



## MAX2244/MAX2246 Evaluation Kits

### General Description

The MAX2244/MAX2246 evaluation kits (EV kits) simplify evaluation of the MAX2244/MAX2245/MAX2246 power amplifiers (PAs). They enable testing of the devices' RF performance and require no additional support circuitry. The EV kits' signal inputs and outputs use SMA connectors to facilitate the connection of RF test equipment.

The MAX2244 EV kit is assembled with a MAX2244 and incorporates output matching components optimized for 2.4GHz to 2.5GHz and approximately 22dBm output power. To evaluate the MAX2245, order samples from Maxim by calling 1-800-998-8800. The MAX2246 EV kit is assembled with a MAX2246 and is matched on-board to provide approximately 20dBm in the 2.4GHz band.

### Component Suppliers

| SUPPLIER           | PHONE        | WEBSITE         |
|--------------------|--------------|-----------------|
| Digi-Key           | 218-681-6674 | www.digikey.com |
| Kamaya             | 219-489-1533 | www.kamaya.com  |
| Murata Electronics | 770-436-1300 | www.murata.com  |
| Toko               | 408-432-8281 | www.toko.com    |

### Features

- ◆ Easy Evaluation of the MAX2244/MAX2246
- ◆ 3V to 3.6V Single-Supply Operation
- ◆ Radio-Frequency Output Matched for Operation from 2.4GHz to 2.5GHz
- ◆ Jumper for Easy Shutdown Control
- ◆ Includes All Critical Peripheral Components

### Ordering Information

| PART         | TEMP RANGE     | IC PACKAGE |
|--------------|----------------|------------|
| MAX2244EVKIT | -40°C to +85°C | 9 UCSP     |
| MAX2246EVKIT | -40°C to +85°C | 9 UCSP     |

### MAX2244 Component List

| DESIGNATION | QTY | DESCRIPTION   |
|-------------|-----|---|
| C1          | 1   | 10µF tantalum capacitor, C case<br>AVXTAJC106K016                       |
| C2          | 1   | 10nF ±10%, 10V min ceramic capacitor (0402)<br>Murata GRP155R71E103K    |
| C3, C9, C11 | 3   | 1000pF ±10%, 25V min ceramic capacitors (0402)<br>Murata GRP155R71H102K |
| C4          | 1   | 27pF ±5% ceramic capacitor (0402)<br>Murata GRP1555C1H270J              |
| C5, C6      | 2   | 10pF ±5% ceramic capacitors (0402)<br>Murata GRP1555C1H100B             |
| C7          | 1   | 1.2pF ±0.25pF ceramic capacitor (0402)<br>Murata GRP1555C1H1R3B         |
| C8          | 1   | 5pF ±0.25pF ceramic capacitor (0402)<br>Murata GRP1555C1H5R0B           |

| DESIGNATION | QTY | DESCRIPTION  |
|-------------|-----|--|
| C10         | 1   | 100pF ±5% ceramic capacitor (0402)<br>Murata GRP155C1H101K |
| J1, J2, J5  | 3   | Connectors<br>Digi-Key 500K-ND                             |
| J3, J4      | 2   | SMA connectors (edge mount)<br>EJJohnson 142-0701-801      |
| JU1         | 1   | 3-pin header, 0.1in center<br>Digi-Key S1012-36-ND         |
| JU1         | 1   | Shunt<br>Digi-Key S9000-ND                                 |
| R1, R3      | 2   | 8.2Ω ±5% resistors (0402)                                  |
| R2          | 1   | 1kΩ ±5% resistor (0402)                                    |
| U1          | 1   | MAX2244EBL 9-bump ultra chip-scale package (UCSP™)         |
| None        | 1   | MAX2244 EV kit PC board                                    |
| None        | 1   | MAX2244 data sheet   |

