

General Description

The MAX14721 evaluation kit (EV kit) is a fully assembled and tested circuit board that demonstrates the MAX14721 overvoltage, undervoltage, and overcurrent-protection device. The EV kit features an external pMOSFET and LED input/output reading. The EV kit comes with the MAX14721ATP+ installed, but can also be used to evaluate the pin-compatible MAX14722 and MAX14723 devices with IC replacement of U1. Request samples from Maxim when ordering the EV kit.

Features

- 5.5V to 60V Operating Voltage Range
- External pMOSFET Installed
- Proven PCB Layout
- Fully Assembled and Tested

EV Kit Contents

- EV kit board containing a MAX14721

[Ordering Information](#) appears at end of data sheet.

Quick Start

Required Equipment

- MAX14721 EV kit
- 40V DC power supply
- 5V DC power supply
- Multimeter

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation:

- 1) Verify that all jumpers are in their default positions.
- 2) Set the 40V DC power supply to 10V and connect to V_{IN} (TP1).
- 3) Connect the 5V DC power supply to VIO (TP21).
- 4) Turn on both power supplies. Verify that LED1 is on and \overline{FLAG} (TP15) is 0V.
- 5) Increase voltage on the DC power supply to TP1 and verify that LED2 turns on when voltage reaches ~12.4V. Check that the voltage on V_{OUT} (TP5) is ~12.5V and \overline{FLAG} (TP15) is 5V.
- 6) Increase the voltage on the DC power supply to TP1 and verify that LED2 turns off when the voltage reaches ~36V. Check that the voltage on V_{OUT} (TP5) goes down and \overline{FLAG} (TP15) is 0V.
- 7) Decrease the voltage on the DC power supply to TP1 and verify that LED2 turns on when the voltage reaches ~33.8V. Check that the voltage on V_{OUT} (TP5) is ~33.8V and \overline{FLAG} (TP15) is 5V.
- 8) Decrease the voltage on the DC power supply to TP1 and verify that LED2 turns off when the voltage reaches ~12V. Check that voltage on V_{OUT} (TP5) goes down and \overline{FLAG} (TP15) is 0V.

Detailed Description of Hardware

The EV kit is a fully assembled and tested circuit board demonstrating the MAX14721 overvoltage, undervoltage, and overcurrent-protection device in a 20-pin, surface-mount TQFN-EP package.

Note that when the input supply voltage is higher than 36V, the current-to-input increases due to the current going to 36V TVS (D2). If a current measurement beyond 36V is desired, remove D2 to get an accurate measurement.

LED Indicators

The EV kit features LEDs to indicate the power for input and output (see [Table 1](#)).

Enable Inputs (EN, $\overline{\text{HVEN}}$)

Use JU1 and JU12 to enable the device (see [Table 2](#) for jumper settings and [Table 3](#) for enable input switch status).

Overvoltage-Lockout Threshold (OVLO)

Use JU3 and JU5 to select the internal/external OVLO threshold. Install a shunt on either JU3 or JU5, but not both at the same time (see [Table 4](#) for jumper settings).

Undervoltage-Lockout Threshold (UVLO)

Use JU4 and JU6 to select the internal/external UVLO threshold. Install a shunt on either JU4 or JU6, but not both at the same time (see [Table 5](#) for jumper settings).

Table 1. LED Indicators (LED1, LED2)

| LED | DESCRIPTION |
|------|--------------------------------|
| LED1 | LED1 is on when IN is powered |
| LED2 | LED2 is on when OUT is powered |

Table 2. Enable Inputs Jumper Settings (JU1, JU12)

| JUMPER | SHUNT POSITION | DESCRIPTION |
|--------|----------------|--|
| JU1 | 1-2 | $\overline{\text{HVEN}}$ is connected to V_{IN} |
| | 2-3* | $\overline{\text{HVEN}}$ is connected to GND |
| JU12 | Installed | EN is high |
| | Not installed* | EN is low |

*Default position.

