



MAX2395 Evaluation Kit

General Description

The MAX2395 evaluation kit (EV kit) simplifies evaluation of the MAX2395 quasi-direct modulator IC for use in WCDMA/UMTS transmitter. The EV 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 MAX2395 EV kit incorporates optimized input and output matching components.

Features

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

Ordering Information

PART	TYPE
MAX2395EVKIT	EV Kit

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C8, C17, C18, C29	0	Not installed, capacitors
C2	2	33pF \pm 5% capacitors (0402) Murata GRP1555C1H330J
C3, C4, C5	3	100pF \pm 5% capacitors (0402) Murata GRP1555C1H101J
C6, C7, C10–C13, C19, C20, C21, C35	10	1000pF \pm 10% capacitors (0402) Murata GRP155R71H102K
C9, C23, C30	3	0.01 μ F \pm 10% capacitors (0402) Murata GRP155R71C103K
C14	1	2200pF \pm 10% capacitor (0402) Murata GRP155R71H222K
C15	1	0.022 μ F \pm 10% capacitor (0402) Murata GRP155R71C223K
C16	1	0.1 μ F \pm 10% capacitor (0402) Murata GRP155R61A104K
C22, C70, C71	3	10 μ F \pm 10% tantalum capacitors C case AVX TAJC106K016
C24–C28	5	0.1 μ F \pm 10% capacitors (0603) Murata GRM188R71C104K
C32	1	1.0 μ F \pm 10% capacitor (0805) Murata GRM21BR71C105K
J1	3	SMA edge-mount connectors, round, contact Johnson 142-0701-801
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	0	Not installed
J6, J7	2	BNC connectors A/D Electronics 580-002-00

DESIGNATION	QTY	DESCRIPTION
JP1, JP2	2	1 x 3, 3-pin, inline headers, 100-mil centers Digi-Key S1012-36-ND
JP3, JP4, JP6–JP9	0	Not installed
L1	1	15nH \pm 5% inductor (0603) Coilcraft 0603CS-15NXJB
L2	0	Not installed
R1	1	12k Ω \pm 1% resistor (0402)
R2–R6	5	100k Ω \pm 1% resistors (0402)
R7, R12	0	Not installed, resistors
R8, R23, R45	3	1k Ω \pm 1% resistors (0402)
R9	1	3.32k Ω \pm 1% resistor (0402)
R10, R18	2	39 Ω \pm 5% resistors (0402)
R11, R16, R28, R48, R50, R51	6	511 Ω \pm 1% resistors (0402)
R13, R22	2	680 Ω \pm 5% resistors (0402)
T3	0	Not installed
TP1, TP2, TP3	0	Not installed
Y1	1	19.2MHz volt-control TCXO Kinseki VC-TCXO-208C3-19P2
U1	1	Quasi-direct modulator (28 TQFN-EP*) Maxim MAX2395ETI+
U3, U4	2	MAX4453 op amps (8 SO) Maxim MAX4453ESA
—	1	36in socket connector ribbon cable, 20 contacts Digi-Key A3AAG-203G-ND
—	1	INTF2300 interface board Maxim INTF2300
—	1	PCB: MAX2395 Evaluation Kit

*EP = Exposed pad.

Evaluates: MAX2395



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Component Suppliers

SUPPLIER	PHONE	WEBSITE
AVX Corporation	843-946-0238	www.avxcorp.com
Coilcraft, Inc.	847-639-6400	www.coilcraft.com
Digi-Key Corp.	800-344-4539	www.digikey.com
Johnson (Emerson Network Power)	507-833-9922	www.emersonnetworkpower.com
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com

Note: Indicate that you are using the MAX2395 when contacting these component suppliers.

Quick Start

The MAX2395 EV kit is 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 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 WCDMA Operation

- 1) Install and run the MAX2395 EV kit control software. The software can be downloaded at www.maxim-ic.com/techsupport/other.htm.
- 2) Connect the INTF2300 interface cable to the 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 PCB. The INTF2300 board derives its power from the EV kit.
- 3) At startup, set the software registers to the values given in the MAX2395 IC data sheet's 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_{P-P} 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 with a +10dBm reference level.
- 9) The output power should be approximately +4dBm 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.

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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	Windows®95/98/2000 operating systems with parallel port.
INTF2300 Interface Board	1	Supplied with the EV kit.

Layout

The EV kit's PCB can serve as a guide for board layout. Keep PCB 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 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.

Windows is a registered trademark of Microsoft Corp.

SPI and QSPI are trademarks of Motorola, Inc.

MICROWIRE is a trademark of National Semiconductor Corp.

