



MAX3537/MAX3538 Evaluation Kits

General Description

The MAX3537/MAX3538 evaluation kits (EV kits) simplify the testing and evaluation of the MAX3537/MAX3538 broadband variable-gain amplifiers. The evaluation kits are fully assembled and tested at the factory. Standard 50Ω SMA connectors are included on the EV kits for the inputs and outputs to allow quick and easy evaluation on the test bench.

This document provides a list of equipment required to evaluate the devices, a straightforward test procedure to verify functionality, a description of the EV kit circuits, the circuit schematics, a bill of materials (BOM) for the kits, and artwork for each layer of the PC board.

Features

- ◆ Low-Noise VGA Eliminates PIN Attenuator
- ◆ 22dB Gain-Control Range
- ◆ Low Noise Figure: 5dB at Maximum Gain Setting
- ◆ High Linearity: +19dBm IIP3 (MAX3538) at Maximum Gain Setting
- ◆ 50Ω SMA Connectors with On-Chip Minimum Loss Pads for Easy Evaluation with 50Ω Test Equipment
- ◆ Fully Assembled and Tested

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX3537EVKIT	0°C to +85°C	12 Thin QFN-EP*
MAX3538EVKIT	0°C to +85°C	12 Thin QFN-EP*

*EP = Exposed paddle.

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C5, C6, C11, C13, C14, C15	7	1000pF ±10% ceramic capacitors (0603) Murata GRM18871H102K
C2	1	10pF ±5% ceramic capacitor (0603) Murata GRM1885C1H100J
C3, C4	2	6.8pF ±10% ceramic capacitors (0603) Murata GRM1885C1H6R8DZ
C7, C8	2	Not installed
C9	1	100nF ±10% ceramic capacitor (0603) Murata GRM18871H104K
C10	1	47pF ±5% ceramic capacitor (0603) Murata GRM1885C1H470J
C12	1	10μF ±10% tantalum capacitor AVX TAJC106K016
C16	1	4.7pF ±10% ceramic capacitor (0603) Murata GRM1885C1H6R8DZ
L1, L2	2	56nH ±5% inductors (0603) Murata LQG18HN56NJ00
L3	1	22nH ±2% inductor (0603) Murata LQW18AN22NG00
L4	1	MAX3537: Not installed MAX3538: 560nH ±5% inductor (0805) Coilcraft 0805CS-561XJB

DESIGNATION	QTY	DESCRIPTION
L5	1	8.2nH ±0.5nH inductor (0603) Murata LQW18AN8N2D00D
R1, R7	2	43Ω ±5% resistors (0603)
R2, R8	2	86.6Ω ±1% resistors (0603)
R3	1	MAX3537: 11.8kΩ ±1% resistor (0603) MAX3538: 9.1kΩ ±1% resistor (0603)
R4, R5	2	1MΩ ±5% resistors (0603)
R6	1	20kΩ ±5% resistor (0603)
R9, R10, R11	3	0Ω ±5% resistors (0603)
R12	1	Not installed
J2, J8	2	RF top-mount SMA connectors Johnson 142-0701-201
J3, J4, J9, J10	4	1 x 2, 2-pin headers Sullins PTC36SAAN
J5, J6, J7	3	Red test points 0.40 Keystone 5000
TP1	1	Not installed
U1	1	MAX3537UTC or MAX3538UTC

Evaluate: MAX3537/MAX3538

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Quick Start

The MAX3537/MAX3538 EV kits are fully assembled and factory tested. Follow the instructions in the *Connections and Setup* section for proper device evaluation.

Test Equipment Required

- A +4.75V to +5.25V power supply that can source 500mA
- A 0 to +3V adjustable DC supply that can source 1mA for the AGC input
- An RF signal generator capable of delivering +13dBm of output power at frequencies up to 1GHz
- A spectrum analyzer capable of covering the operating frequency range of the device
- (Optional) A network analyzer to measure gain and return loss
- (Optional) An ammeter to measure supply current

Connections and Setup

This section provides a step-by-step guide to testing the basic functionality of the EV kits. **Do not turn on DC power or RF signal generators until all connections are completed:**

- 1) With its output disabled, set the DC power supply to 5V. Connect the power supply to the VCC (through an ammeter if desired) and GND terminals on the EV kit. If available, set the current limit to 75mA.
- 2) With its output disabled, set the adjustable DC power supply to 3V. Connect the adjustable power supply to the RFAGC and GND terminals on the EV kit. If available, set the current limit to 1mA.
- 3) Set the RF signal generator to an 878MHz frequency and a -10dBm output power. Do not turn on the generator's output. Connect the signal generator to RFIN on the EV kit.