Table 3. Enable Inputs Switch Status

| EN | $\overline{\text{HVEN}}$ | SWITCH STATUS |
|----|--------------------------|---------------|
| 0 | 0 | On |
| 1 | 0 | On |
| 0 | 1 | Off |
| 1 | 1 | On |

Table 4. OVLO Threshold Jumper Settings (JU3, JU5)

| JUMPER | SHUNT POSITION | DESCRIPTION |
|--------|----------------|---|
| JU3 | Installed* | OVLO is connected to ground; internal OVLO threshold is used (do not install JU5) |
| | Not installed | OVLO is open |
| JU5 | Installed | OVLO is connected to an external voltage-divider; use R2/R3 or R6 to set overvoltage threshold (do not install JU3) |
| | Not installed* | OVLO is open |

*Default position.

Table 5. UVLO Threshold Jumper Settings (JU4, JU6)

| JUMPER | SHUNT POSITION | DESCRIPTION |
|--------|----------------|--|
| JU4 | Installed* | UVLO is connected to ground; internal UVLO threshold is used (do not install JU6) |
| | Not installed | UVLO is open |
| JU6 | Installed | UVLO is connected to an external voltage-divider; use R4/R5 or R7 to set the undervoltage threshold (do not install JU4) |
| | Not installed* | UVLO is open |

*Default position.

Current-Limit Threshold

Use JU7-JU10 to use different resistors to program the current-limit threshold (see [Table 6](#) for jumper settings).

Reverse Current-Blocking

RIPEN is internally pulled up. Use JU13 to enable/disable reverse current-blocking (see [Table 7](#) for jumper settings).

Current-Limit Mode

Use JU14 and JU15 to select the current-limit mode (see [Table 8](#) for jumper settings and [Table 9](#) for current-limit type select).

Table 6. Current-Limit Threshold Jumper Settings (JU7-JU10)

| JUMPER | SHUNT POSITION | DESCRIPTION |
|--------|----------------|---|
| JU7 | Installed* | SET1 is connected to ground with a 62kΩ resistor (~0.2A current limit) |
| | Not installed | SET1 is not connected to ground with a 62kΩ resistor |
| JU8 | Installed | SET1 is connected to ground with a 13kΩ resistor (~0.9A current limit) |
| | Not installed* | SET1 is not connected to ground with a 13kΩ resistor |
| JU9 | Installed | SET1 is connected to ground with a 6.8kΩ resistor (~1.8A current limit) |
| | Not installed* | SET1 is not connected to ground with a 6.8kΩ resistor |
| JU10 | Installed | SET1 is connected to ground with a 100kΩ potentiometer (programmable current limit) |
| | Not installed* | SET1 is not connected to ground with a 100kΩ potentiometer |

*Default position.

Table 7. Reverse-Current-Blocking Jumper Settings (JU13)

| JUMPER | SHUNT POSITION | DESCRIPTION |
|--------|----------------|------------------------|
| JU13 | Installed | RIPEN is low (disable) |
| | Not installed* | RIPEN is high (enable) |

*Default position.

Table 8. Current-Limit Type Jumper Settings (JU14, JU15)

| JUMPER | SHUNT POSITION | DESCRIPTION |
|--------|----------------|---------------|
| JU14 | Installed* | CLTS2 is low |
| | Not installed | CLTS2 is high |
| JU15 | Installed | CLTS1 is low |
| | Not installed* | CLTS1 is high |

*Default position.

Table 9. Current-Limit Type Select (CLTS1, CLTS2)

| CLTS2 | CLTS1 | CURRENT-LIMIT TYPE |
|-------|-------|--------------------|
| 0 | 0 | Latchoff mode |
| 0 | 1 | Autoretry mode |
| 1 | 0 | Continuous mode |
| 1 | 1 | Continuous mode |

Component Information, PCB Layout, and Schematic

See the following links for component information, PCB layout diagrams, and schematic:

- [MAX14721 EV BOM](#)
- [MAX14721 EV PCB Layout](#)
- [MAX14721 EV Schematic](#)

Ordering Information

| PART | TYPE |
|----------------|-------|
| MAX14721EVKIT# | EVKIT |

#Denotes RoHS compliant.