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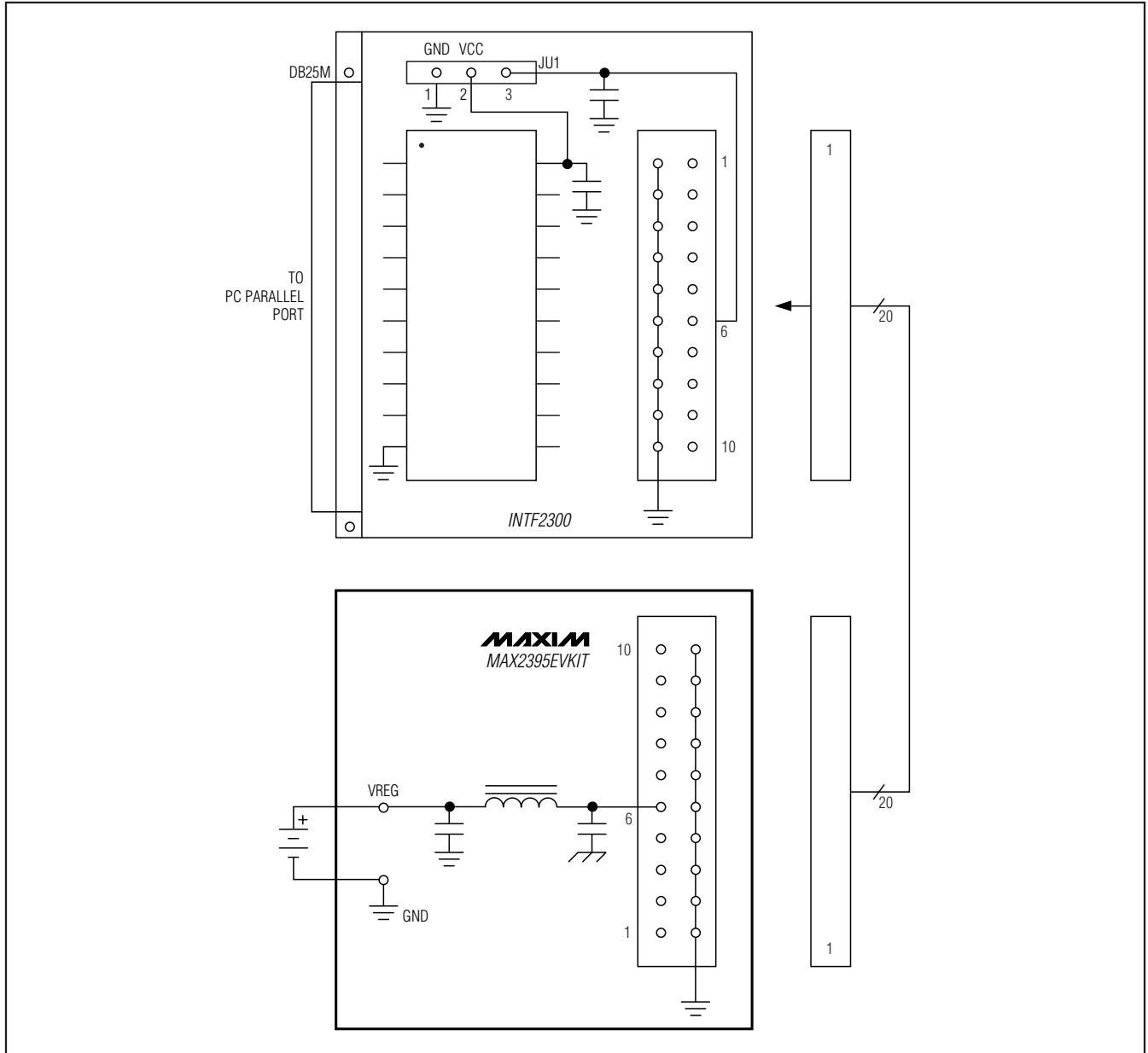


