



# MAX8564 Evaluation Kit

## General Description

The MAX8564 evaluation kit (EV kit) is a fully assembled and tested circuit board that evaluates the MAX8564 dual linear n-FET controller. The MAX8564 circuit generates a 1.5V output voltage at load currents up to 1.5A from a 1.8V input voltage and a 1.05V output voltage at load currents up to 3A from a 1.2V input voltage. The VDD bias supply permits operation from 5V or 12V rails. The MAX8564 EV kit can also evaluate the MAX8563. To evaluate the MAX8563, order a free sample with this EV kit.

## Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX8564EVKIT	0°C to +70°C	10 $\mu$ MAX <sup>®</sup>

## Features

- ◆ MAX8563: 3 Outputs
- ◆ MAX8564: 2 Outputs
- ◆  $\pm 1\%$  Feedback Regulation
- ◆ Adjustable Output Voltage Down to 0.5V
- ◆ Wide Supply Voltage Range Permits Operation from 5V and 12V Rails
- ◆ Individual Enable Control and POK Signals Allow Sequencing
- ◆ Undervoltage Short-Circuit Protection
- ◆ Drives n-Channel MOSFETs
- ◆ Fully Assembled and Tested

## Component List

DESIGNATION	QTY	DESCRIPTION
<b>MAX8564 Circuit</b>		
C17	1	0.1 $\mu$ F $\pm 10\%$ , 16V X7R ceramic capacitor (0603) TDK C1608X7R1C104K
C18, C21	2	2.2 $\mu$ F $\pm 10\%$ , 6.3V X5R ceramic capacitors (0603) TDK C1608X5R0J225K
C19, C20 C22, C23	4	100 $\mu$ F, 18m $\Omega$ , 6.3V aluminum electrolytic Sanyo 6TPE100MI
C24, C25	2	1 $\mu$ F $\pm 10\%$ , 16V X5R ceramic capacitors (0603) TDK C1608X5R1C105K
C26, C27	0	Not installed (0402)
JU4, JU5	2	3-pin headers
N3	1	Dual n-channel MOSFET, 30V, 18m $\Omega$ (max), SO-8 Vishay Si4922DY
R10	1	620 $\Omega$ $\pm 5\%$ , resistor (0603)
R11	1	332 $\Omega$ $\pm 1\%$ , resistor (0603)
R12	1	665 $\Omega$ $\pm 1\%$ , resistor (0603)
R13	1	390 $\Omega$ $\pm 5\%$ , resistor (0603)
R14	1	182 $\Omega$ $\pm 1\%$ , resistor (0603)
R15	1	165 $\Omega$ $\pm 1\%$ , resistor (0603)
U2	1	MAX8564EUB
None	2	Shunts, position 2
None	1	MAX8564 EV kit PC board

DESIGNATION	QTY	DESCRIPTION
<b>MAX8563 Circuit (Not Installed)</b>		
C1	0	0.1 $\mu$ F $\pm 10\%$ , 16V X7R ceramic capacitor (0603) TDK C1608X7R1C104K
C2, C6, C10	0	2.2 $\mu$ F $\pm 10\%$ , 6.3V X5R ceramic capacitors (0603) TDK C1608X5R0J225K
C3, C4, C7, C8, C11, C12	0	100 $\mu$ F, 18m $\Omega$ , 6.3V aluminum electrolytic Sanyo 6TPE100MI
C5, C9, C13	0	1 $\mu$ F $\pm 10\%$ , 16V, X5R ceramic capacitors (0603) TDK C1608X5R1C105K
C14, C15, C16	0	Not installed (0402)
JU1, JU2, JU3	0	3-pin headers
N1	0	Dual n-channel MOSFET, 30V, 18m $\Omega$ (max), SO-8 Vishay Si4922DY
N2	0	n-channel MOSFET, 30V, 50m $\Omega$ (max), DPAK Fairchild Semiconductor FDD6630A
R1	0	665 $\Omega$ $\pm 1\%$ resistor (0603)
R2	0	620 $\Omega$ $\pm 5\%$ resistor (0603)
R3	0	332 $\Omega$ $\pm 1\%$ resistor (0603)
R4	0	390 $\Omega$ $\pm 5\%$ resistor (0603)
R5	0	182 $\Omega$ $\pm 1\%$ resistor (0603)
R6	0	165 $\Omega$ $\pm 1\%$ resistor (0603)
R7	0	910 $\Omega$ $\pm 5\%$ resistor (0603)
R8	0	1k $\Omega$ $\pm 1\%$ resistor (0603)
R9	0	249 $\Omega$ $\pm 1\%$ resistor (0603)
U1	0	MAX8563EEE
None	0	Shunt, position 2

