19-3073; Rev 0; 11/03

MAX3558 Evaluation Kit

Evaluates: MAX3558

General Description

The MAX3558 evaluation kit (EV kit) simplifies evaluation of the broadband LNA. It enables testing of the device's RF performance and requires no additional support circuitry. The signal inputs and outputs use F-connectors to simplify the connection of RF test equipment. Each output includes a balun for differential-to-single-ended conversion. The EV kit is fully assembled and tested.

CAUTION! ESD SENSITIVE DEVICE

Features

- **75Ω F-Connector Ports for Easy Testing**
- **Output Baluns Included for Easy Testing**
- **Jumpers for AGC and $\overline{SHDN}$**
- **Fully Assembled and Tested**

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX3558EVKIT	0°C to +70°C	28 QFN-EP* (5mm x 5mm)

**EP = Exposed paddle.*

Component Suppliers

SUPPLIER	PHONE	FAX	WEBSITE
AVX	843-448-9411	803-626-3123	www.avxcorp.com
Coilcraft	847-639-6400	803-639-1469	www.coilcraft.com
Murata	770-436-1300	770-436-3030	www.murata.com
Taiyo Yuden	800-348-2496	847-925-0899	www.t-yuden.com
TOKO	847-297-0070	847-699-7864	www.toko.com

Note: *Please indicate that you are using the MAX3558 when contacting these component suppliers.*

Component List

DESIGNATION	QTY	DESCRIPTION
C1N–C4N, C1P–C4P, CINP, CPD, CA1–CA4	14	0.01µF capacitors (0603)
CM	1	Not installed
CINN	1	0.01µF capacitor (0402)
C1–C4	4	1000nF capacitors (0603)
C6	1	33µF tantalum capacitor
C7	1	2.2µF tantalum capacitor
C8	1	0.1µF tantalum capacitor
R1, R4, R21, R31, R41	5	86.6Ω ±1% resistors (0603) (not installed)
R2, R3, R22, R32, R42	5	0Ω 0603 resistors
RA1	1	1kΩ ±1% 0603 resistor
RA10	1	10kΩ ±1% 0603 resistor

DESIGNATION	QTY	DESCRIPTION
RB	1	1.1kΩ ±1% resistor (0603)
LINP	1	5.1nH inductor (0603)
LB	1	82nH inductor (0603)
FL1	1	470Ω EMI filter Murata BLM21AG471S
T1–T4	4	Balun transformers Pulse CX2038
U1	1	MAX3558CGI
JPA1–JPA4, JPPD	5	2-pin headers
JPRA, JPS1–JPS4	5	3-pin headers
TP1, GND, VCC	3	Test points
OUT1–OUT4, RFIN	5	F-connectors Duplex CSA, Ltd. F-P225GD/D-DPX

Quick Start

The MAX3558 EV kit is fully assembled and factory tested. Follow the instructions in the *Connections and Setup* section for proper device evaluation. Figure 1 shows the schematics. Figures 2–7 are component placement guides and PC board layouts.

Test Equipment Required

- An RF signal generator capable of delivering +13dBm of output power up to 900MHz
- A spectrum analyzer covering the operating frequency range of the device
- A +4.75V to +5.25V power supply that can source 500mA
- A 0 to +3V adjustable DC supply that can source 1mA for AGC input
- A voltmeter or multimeter for monitoring the power-detector output
- (Optional) An ammeter for measuring supply current
- (Optional) A network analyzer for measuring gain and return loss

