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## 1 Kit Contents

- ZSPM4141 Evaluation Board
- Resistor set including 6 different values for 1/10W 0603 SMD resistors (see Table 5.1 for values)
- Kit documentation

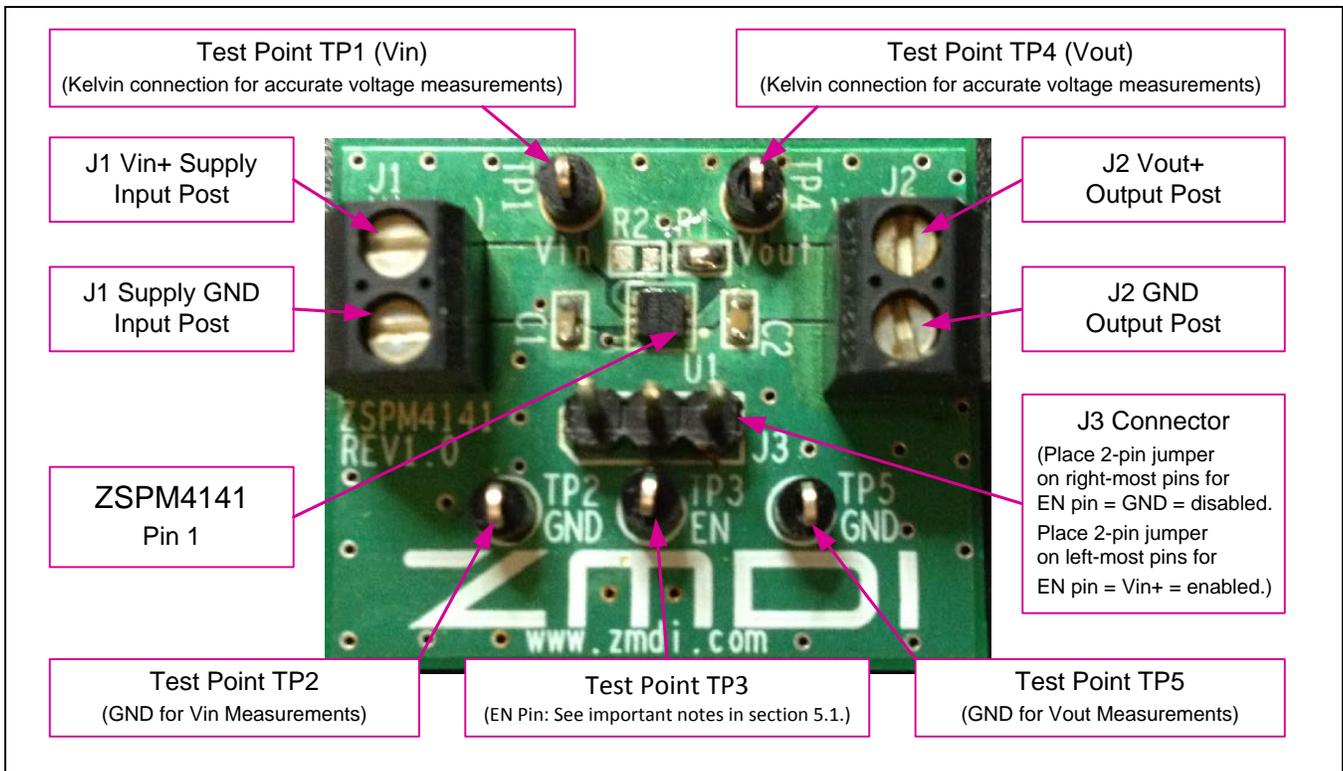
## 2 Introduction

The ZSPM4141 Evaluation Board is a compact system intended to facilitate measuring the performance and operating characteristics of the ZSPM4141 Ultra-low-Power Linear Regulator. The board contains a number of test points to allow evaluating the functions of the ZSPM4141 (see Figure 2.1 and section 4). It has a solid ground plane on the back of the board.