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**For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at [www.maxim-ic.com](http://www.maxim-ic.com).**

# MAX8564 Evaluation Kit

## Component Suppliers

SUPPLIER	PHONE	WEBSITE
Fairchild Semiconductor	972-910-8000	www.fairchildsemi.com
Sanyo	619-661-6835	www.sanyo.com
TDK	888-835-6646	www.component.tdk.com
Vishay	402-563-6866	www.vishay.com

**Note:** Indicate you are using the MAX8564 EV kit when contacting these suppliers.

## Quick Start

### Recommended Equipment

- Two variable-DC power supplies capable of supplying up to 2V at 4A
- One DC power supply capable of supplying 5V or 12V at 100mA
- Two digital multimeters (DMM)
- 1.5A load
- 3A load
- Ammeter (optional)

### Procedure

The MAX8564 EV kit is fully assembled and tested. Follow the steps below to verify board operation:

- 1) Preset a variable-DC power supply (further referred to as PS1) to 1.8V. Turn off the power supply. **Do not turn on the power supply until all connections are complete.**
- 2) Preset a variable-DC power supply (further referred to as PS2) to 1.2V. Turn off the power supply. **Do not turn on the power supply until all connections are complete.**
- 3) Preset the DC power supply (further referred to as PS3) to 5V or 12V. Turn off the power supply. **Do not turn on the power supply until all connections are complete.**
- 4) Connect the positive lead of PS1 to the IN12 pad on the EV kit and connect the negative lead of PS1 to the GND2 pad on the EV kit.
- 5) Connect the positive lead of PS2 to the IN22 pad on the EV kit and connect the negative lead of PS2 to the GND2 pad on the EV kit.
- 6) Connect the positive lead of PS3 to the VDD2 pad on the EV kit and connect the negative lead of PS3 to the GND2 pad on the EV kit.
- 7) Connect the positive lead of one DMM to the OUT12 pad on the EV kit and connect the negative lead of that DMM to the GND2 pad on the EV kit.
- 8) Connect the positive lead of the second DMM to the OUT22 pad on the EV kit and connect the negative lead of that DMM to the GND2 pad on the EV kit.
- 9) Turn on PS1 and PS2.
- 10) Turn on PS3.
- 11) Verify the voltage at OUT12 is 1.5V  $\pm$ 2%.
- 12) Verify the voltage at OUT22 is 1.05V  $\pm$ 2%.
- 13) Connect a 1.5A load between OUT12 and GND.
- 14) Verify that the voltage at OUT12 is 1.5V  $\pm$ 2%.
- 15) Connect a 3A load between OUT22 and GND.
- 16) Verify that the voltage at OUT22 is 1.05V  $\pm$ 2%.

## Detailed Description

### Evaluating Other Output Voltages

The minimum output voltage for each controller of the MAX8563/MAX8564 is 0.5V. The maximum output voltage is adjustable up to 3.3V with  $V_{DD} = 12V$ , and up to 1.8V with  $V_{DD} = 5V$ . To set the output voltage for OUT12, connect the FB1 pin to the center of a voltage-divider between OUT12 and GND (R11 and R12 in Figure 1). The resistor-divider current should be at least 1mA per 1A of maximum output current.

$$R11 \leq \frac{500}{I_{OUT12(MAX)}}$$

$$R12 = R11 \times (2 \times V_{OUT12} - 1)$$

For OUT22, R14 and R15 are calculated using the same method.

To set the output voltage to 0.5V, disconnect R11 from FB1 and connect R11 to OUT12; this change maintains the minimum load requirement on the output. In this case, R12 can vary from 1k $\Omega$  to 10k $\Omega$ .

Refer to the MAX8564 data sheet for information on selecting the compensation resistor and compensation capacitor to optimize the circuit for different output voltages.

