



# MAX2394/MAX2395 Evaluation Kits

## General Description

The MAX2394/MAX2395 evaluation kits (EV kits) simplify evaluation of the MAX2394/MAX2395 quasi-direct modulator ICs for use in WCDMA/UMTS transmitters. The kit enables testing of the device's RF performance and requires no additional support circuitry. The board includes input BNC connectors and an output SMA connector to simplify the connection to test equipment.

The MAX2394/MAX2395 EV kits are populated with the MAX2394 or MAX2395 IC and incorporate input and output matching components optimized for RF frequencies from 1920MHz to 1980MHz.

## Features

- ◆ Easy Evaluation of the MAX2394/MAX2395
- ◆ +2.7V to +3.6V Single-Supply Operation
- ◆ Evaluation Software for PCs
- ◆ Fully Assembled and Tested

## Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX2394EVKIT	-40°C to +85°C	28 QFN
MAX2395EVKIT	-40°C to +85°C	28 QFN

## Component List

DESIGNATION	QTY	DESCRIPTION
C1, C8, C17, C18, C29	—	Open
C2	2	33pF ±5% 0402 capacitor Murata GRP1555C1H330J
C3, C4, C5	3	100pF ±5% 0402 capacitors Murata GRP1555C1H101J
C6, C7, C10–C13, C19, C20, C21, C35	10	1000pF ±10% 0402 capacitors Murata GRP155R71H102K
C9, C23, C30	3	0.01µF ±10% 0402 capacitors Murata GRP155R71C103K
C14	1	2200pF ±10% 0402 capacitor Murata GRP155R71H222K
C15	1	0.022µF ±10% 0402 capacitor Murata GRP155R71C223K
C16	1	0.1µF ±10% 0402 capacitor Murata GRP155R61A104K
C22, C70, C71	3	10µF ±10% tantalum capacitors C case AVX TAJC106K016
C24–C28	5	0.1µF ±10% 0603 capacitors Murata GRM188R71C104K
C32	1	1.0µF ±10% 0805 capacitor Murata GRM21BR71C105K
J1	3	Connector SMA edge mount, round contact Johnson 142-0701-801

DESIGNATION	QTY	DESCRIPTION
J2	1	2 x 10 inline header, 100-mil center Digi-Key S2012-36-ND
J3, J8, J9, J10	4	Test points Digi-Key 5000K-ND
J4, J5	—	Open
J6, J7	2	BNC connectors A/D Electronics 580-002-00
JP1, JP2	2	1 x 3, 3-pin, inline headers, 100-mil centers Digi-Key S1012-36-ND
JP3, JP4, JP6–JP9	—	Open
L1	1	15nH ±5% 0603 inductor Coilcraft 0603CS-15NXJB
L2	—	Open
R1	1	12kΩ ±1% 0402 resistor
R2–R6	5	100kΩ ±1% 0402 resistors
R7, R12	—	Open
R8, R23, R45	3	1kΩ ±1% 0402 resistors
R9	1	3.32kΩ ±1% 0402 resistor
R10, R18	2	39Ω ±5% 0402 resistors
R11, R16, R28, R48, R50, R51	6	511Ω ±1% 0402 resistors
R13, R22	2	680Ω ±5% 0402 resistors
T3	—	Open
TP1, TP2, TP3	—	Open
Y1	1	19.2MHz volt-control TCXO Kinseki VC-TCXO-208C3-19P2

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## Component List (continued)

DESIGNATION	QTY	DESCRIPTION
U1	1	MAX2394 or MAX2395 Maxim MAX2394EGI/MAX2395EGI
U3, U4	2	MAX4453 op amps Maxim MAX4453ESA
None	1	36in socket connector ribbon cable, 20 contacts Digi-Key A3AAG-203G-ND
None	1	INTF2300 interface board Maxim INTF2300
None	1	MAX2394/MAX2395 EV kit circuit board
None	1	MAX2394/MAX2395 data sheet
None	1	MAX2394/MAX2395 EV kit data sheet

## Quick Start

The MAX2394/MAX2395 EV kits are fully assembled and factory tested. Follow the instructions in the *Connections and Setup* section for proper device evaluation.

### Test Equipment Required

Table 1 lists the required test equipment to verify MAX2394/MAX2395 operation. It is intended as a guide only, and some substitutions are possible.