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## MAX2246 Component List

| DESIGNATION | QTY | DESCRIPTION  |
|-------------|-----|--|
| C1          | 1   | 10 $\mu$ F tantalum capacitor, C case AVXTAJC106K016                     |
| C2          | 1   | 10nF $\pm$ 10% 10V min ceramic capacitor (0402)<br>Murata GRP155R71E103K |
| C3, C9, C11 | 3   | 1000pF $\pm$ 10% 25V min ceramic capacitors (0402) Murata GRP155R71H102K |
| C4, C8, C10 | 3   | 27pF $\pm$ 5% ceramic capacitors (0402)<br>Murata GRP1555C1H270J         |
| C5, C6      | 2   | 10pF $\pm$ 0.1pF ceramic capacitors (0402)<br>Murata GRP1555C1H100B      |
| C7          | 1   | 1.3pF $\pm$ 0.1pF ceramic capacitor (0402)<br>Murata GRP1555C1H1R3B      |
| J1, J2, J5  | 3   | Connectors<br>Digi-Key 500K-ND   |
| J3, J4      | 2   | SMA connectors (edge mount)<br>EFJohnson 142-0701-801                    |
| JU1         | 1   | 3-pin header, 0.1in center<br>Digi-Key S1012-36-ND                       |
| JU1         | 1   | Shunt<br>Digi-Key S9000-ND   |
| R1, R3      | 2   | 8.2 $\Omega$ $\pm$ 5% resistors (0402)                                   |
| R2          | 1   | 1k $\Omega$ $\pm$ 5% resistor (0402)                                     |
| U1          | 1   | MAX2246EBL 9-pin UCSP  |
| None        | 1   | MAX2246 EV kit PC board  |
| None        | 1   | MAX2246 data sheet   |

## Quick Start

The MAX2244/MAX2246 EV kits are fully assembled and factory tested. Follow the instructions in the *Connections and Setup* section for proper device evaluation. To evaluate the MAX2245, order samples from Maxim by calling 1-800-998-8800.

## Test Equipment Required

This section lists the recommended test equipment to verify operation of the MAX2244/MAX2245/MAX2246. It is intended only as a guide, and some substitutions are possible:

- One RF signal generator capable of delivering at least 5dBm of output power at the operating frequency (HP 8648D or equivalent)
- One RF power sensor capable of handling at least 10dBm of output power at the operating frequency (HP 8482A or equivalent)
- One RF power meter capable of measuring up to 10dBm of output power at the operating frequency (HP 438A or equivalent)
- An RF spectrum analyzer that covers the MAX2244/MAX2246 operating frequency range, as well as a few harmonics (HP 8562E, for example)
- A dual-output power supply capable of up to 0.25A at 3.0V to 3.6V and a supply capable of 0 to 2.5V at up to 10mA.
- An optional ammeter for measuring the supply current
- Two 50 $\Omega$  SMA cables
- One SMA 20dB pad
- A network analyzer (HP 8753D, for example) to measure small-signal return loss and gain (optional)

## Connections and Setup

This section is a step-by-step guide to operating the EV kits and testing the devices' function. **Do not turn on the DC power or RF signal generators until all connections are made:**

- 1) Connect a DC supply set to 3.0V (through an ammeter, if desired) to the VCC and GND terminals on the EV kit. Set the second DC supply voltage to 2.0V and connect to PC. **Do not turn on the supply.**
- 2) Connect one RF signal generator to the RFIN SMA connector. **Do not turn on the generator's output.** Set the generator for an output frequency of 2.45GHz at a power level of 2dBm.
- 3) Connect a 20dB pad to the RFOUT SMA connector on the EV kit to prevent overloading the power sensor and power meter.
- 4) Connect a power sensor to the 20dB pad.
- 5) Connect the power sensor to a power meter. Set the power meter offset to 20dB and frequency to 2.45GHz.
- 6) Ensure JU1 (SHUTDOWN) is in the ON position. First turn on the VCC supply, and then the PC supply. The VCC supply current should read approximately 60mA (MAX2244) or 35mA (MAX2246).
- 7) Activate the RF generator's output. For the MAX2244 EV kit, the output power should increase to approximately 22dBm with supply current rising

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to approximately 172mA. For the MAX2246 EV kit, output power is approximately 20dBm with a supply current of approximately 120mA.

- 8) Varying the DC supply voltage connected to PC between 0 and 2.5V varies the output power. Refer to the MAX2244/MAX2245/MAX2246 data sheet for more information.

## Layout Issues

A good PC board is an essential part of an RF circuit design. The EV kit PC board can be a guide for laying out a board using the MAX2244/MAX2245/MAX2246.