Connections and Setup

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

LNA Output Testing

1) Make sure there are shunts installed on JPS2, JPS3, and JPS4 in the OFF position, and a shunt in the ON position for JPS1. This setting activates OUT1 while turning off the remaining outputs.
2) Connect a DC power supply, preset to +5.0V, to V_{CC} (through an ammeter if desired), and GND terminals on the EV kit. If available, set the current limit to 400mA.
3) Connect an adjustable DC power supply, preset to +0V, to the JPA1 jumper and GND terminals on the EV kit. If available, set the current limit to 1mA. The JPA1 is the AGC1 input.
4) Connect the RF signal generator to the RFIN F-connector. Do not turn on the generator's output. Set the generator for an output frequency of 50MHz. Set the level to +15dBmV.
5) Connect the spectrum analyzer to the OUT1 F-connector. Set the center frequency to 50MHz and set the span to 5MHz.
6) Turn on the DC power supplies and the RF signal generator.
7) Slowly increase the adjustable supply to +3V for the gain control.
8) You should see the output signal on the spectrum analyzer. Adjust the voltage on the JPA1 pin to observe the gain-control range.
9) When measuring the gain, be sure to account for balun losses (0.08dB at 50MHz), cable losses, and circuit board losses (0.1dB).
10) Repeat the steps for output OUT2 to OUT4, if desired.
11) (Optional) Another method for determining gain is by using a network analyzer. This has the advantage of displaying gain over a swept frequency band and input power. Refer to the network analyzer manufacturer's user manual for setup details.

Power-Detector Testing

1) If connected, remove the adjustable DC power supply connected to the JPA1.
2) Make sure there are shunts on JPPD, JPA1, JPRA (either side), and JPS1 is in the ON position.
3) Vary the signal generator's output power to observe the LNA's output power. Once the input power reaches the attack point, the LNA's output power should be relatively constant.

Layout

The EV kit PC board can serve as a guide for layout using the MAX3558. Keep traces carrying RF signals as short as possible to minimize radiation and insertion loss due to the PC board. Keep the differential output traces together and of equal length to ensure signal amplitude balance. Solder the entire bottom side exposed paddle evenly to the board ground plane.

