19-3402; Rev 2; 5/05

MAXIM

MAX3550/MAX3551/MAX3553/ MAX3570/MAX3571/MAX3573 Evaluation Kits

Evaluate: MAX3550/51/53/MAX3570/71/73

General Description

The MAX355X/MAX357X evaluation kits (EV kits) simplify evaluation of the MAX355X/MAX357X broadband dual-conversion tuner ICs. They enable testing of the devices' performance and require no additional support circuitry. The EV kit's signal inputs and outputs use SMA connectors to facilitate the connection of RF test equipment.

Features

- **Easy Evaluation of the MAX355X/MAX357X**
- **50Ω SMA Connectors on RF and IF Ports**
- **PC Control Software Available at www.maxim-ic.com**
- **I²C and SPI™/QSPI™/MICROWIRE™ Compatible**

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX3550EVKIT	0°C to +70°C	48 QFN-EP*
MAX3551EVKIT	0°C to +70°C	48 QFN-EP*
MAX3553EVKIT	0°C to +70°C	48 QFN-EP*
MAX3570EVKIT	0°C to +70°C	48 QFN-EP*
MAX3571EVKIT	0°C to +70°C	48 QFN-EP*
MAX3573EVKIT	0°C to +70°C	48 QFN-EP*

**EP = Exposed paddle.*

Component List

DESIGNATION	QTY	DESCRIPTION
C2, C50–C55, C57, C59, C62–C68, C78, C82–C86	22	1000pF ±10% (0603) ceramic capacitors Murata GRM188R71H102K
C6, C70–C74	6	100pF ±5% (0603) ceramic capacitors Murata GRM1885C1H101J
C7	1	Open
C45, C60	2	47pF ±5% (0603) ceramic capacitors Murata GRM1885C1H470J
C56	1	8200pF ±10% (0603) ceramic capacitor Murata GRM188R71H822K
C61	1	120pF ±5% (0603) ceramic capacitor Murata GRM1885C1H121J
C69	1	820pF ±10% (0603) ceramic capacitor Murata GRM1885C1H821K
C75, C77, C87, C88	4	0.1µF ±10% (0603) capacitors Murata GRM188R71E104K
C76	1	10µF ±10% tantalum capacitor (C case) AVX TAJC106K016
C95	1	0.1µF ±10% (0805) ceramic capacitor Murata GRM21BR71E104K
C96	1	0.015µF ±5% (0805) ceramic capacitor Murata GRM2195C1H153J
C97	1	0.22µF ±10% (0805) ceramic capacitor Murata GRM219R71E224K
C98	1	0.068µF ±10% (0805) ceramic capacitor Murata GRM21BR71H683K

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MAX3550/MAX3551/MAX3553/ MAX3570/MAX3571/MAX3573 Evaluation Kits

Component List (continued)

DESIGNATION	QTY	DESCRIPTION
J1, J19	2	SMA end-mount connectors Johnson 142-0701-801
J12	1	SMA PC-mount connector Johnson 142-0701-201
		RF jack right-angle connector, F type, PC board (not installed; included with EV kit) Mouser ME161-5371
J13	1	DB25 connector AMP 745783-4 right-angle female
JP10–JP14	5	1 x 3, 3-pin inline headers, 100-mil centers Sullins PTC36SAAN
JP10–JP14	5	Shorting jumpers Sullins STC02SYAN
R1, R2	2	Open
R3, R40, R41, R42	4	100Ω ±5% (0603) resistors
R10, R56	2	86.6Ω ±1% (0603) resistors
R11, R55	2	43.2Ω ±1% (0603) resistors
R30, R39	2	270Ω ±5% (0603) resistors
R31, R32	2	Open (MAX3550)
		100kΩ ±5% (0603) resistors (MAX3551/MAX3553)
R37	1	910Ω ±5% (0603) resistor
R38	1	4.7kΩ ±5% (0603) resistor
R43, R44, R58	3	5.1kΩ ±5% (0603) resistors
R45, R46, R47, R50	4	2.7kΩ ±5% (0603) resistors
R48	1	5.90kΩ ±1% (0603) resistor
R49	1	1kΩ ±5% (0603) resistor
L3	1	36nH ±5% (0603) inductor Murata LQW18AN36Nj00
L4	1	680nH ±5% (0603) inductor Coilcraft 0805CS-681XJB
L5	1	16nH ±5% (0603) inductor Coilcraft 0603CS-16NXJB