Note: The default part number for the ZSPM4141 Ultra-low-Power Linear Regulator (U1 in Figure 6.1) is the ZSPM4141A11W12 (note 1), which is factory configured for  $V_{OUT}$  set to 1.2 V. If the application requires different values for  $V_{OUT}$ , see section 5.2 for procedures for modifying  $V_{OUT}$  by changing resistor values on the board using the resistor set included with the kit.

Note: The default resistor configuration for the Evaluation Board is with the FB pin pulled up to  $V_{out}$  via R1, which has a value of  $0.0\Omega$  (i.e., a short), and R2 is unpopulated (NL designation in the schematic in Figure 6.1).

**Figure 2.1 ZSPM4141 Evaluation Board Connections**



### 3 Connectors

The board contains the following connectors for external signals and supplies (see Figure 2.1):

- J1:** Screw terminal connection for  $V_{in}$  supply ( $V_{in+}$  and GND)
- J2:** Screw terminal connection to  $V_{out}$  output ( $V_{out+}$  and GND)

### 4 Probe and Test Points

The board contains the following test/probe points (see Figure 2.1):

- TP1/ $V_{in}$ :** Kelvin measurement test point for  $V_{in}$  main input.
- TP4/ $V_{out}$ :** Kelvin measurement test point for  $V_{out}$  output.
- TP3/EN:** Measurement point for the ZSPM4141's EN pin 8 (enable input), which must be HIGH for the ZSPM4141 to operate (see *ZSPM414 Data Sheet*). Note: do not use TP3 to input a control signal to the EN pin. See section 5.3 for the proper method of inputting a control signal.
- TP2/GND:** Test point for ground; recommended ground for accurate measurements for  $V_{in}$ .
- TP5/GND:** Test point for ground; recommended ground for accurate measurements for  $V_{out}$ .

### 5 Setup

#### 5.1. Jumper on J3 Connector

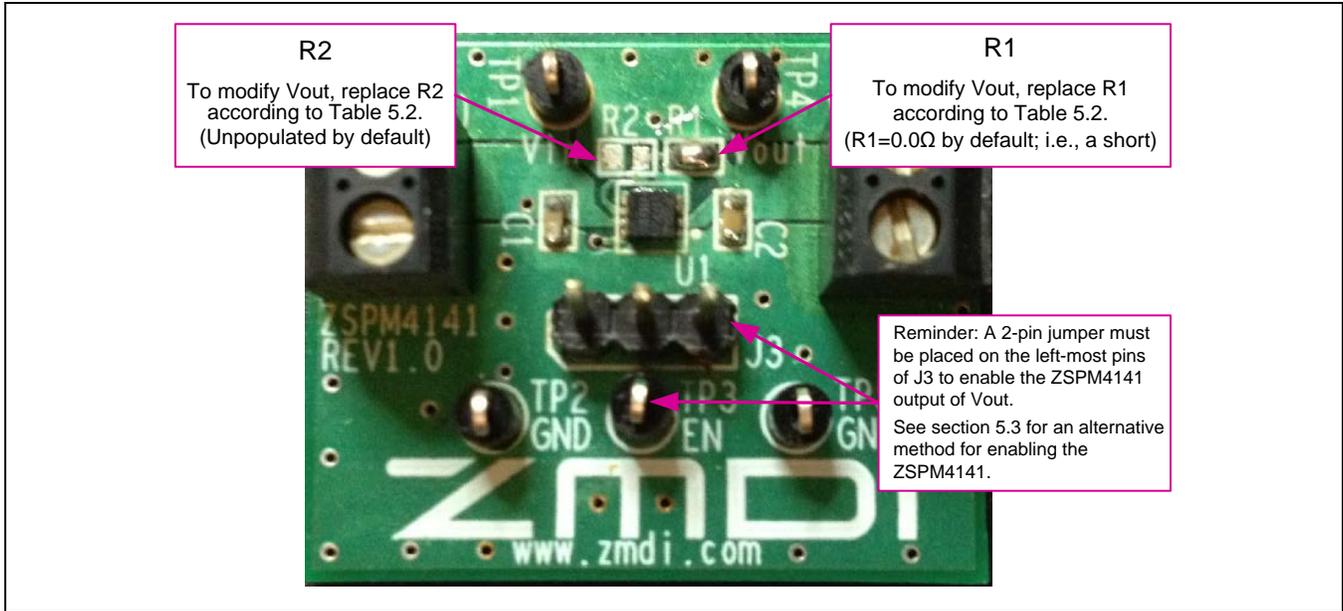
The Evaluation Board's J3 three-pin connector allows manually enabling the device. When a 2-pin jumper is placed on the left-most position (see Figure 2.1), the EN pin is connected to  $V_{in+}$  and the VCC pin, which enables the ZSPM4141. If the 2-pin jumper is placed on the right-most position, the EN pin is connected to ground, which disables the ZSPM4141. See section 5.3 for an alternative method of enabling the ZSPM4141.