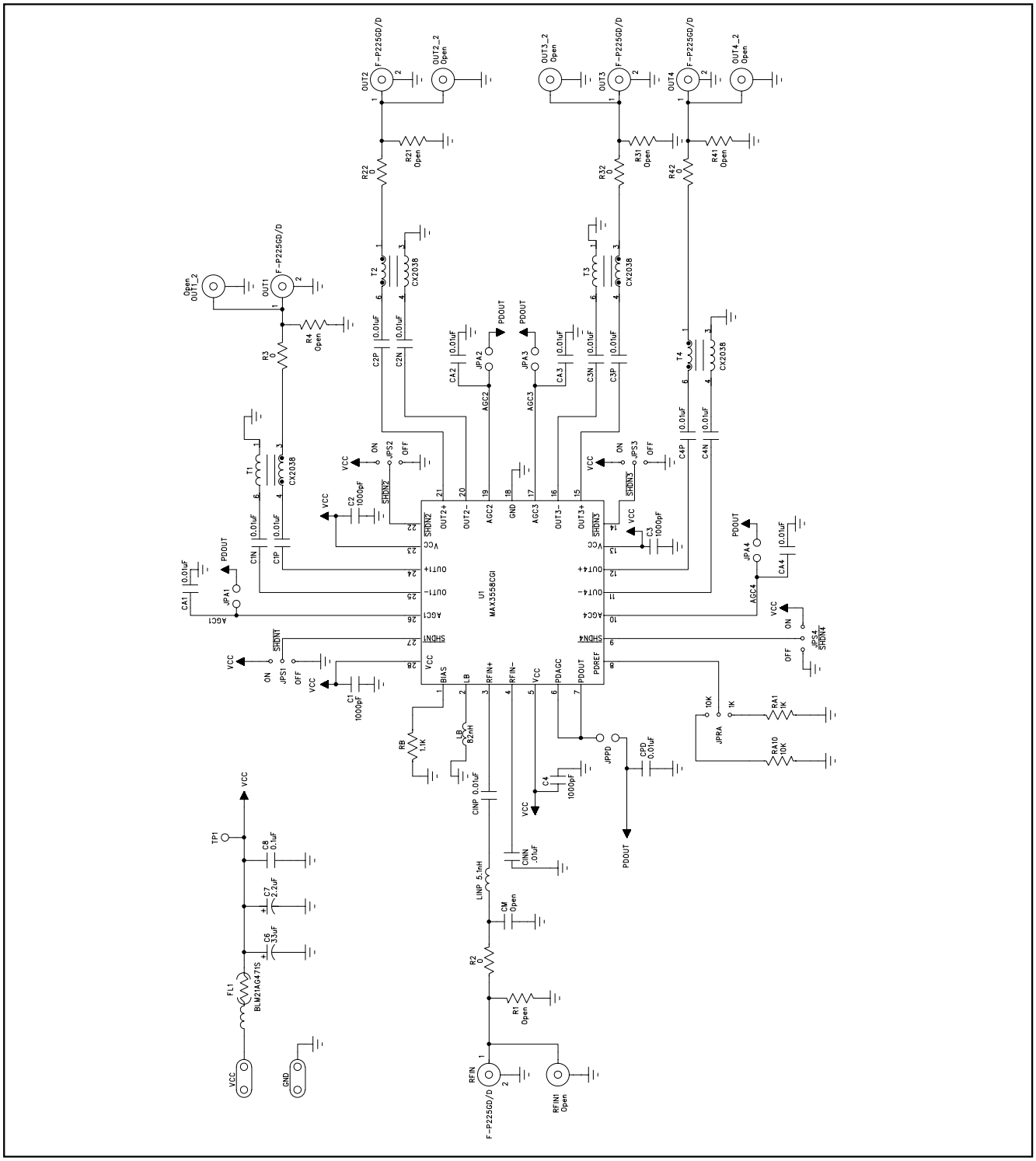

Figure 1. MAX3558 EV Kit Schematic

MAX3558 Evaluation Kit

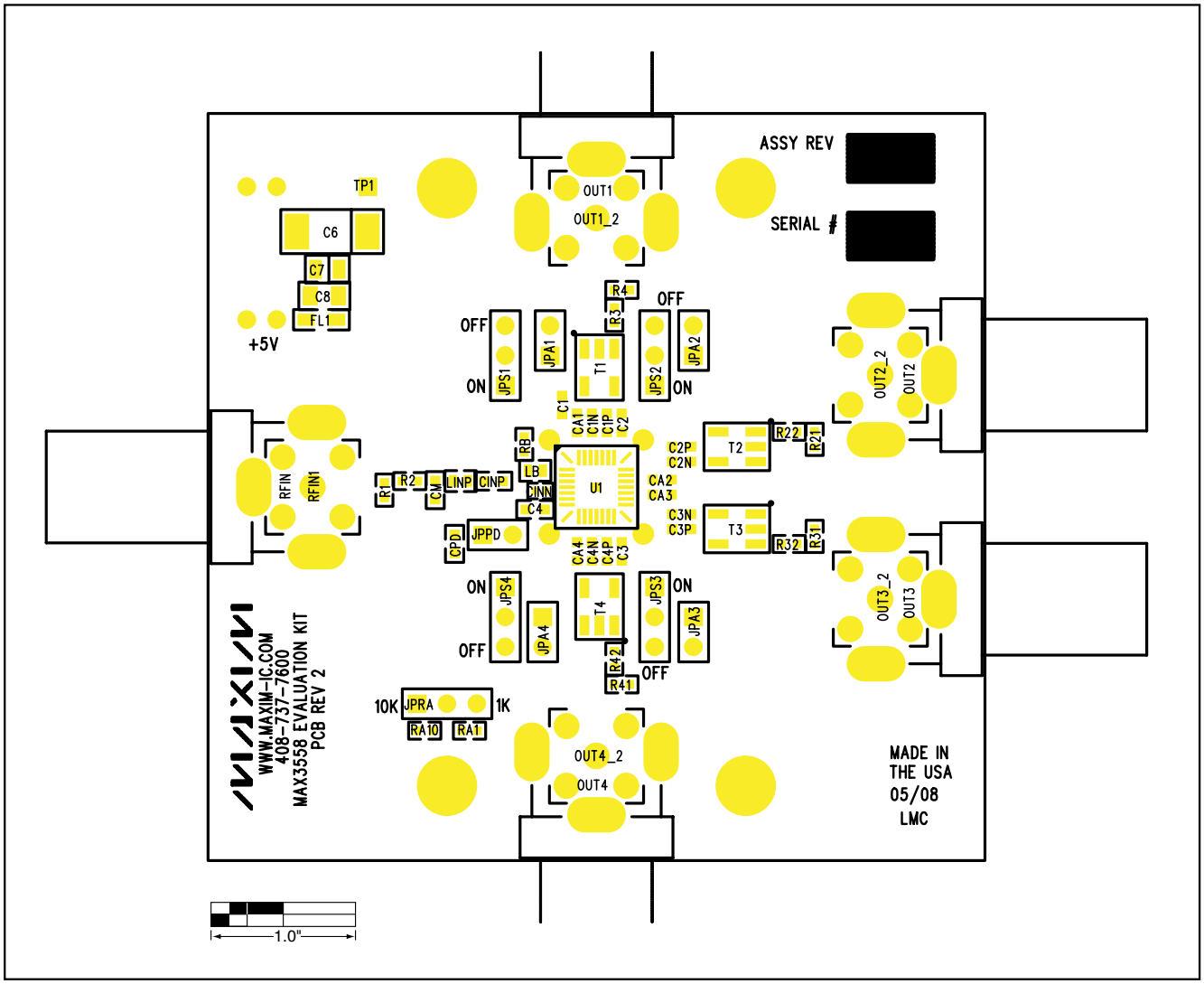

Figure 2. MAX3558 EV Kit Component Placement Guide—Component Side