Keep traces carrying RF signals as short as possible to minimize radiation and insertion loss because of the PC board. Each VCC node on the PC board should have its own decoupling capacitor to minimize supply coupling from one section of the IC to another. A star topology for the supply layout, in which each VCC node on the circuit has a separate connection to a central VCC node, can further minimize coupling between sections of the IC. Refer to the *Layout* section of the MAX2244/MAX2245/MAX2246 data sheet for more information.

Evaluate: MAX2244/MAX2245/MAX2246

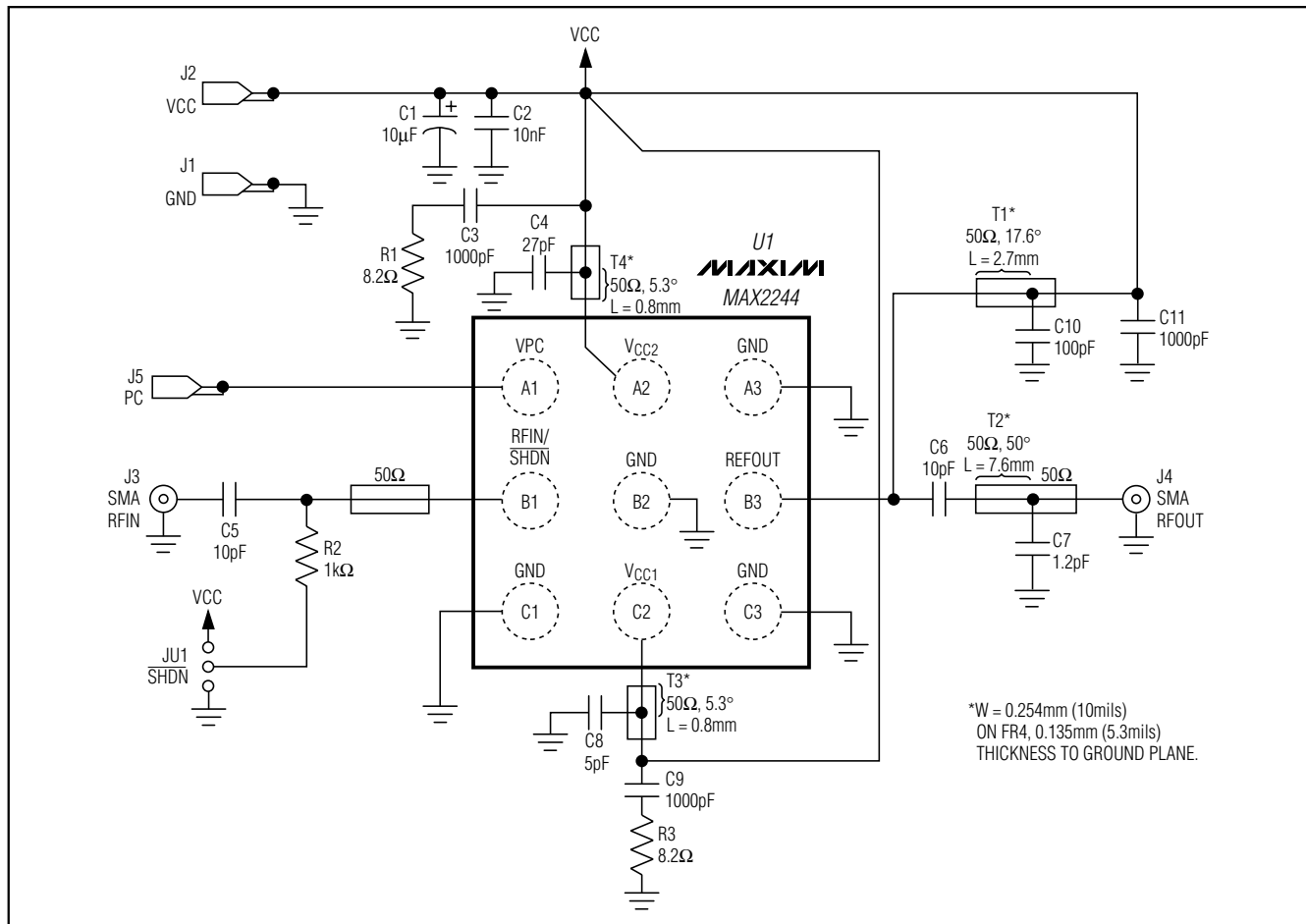


Figure 1. MAX2244 EV Kit Schematic

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Evaluate: MAX2244/MAX2245/MAX2246