- 4) Set the spectrum analyzer to an 878MHz center frequency and a 10MHz span. Set the reference level of the spectrum analyzer to 0dBm. Connect the spectrum analyzer to RFOUT on the EV kit.
- 5) Leave SEL_UHF floating to select the UHF input. The MAX3537/MAX3538 EV kits have a 1M Ω pullup resistor from SEL_UHF to VCC.
- 6) Enable the DC power supplies and the RF signal generator. An 878MHz tone will be displayed on the spectrum analyzer.
- 7) When measuring gain, be sure to account for the loss introduced by the minimum loss pads at the input and output of the device (approximately 5.7dB per pad, 11.4dB total). The minimum loss pads provide a broadband match from 75 Ω to 50 Ω and are included to allow for evaluation of the MAX3537/MAX3538 with 50 Ω test equipment.
- 8) Adjust the RFAGC voltage from 3V to 1V. The output signal power decreases by approximately 22dB.
- 9) (Optional) Another method for determining gain is by using a network analyzer. This has the advantage of displaying gain over a swept frequency band or input power. Refer to the network analyzer manufacturer's user manual for setup details.

Layout Considerations

The MAX3537/MAX3538 evaluation board can serve as a reference board layout. Keep traces carrying RF signals as short as possible to minimize radiation and insertion loss. Place supply decoupling capacitors as close to the device as possible. Solder the package's exposed paddle evenly to the board ground plane for a low-inductance ground connection and for improved thermal dissipation.

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
Murata	770-436-1300	770-436-3030	www.murata.com

Note: Indicate that you are using the MAX3537/MAX3538 when contacting these component suppliers.

