

# MAX14670 Evaluation Kit

# Evaluates: MAX14670/MAX14671

## General Description

The MAX14670 evaluation kit (EV kit) is a fully assembled and tested circuit board that demonstrates the MAX14670 and MAX14671 bidirectional current-blocking, high-input overvoltage protectors with adjustable OVLO. The EV kit features LED output reading and a USB-powered option for logic pins.

## Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2	2	1 $\mu$ F $\pm$ 10%, 6.3V X5R ceramic capacitors (0603) Murata GRM188R60J105KA01D
C3	1	4.7 $\mu$ F $\pm$ 20%, 6.3V X5R ceramic capacitor (0603) TDK C1608X5R0J475M080AB
C4, C5	2	0.1 $\mu$ F $\pm$ 10%, 50V X7R ceramic capacitors (0603) Murata GRM188R71H104KA93D
C6, C7	2	1 $\mu$ F $\pm$ 10%, 25V X5R ceramic capacitors (0603) Murata GRM188R61E105KA12D
C8	1	0.1 $\mu$ F $\pm$ 10%, 25V X7R ceramic capacitor (0603) Murata GRM188R71E104KA01D
J1	1	USB-B connector FCI 61729-0010BLF
J2–J4	3	Power terminals Phoenix Contact 1729018
JU1–JU3, JU5, JU7, JU8	6	2-pin single-row headers
JU4, JU6	2	3-pin single-row headers
LED1	1	Red LED Lite-On LTST-C150EKT
LED2, LED3	2	Green LEDs OSRAM Opto LG N971-KN-1
R1, R11, R12, R15, R16	5	1k $\Omega$ $\pm$ 1% resistors (0805)
R2, R18, R20	3	100k $\Omega$ $\pm$ 1% resistors (0805)
R3, R13, R14	3	10k $\Omega$ $\pm$ 1% resistors (0805)

## Benefits and Features

- 3V to 28V Operating Voltage Range
- Evaluates Bidirectional OVLO and Adjustable OVLO
- Proven PCB Layout
- Fully Assembled and Tested

*Ordering Information appears at end of data sheet.*

DESIGNATION	QTY	DESCRIPTION
R4	1	23.2k $\Omega$ $\pm$ 1% resistor (0805)
R5	1	9.31k $\Omega$ $\pm$ 1% resistor (0805)
R6	1	20k $\Omega$ potentiometer Bourns 3266W-1-203LF
R7–R10	0	Not installed, resistors (0805)
R17, R19	2	22k $\Omega$ $\pm$ 5% resistors (0805)
TP1, TP8, TP10, TP11, TP18	5	Red test points
TP2, TP3, TP9, TP12, TP13	5	Black test points
TP4, TP14	2	White test points
TP5, TP15	2	Yellow test points
TP6, TP16	2	Orange test points
TP7, TP17	2	Green test points
U1	1	Bidirectional overvoltage protector (15 WLP) Maxim MAX14670EWL+
U2	1	Bidirectional overvoltage protector (15 WLP) Maxim MAX14671EWL+
U3	1	Dual inverter (6 SC70) Fairchild NC7WZ04P6X
U4	1	LDO linear regulator (6 SOT23) Maxim MAX8880EUT+
—	8	Shunts
—	1	PCB: MAX14670 EVKIT

## Component Suppliers

SUPPLIER	PHONE	WEBSITE
Bourns, Inc.	408-496-0706	www.bourns.com
FCI Electronics Interconnection Solutions	800-237-2374	www.fciconnect.com
Lite-On, Inc.	408-946-4873	www.us.liteon.com
Murata Americas	800-241-6574	www.murataamericas.com
OSRAM Opto Semiconductors	888-446-7726	www.osram-os.com
Phoenix Contact, Inc.	800-888-7388	www.phoenixcontact.com
TDK Corp.	847-803-6100	www.component.tdk.com

**Note:** Indicate that you are using the MAX14670 when contacting these component suppliers.

## Quick Start

### Required Equipment

- MAX14670 EV kit
- 25V DC power supply
- Multimeter
- USB-A male to USB-B male cable or 5V DC power supply

### 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) Connect the USB cable to J1 from a computer (or connect 5V DC power supply to TP8).
- 3) Verify LED1 is on.
- 4) Connect 6V DC power supply to TP1. Verify OUT (TP18) is 6V and LED2 is on.
- 5) Increase voltage on DC power supply to TP1. Verify OUT voltage goes down and LED2 is off when input reaches about 6.8V (OVLO).
- 6) Turn off the power supply and remove it from TP1. Connect it to TP11 and set the voltage to 15V.
- 7) Turn on the power supply and verify OUT (TP18) is 15V and LED3 is on.
- 8) Increase voltage on DC power supply to TP11. Verify OUT voltage goes down and LED3 is off when input reaches about 15.5V (OVLO).