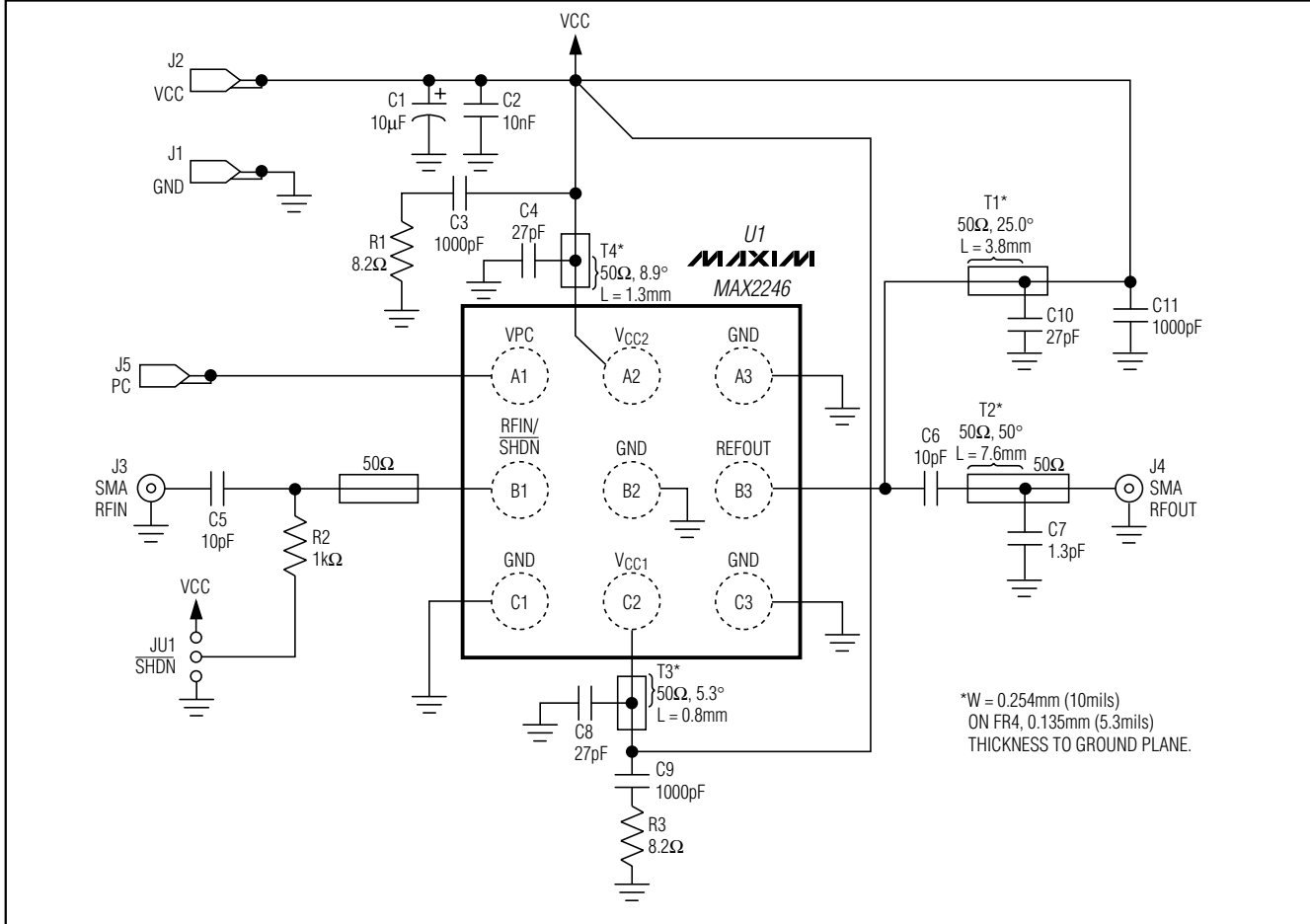


Figure 2. MAX2246 EV Kit Schematic

# MAX2244/MAX2246 Evaluation Kits

Evaluate: MAX2244/MAX2245/MAX2246

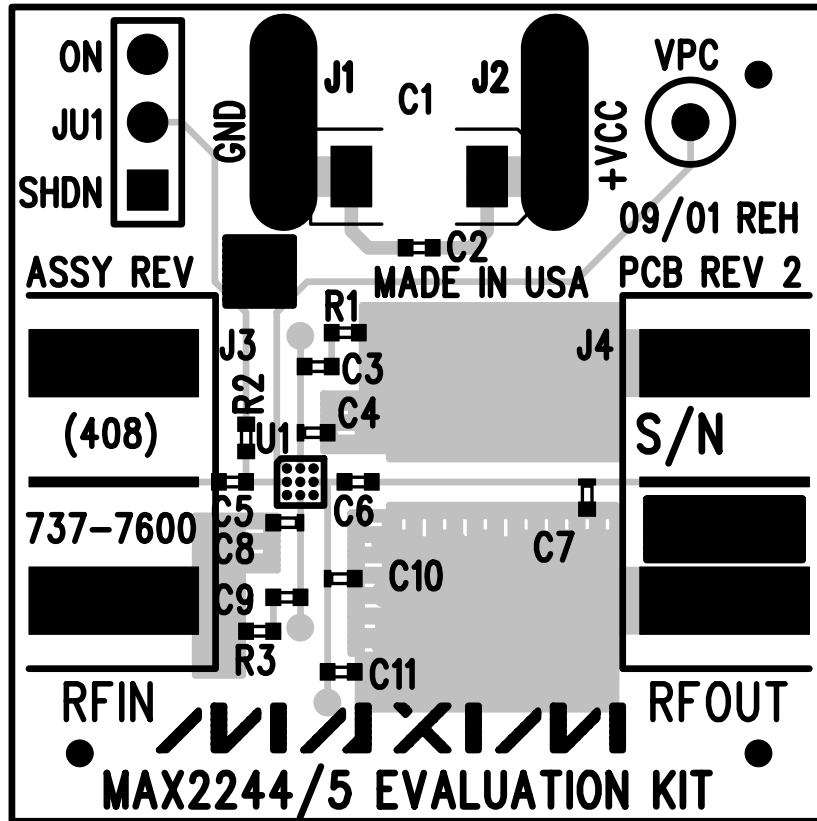


Figure 3. MAX2244 EV Kit Component Placement Guide—Component Side