Figure 1. MAX2395 EV Kit to INTF2300 Interface Diagram

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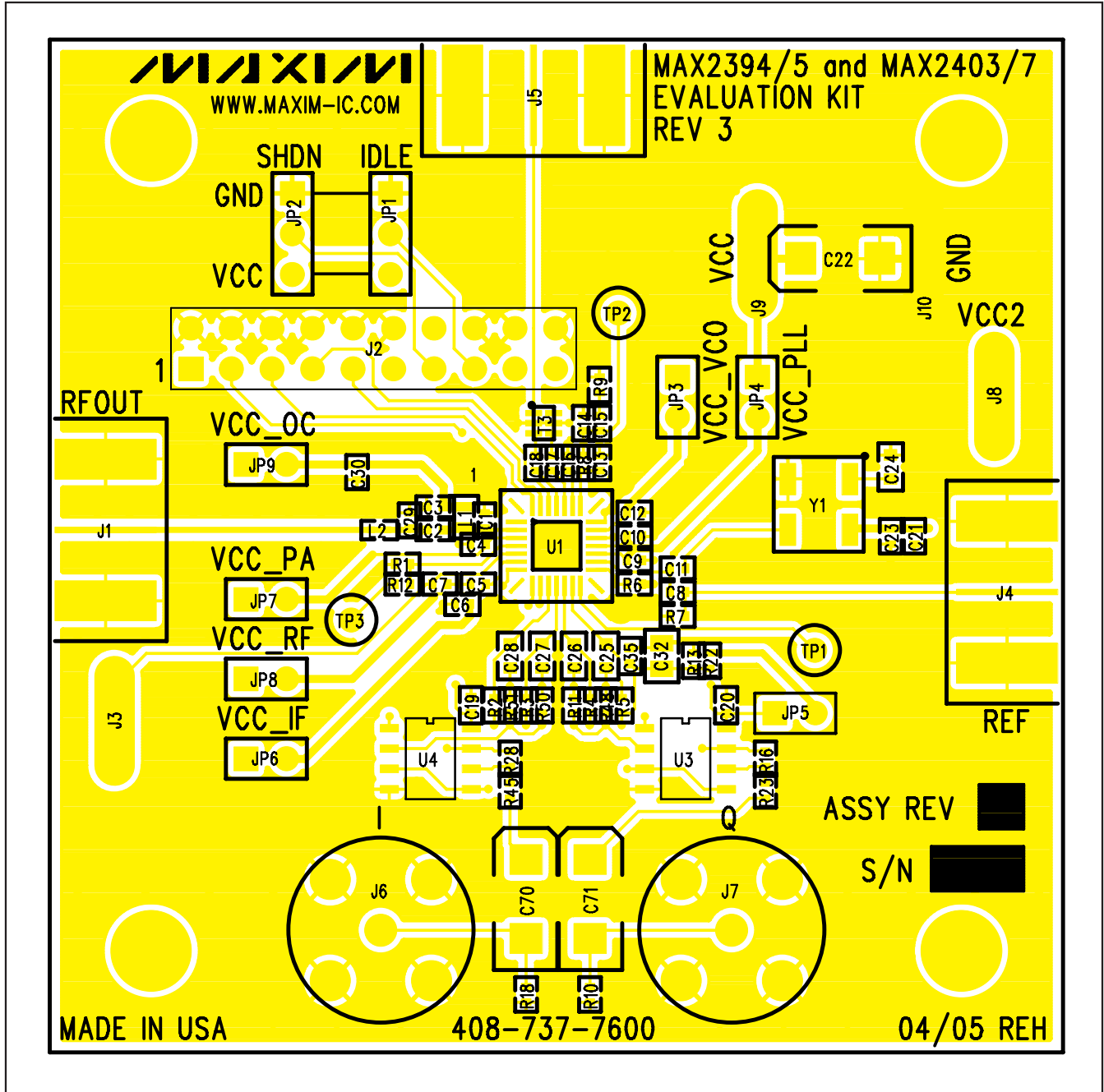


Figure 3. MAX2395 EV Kit Component Placement Guide—Component Side

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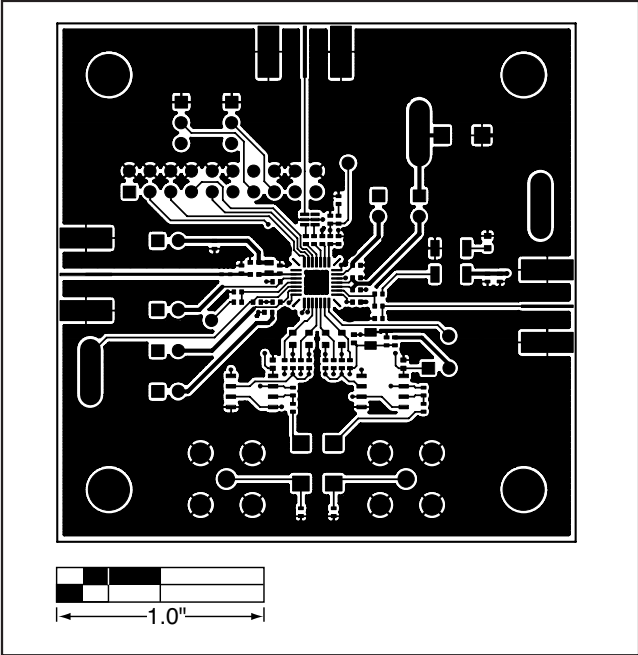