DESIGNATION	QTY	DESCRIPTION
L6	1	0Ω ±5% (0603) resistor
FL2	1	SAW filter (SIP5D) Epcos B39440-X6965-D100 (MAX3550/3551)
		SAW filter (SIP5D) Epcos B39440-X6966-D100 (MAX3553)
T1, T8	2	Surface-mount balun transfomers, 2:1 voltage ratio TOKO 458PT-1087
Y2	1	4MHz surface-mount crystal Pletronics SM42306-4M Citizen America HCM49-4.000MABJT Digi-Key 300-6103-1-ND
U3	1	Hex buffer/driver with open drain Texas Instruments SN74LV07ADR Digi-Key 296-3764-1-ND
U4	1	MAX3550 48-pin QFN Maxim MAX3550CGM
		MAX3551 48-pin QFN Maxim MAX3551CGM
		MAX3553 48-pin QFN Maxim MAX3553CGM
		MAX3570 48-pin QFN Maxim MAX3570CGM
		MAX3571 48-pin QFN Maxim MAX3571CGM
		MAX3573 48-pin QFN Maxim MAX3573CGM
TP6–TP10, J14, J15	4	Test points, PC mini, 0.040 red Keystone 5000
Shield	1	One-piece board level shield (not installed; included with EV kit) Laird Technologies MAX-S-138

Quick Start

The MAX355X/MAX357X EV kits are fully assembled and factory tested. Follow the instructions in the *Connections and Setup* section for proper device evaluation.

Test Equipment Required

This section lists the recommended test equipment needed to verify operation of the MAX355X/MAX357X. It is intended as a guide only, and substitutions are possible:

- DC supply capable of delivering +5.5V and 500mA of continuous current
- Two DC supplies, each capable of delivering +3.5V and 10mA of continuous current
- HP 8648 or equivalent signal source capable of generating 0dBm, up to 900MHz
- HP 8561E or equivalent RF spectrum analyzer with minimum frequency range of 100kHz to 3GHz
- IBM PC or compatible with Windows® 95/98, Windows 2000, Windows NT 4.0, Windows XP, or later operating system and an available parallel port
- Male-to-male, 25-pin parallel cable, straight through

Connections and Setup

1) Verify jumpers JP10, JP11, and JP12 are connected to pins 1 and 2.
2) Verify jumpers JP13 and JP14 are connected to pins 2 and 3.
3) To control the MAX355X/MAX357X through the serial interface, connect the male-to-male, 25-pin parallel cable between the PC's parallel port and EV kit.
4) With the power supply turned off, connect the main power supply (preset to +5.0V) to the header labeled +5V (J14). Connect the main power-supply ground to the header labeled GND (J15).
5) Connect an optional multimeter between +5V (J14) and GND (J15) to monitor the supply voltage.
6) With the power supplies turned off, connect the other two power supplies (preset to +3.0V) to the headers labeled RFAGC (TP7) and IFAGC (TP10). Connect the two power-supply grounds to the ground headers TP8 and TP9.
7) With the RF signal source output turned off, set the amplitude to -70dBm at 50.25MHz and connect it to RF1 (J12).
8) Connect IF_OUT (J19) to the spectrum analyzer.
9) Turn on the power supplies.
10) Install and run the MAX355X/MAX357X control software. The control software defaults to standard settings that will be used for the test procedure of this EV kit. The software is available for download on the Maxim website at www.maxim-ic.com/tools/evkit.
11) Under the Options tab, select the proper part type (MAX3550/MAX3551/MAX3553/MAX3570/MAX3571/MAX3573).
12) With the control software active in the Entry screen, select the PIX option in the RF Input section.

Default Spectrum Analyzer Settings

Reference level = 0dBm

Attenuation = 10dB

Center frequency = 44MHz (MAX3550/MAX3551/MAX3570/MAX3571) or 36MHz (MAX3553/MAX3573)

Span = 10MHz

RBW = 100kHz

VBW/RBW ratio = 0.03

VBW = 30kHz

Table 1. MAX355X/MAX357X EV Kit Jumper Settings

JUMPER	FUNCTION	JUMPER POSITION	
		PIN 1 TO PIN 2	PIN 2 TO PIN 3
JP10	Set the control of EN2 line	PC control	Manual control
JP11	Set the control of CLK2 line	PC control	Manual control
JP12	Set the control of DATA2 line	PC control	Manual control
JP13	Set the control of RF AGC line	Max gain	External control
JP14	Set the control of IF AGC line	Max gain	External control

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Gain Adjustment Calculations

All input power levels are referenced to RF1 (J12) SMA connector. Be sure to account for power and voltage losses in cables, combiner, minimum loss pad (MLP), and SAW filter.