#### 5.2. Controlling $V_{OUT}$ via R1 and R2 Values

The default configuration for the Evaluation Board results in a  $V_{OUT}$  of 1.2V (see section 2). If the application requires a different level for  $V_{OUT}$ ,  $V_{OUT}$  can be modified by changing the R1 and R2 resistor values on the board according to Table 5.1 using the resistor set included with the kit.

The default resistor configuration for the Evaluation Board is with the FB pin pulled up to  $V_{out}$  via R1, which has a value of  $0.0\Omega$  (i.e., a short), and R2 is unpopulated as shown in Figure 5.1 and also represented by the first row of resistor combinations in Table 5.1.

**Figure 5.1 ZSPM4141 Evaluation Board Default Configuration for R1 and R2**



**Table 5.1 Resistor Combinations for Setting Vout**

| Vout | R1 (+/-0.1%) | R2 Calculated | R2 Standard Value | Current Drawn by Feedback Divider | Comments  |
|------|--------------|---------------|-------------------|-----------------------------------|---|
| 1.2V | 0Ω           | Unpopulated   | Not applicable    | Not applicable                    | Default   |
| 1.5V | 1000000Ω     | 4000000Ω      | 4.02MΩ            | 0.30μA                            | R1 and R2 standard values included in resistor set provided with kit. |
| 1.8V | 1000000Ω     | 2000000Ω      | 2MΩ               | 0.60μA                            | R1 and R2 standard values included in resistor set provided with kit. |
| 3.0V | 1000000Ω     | 666667Ω       | 665KΩ             | 1.80μA                            | R1 and R2 standard values included in resistor set provided with kit. |
| 3.3V | 1000000Ω     | 571429Ω       | 576KΩ             | 2.10μA                            | R1 and R2 standard values included in resistor set provided with kit. |
| 4.2V | 1000000Ω     | 400000Ω       | 402KΩ             | 3.00μA                            | R1 and R2 standard values included in resistor set provided with kit. |

### 5.3. Input and Output Connections

Connect the input voltage supply for the ZSPM4141 at the J1 screw terminal with the leads connected as indicated in Figure 2.1.