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Evaluate: MAX3537/MAX3538

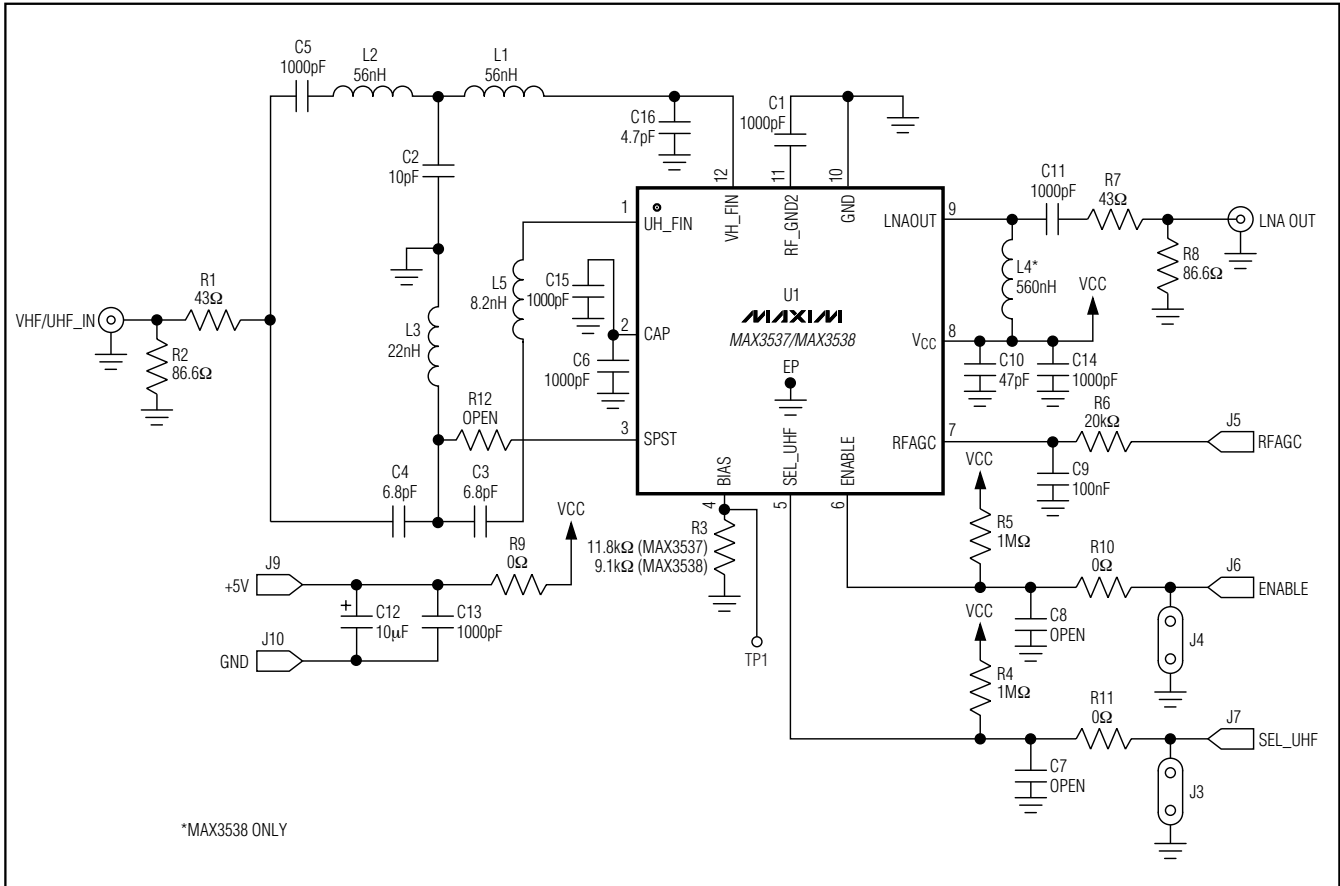


Figure 1. MAX3537/MAX3538 EV Kit Schematic

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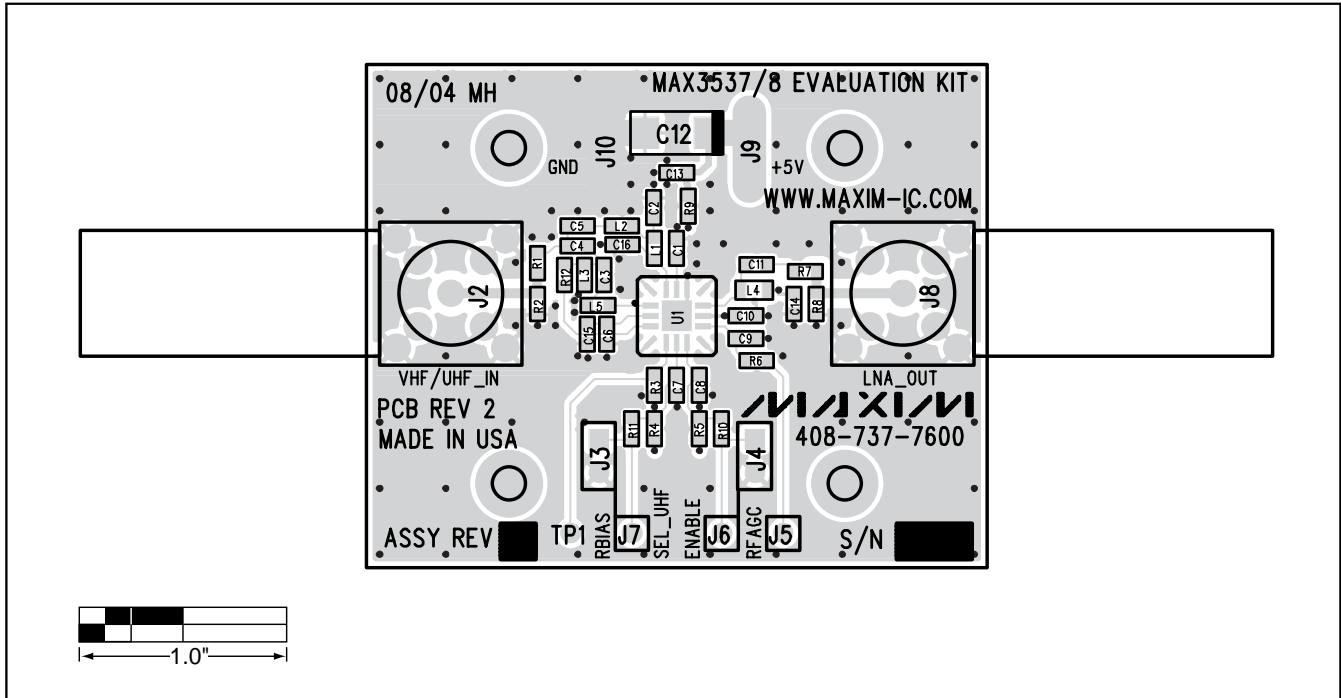