### Connections and Setup

This section provides a step-by-step guide to operating the EV kit and testing the device functions. **Do not turn on DC power or RF signal generators until all connections are made:**

#### Testing W-CDMA Operation

- 1) Install and run the MAX2394/MAX2395 EV kit control software. The software can be downloaded at [www.maxim-ic.com/techsupport/other.htm](http://www.maxim-ic.com/techsupport/other.htm).
- 2) Connect the INTF2300 interface cable to the MAX2394/MAX2395 EV kit and interface board (Figure 1).  
**Note:** Pin 1 of the interface cable corresponds to the red wire. Pin 1 is designated in the silkscreen on each of the PC boards. The INTF2300 board derives its power from the MAX2394/MAX2395 EV kits.
- 3) At startup, set the software registers to the values given in the MAX2394/MAX2395 data sheet Table 1.

To change the output RF frequency, type the desired frequency in the Fout box and hit enter to update the registers.

- 4) Connect a DC supply set to +2.85V (through an ammeter if desired) to both VCC and VCC2 terminals on the EV kits. If available, set the current limit to 100mA.
- 5) Turn on the DC supply; the supply current should read approximately 50mA to 80mA. In shutdown mode, the device draws 5mA (the auxiliary circuitry on board and the INTF2000 draw current from VCC2).
- 6) Set the VGC voltage to 2.0V (J3).
- 7) Connect a WCDMA baseband signal generator to the I/Q ports using BNC connectors. Configure the output for 1V<sub>P-P</sub> (MAX2395) or 600mV<sub>P-P</sub> (MAX2394) into a 50Ω load.
- 8) Connect the SMA connector to the spectrum analyzer. Configure the spectrum analyzer to measure ACPR for reverse-channel WCDMA. Set the center frequency to 1950MHz with a +10dBm reference level.
- 9) The output power should be approximately 0dBm after accounting for cable and connector loss. The ACPR at ±5MHz offset should be < -45dBc, and the ACPR at ±10MHz offset should be < -55dBc. Modify the voltage on VGC to obtain the desired output power.

## Layout

The EV kit's PC board can serve as a guide for board layout. Keep PC board trace lengths as short as possible to minimize parasitics. Also, keep decoupling capacitors as close to the IC as possible with a direct connection to the ground plane. Gerber files for the MAX2394/MAX2395 EV kits are available upon request.

## Interface board

The INTF2300 interface board is used to interface 3-wire bus, routing the SPI™/QSPI™/MICROWIRE™ protocol from a PC's parallel port to a device under test. This board level translates 5V logic from the PC to VCC of the device under test. The INTF2300 also provides buffering and EMI filtering. Its absolute maximum supply voltage is 4.6V, limited by the breakdown of the buffer IC. The recommended operating supply voltage range is +2.7V to +3.6V.

SPI and QSPI are trademarks of Motorola, Inc.

MICROWIRE is a trademark of National Semiconductor Corp.

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**Table 1. Test Equipment**

EQUIPMENT	QTY	DESCRIPTION
WCDMA Signal Generator	1	Capable of generating WCDMA I/Q signals (HP E4433B or equivalent).
Power Supply	2	Capable of up to 100mA at +2.7V to +3.3V; another supply to be used for VGC.
Spectrum Analyzer	1	Capable of covering the operating frequencies of the device with optional WCDMA personality (Rhode and Schwarz FSEA20 or equivalent).
Multimeter	1	(Optional) To measure supply current.
PC	1	Win@95, Win98, or Win2000 operating systems with parallel port
INTF2300 Interface Board	1	Supplied with the EV kit

*Windows is a registered trademark of Microsoft Corp.*

## Component Suppliers

SUPPLIER	PHONE	FAX
AVX	803-946-0690	803-626-3123
Coilcraft	847-639-6400	847-639-1469
Digi-Key	800-344-4539	218-681-3380
EFJohnson	402-474-4800	402-474-4858
Murata	800-831-9172	814-238-0490