Revision History

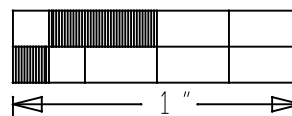
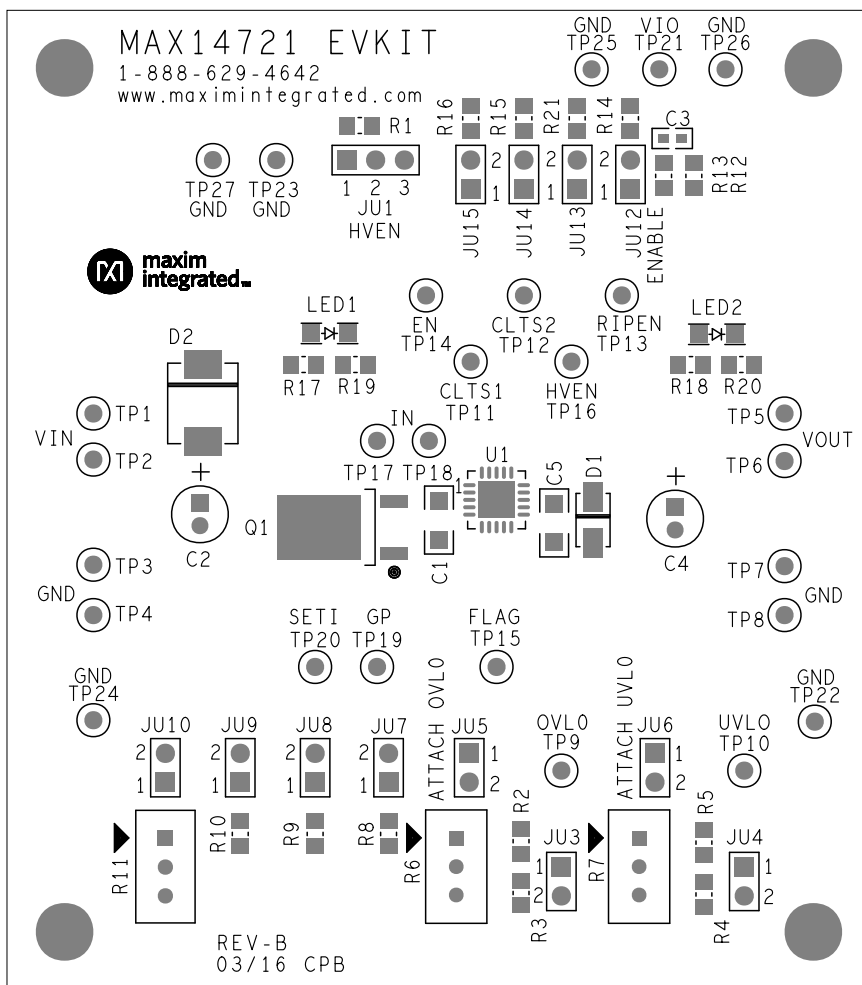
| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|-----------------|---------------|--|---------------|
| 0 | 5/15 | Initial release | — |
| 1 | 3/16 | Updated <i>Features</i> , <i>Quick Start</i> , <i>Reverse Current-Blocking</i> sections, Table 7, and <i>Schematic</i> | 1, 3, 4 |

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at www.maximintegrated.com.