# MAX8564 Evaluation Kit

## **Output Undervoltage and Overload Protection**

When an overload event or short circuit occurs, the device that is most vulnerable to damage is the external n-MOSFET. The MAX8564 monitors the output voltage to protect the MOSFET. When DRV\_ is at its maximum voltage and the output voltage drops below 80% but is still greater than 60% of its nominal voltage for more than 50ms, the MAX8564 shuts down that particular regulator output by pulling DRV\_ to GND. Note that there is an additional inherent delay in turning off the MOSFET. The delay is a function of the compensation capacitor and the MOSFET. If the output recovers to greater than 80% within 50ms, it is not considered to be in overload and no action is taken. When the output voltage drops below 60% of its nominal voltage, the MAX8564 immediately shuts down that particular regulator output by pulling DRV\_ to GND. To restart that particular LDO, VDD must be cycled below the UVLO or the corresponding EN\_ must be cycled.

## **Evaluating the MAX8563**

For evaluating the MAX8563, install the MAX8563 in the top circuit labeled MAX8563. All components for the MAX8563 are not installed; see the *Component List* for proper component selection.

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## **Jumper Settings**

### **Jumper JU4 Function**

The MAX8564 circuit features an output shutdown mode for OUT12. To shut down the output, place a shunt between pins 2 and 3 on JU4. For normal operation, remove the shunt or place it on pins 1 and 2 of JU4 (default position).

### **Jumper JU5 Function**

The MAX8564 circuit features an output shutdown mode for OUT22. To shut down the output, place a shunt between pins 2 and 3 on JU5. For normal operation, remove the shunt or place it on pins 1 and 2 of JU5 (default position).

