General Description

The MAX14571 evaluation kit (EV kit) demonstrates the MAX14571 adjustable overvoltage and overcurrent protector in a 14-pin TSSOP surface-mount package with an exposed pad. The EV kit features jumper-configurable SETI resistors and can handle up to 36V input supply.

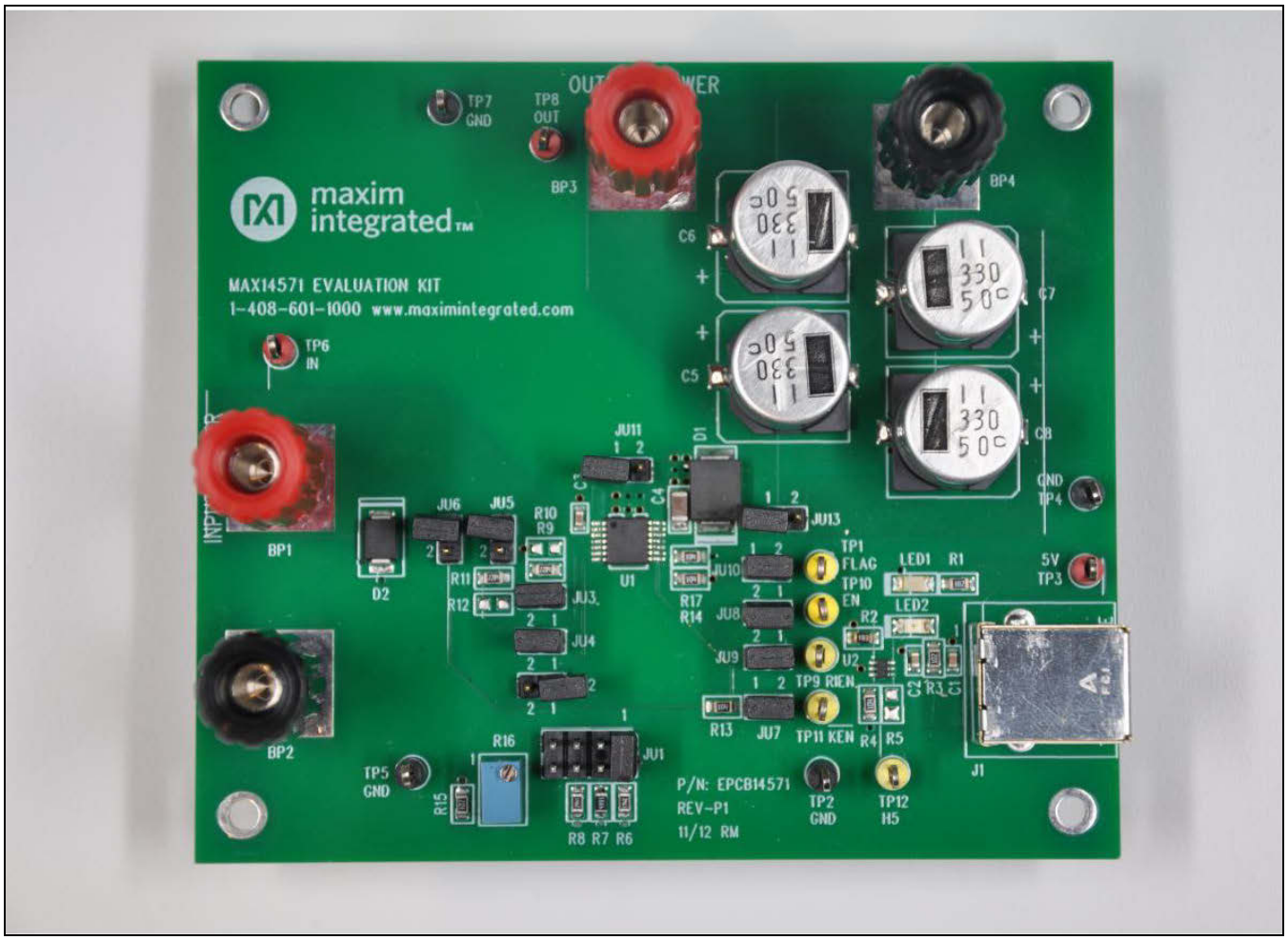
The EV kit can also be used to evaluate the MAX14572 and MAX14573 devices with IC replacement of U1. Request free samples from the factory when ordering the EV kit.