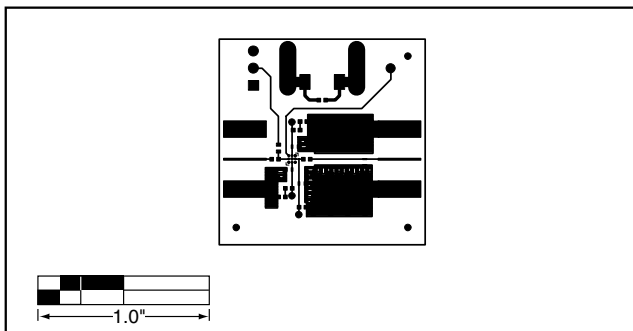


Figure 4. MAX2244 EV Kit PC Board Layout—Component Side

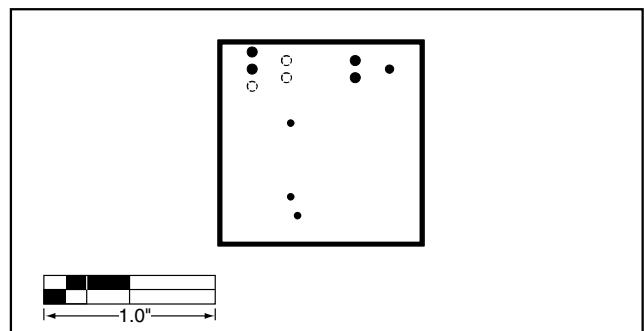


Figure 5. MAX2244 EV Kit PC Board Layout—Ground Plane

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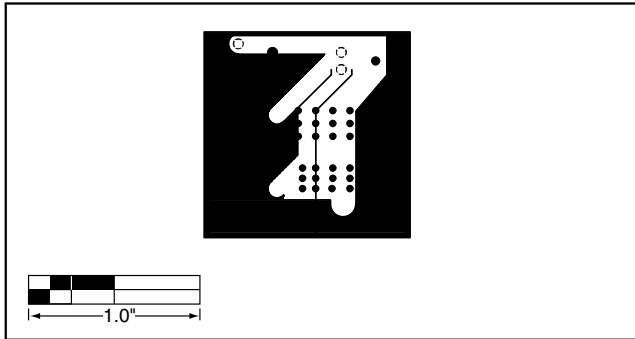