Figure 2. MAX3537/MAX3538 EV Kit Component Placement Guide—Component Side

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Evaluate: MAX3537/MAX3538

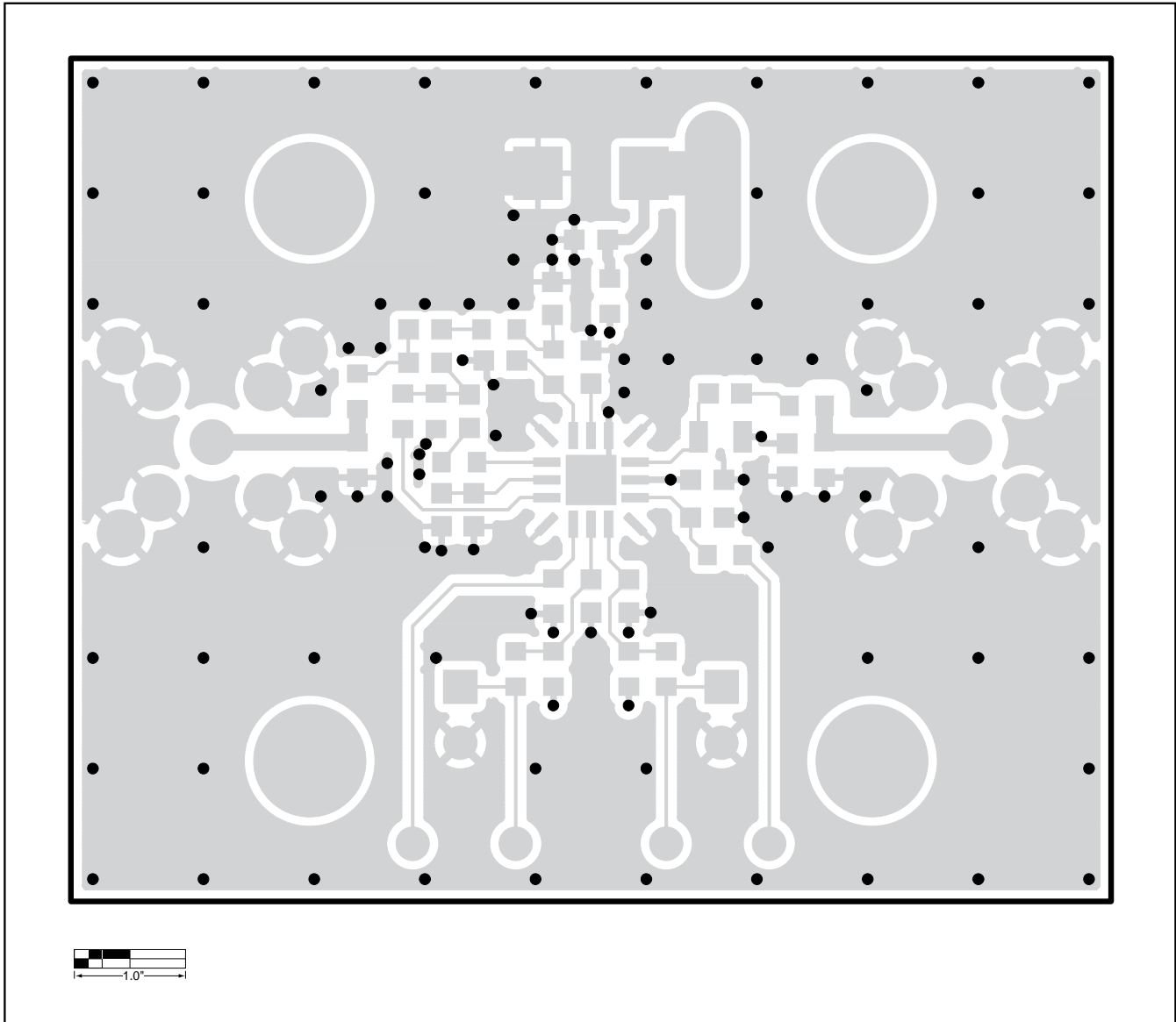