Features

- 6V to 36V Operating Voltage Range
- Jumper-Configurable Current Limit
- Proven PCB Layout
- Fully Assembled and Tested

***Ordering Information* appears at end of data sheet.**

MAX14571 EV Kit Photo



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Quick Start

Required Equipment

- MAX14571 EV kit
- 6V to 36V DC power supply
- 5V DC power supply
- Voltage meter
- USB type-A to USB type-B cable

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on the power supply until all connections are completed.**

1) Verify that the default jumper configurations are as in Table 1.
2) Connect a voltage meter to the EV kit's OUTPUT POWER red banana jack and the corresponding black GND banana jack.
3) Connect the DC power supply to the EV kit's INPUT POWER red banana jack and the corresponding black GND banana jack.
4) Turn on the DC power supply and set it to 24V, then enable the power-supply output.
5) Connect a USB cable from a computer to the USB connector J1 to enable the device. If a cable is not available, connect a 5V DC power supply between the EV kit's TP3 test point and the corresponding GND test point, TP4.
6) Verify that the voltage meter reads approximately 24V.
7) Set the input power supply to 17V. The switch turns off and the voltmeter reading should slowly decrease to 0V.
8) Set the input power supply to 24V and verify that the voltmeter reads approximately 24V.
9) Set the input power supply to 35V. The switch turns off and the voltmeter reading should slowly decrease to 0V.

Detailed Description of Hardware

The MAX14571 EV kit demonstrates the MAX14571 adjustable overvoltage and overcurrent protector. The jumper configurations by default are configured to test internal UVLO and internal OVLO thresholds. There are jumpers that can be configured and resistor pads to test user-defined UVLO and OVLO thresholds. The overcurrent threshold is determined by external resistors connected to the SETI pin and is jumper configurable through jumper JU1.

External Power Supply

The EV kit is powered by a user-supplied 6V to 36V DC power supply connected between BP1 (INPUT POWER) and GND.

Programmable Current Limit

Jumper JU1 configures the RSETI resistor value that is connected to the SETI pin and sets the current limit/threshold for the switch (see Table 2). Refer to the MAX14571/MAX14572/MAX14573 IC data sheet for more information.

No shunt connected to JU1 or JU2 forces the SETI pin to be unconnected, with the current limit set to 0A.

Overvoltage Lockout (OVLO)

Jumper JU4 (shunted by default) connects the OVLO pin to GND and configures the device to have the internal 33V preset OVLO. To configure a user-defined OVLO, disconnect JU4 and connect a shunt on jumper JU5. This allows the device to monitor the IN voltage. Connect a resistor on R12 to set the user-defined OVLO threshold. Use the following equation to set the OVLO threshold:

$$V_{OVLO} = V_{BG} x \left[1 + \frac{R11}{R12} \right]$$

where:

R11 is 2.2MΩ

V_{BG} is 1.21

External LED2 indicates that an OVLO fault has occurred.

Undervoltage Lockout (UVLO)

Jumper JU3 (shunted by default) connects the UVLO pin to GND and configures the device to have the internal 19.2V preset UVLO. To configure a user-defined UVLO, disconnect JU3 and connect a shunt on JU5. This allows the device to monitor the IN voltage. Connect a resistor on R10 to set the user-defined UVLO threshold. Use the following equation to set the UVLO threshold:

$$V_{UVLO} = V_{BG} x \left[1 + \frac{R9}{R10} \right]$$

where:

R9 is 2.2MΩ

V_{BG} is 1.21

External LED2 indicates that an UVLO fault has occurred.