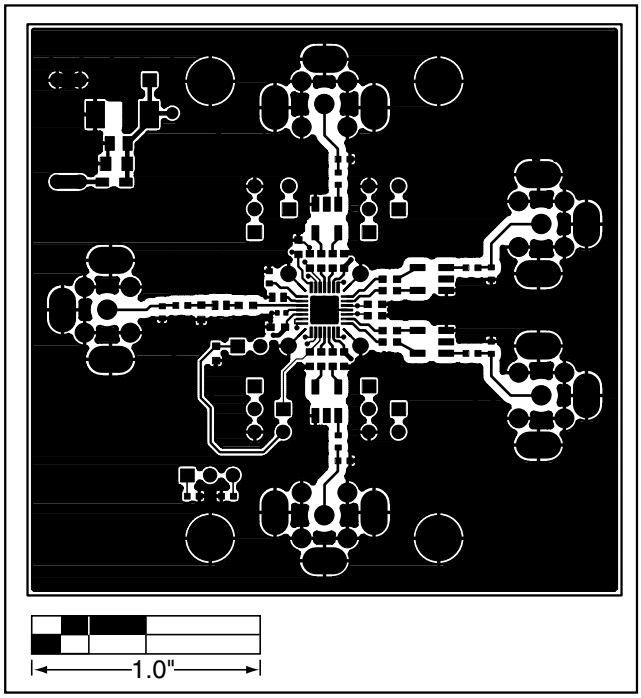

Figure 3. MAX3558 EV Kit PC Board Layout—Component Side

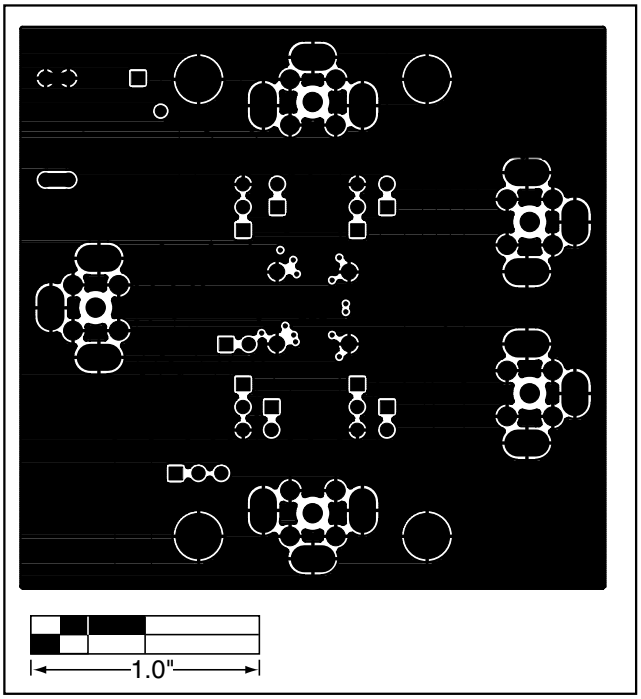

Figure 4. MAX3558 EV Kit PC Board Layout—Ground Plane 1