**Note:** Please specify you are using the MAX2394/MAX2395 when contacting these component suppliers.

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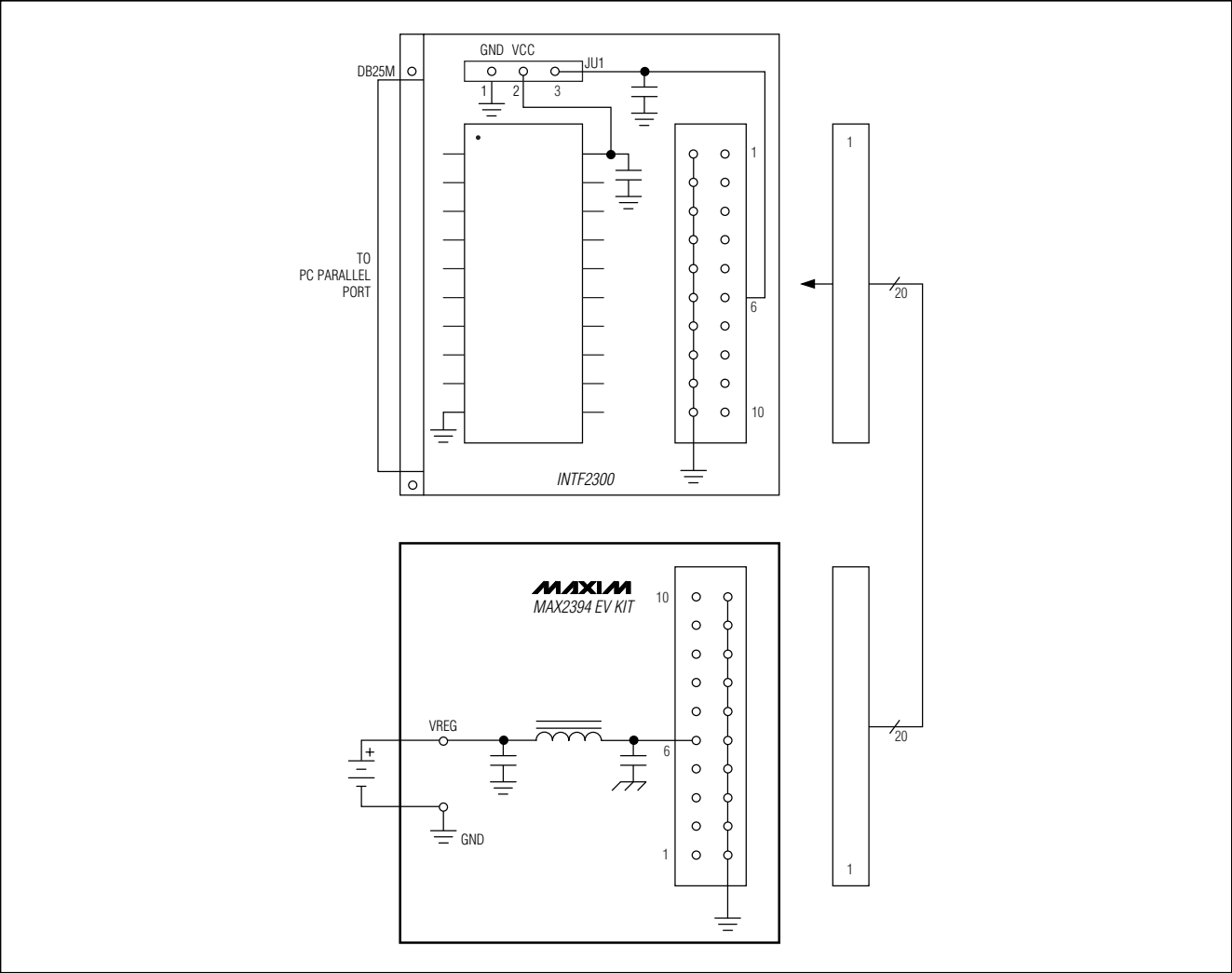
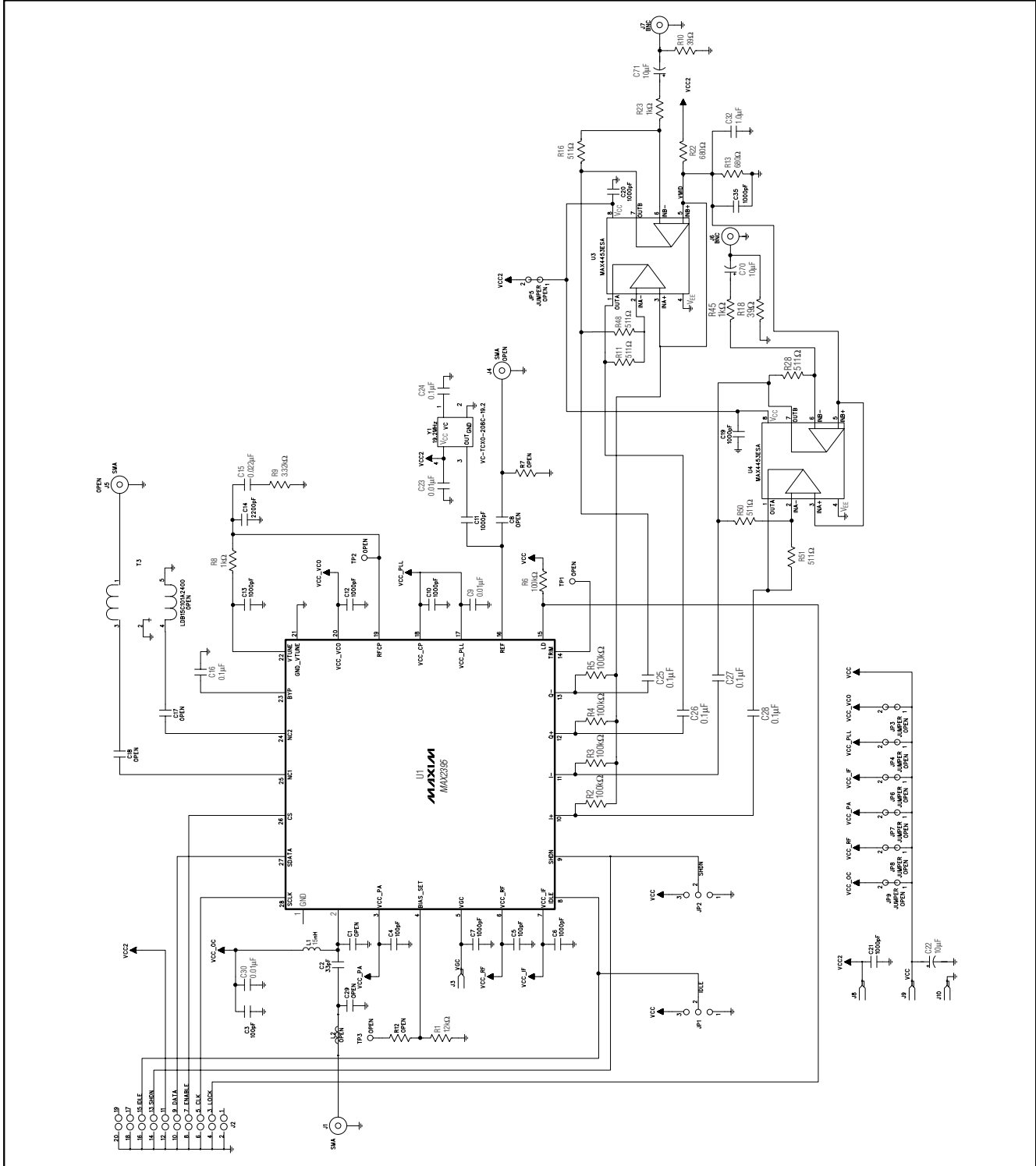