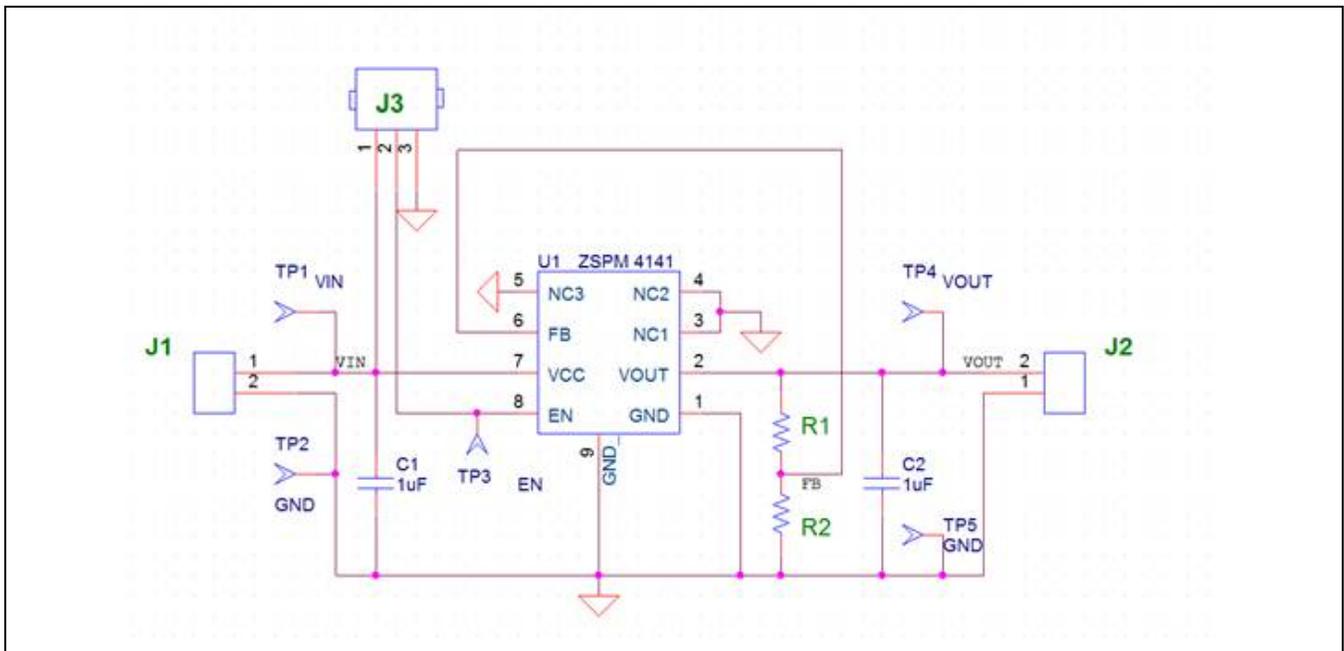
The output of the ZSPM4141 Evaluation Board can be measured at the J2 screw terminal.

Recommendation: Use J1 and J2 only for power connections. Use test points TP1 (Vin) and TP4 (Vout) as Kelvin connections for accurate voltage measurements (see Figure 2.1).

Optional: Instead of using the EN pin jumper on J3 described in section 5.1 for manually enabling/disabling the ZSPM4141, a signal can be input on J3 to control the enabling of the ZSPM4141. In this case, remove the jumper on J3 and connect the control signal (e.g., a function generator) to J3 with the positive lead on the middle pin and the ground lead on the right-most pin of J3. Note the J3 jumper **must** be removed; otherwise the board will be damaged. Do not use TP3 to connect the control signal.