Input minimum loss pad = -5.7dB	(Power loss)
IF SAW Filter = -14.7dB (44MHz), -20dB (36MHz)	(Voltage loss)
IF balun = -6dB	(Voltage loss)
IF min-loss pad = -5.7dB	(Power loss, with input MLP total of 11.48dB of voltage loss)

Total voltage loss = 11.48 + 14.7 + 6 = 32.18dB (44MHz)

Total voltage loss = 11.48 + 20 + 6 = 37.488dB (36MHz)

RF Gain and Gain Flatness

1) With the control software active in the Entry screen, enter 50.25MHz into the Frequency box under the RF Input section.
2) Verify VCO lock by selecting Auto Lock Check in the Lock Status section. Green LEDs indicate LOCK.
3) Turn on the output of the signal generator.
4) Set the voltage at both RFAGC and IFAGC to +3.0V.
5) Measure the IF output (P1 in dBm) at IF_OUT at 45.75MHz (MAX3550/MAX3551/MAX3570/MAX3571) or 38.9MHz (MAX3553/MAX3573).
6) Calculate the EV kit gain and active device RF gain by:
   a) EV kit gain = P1 + 70 (dB)
   b) Active device RF gain (MAX3550/MAX3551/MAX3570/MAX3571) = P1 + 102.2 (dB)
   c) Active device RF gain (MAX3553/MAX3573) = P1 +107.5 (dB)
7) Decrease the IFAGC voltage to +0.5V.
8) Measure the IF output (P1L2 in dBm).
9) Calculate the IF gain-control range by:
   a) IF gain-control range = P1 - P1L2 (dB)
10) Return the IFVGA voltage back to +3.0V.
11) Decrease the RFVGA voltage to +0.5V.
12) Measure the IF output (P1L in dBm).
13) Calculate the RF gain-control range by:
   a) RF gain-control range = P1 - P1L (dB)
14) Return the RFVGA voltage back to +3.0V.
15) Change the frequency of the signal generator to 878.25MHz.
16) Enter 878.25MHz into the Frequency box under the RF Input section.
17) Measure the IF output (P2 in dBm).
18) Calculate the RF gain flatness by:
   a) RF gain flatness = P1 - P2 (dBc)

Note: For normal operation, adjust the IFAGC (TP10) voltage to achieve an output amplitude of -9.5dBm at the IF_OUT (J19) SMA connector.

Layout Considerations

The MAX355X/MAX357X EV kits can serve as guides 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.

Component Suppliers

SUPPLIER	PHONE	FAX	WEBSITE
AVX	803-946-0690	803-626-3123	www.avxcorp.com
Coilcraft	847-639-6400	847-639-1469	www.coilcraft.com
EPCOS	408-263-4242	408-263-4471	www.epcos.com
Murata	770-436-1300	770-436-3030	www.murata.com
Taiyo Yuden	408-573-4150	408-573-4159	www.t-yuden.com
TOKO	708-297-0070	708-699-1194	www.toko.com

Note: *Indicate that you are using the MAX355X/MAX357X when contacting these component suppliers.*