Enable (J1)

To enable the device, connect a USB connector from the computer to the USB connector, J1. This provides 5V to VBUS and to the EN pin (JU8 connects VBUS to IN by default). If no cable is available, connect a 5V DC power supply between test point TP3 and the corresponding GND test point, TP4.

Negative Input Test

When applying a negative input to V_{IN}, the negative input test should be performed when the output capacitors are fully discharged and VBUS should not be supplied.

Table 1. Default Jumper Settings (JU1–JU11, JU13)

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	1-2*	Sets current threshold to 0.709A.
	3-4	Sets current threshold to 2.304A.
	5-6	Sets current threshold to 4.197A.
	7-8	Adjustable current limit using a potentiometer.
JU2	1-2	Connects the SETI pin to GND, asserts the $\overline{FLAG}$ output, and sets the current limit to 0A.
	Open*	Allows the user to connect JU1 shunts to configure the current limit.
JU3	1-2*	Connects the UVLO pin to GND and enables the internal UVLO threshold.
	Open	Allows the user to connect an external resistor-divider to set a user-defined UVLO threshold. **Note:** JU5 should also be connected.
JU4	1-2*	Connects the OVLO pin to GND and enables the internal OVLO threshold.
	Open	Allows the user to connect an external resistor-divider to set a user-defined OVLO threshold. **Note:** JU5 should also be connected.
JU5	1-2	Allows the user to connect an external resistor-divider to set a user-defined OVLO and UVLO threshold.
	Open*	Connect JU3 and JU4 or connect an external resistor-divider for normal UVLO/OVLO operation.

Table 1. Default Jumper Settings (JU1–JU11, JU13) (continued)

JUMPER	SHUNT POSITION	DESCRIPTION
JU6	1-2	Connects $\overline{HVEN}$ to V_{IN} and disables the device.
	Open*	If open connect JU7.
JU7	1-2*	Connects $\overline{HVEN}$ to GND for normal operation.
	Open	If open, connect JU6.
JU8	1-2*	Connects EN to VBUS and enables the device for normal operation.
	Open	Disables the device.
JU9	1-2*	Enables reverse-current flow protection.
	Open	Disables reverse-current flow protection.
JU10	1-2*	Allows LED2 to indicate a $\overline{FLAG}$ fault.
	Open	Use external circuitry to connect to the $\overline{FLAG}$ output.
JU11	1-2	Connects OUT to IN.
	Open*	Normal operation.
JU13	1-2	Adds 2 330µF capacitors to OUT.
	Open*	Normal operation.

**Default position.*

Table 2. Current-Limit/Threshold Setting (JU1)

SHUNT POSITION	RSETI	ILIM (mA)
1-2	16.2kΩ	709mA
3-4	4.99kΩ	2.304A
5-6	2.74kΩ	4.197A
7-8	1kΩ + 25kΩ (Adjustable pot)	Adjustable

Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	1µF ±10%, 25V X7R ceramic capacitor (0603) Murata GRM188R71E105K
C2	1	0.1µF ±10%, 25V X7R ceramic capacitor (0603) Murata GRM188R71E104K
C3	1	0.47µF ±10%, 50V X7R ceramic capacitor (0603) TDK C1608X5R1H474K
C4	1	4.4µF ±10%, 50V X7R ceramic capacitor (1206) Murata GRM31CR71H475K
C5–C8	4	330µF ±20%, 50V aluminum (12.5mm) Panasonic EEVFK1H331Q
D1	1	60V, 5A power Schottky diode (SMC) STMicroelectronics STPS5L60S
D2	1	600W TVS diode (SMB) STMicro SM6T36CA
GND	2	Black banana jacks Keystone 7007
IN, OUT	2	Red banana jacks Keystone 7006
J1	1	USB type-B connector FCI 61729-0010BLF
JU1	1	8-pin (2 x 4) dual-row header, 0.1in centers Sullins Connector PEC36DAAN
JU2–JU11, JU13	11	2-pin single-row headers Sullins PEC36SAAN
LED1	1	Green LED (1206) Lumex SML-LX1206GW-TR
LED2	1	Red LED (1206) Lumex SML-LX1206IC-TR
R1, R3, R15	3	1kΩ ±5% resistors (0805)
R2	1	10kΩ ±5% resistor (0805)
R4, R13, R14, R17	4	100kΩ ±5% resistors (0805)
R5, R10, R12	0	Not installed, resistors (0805)
R6	1	16.2kΩ ±1% resistor (0805)
R7	1	4.99kΩ ±1% resistor (0805)
R8	1	2.74kΩ ±1% resistor (0805)
R9, R11	2	2.2MΩ ±1% resistors (0805)
R16	1	25kΩ trimmer potentiometer Murata PV37Y253C01B00
TP1, TP9–TP12	5	Yellow test points Keystone 5014
TP2, TP4, TP5, TP7	4	Black test points Keystone 5011
TP3, TP6, TP8	3	Red test points Keystone 5010
U1	1	Overvoltage and overcurrent protector (14 SSOP-EP*) Maxim MAX14571EUD+
U2	1	Dual buffer (6 SC70, 1.25mm wide) Fairchild NC7WZ07P6X
—	13	Shunts
—	1	PCB: MAX14571 EVKIT