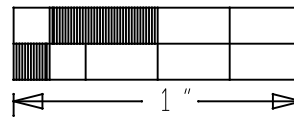
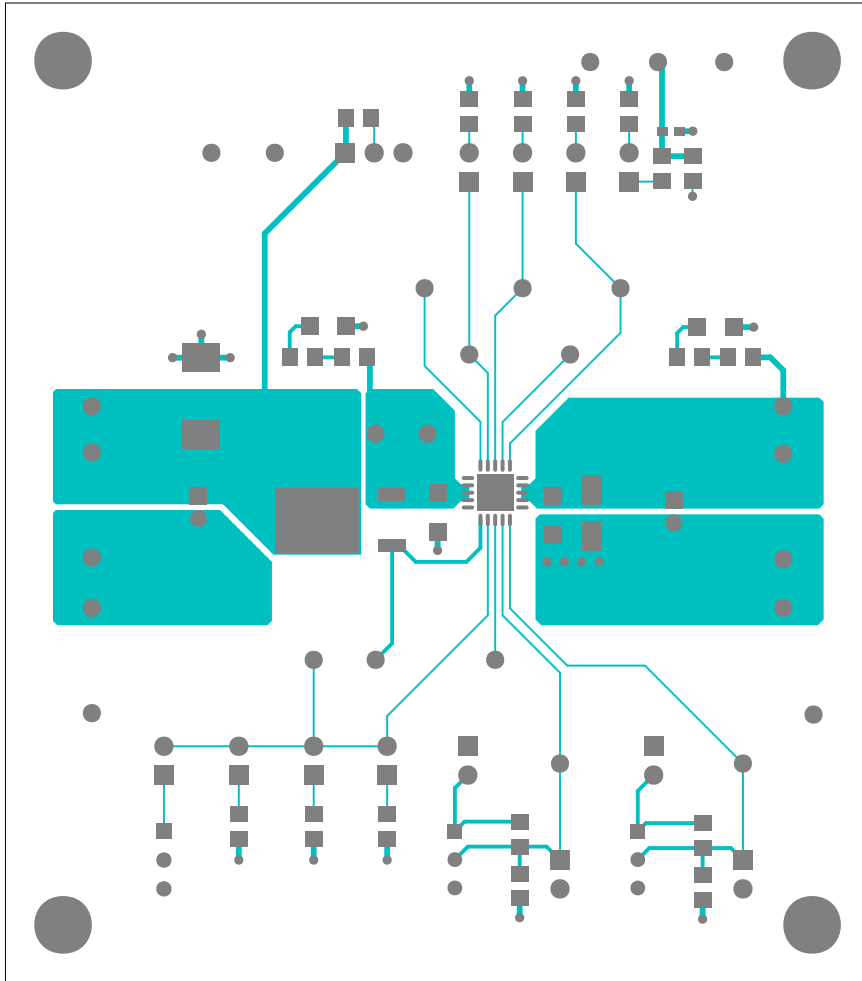
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TITLE: Bill of Materials - Revision 3/16