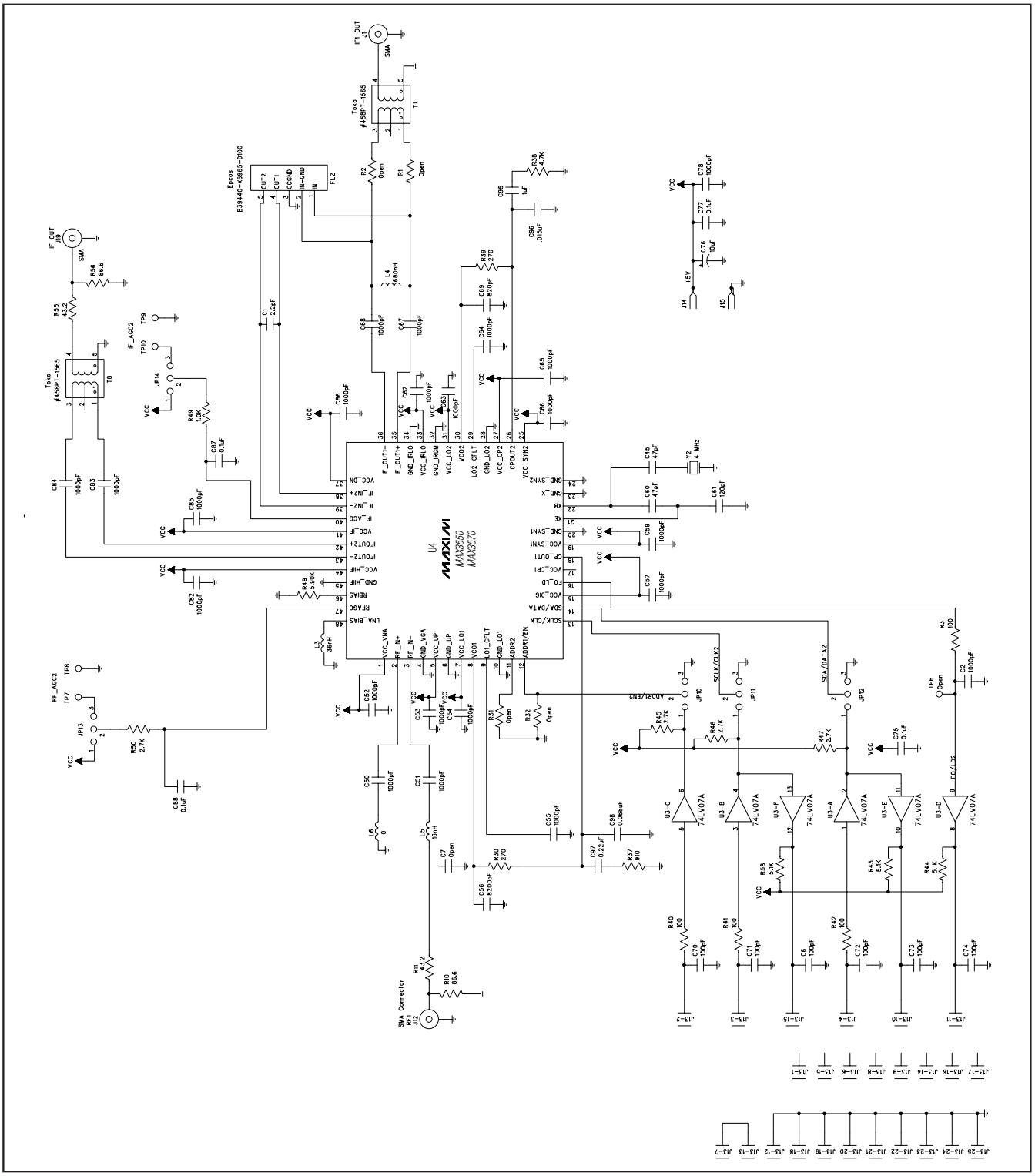

Figure 1. MAX3550/MAX3570 EV Kit Schematic (Sheet 1 of 3)

MAX3550/MAX3551/MAX3553/ MAX3570/MAX3571/MAX3573 Evaluation Kits

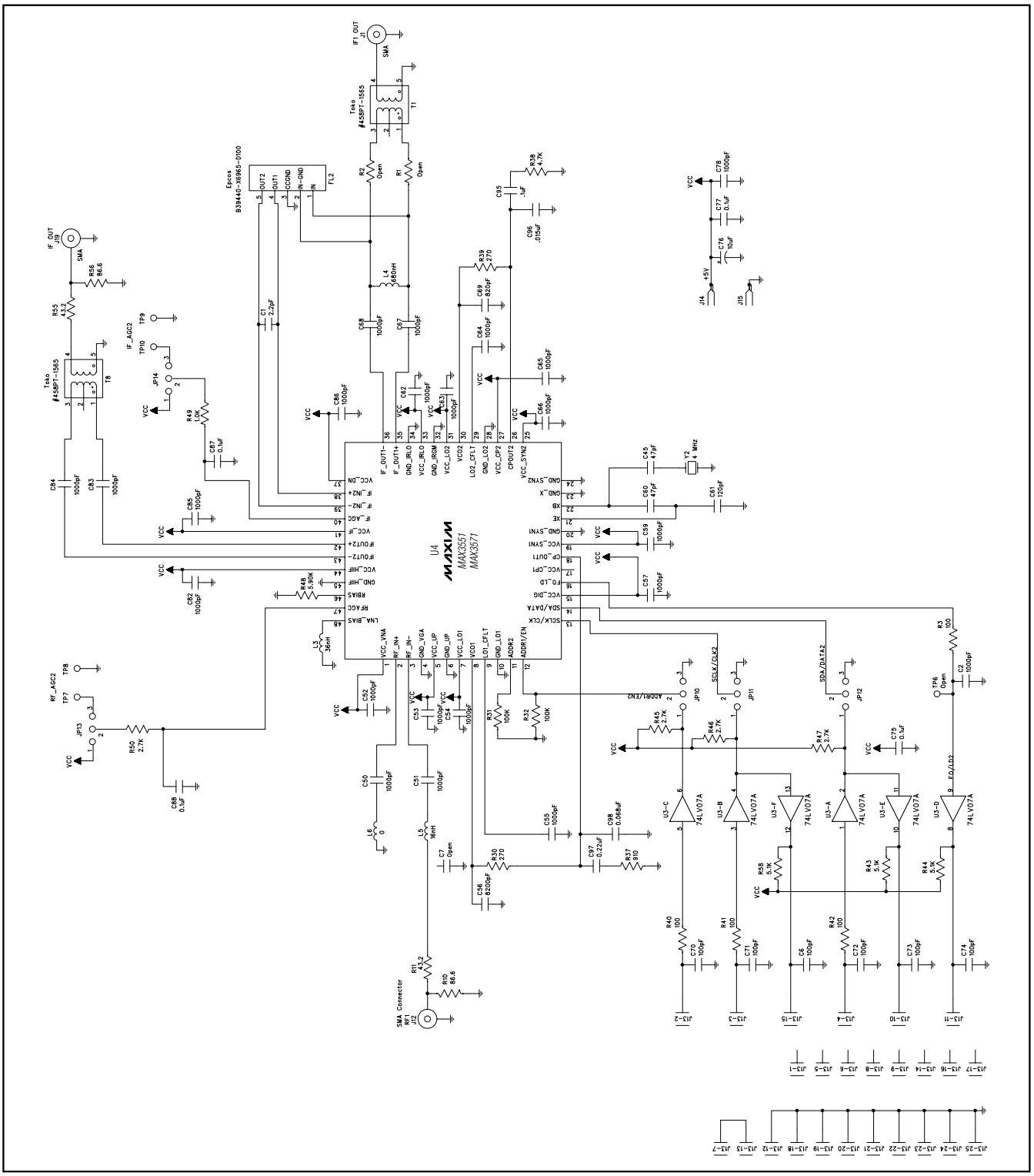

Figure 1. MAX3551/MAX3571 EV Kit Schematic (Sheet 2 of 3)