## 6 Evaluation Board Schematic

Figure 6.1 ZSPM4141 Evaluation Board Circuit

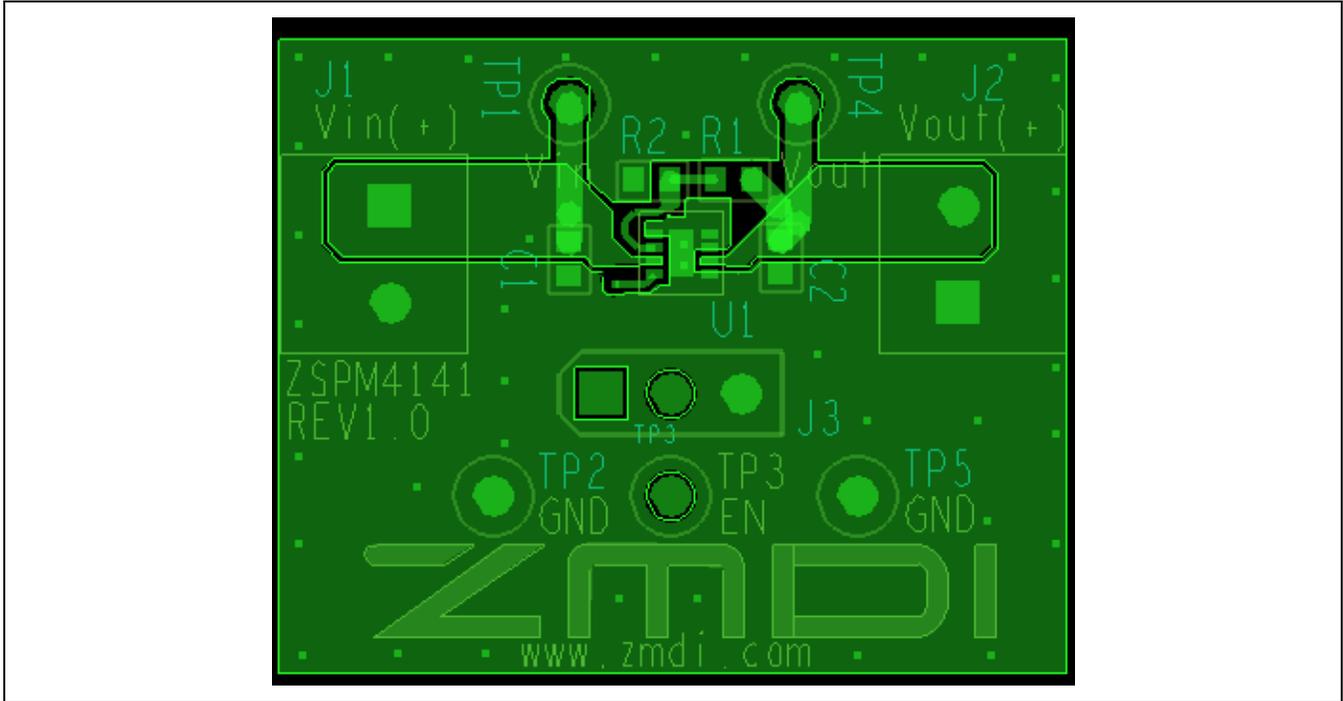


**Table 6.1 ZSPM4141 Evaluation Board Bill of Materials (BOM)**

| QTY | Reference                     | Description   | Manufacturer               | Manufacturer P/N | Digikey P/N         |
|-----|-------------------------------|---|----------------------------|------------------|---------------------|
| 1   | U1                            | ZSPM4141  | IDT                        | ZSPM4141AI1W12   | N/A                 |
| 2   | C1, C2                        | CAP CER 1UF 25V<br>10% X5R 0603   | TDK                        | C1608X5R1E105K   | 445-5146-2-ND       |
| 1   | R1                            | Default configuration:<br>RES 0.0 OHM 1/10W<br>0603 SMD<br>See section 5.2. | Stackpole                  | RMCF0603ZT0R00   | RMCF0603ZT0R00CT-ND |
| 0   | R2                            | Not populated in<br>default configuration.<br>See section 5.2.              |                            |                  |                     |
| 5   | TP1, TP2,<br>TP3, TP4,<br>TP5 | Test Point  | Keystone                   | 5001             | 5001K-ND            |
| 2   | J1, J2                        | Terminal Block<br>3.5mm 2-pos PCB   | On Shore Technology<br>Inc | ED555/2DS        | ED1514-ND           |
| 1   | J3                            | Header 3 pin 2.54mm   | TE Connectivity            | 3-644456-3       | A31113-ND           |

## 7 Evaluation Board Layout

Figure 7.1 ZSPM4141 Evaluation Board Layout – Top View



## 8 Related Documents

| File Name                     |
|-------------------------------|
| <i>ZSPM4141 Data Sheet</i>    |
| <i>ZSPM4141 Feature Sheet</i> |

Visit [www.IDT.com/ZSPM4141](http://www.IDT.com/ZSPM4141) or contact your nearest sales office for the latest version of these documents.

## 9 Document Revision History

| Revision | Date              | Description              |
|----------|-------------------|--------------------------|
| 1.00     | November 14, 2012 | First release.           |
|          | April 15, 2016    | Changed to IDT branding. |

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### Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,  
Koto-ku, Tokyo 135-0061, Japan  
[www.renesas.com](http://www.renesas.com)

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