

## TPS82085EVM-672 Evaluation Module

The TPS82085EVM-672 (PWR672-001) facilitates the evaluation of the TPS82085 MicroSiP™ module. The device outputs a 1.2-V output voltage at up to 3-A of output current from input voltages between 2.5 V and 6 V.

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## 1 Introduction

The TPS82085 is a synchronous, step-down module in a 2.8- x 3.0- x 1.33-mm package. The inductor and IC are included in the device.

### 1.1 Performance Specification

[Table 1](#) provides a summary of the TPS82085EVM-672 performance specifications.

**Table 1. Performance Specification Summary**

| Specification           | Test Conditions | Min | Typ | Max  | Unit |
|-------------------------|-----------------|-----|-----|------|------|
| Input Voltage           |                 | 2.5 |     | 6    | V    |
| Output Voltage Setpoint |                 |     | 1.2 |      | V    |
| Output Current          |                 | 0   |     | 3000 | mA   |

## 1.2 Modifications

The printed-circuit board (PCB) for this EVM is designed to accommodate some modifications by the user. Additional input and output capacitors can be added.

### 1.2.1 Input and Output Capacitors

C4 is provided for an additional input capacitor. This capacitor is not required for proper operation but can be used to reduce the input voltage ripple.

C5, C6, C7, and C8 are provided for additional output capacitors. These capacitors are not required for proper operation but can be used to reduce the output voltage ripple and to improve the load transient response. The total output capacitance must remain within the recommended range in the data sheet for proper operation.

## 2 Setup

This section describes how to properly use the TPS82085EVM-672.

### 2.1 Input/Output Connector Descriptions

|                                |                                                                                                                                                                                                                                                                                                             |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>J1 – VIN</b>                | Positive input connection from the input supply for the EVM                                                                                                                                                                                                                                                 |
| <b>J2 – S+/S-</b>              | Input voltage sense connections. Measure the input voltage at this point.                                                                                                                                                                                                                                   |
| <b>J3 – GND</b>                | Return connection from the input supply for the EVM                                                                                                                                                                                                                                                         |
| <b>J4 – VOUT</b>               | Output voltage connection                                                                                                                                                                                                                                                                                   |
| <b>J5 – S+/S-</b>              | Output voltage sense connections. Measure the output voltage at this point.                                                                                                                                                                                                                                 |
| <b>J6 – GND</b>                | Output return connection                                                                                                                                                                                                                                                                                    |
| <b>J7 – PG/GND</b>             | The PG output appears on pin 1 of this header with a convenient ground on pin 2                                                                                                                                                                                                                             |
| <b>JP1 – EN</b>                | EN pin input jumper. Place the supplied jumper across ON and EN to turn on the IC. Place the jumper across OFF and EN to turn off the IC.                                                                                                                                                                   |
| <b>JP2 – PG Pullup Voltage</b> | PG pin pullup voltage jumper. Place the supplied jumper on JP2 to connect the PG pin pullup resistor to Vin. Alternatively, the jumper can be removed and a different voltage can be supplied on pin 1 to pull up the PG pin to a different level. This externally applied voltage should remain below 6 V. |

### 2.2 Setup

To operate the EVM, set jumpers JP1 and JP2 to the desired position per [Section 2.1](#). Connect the input supply to J1 and J3 and connect the load to J4 and J6.

### 3 TPS82085EVM-672 Test Results

The TPS82085EVM-672 was used to take all the data in the TPS82085 data sheet ([SLVSCN4](#)). See the device data sheet for the performance of this EVM.

Figure 1 shows the thermal performance of the EVM. "Spot" shows the temperature of the PCB.

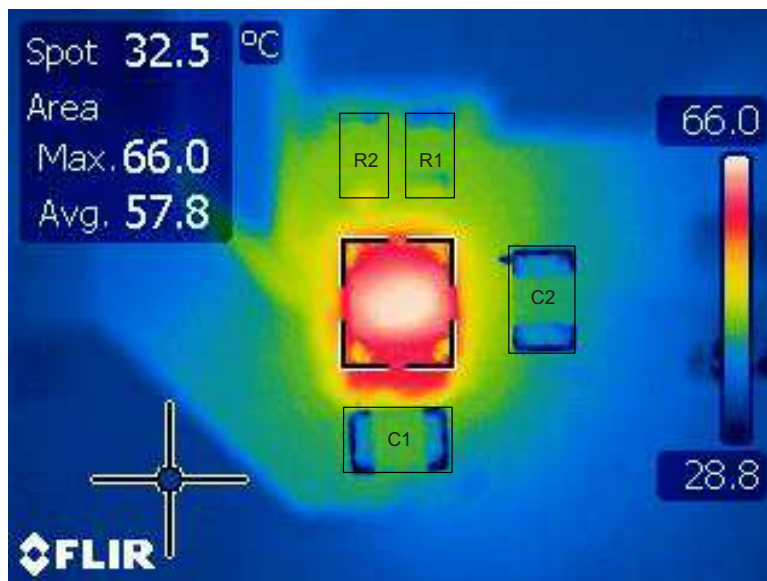


Figure 1. Thermal Performance ( $V_{IN} = 5\text{ V}$ ,  $I_{OUT} = 3000\text{ mA}$ )