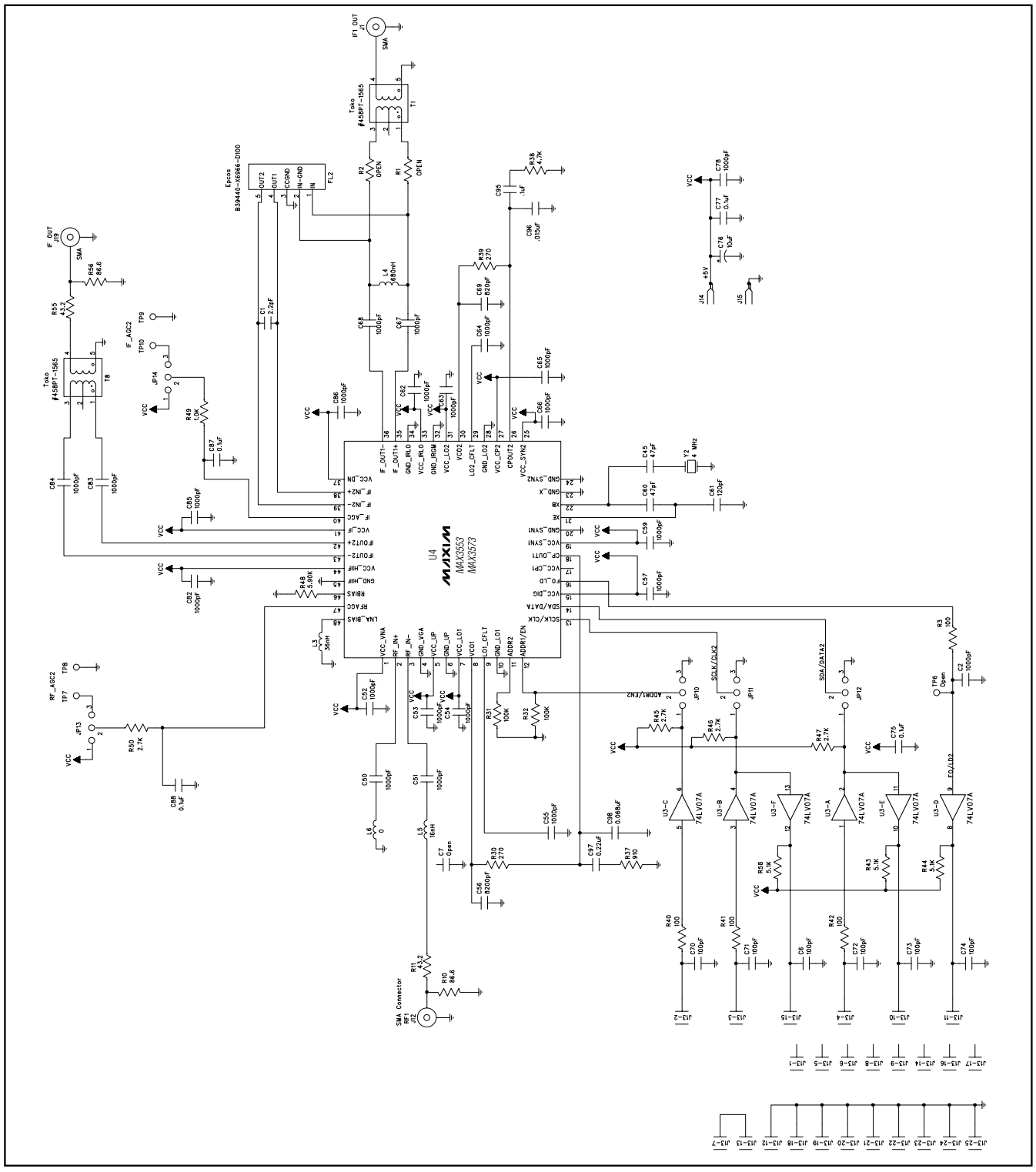

Figure 1. MAX3553/MAX3573 EV Kit Schematic (Sheet 3 of 3)