Figure 3. MAX3537/MAX3538 EV Kit PC Board Layout—Component Side

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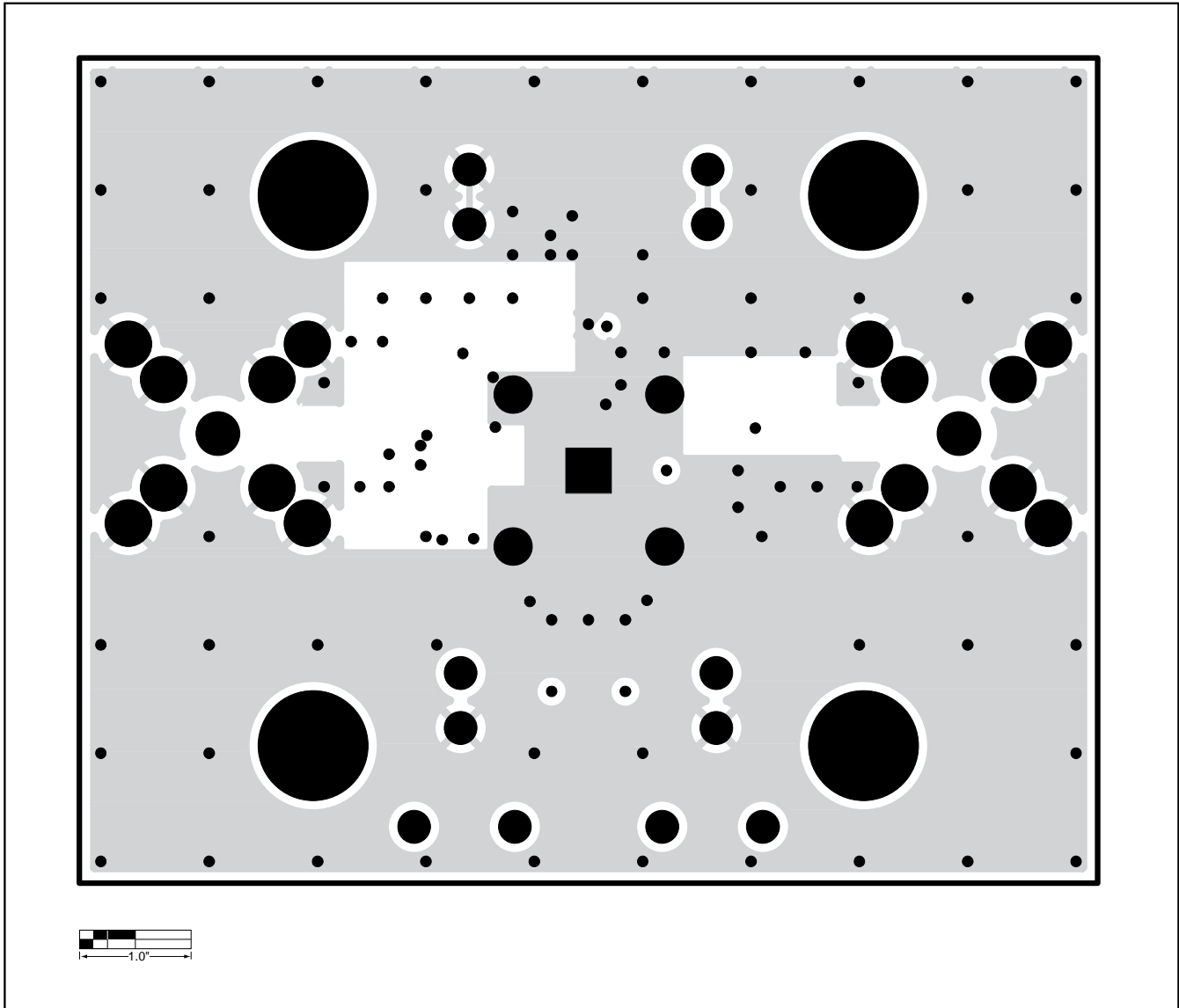