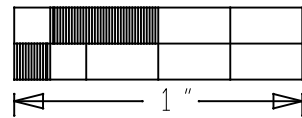
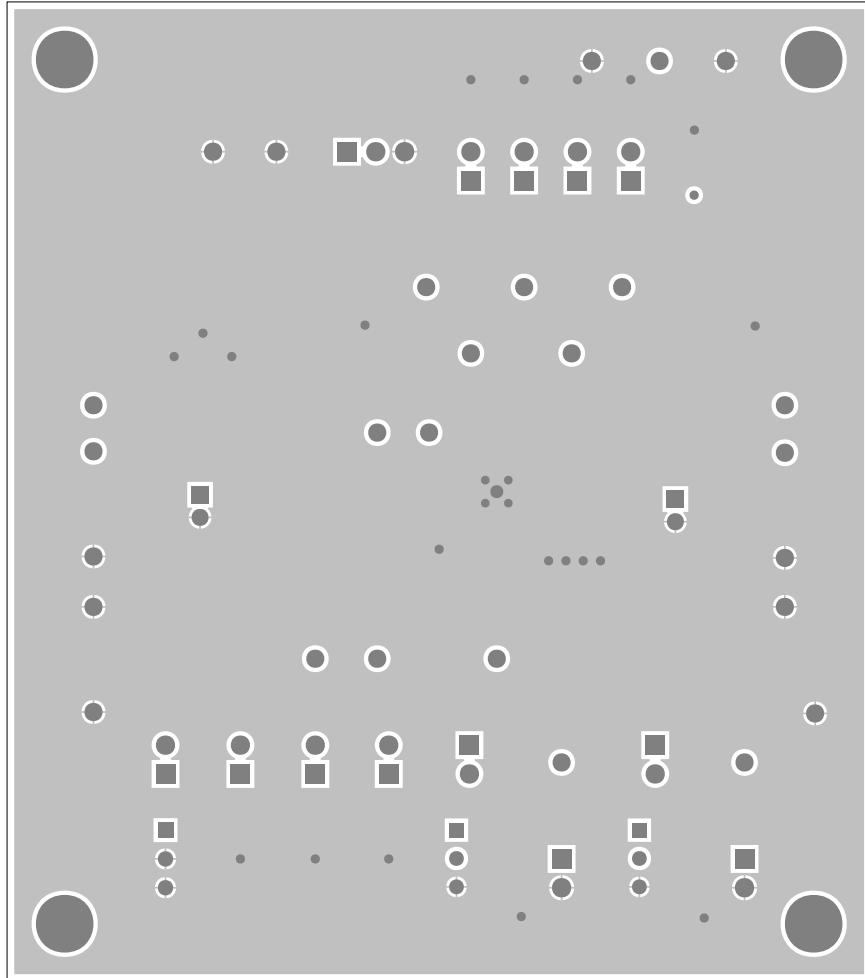
| Part Reference | Qty | Description |
|--------------------------------|-----|---|
| C1 | 1 | CAPACITOR CER 0.1UF 100V ±10% X7R 1206 |
| C2, C4 | 2 | CAPACITOR RADIAL 10UF 63V ±20% |
| C3 | 1 | CAPACITOR CER 1UF 6.3V ±10% X5R 0603 |
| C5 | 1 | CAPACITOR CER 1UF 100V ±10% X7R 1206 |
| D1 | 1 | DIODE 1A 50V |
| D2 | 1 | DIODE TVS 1500 WATT TRANSIENT VOLTAGE SUPPRESSOR 1A 36V |
| JU1 | 1 | CONN HEADER 3PINS |
| JU3-JU10, JU12-JU15 | 12 | CONN HEADER 2PINS |
| LED1 | 1 | LED GREEN 1206 |
| LED2 | 1 | LED YELLOW 1206 |
| Q1 | 1 | P-CHANNEL 60V 50A MOSFET |
| R1 | 1 | RES 220K OHM 1% 0805 SMD |
| R6, R7 | 2 | RES TRIMMER POTENTIOMETER 1M OHM |
| R8 | 1 | RES 62K OHM 1% 0805 SMD |
| R9 | 1 | RES 13K OHM 1% 0805 SMD |
| R10 | 1 | RES 6.8K OHM 1% 0805 SMD |
| R11 | 1 | RES TRIMMER POTENTIOMETER 100K OHM |
| R12, R13, R15, R16, R21 | 5 | RES 10K OHM 1% 0805 SMD |
| R14 | 1 | RES 100K OHM 1% 0805 SMD |
| R17, R18 | 2 | RES 2.7K OHM 1% 0805 SMD |
| R19, R20 | 2 | RES 0 OHM 0805 SMD |
| TP1, TP2, TP5, TP6, TP17, TP18 | 6 | RED TEST POINT |
| TP3, TP4, TP7, TP8, TP22-TP27 | 10 | BLACK TEST POINT |
| TP9, TP10, TP14, TP16, TP20 | 5 | YELLOW TEST POINT |
| TP11-TP13, TP15, TP19 | 5 | WHITE TEST POINT |
| TP21 | 1 | ORANGE TEST POINT |
| U1 | 1 | IC OVERCURRENT OVERVOLTAGE PROTECTOR (MAX14721ATP+) |
| | 1 | PCB: EPCB14721 |
| DNI | | |
| R2-R5 | 0 | RESISTOR; 0805 PACKAGE; GENERIC |



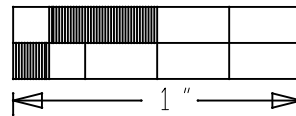
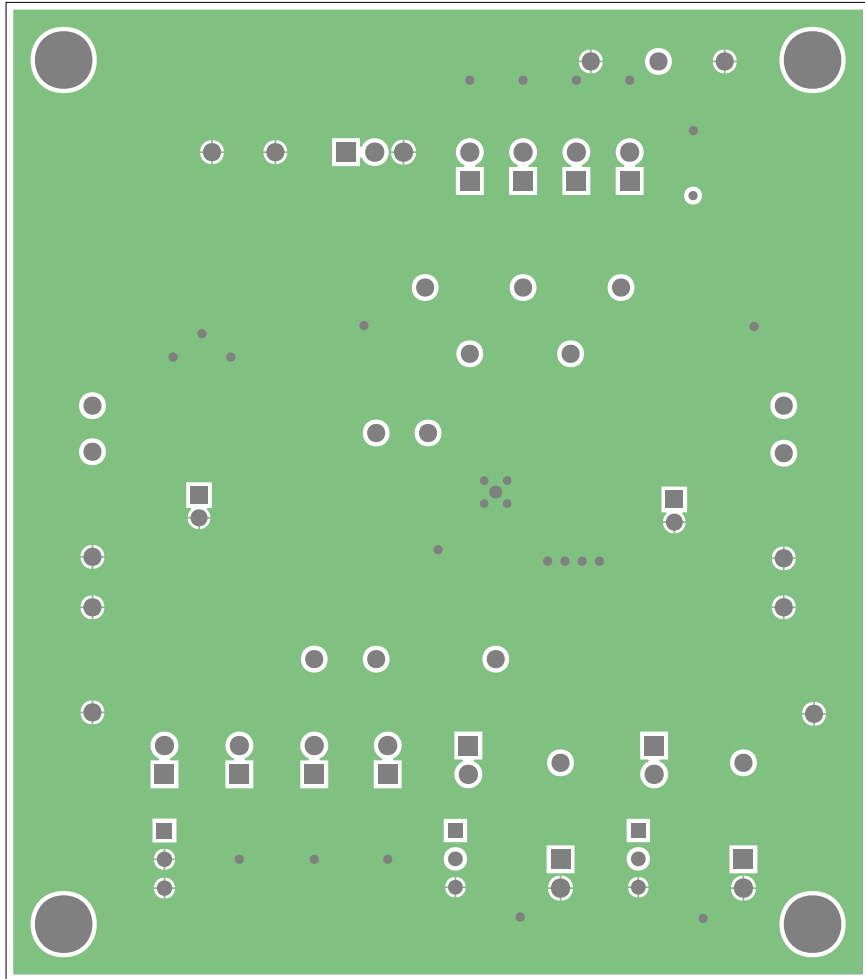
Silkscreen Top