**Table 1. LED Indicator (LED1–LED3)**

LED	DESCRIPTION
LED1	LED1 is on when VBUS/5V supply for logic pins is powered.
LED2	LED2 is on when MAX14670 $\overline{\text{ACOK}}$ is asserted.
LED3	LED3 is on when MAX14671 $\overline{\text{ACOK}}$ is asserted.

**Table 2. Pullup Voltage (JU1–JU3)**

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	Installed*	$V_{CC}$ is set to 1.8V through R4.
	Not installed	$V_{CC}$ is not set through R4.
JU2	Installed	$V_{CC}$ is set to 2.6V through R5.
	Not installed*	$V_{CC}$ is not set through R5.
JU3	Installed	$V_{CC}$ is set through R6 (variable).
	Not installed*	$V_{CC}$ is not set through R6.

\*Default position.

## Detailed Description of Hardware

The MAX14670 EV kit is a fully assembled and tested circuit board demonstrating the MAX14670 and MAX14671 bidirectional current-blocking, high-input overvoltage protector IC in a 15-bump surface-mount wafer-level package (WLP).

The EV kit also features LEDs to indicate the power for logic pins and  $\overline{\text{ACOK}}$  status (see Table 1).

### Pullup Voltage

The EV kit features jumpers to select pullup voltage ( $V_{CC}$ ) for OTG\_EN. Install a jumper in positions shown in Table 2 to change the voltage.

**OVLO Threshold**

Use jumpers JU4 and JU6 to select internal or external OVLO threshold (see Table 3 for jumper settings).

Use these equations to calculate the external OVLO threshold:

$$\text{MAX14670: } V_{\text{IN\_OVLO}} = V_{\text{OVLO\_TH}} \times \left[ 1 + \frac{R7}{R8} \right]$$

$$\text{MAX14671: } V_{\text{IN\_OVLO}} = V_{\text{OVLO\_TH}} \times \left[ 1 + \frac{R9}{R10} \right]$$

**OTG Enable Input**

Use jumpers JU5 and JU7 to select OTG\_EN high or low (see Table 4 for jumper settings).

**Two Inputs**

The EV kit features jumper JU8, which can be set to demonstrate using two devices for two input sources to one output (see Table 5 for jumper settings).

**Table 3. OVLO Threshold (JU4, JU6)**

JUMPER	SHUNT POSITION	DESCRIPTION
JU4	1-2	MAX14670 OVLO is connected to R7/R8 voltage divider (external OVLO threshold).
	2-3*	MAX14670 OVLO is connected to ground (internal OVLO threshold).
JU6	1-2	MAX14671 OVLO is connected to R9/R10 voltage divider (external OVLO threshold).
	2-3*	MAX14671 OVLO is connected to ground (internal OVLO threshold).

\*Default position.

**Table 4. OTG Enable Input (JU5, JU7)**

JUMPER	SHUNT POSITION	DESCRIPTION
JU5	Installed	MAX14670 OTG_EN is connected to V <sub>CC</sub>
	Not installed*	MAX14670 OTG_EN is connected to ground
JU7	Installed	MAX14671 OTG_EN is connected to V <sub>CC</sub>
	Not Installed*	MAX14671 OTG_EN is connected to ground

\*Default position.

**Table 5. Two Inputs (JU8)**

JUMPER	SHUNT POSITION	DESCRIPTION
JU8	Installed	MAX14671 ACOK is connected to device's OVLO
	Not installed*	MAX14671 ACOK is not connected to device's OVLO

\*Default position.