MAX3550/MAX3551/MAX3553/ MAX3570/MAX3571/MAX3573 Evaluation Kits

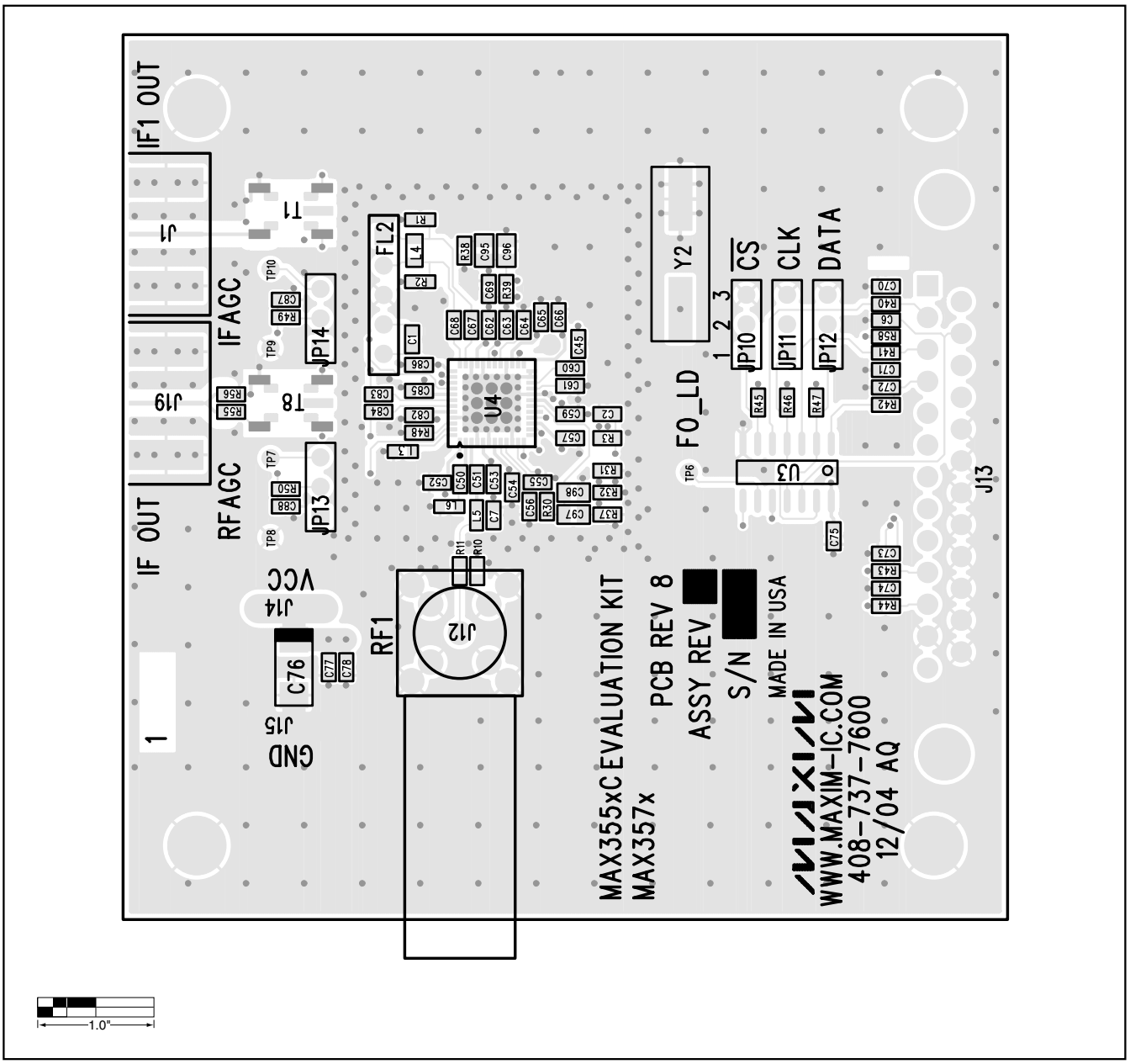

Figure 2. MAX355_/MAX357_ EV PC Board Layout—Component Placement Guide

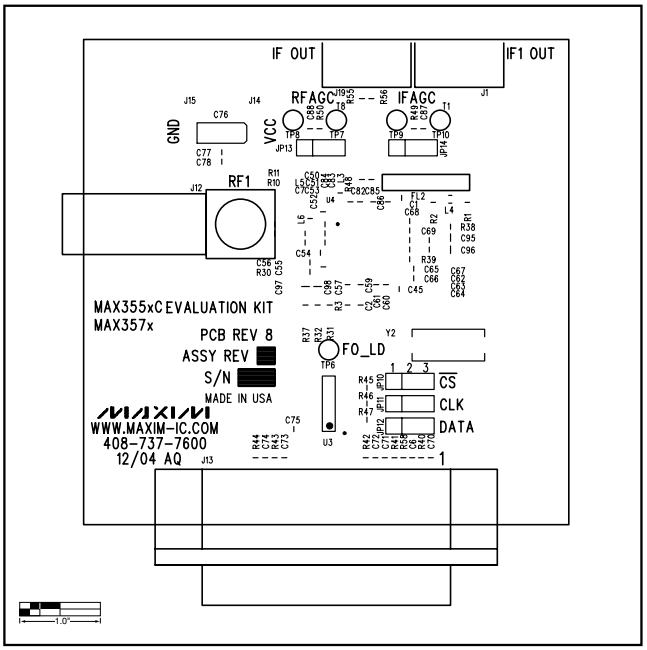

Figure 3. MAX355_/MAX357_ EV Kit PC Board Layout—Top Silkscreen

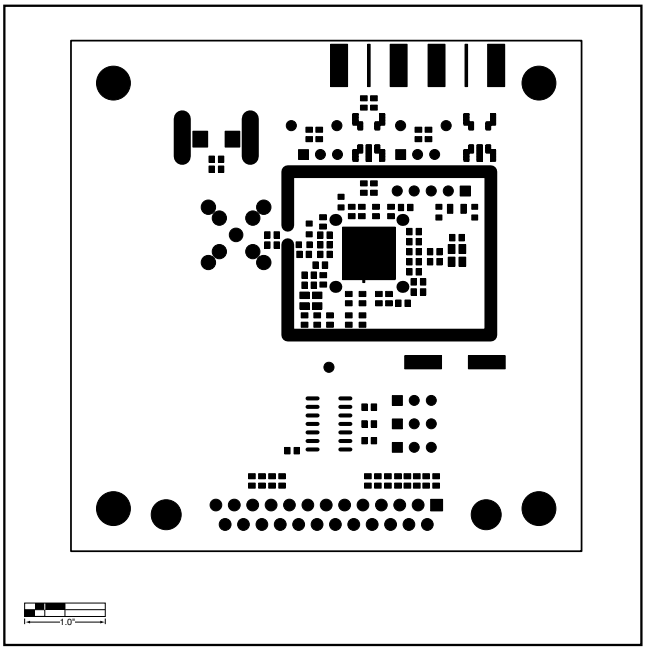