Figure 1. MAX2394/MAX2395 EV Kits PC Board Layout—Solder Side

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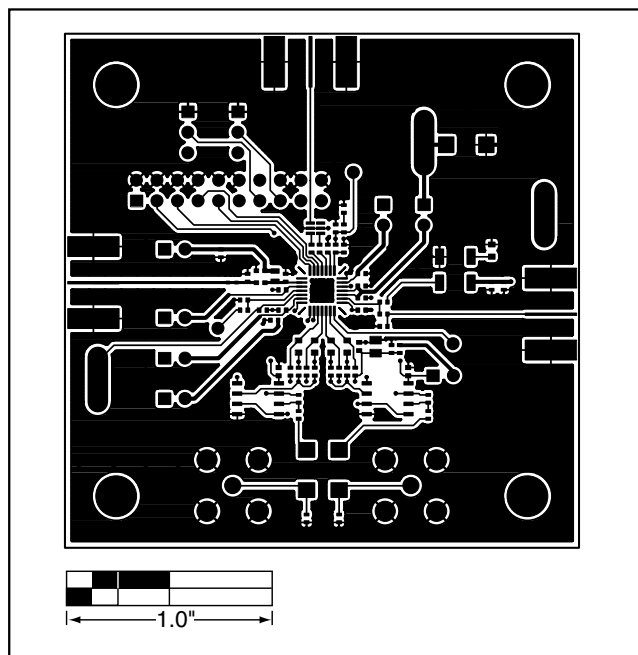