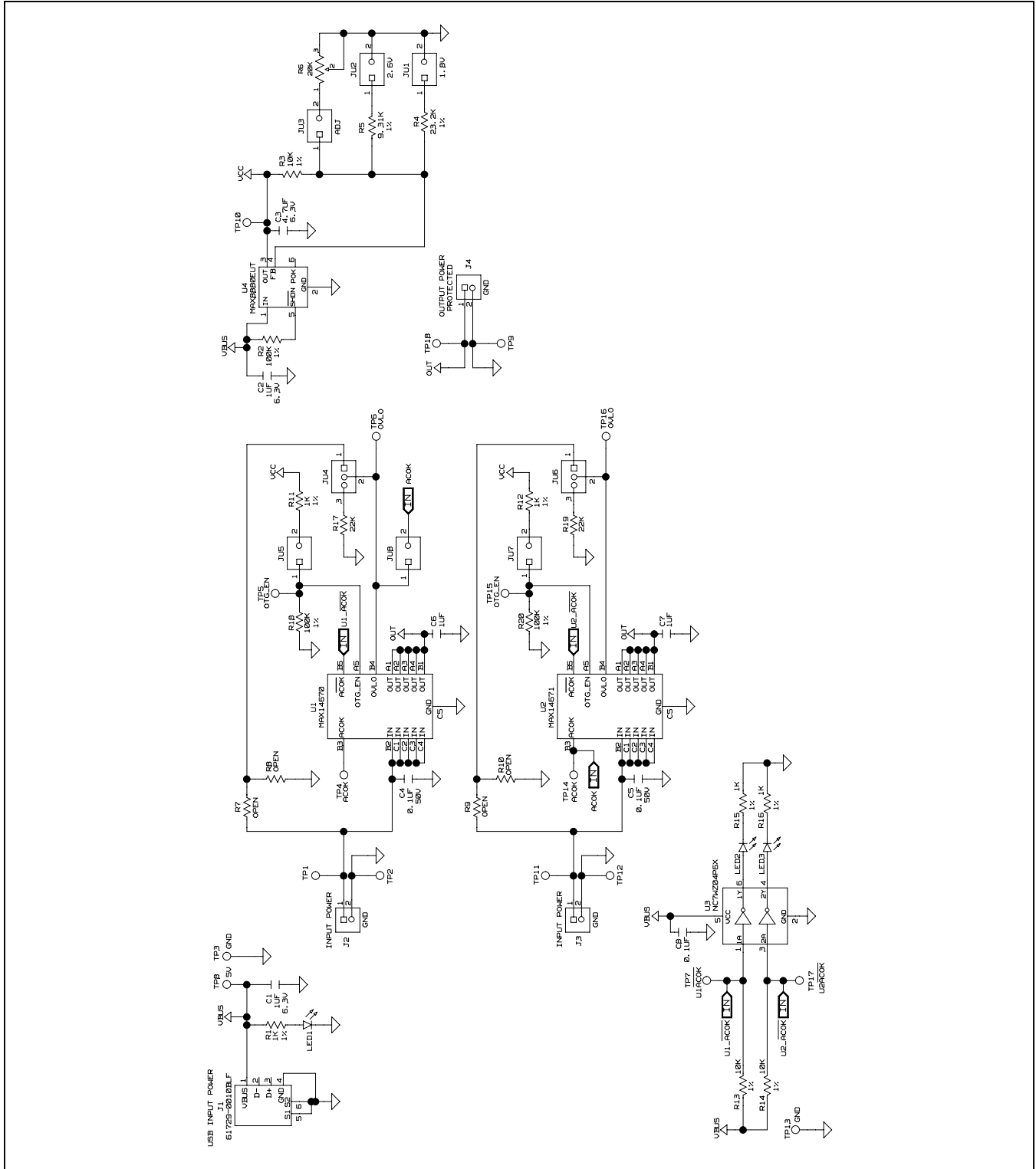


Figure 1. MAX14670 EV Kit Schematic

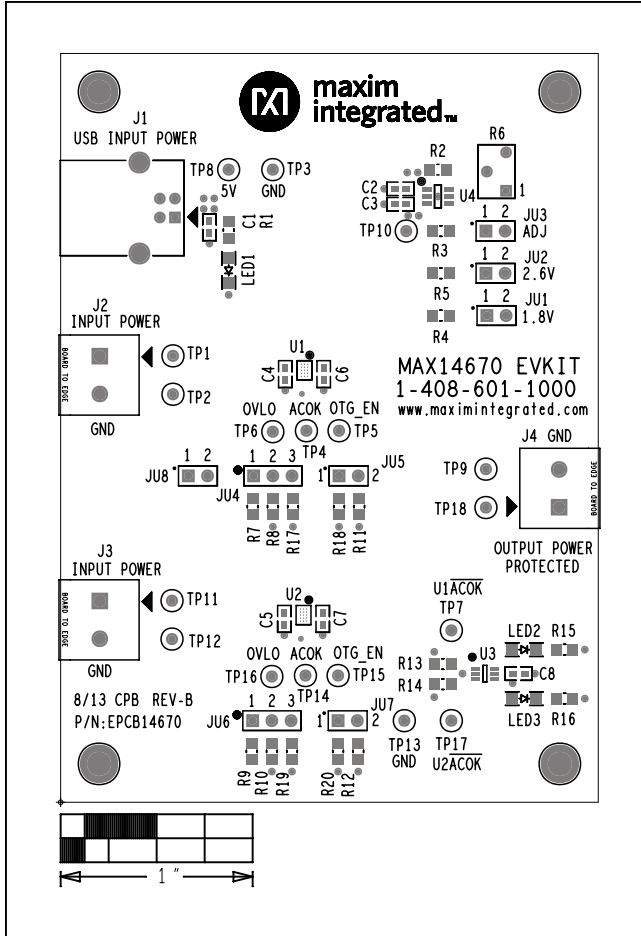


Figure 2. MAX14670 EV Kit Component Placement Guide—Component Side

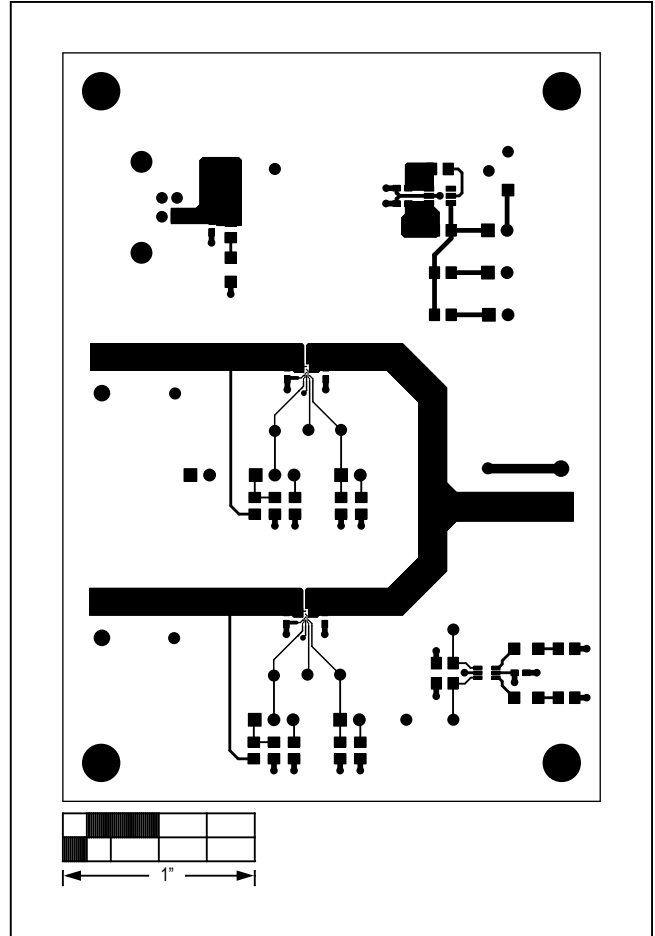


Figure 3. MAX14670 EV Kit PCB Layout—Component Side