Figure 4. MAX355_/MAX357_ EV Kit PC Board Layout—Top Soldermask

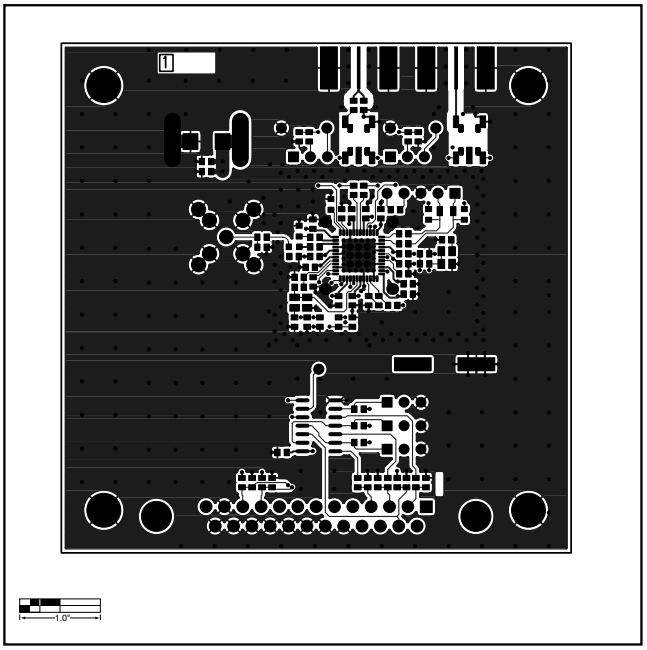

Figure 5. MAX355_/MAX357_ EV Kit PC Board Layout—Primary Component Side

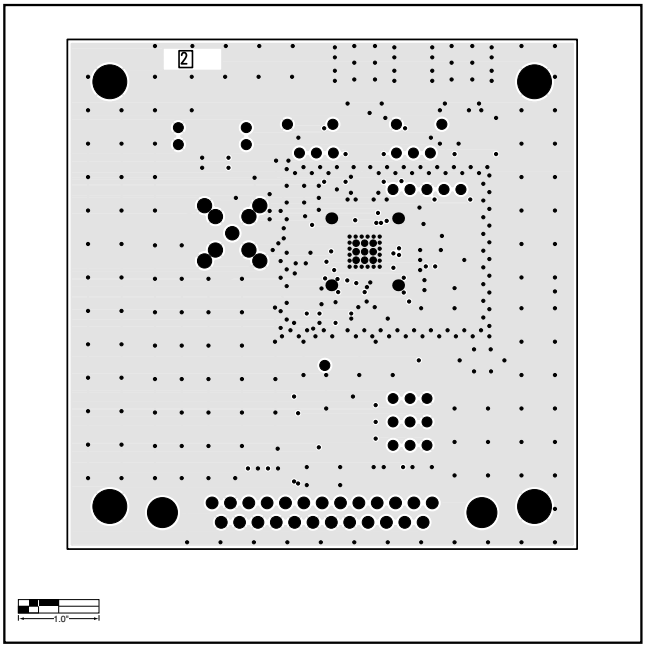

Figure 6. MAX355_/MAX357_ EV Kit PC Board Layout—Inner Layer 2