Figure 4. MAX3537/MAX3538 EV Kit PC Board Layout—Inner Layer 2

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Evaluate: MAX3537/MAX3538

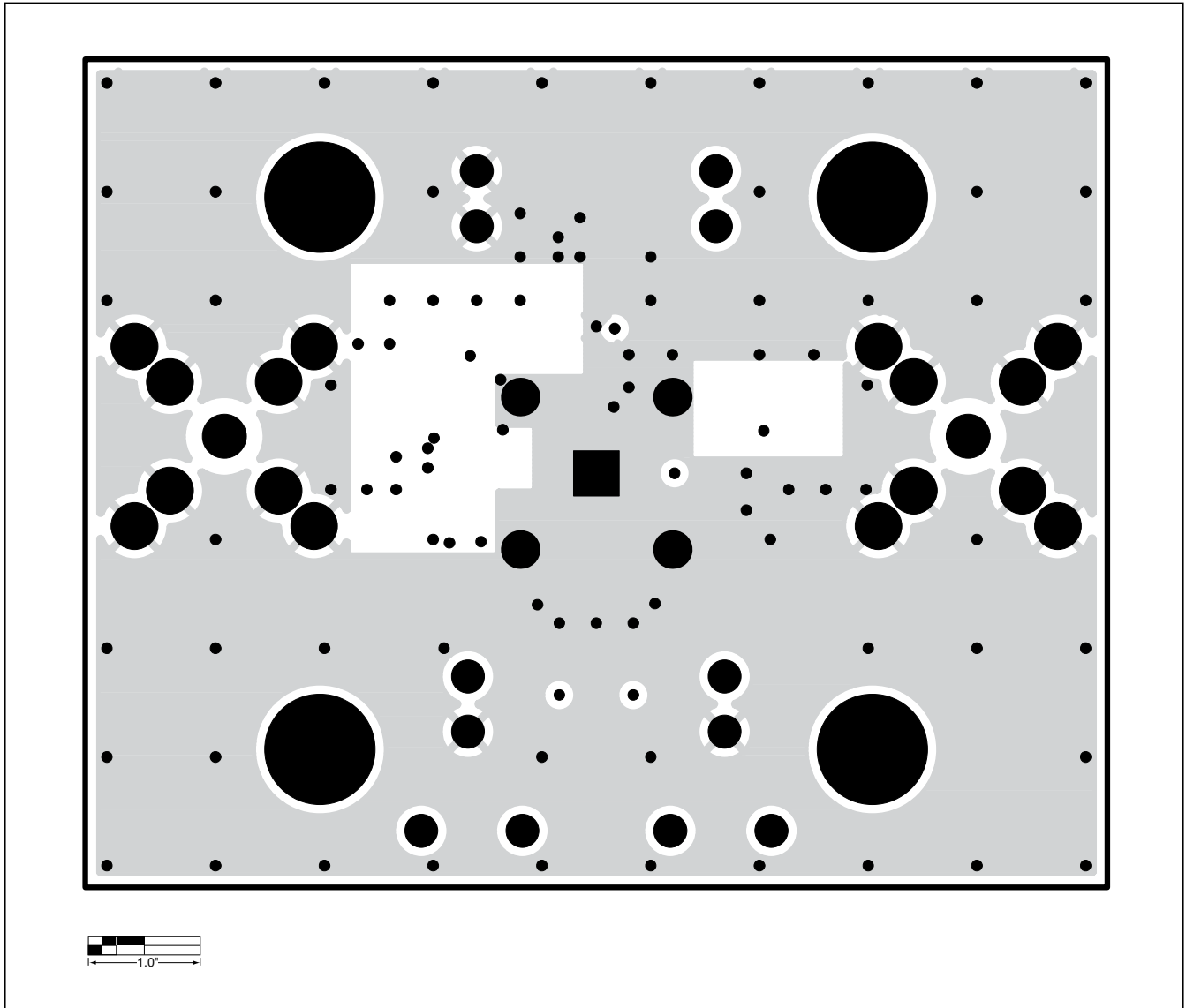


Figure 5. MAX3537/MAX3538 EV Kit PC Board Layout—Inner Layer 3