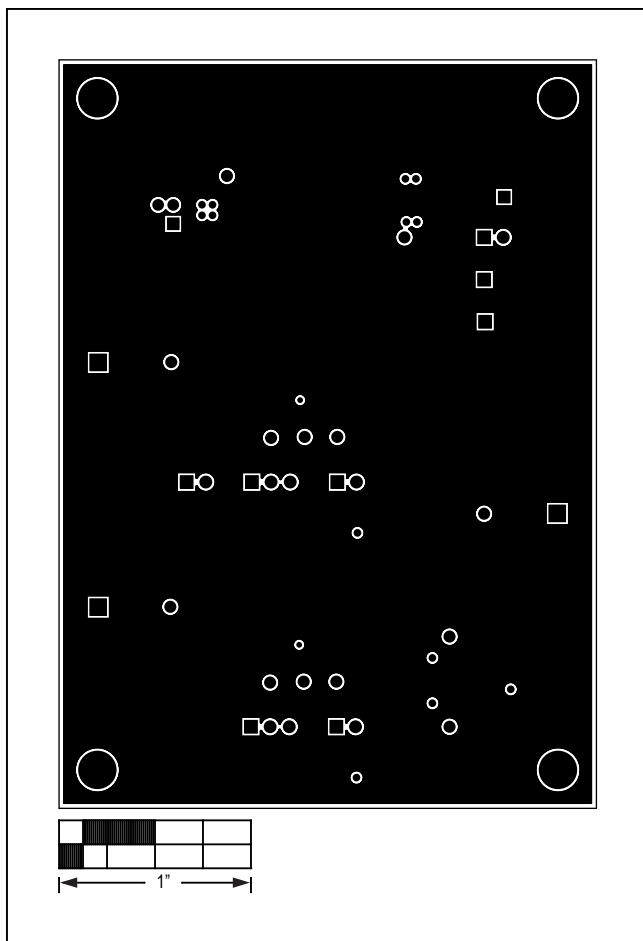


Figure 4. MAX14670 EV Kit PCB Layout—Internal Layer 1

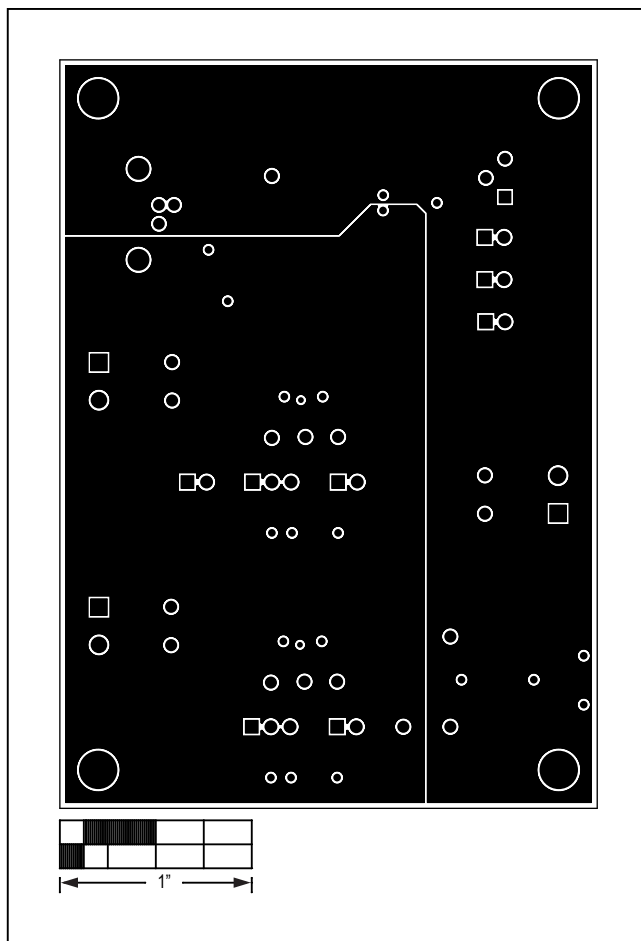


Figure 5. MAX14670 EV Kit PCB Layout—Internal Layer 2

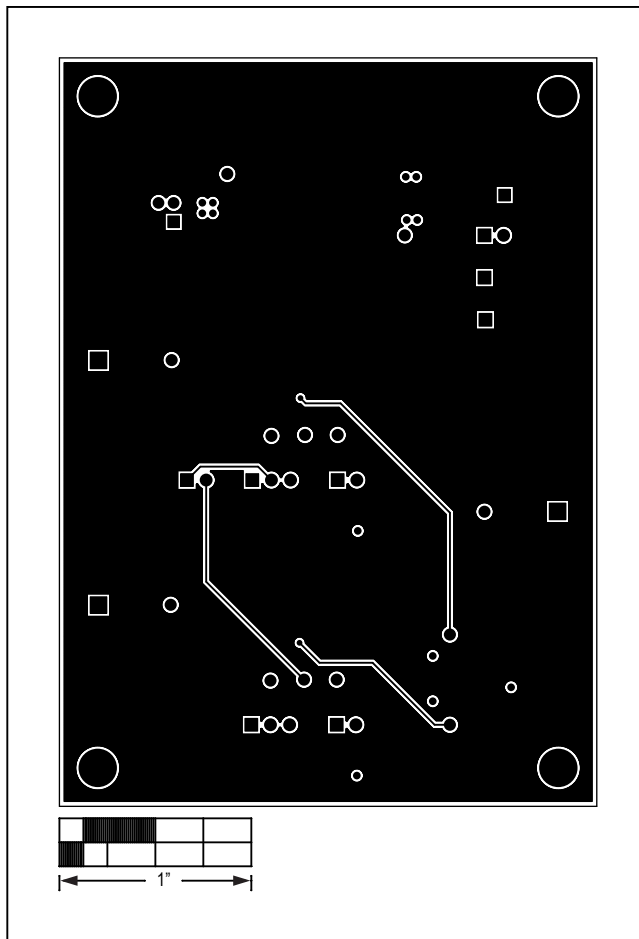


Figure 6. MAX14670 EV Kit PCB Layout—Solder Side

### Ordering Information

PART	TYPE
MAX14670EVKIT#	EV Kit

*#Denotes RoHS compliant.*



### Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	9/13	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](http://www.maximintegrated.com).

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