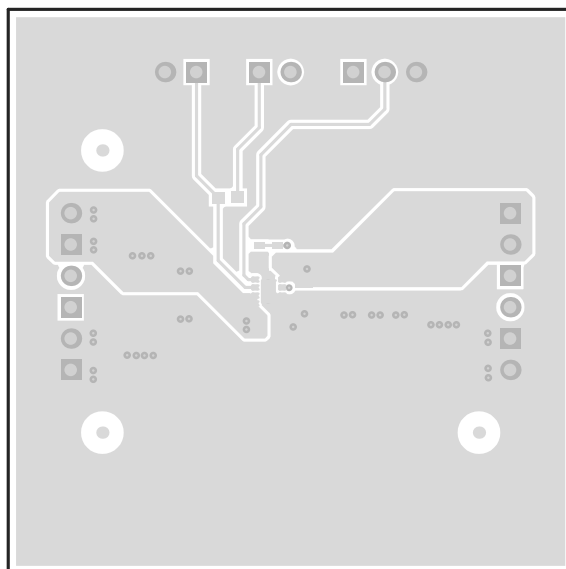
**WARNING**



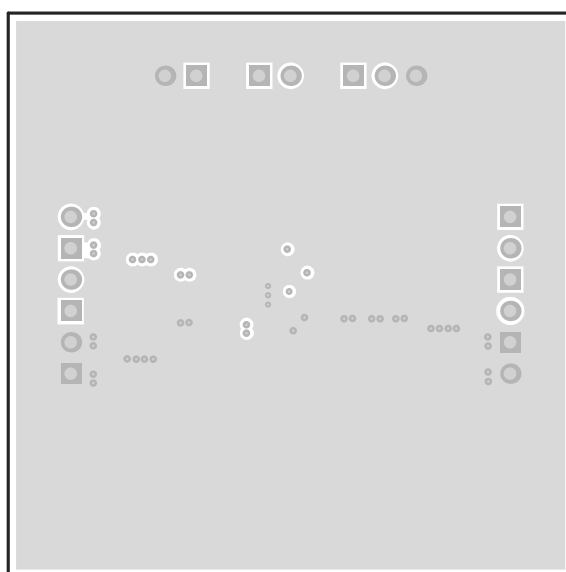
**Hot surface. Contact may cause burns. Do not touch!**

This section provides the TPS82085EVM-672 board layout and illustrations in [Figure 2](#) through [Figure 7](#). The Gerbers are available on the EVM product page: [TPS82085EVM-672](#). Rev B of the PCB changed the land pattern of the TPS82085 to use solder mask defined (SMD) pads. This gives better assembly results during reflow.