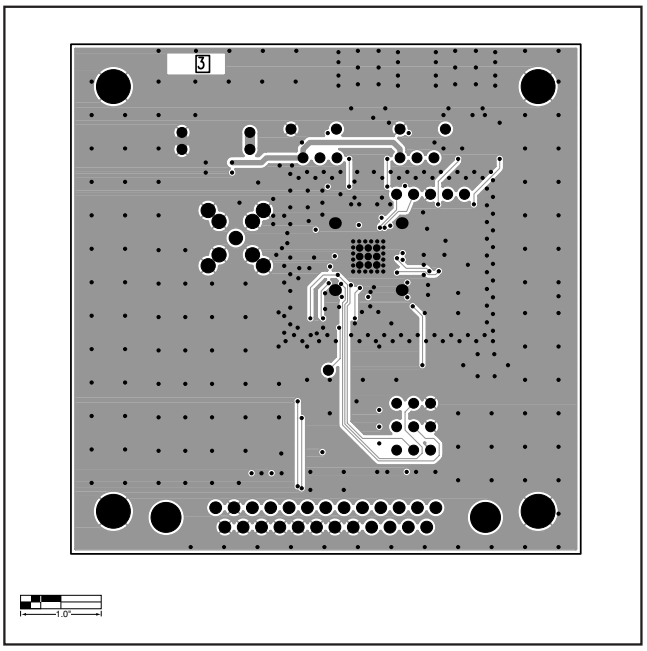

Figure 7. MAX355_/MAX357_ EV Kit PC Board Layout—Inner Layer 3

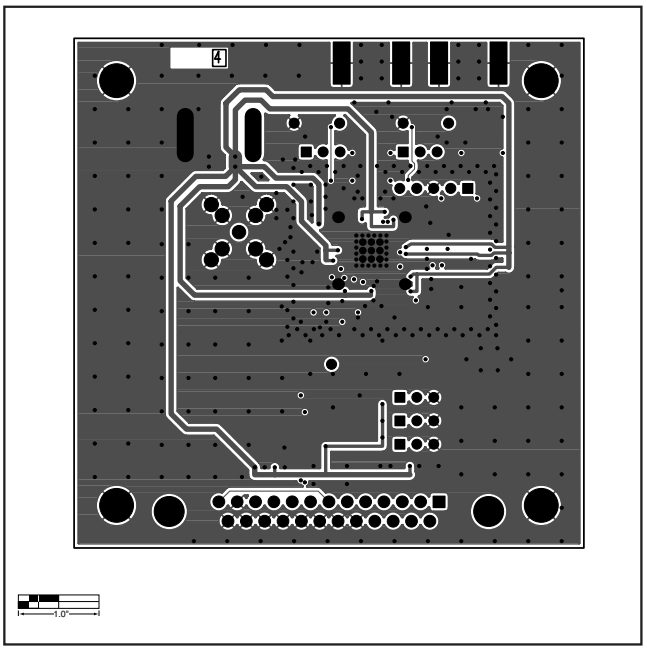

Figure 8. MAX355_/MAX357_ EV Kit PC Board Layout—Secondary Component Side

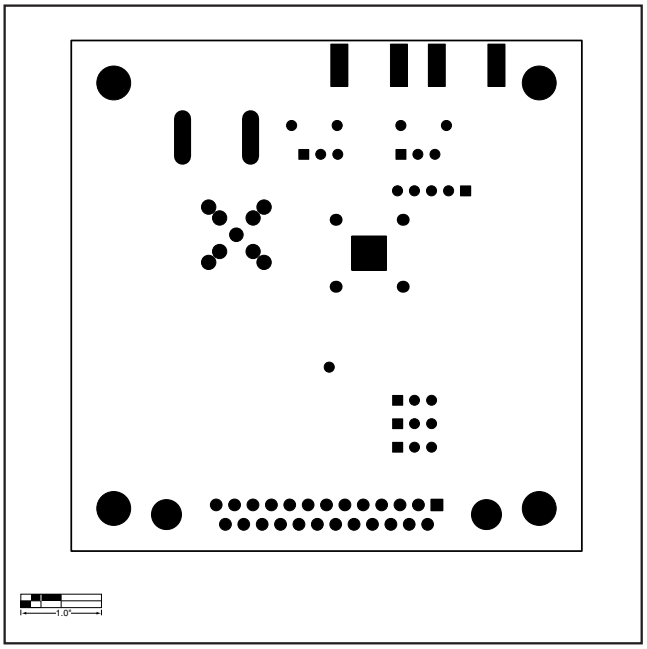

Figure 9. MAX355_/MAX357_ EV Kit PC Board Layout—Bottom Soldermask