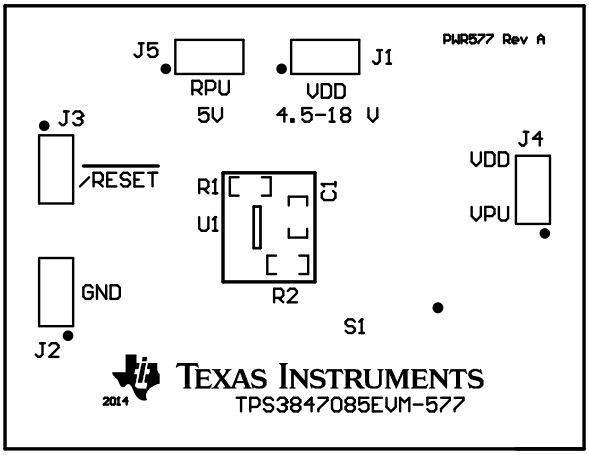

Figure 1. Top Silkscreen

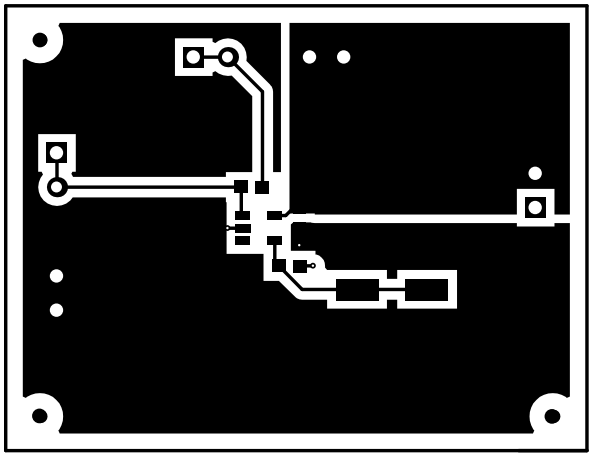

Figure 2. Top Layer Routing

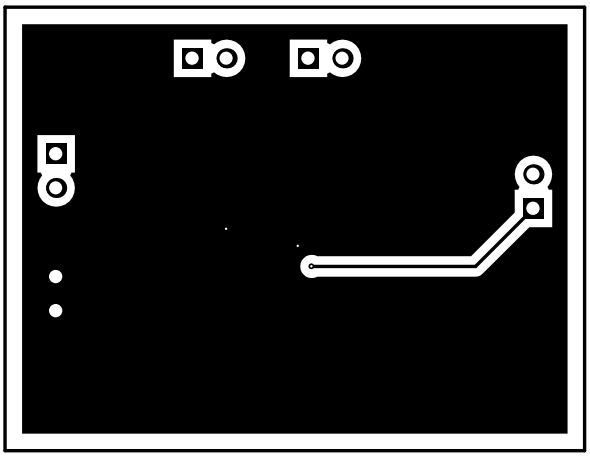

Figure 3. Bottom Layer Routing

6 Schematic

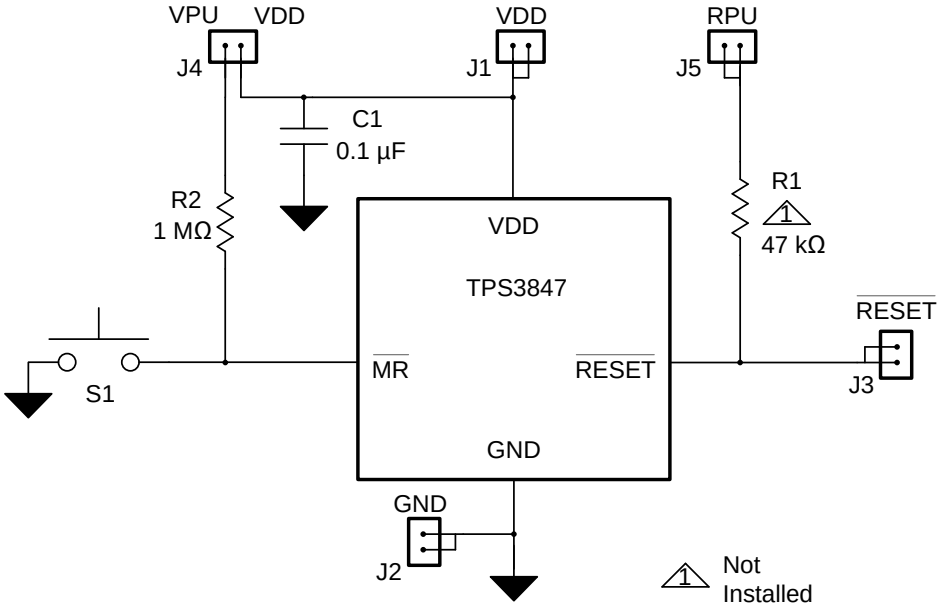

Figure 4. TPS3847085EVM-577 Schematic

7 Bill of Materials

Table 1. TPS3847085EVM-577 Bill of Materials(1)(2)(3)

Qty	Designator	Value	Description	Size	Part Number	Manufacturer
1	C1	100 nF	Capacitor, Ceramic Chip, 20V, X5R, ±10%	402	STD	STD
5	J1, J2, J3, J4, J5		Header, Male 2-pin, 100mil spacing,	0.100 inch x 2	PEC02SAAN	Sullins
0	R1	47 kΩ	RES 47K OHM 1/20W 5% 0201 SMD	0603	ERJ-1GEJ473C	Panasonic
1	R2	1 MΩ	RES, 1.00Meg ohm, 1%, 0.1W, 0603	0603	CRCW06031M00FKEA	Vishay-Dale
1	S1SH-J4	1 x 2	Shunt, 100mil, Gold plated, Black	Shunt	969102-0000-DA	3M
1	S1		Switch, Tactile, SPST-NO, 1VA, 32V, SMT	6.3 x 5.36 x 6.6 mm, SMT	KT11P2JM34LFS	C&K Components
1	U1(4)		IC, Supply Voltage Supervisory Circuit, 8.5V	SOT23-5	TPS3847085DBV	TI
1			PCB, 1.30 in x 1.645 in x 0.062 in	1.30 in x 1.70 in x 0.062 in	PWR577	Any

(1) These assemblies are electrostatic-discharge (ESD) sensitive; observe ESD precautions.
(2) These assemblies must be clean and free from flux and all contaminants. Do not use no-clean flux.
(3) These assemblies must comply with workmanship standards IPC-A-610 Class 2.
(4) Cannot be substituted. All other components can be substituted with equivalent manufacturer components.

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Caution

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications could void the user's authority to operate the equipment.

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Industry Canada Compliance (English)

For EVMs Annotated as IC – INDUSTRY CANADA Compliant:

This Class A or B digital apparatus complies with Canadian ICES-003.

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Concerning EVMs Including Radio Transmitters

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

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Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Canada Industry Canada Compliance (French)

Cet appareil numérique de la classe A ou B est conforme à la norme NMB-003 du Canada

Les changements ou les modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner l'équipement.

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Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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2. Use EVMs only after user obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after user obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless user gives the same notice above to the transferee. Please note that if user does not follow the instructions above, user will be subject to penalties of Radio Law of Japan.

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