Figure 6. MAX2244 EV Kit PC Board Layout—Power Plane

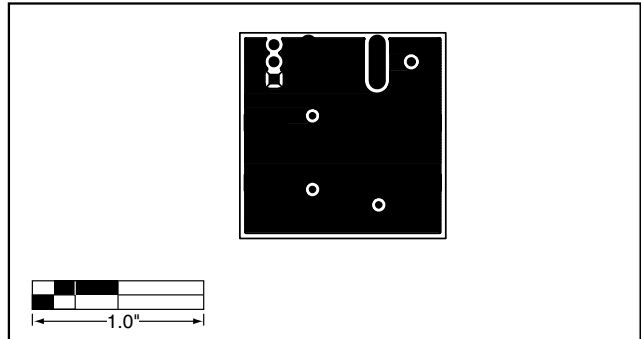


Figure 7. MAX2244 EV Kit PC Board Layout—Solder Side

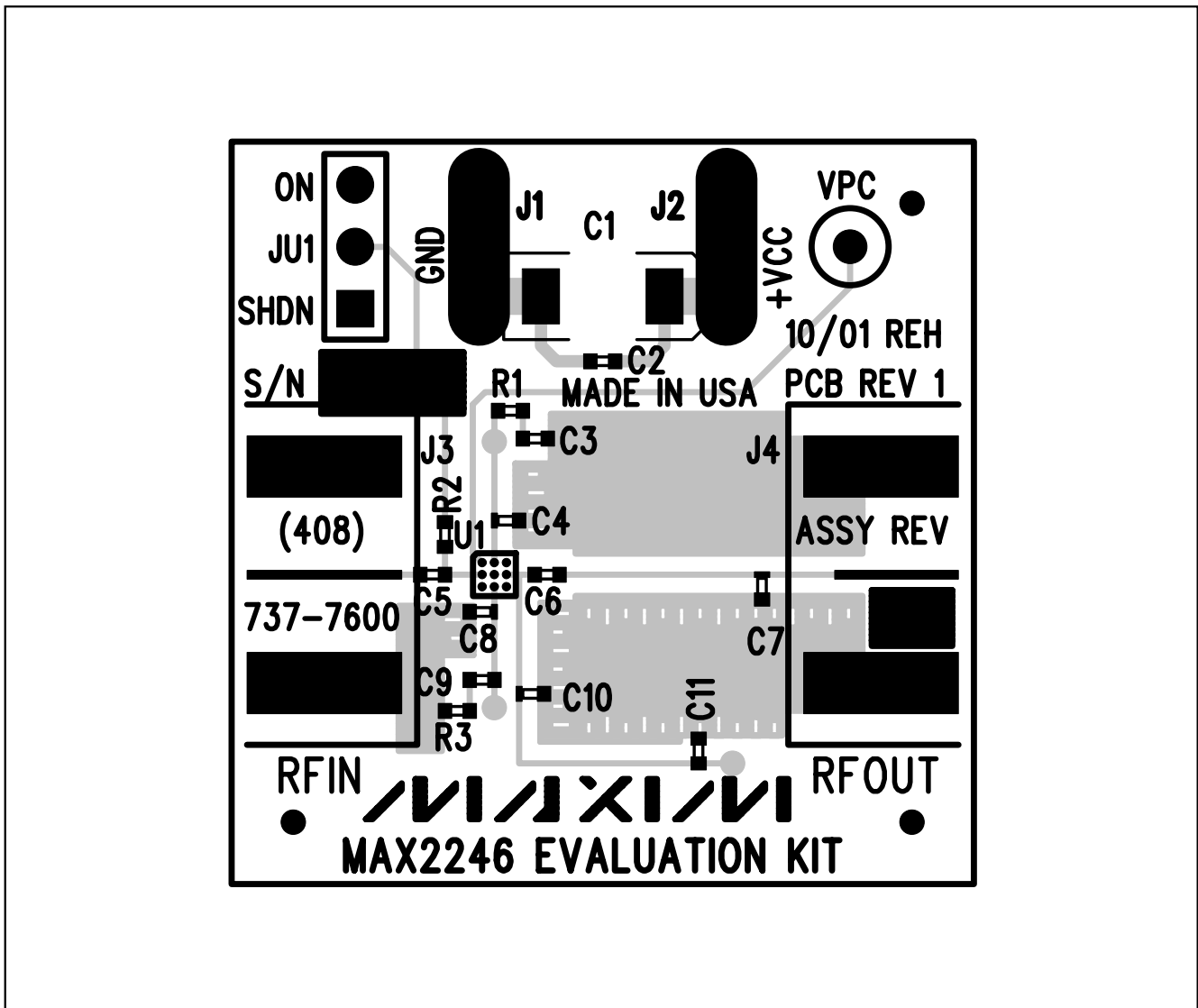


Figure 8. MAX2246 EV Kit Component Placement Guide—Component Side

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Evaluate: MAX2244/MAX2245/MAX2246

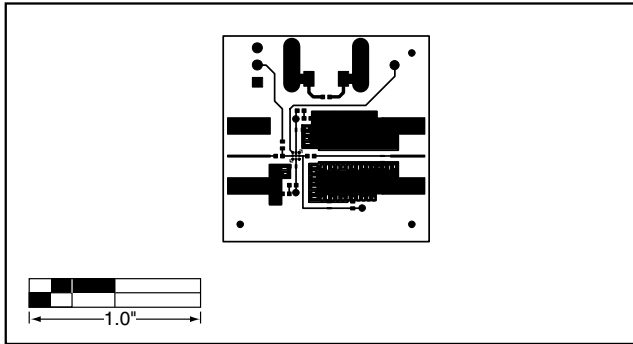