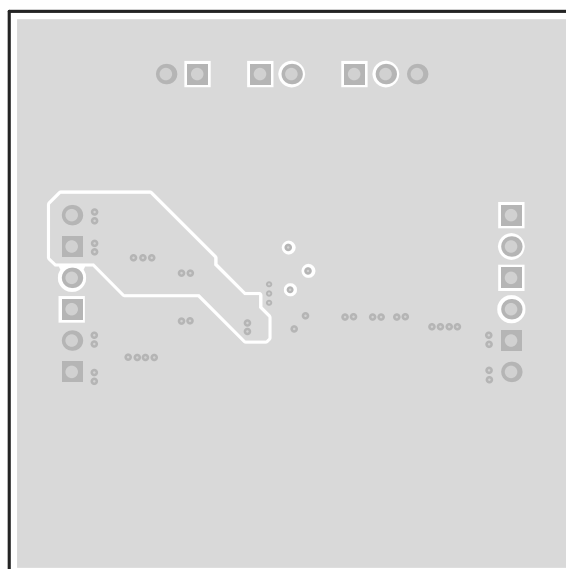




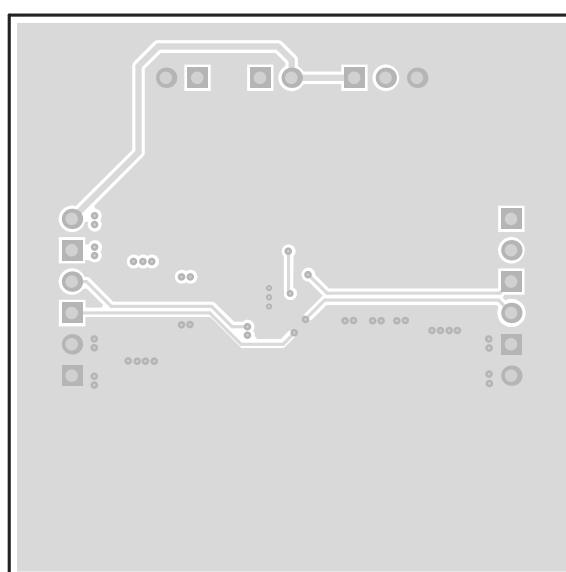
**Figure 4. Top Layer**



**Figure 5. Layer 1**



**Figure 6. Layer 2**



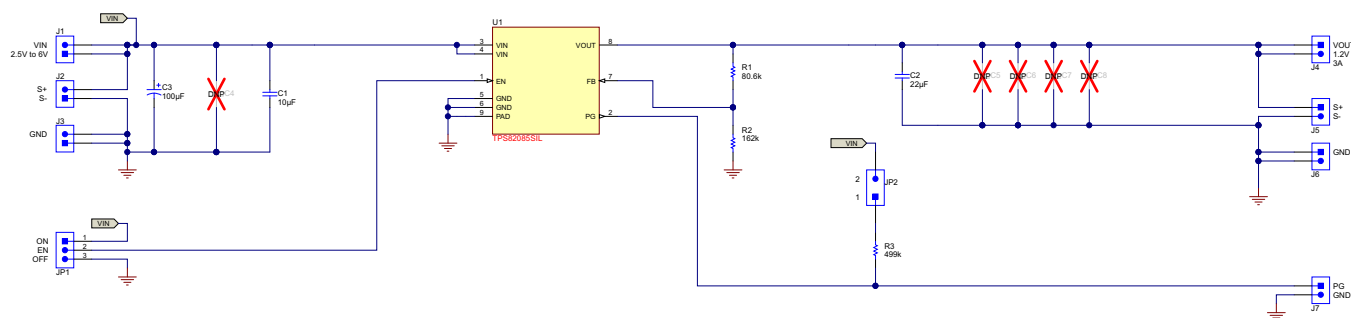
**Figure 7. Bottom Layer**

## 5 Schematic and Bill of Materials

This section provides the TPS82085EVM-672 schematic and bill of materials (BOM).

### 5.1 Schematic

Figure 8 illustrates the EVM schematic.



**Figure 8. TPS82085EVM-672 Schematic**

## 5.2 Bill of Materials

Table 2 lists the BOM for this EVM.

### Table 2. TPS82085EVM-672 Bill of Materials

| Ref Des | Qty | Value    | Description                                                             | Size       | Part Number                            | Manufacturer      |
|---------|-----|----------|-------------------------------------------------------------------------|------------|----------------------------------------|-------------------|
| C1      | 1   | 10uF     | CAP, CERM, 10 µF, 10 V, +/- 10%, X7R                                    | 0805       | GRM21BR71A106KE51                      | MuRata            |
| C2      | 1   | 22uF     | CAP, CERM, 22 µF, +/- 20%, X7x                                          | 0805       | CL21B226MQQNNNE or C2012X7S1A226M125AC | Samsung or TDK    |
| C3      | 1   | 100uF    | CAP, TA, 100uF, 10V, +/-10%, 0.075 ohm, SMD                             | 6032-28    | TPSC107K010R0075                       | AVX               |
| R1      | 1   | 80.6k    | RES, 80.6 k, 1%, 0.1 W, 0603                                            | 0603       | Std                                    | Std               |
| R2      | 1   | 162k     | RES, 162 k, 1%, 0.1 W, 0603                                             | 0603       | Std                                    | Std               |
| R3      | 1   | 499k     | RES, 499 k, 1%, 0.1 W, 0603                                             | 0603       | Std                                    | Std               |
| U1      | 1   | TPS82085 | 3A, High Efficiency Step Down Converter Module with Integrated Inductor | 3 x 2.8 mm | TPS82085SIL                            | Texas Instruments |

## Revision History

### Changes from A Revision (April 2015) to B Revision

Page

- Changed MicroSIL™ To: MicroSIP™ in the document abstract ..... 1
- Deleted text "and enable bypass mode" from JP1–EN in [Section 2.1](#) ..... 2

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

## Revision History

### Changes from Original (December 2015) to A Revision

Page

- Changed *Thermal Performance* ( $V_{IN} = 5\text{ V}$ ,  $I_{OUT} = 3000\text{ mA}$ ) image. .... 3
- Changed PCB layout images in *Board Layout* section. .... 4
- Changed contents of the BOM. .... 7

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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- *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.*
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|                               |                                                                                          |
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