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Evaluate: MAX3537/MAX3538

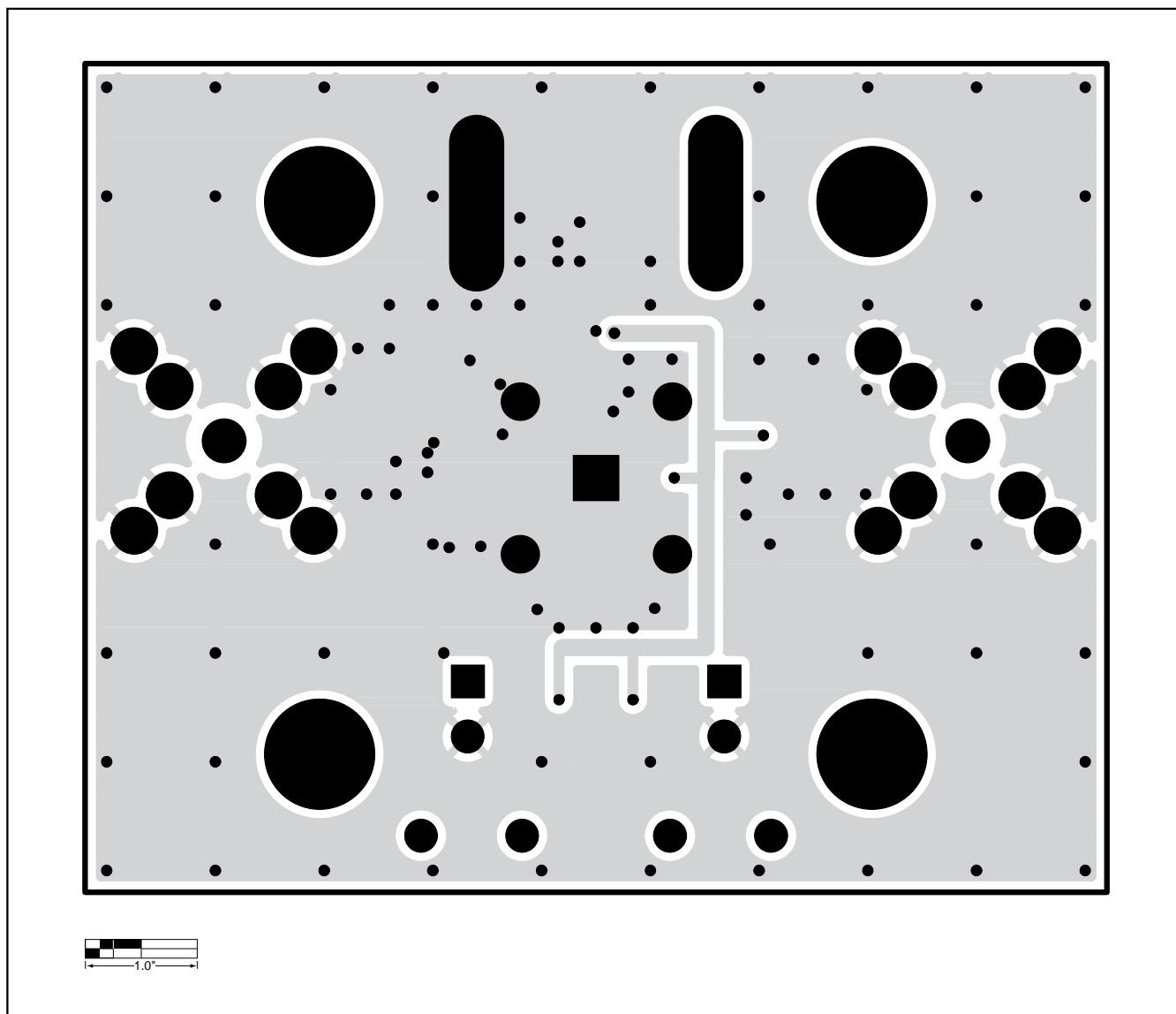


Figure 6. MAX3537/MAX3538 EV Kit PC Board Layout—Secondary Component

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