Figure 4. MAX2395 EV Kit PCB Layout—Primary Component Side

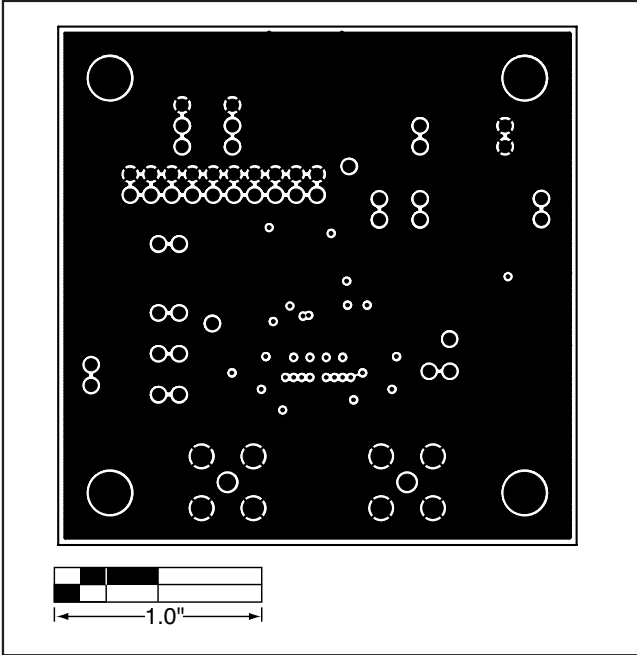


Figure 6. MAX2395 EV Kit PCB Layout—Inner Layer 3

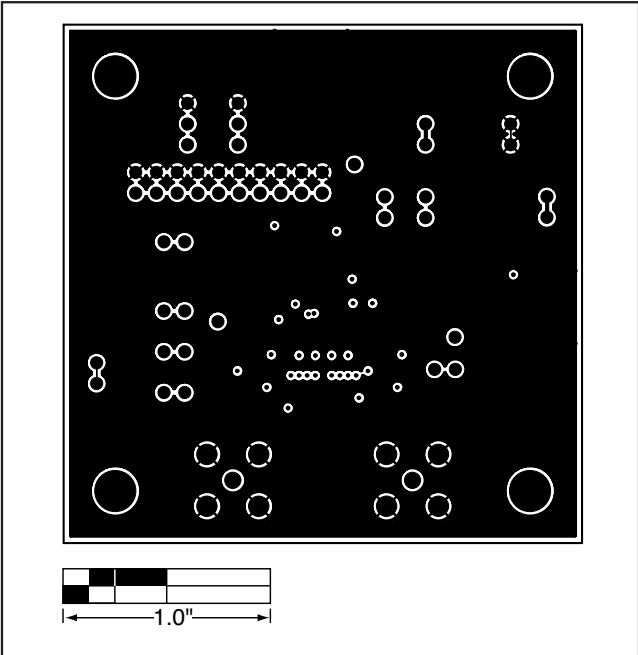


Figure 5. MAX2395 EV Kit PCB Layout—Inner Layer 2

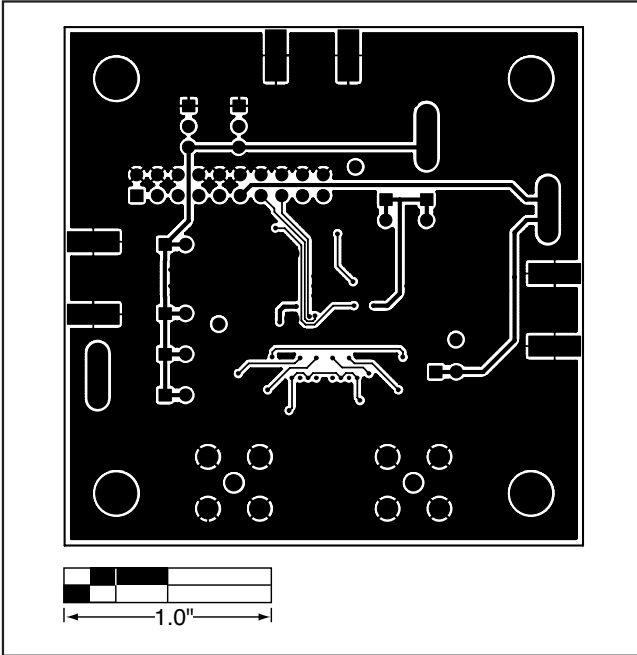


Figure 7. MAX2395 EV Kit PCB Layout—Secondary Component Side

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Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
1	5/05	—	—
2	1/09	Obsolete and remove MAX2394, MAX2403, and MAX2407	1-7

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