**Evaluates: MAX8563/MAX8564**

# MAX8564 Evaluation Kit

Evaluates: MAX8563/MAX8564

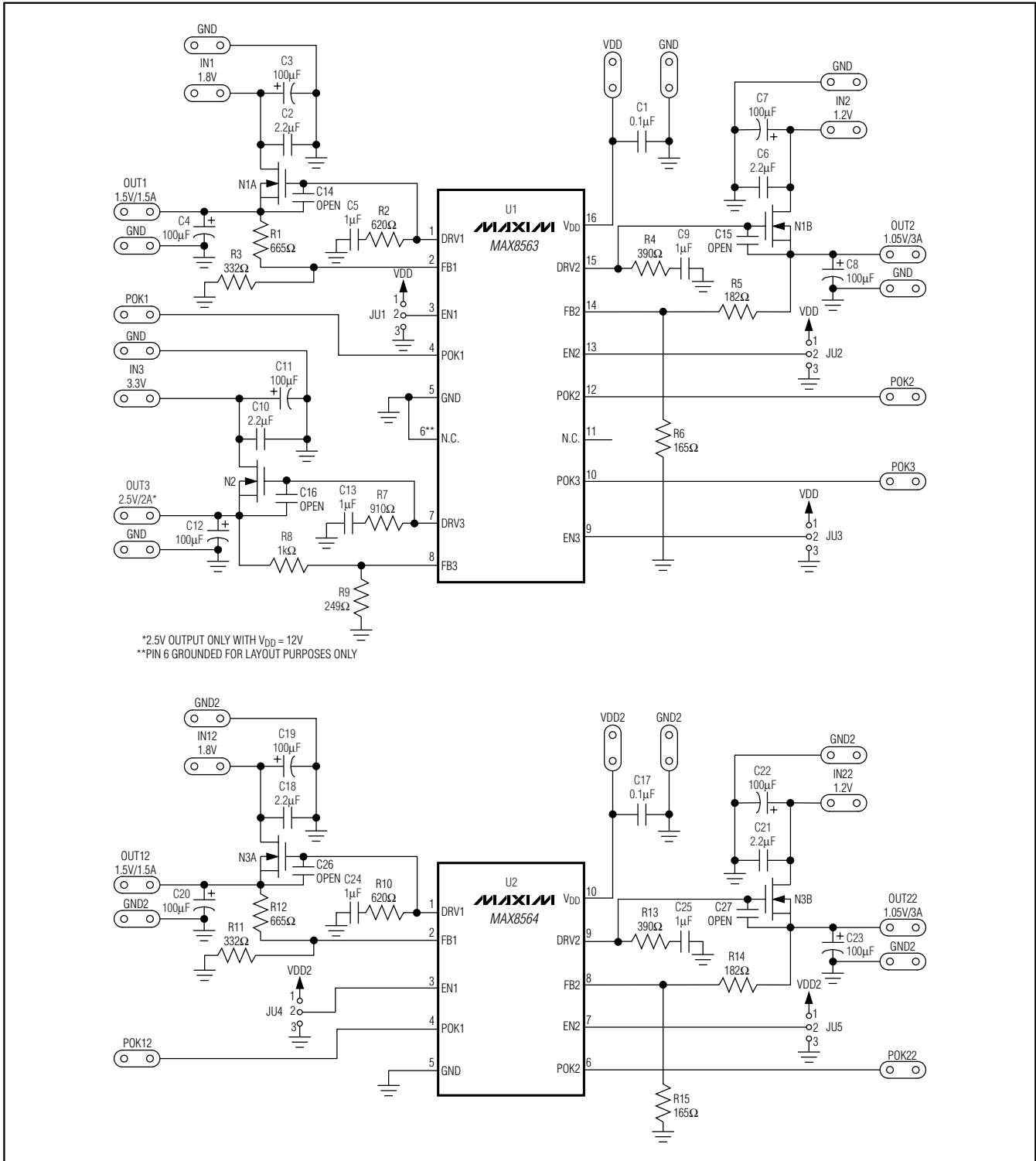


Figure 1. MAX8564 EV Kit Schematic

# MAX8564 Evaluation Kit

Evaluates: MAX8563/MAX8564

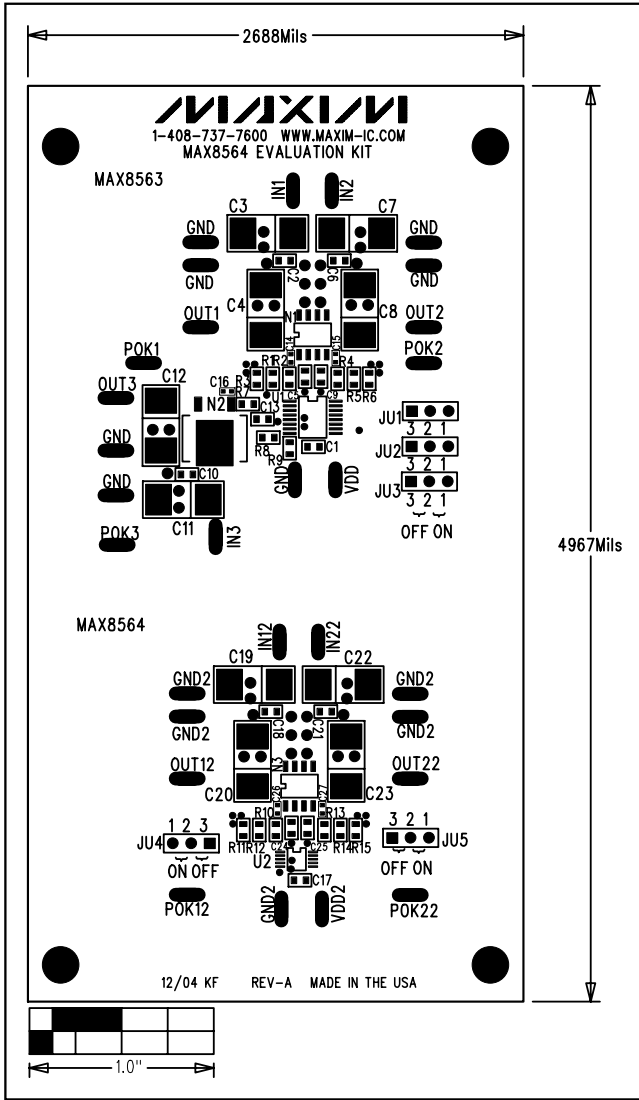