**EP = Exposed pad.*

Component Suppliers

SUPPLIER	PHONE	WEBSITE
FCI (Berg Electronics)	717-938-7200	www.fciconnect.com
Keystone Electronics Corp.	209-796-2032	www.keyelco.com
Lumex Inc.	800-278-5666	www.lumex.com
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
Panasonic Corp.	800-344-2112	www.panasonic.com
STMicroelectronics	408-452-8585	www.us.st.com
Sullins	402-563-6866	www.vishay.com

Note: *Indicate that you are using the MAX14571 when contacting these component suppliers.*

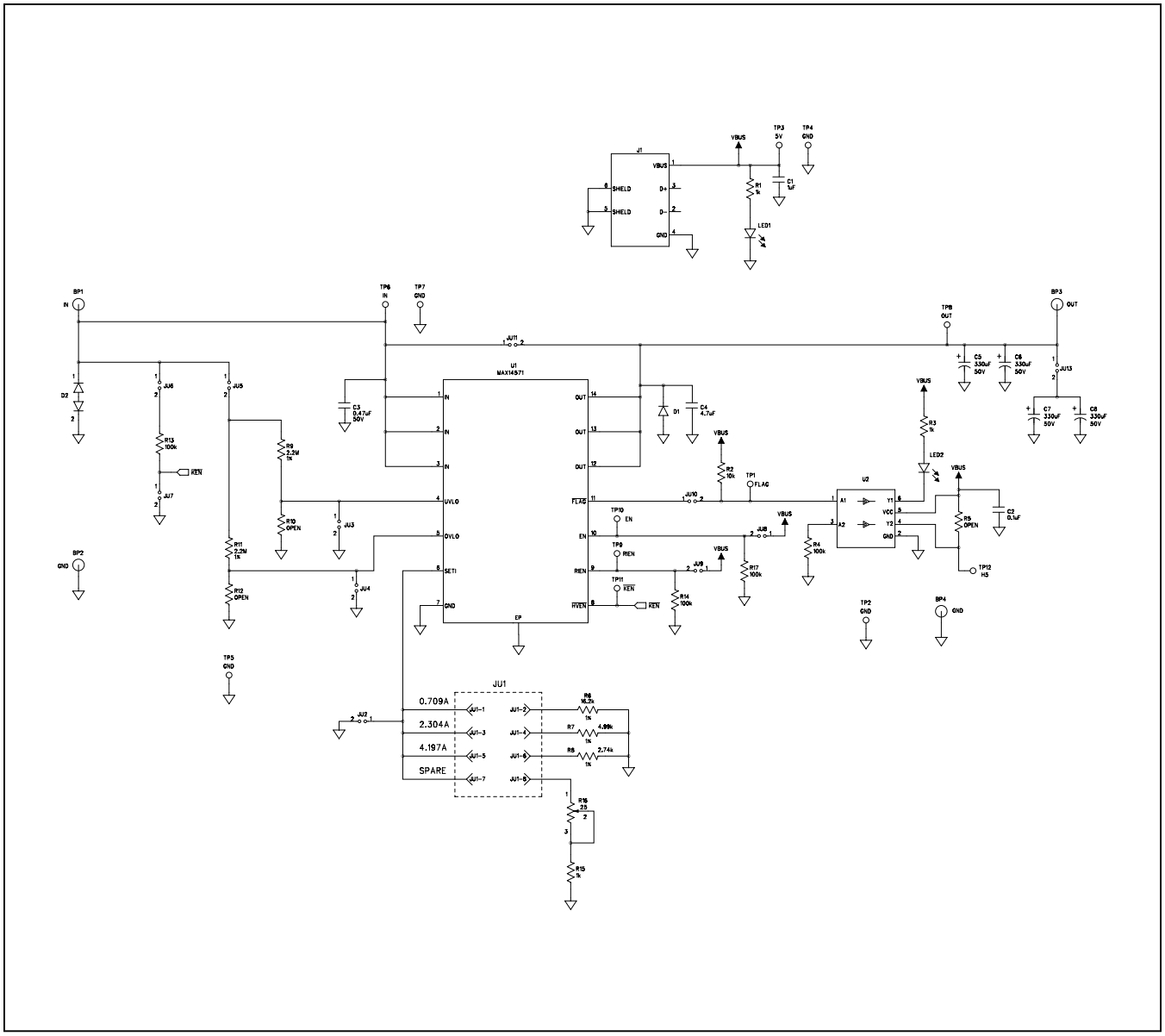

Figure 1. MAX14571 EV Kit Schematic

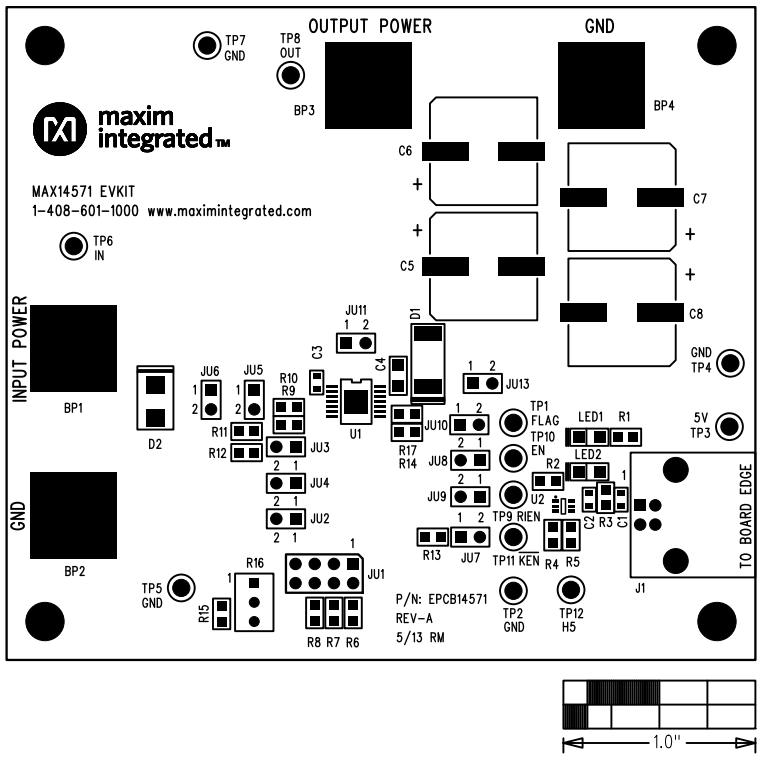

Figure 2. MAX14571 EV Kit Component Placement Guide—Component Side

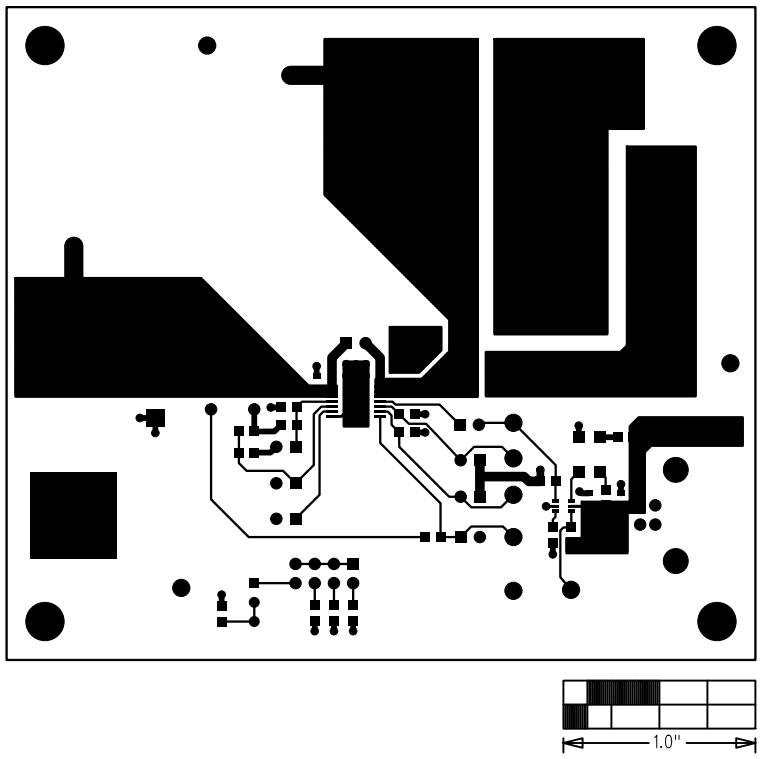

Figure 3. MAX14571 EV Kit PCB Layout—Component Side