Figure 9. MAX2246 EV Kit PC Board Layout—Component Side

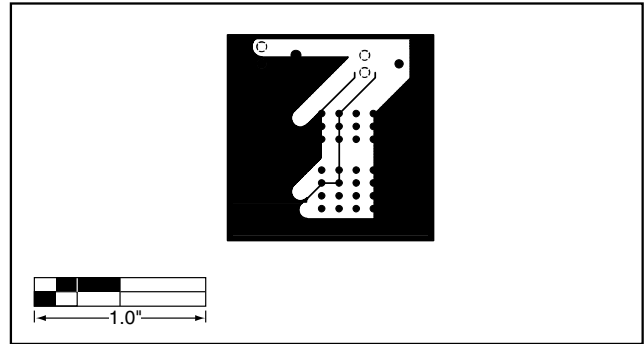


Figure 10. MAX2246 EV Kit PC Board Layout—Ground Plane

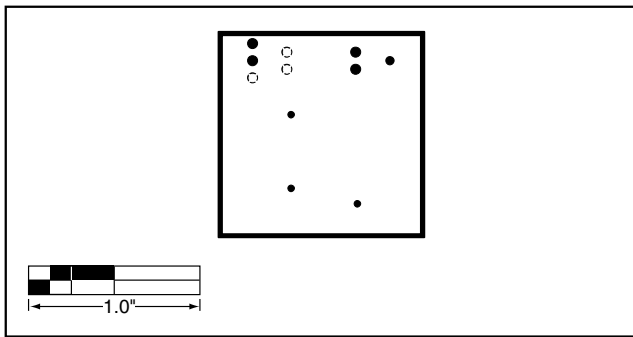


Figure 11. MAX2246 EV Kit PC Board Layout—Power Plane

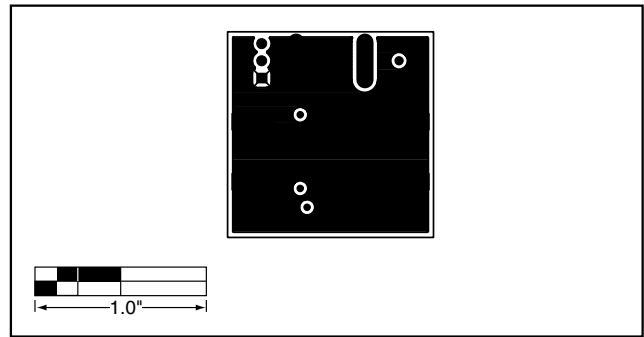


Figure 12. MAX2246 EV Kit PC Board Layout—Solder Side

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