Figure 2. MAX8564 EV Kit Component Placement Guide—Component Side

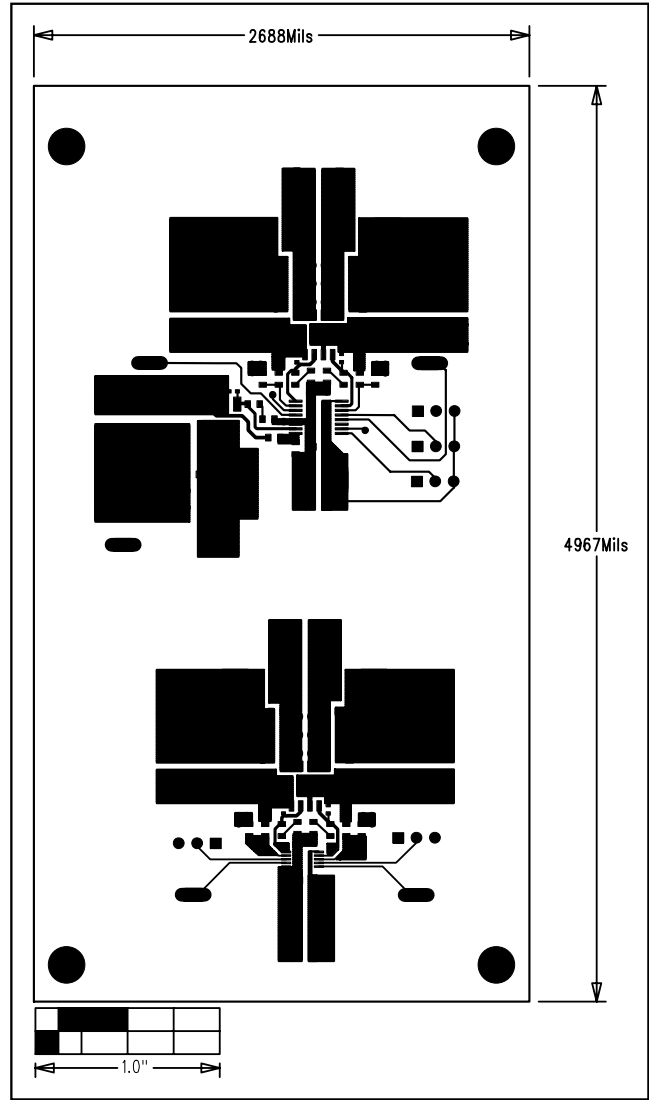


Figure 3. MAX8564 EV Kit PC Board Layout—Component Side

# MAX8564 Evaluation Kit

**Evaluates: MAX8563/MAX8564**

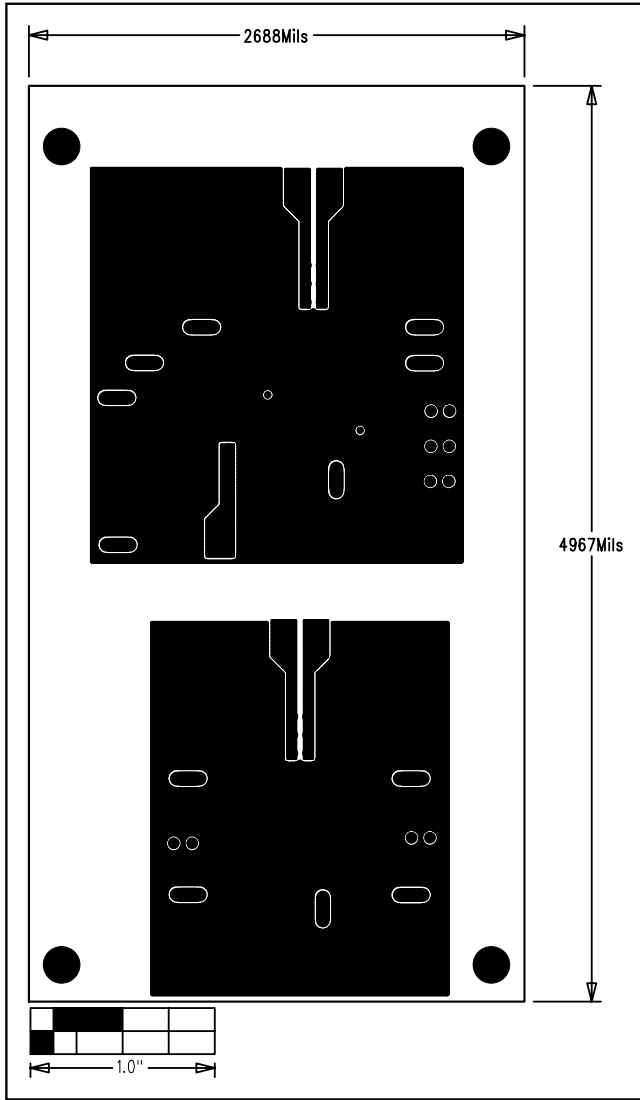


Figure 4. MAX8564 EV Kit PC Board Layout—Layer 2