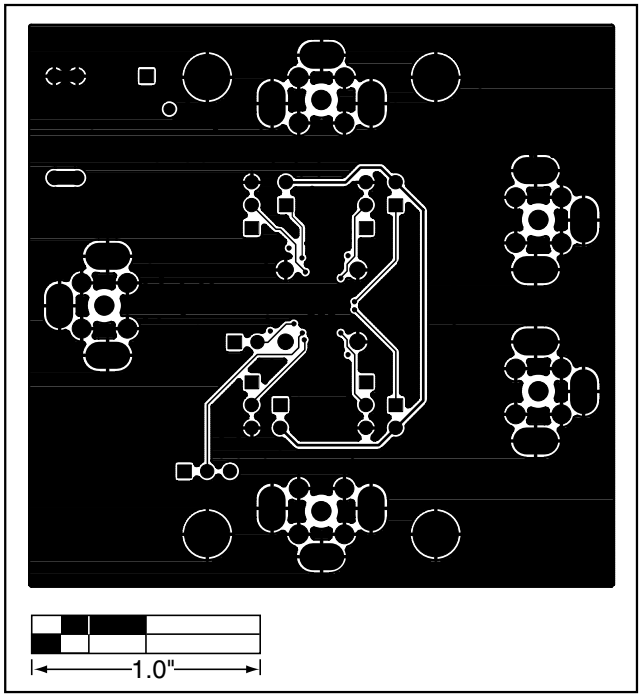

Figure 5. MAX3558 EV Kit PC Board Layout—Ground Plane 2

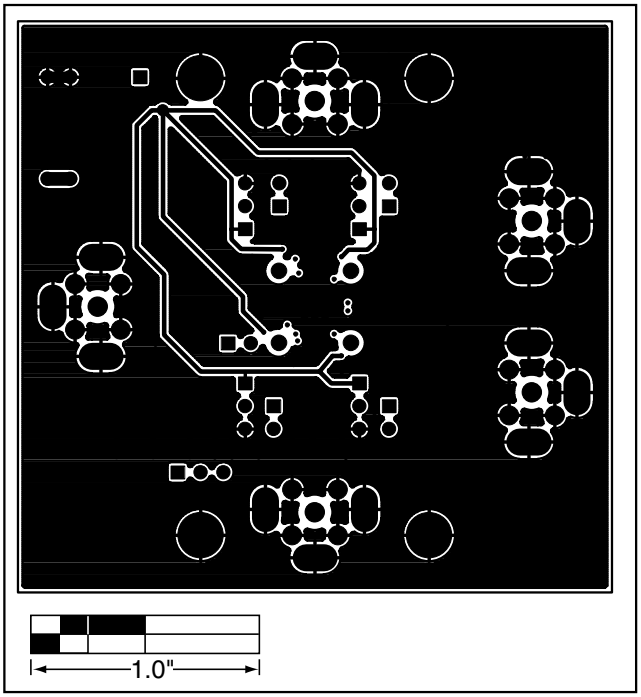

Figure 6. MAX3558 EV Kit PC Board Layout—Solder Side