Figure 4. MAX2394/MAX2395 EV Kits PC Board Layout—Primary Component Side

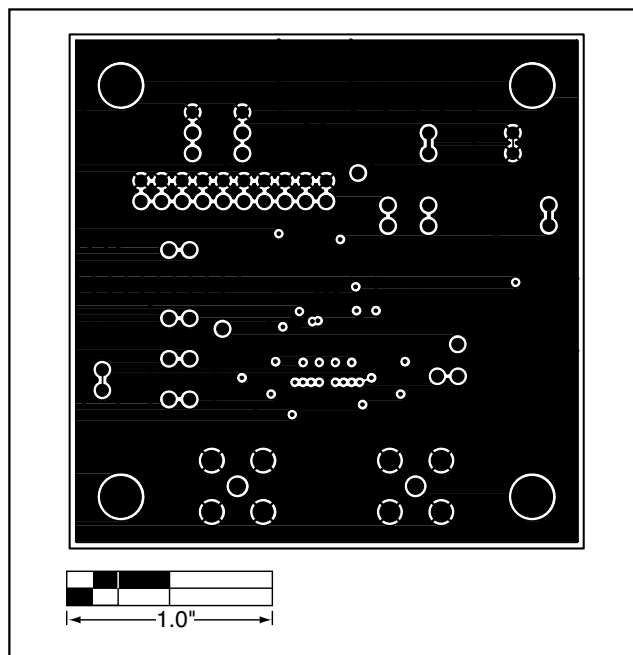


Figure 5. MAX2394/MAX2395 EV Kits PC Board Layout—Inner Layer 2

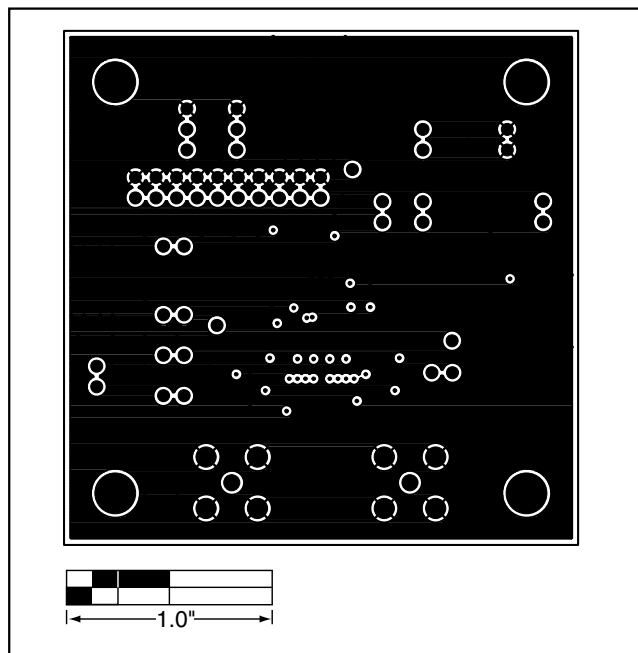


Figure 6. MAX2394/MAX2395 EV Kits PC Board Layout—Inner Layer 3

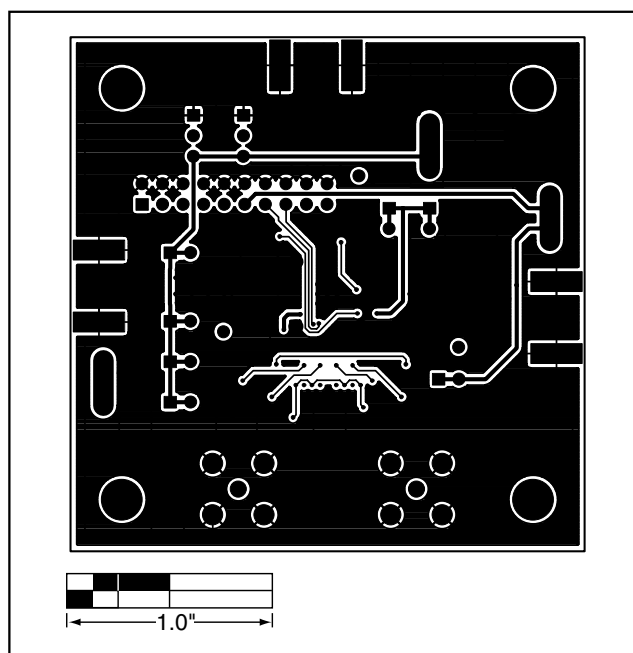


Figure 7. MAX2394/MAX2395 EV Kits PC Board Layout—Secondary Component Side

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