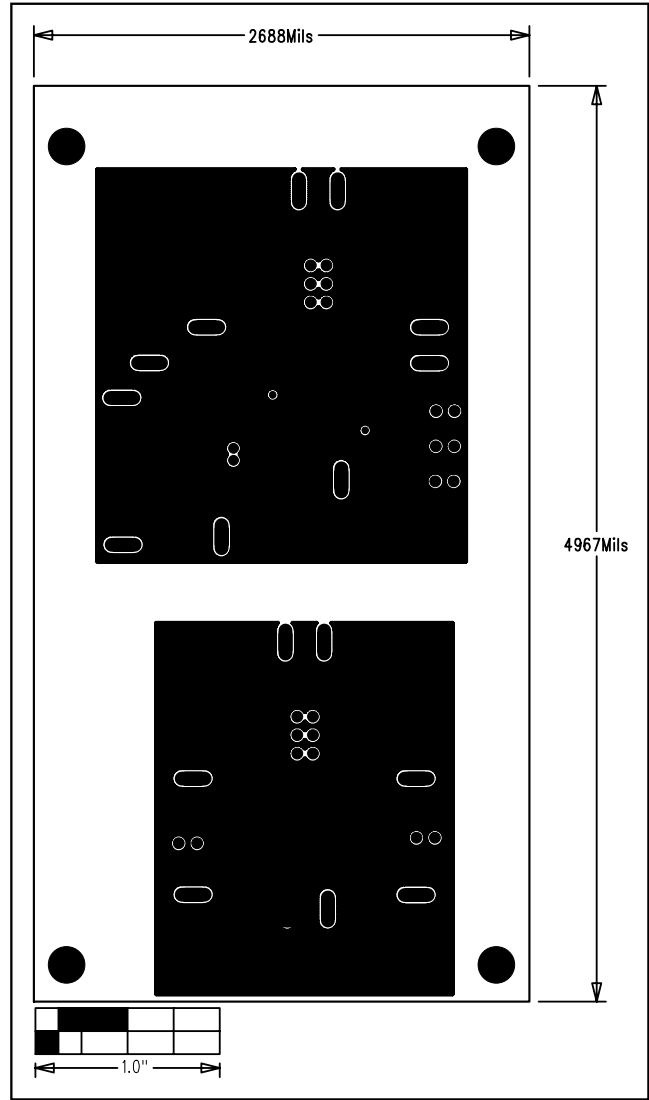


Figure 5. MAX8564 EV Kit PC Board Layout—Layer 3

# MAX8564 Evaluation Kit

Evaluates: MAX8563/MAX8564

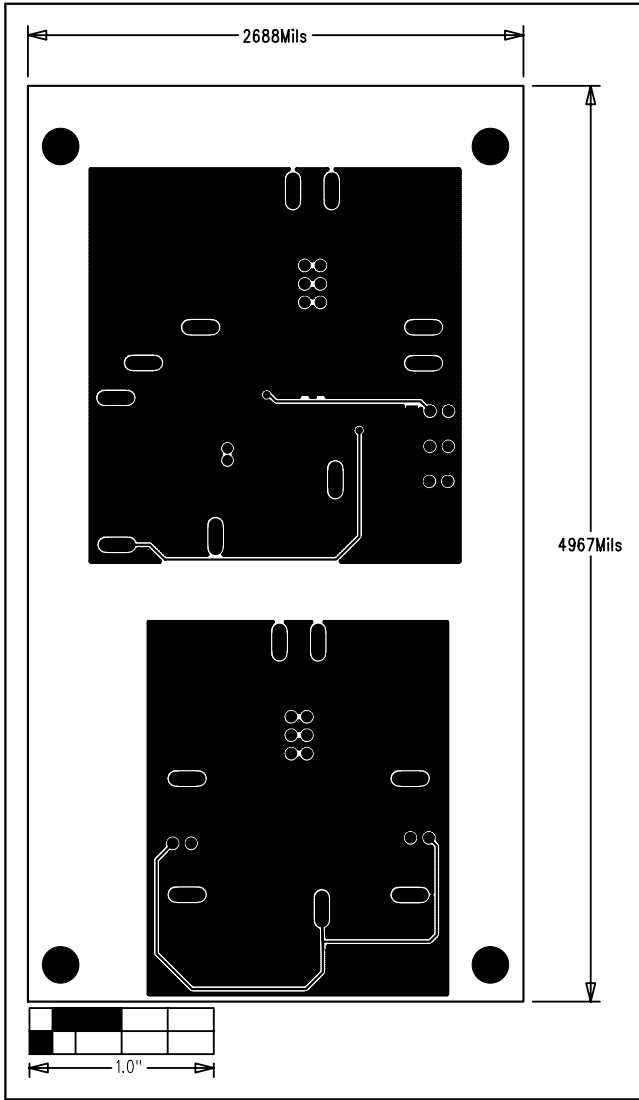


Figure 6. MAX8564 EV Kit PC Board Layout—Solder Side

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