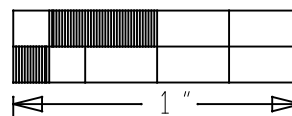
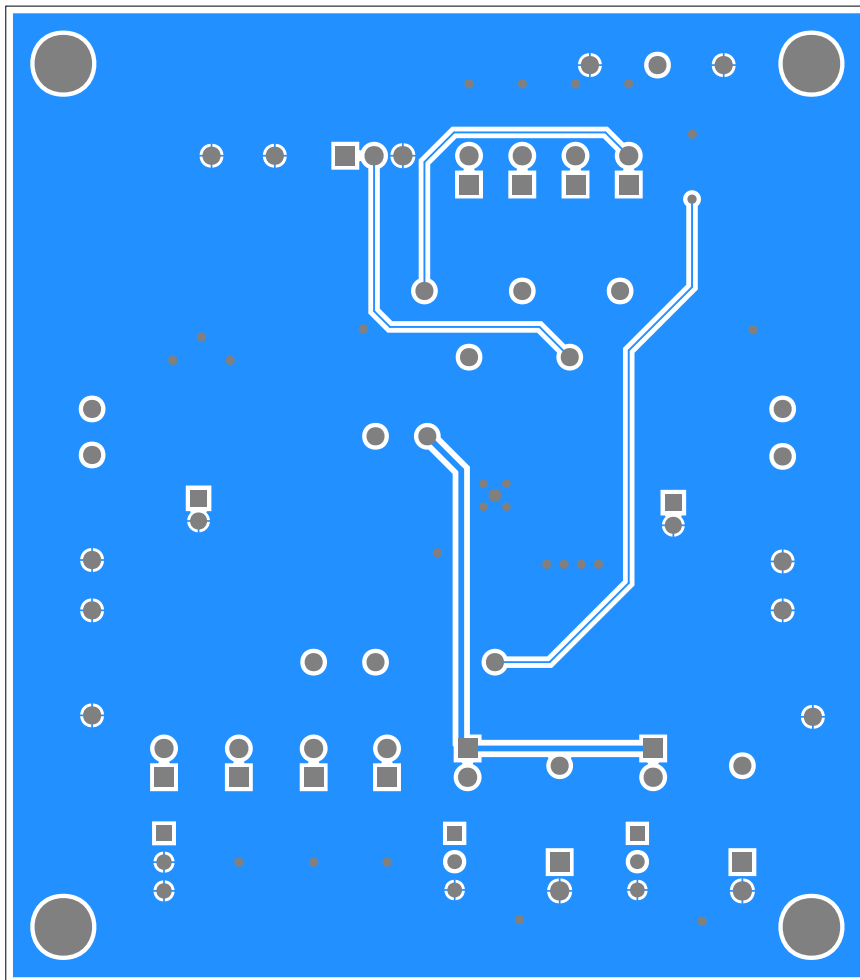
Top



Internal 2



Internal 3



Bottom