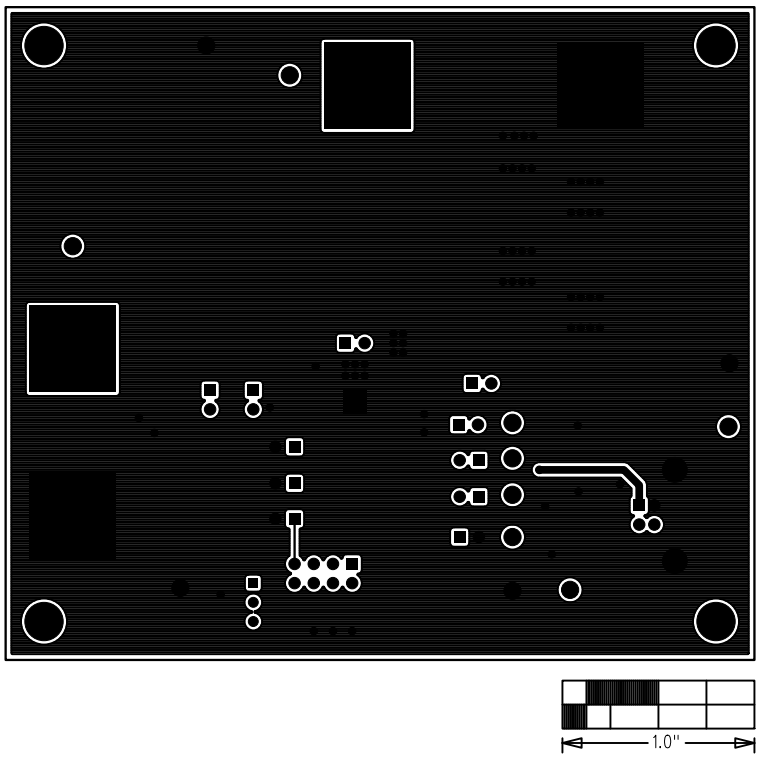

Figure 4. MAX14571 EV Kit PCB Layout—Solder Side

Ordering Information

PART	TYPE
MAX14571EVKIT#	EV Kit

#Denotes RoHS compliant.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/13	Initial release	—

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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