19-2160; Rev 0; 9/01

MAXIM

MAX3754/MAX3755 Evaluation Kits

Evaluate: MAX3754/MAX3755

General Description

The MAX3754/MAX3755 evaluation kits (EV kits) simplify evaluation of the MAX3754/MAX3755 quad-port bypass circuit. The EV kits enable testing of all the devices' functions. SMA connectors and 50Ω terminations are provided for all input and output ports to facilitate connection to standard high-speed test equipment. The MAX3754/MAX3755 EV kits are fully assembled and tested.

Features

- **SMA Connectors for All High-Speed Inputs and Outputs**
- **On-Board 75Ω to 50Ω Impedance-Conversion Networks for Interface with Standard Test Equipment (MAX3754)**
- **Loss-of-Lock LED Indicator**
- **Jumpers to Enable Testing of All Functions**
- **Fully Assembled and Tested**

Component Suppliers

SUPPLIER	PHONE	FAX
AVX	843-946-0238	843-626-3123
Coilcraft	847-639-6400	847-639-1469
Murata	770-436-1300	770-436-3030

Note: *Please indicate that you are using the MAX3754/MAX3755 when contacting these component suppliers.*

Ordering Information

PART	TEMP. RANGE	IC PACKAGE
MAX3754EVKIT	0°C to +70°C	48 TQFP-EP*
MAX3755EVKIT	0°C to +70°C	48 TQFP-EP*

**Exposed paddle*

Component List MAX3754

DESIGNATION	QTY	DESCRIPTION
C1–C24, C28, C29, C30	27	0.1µF ±10% Murata ceramic capacitors (0805)
C25	1	0.047µF ±10% Murata ceramic capacitor (0603)
C26	1	33µF tantalum capacitor (1206) AVX TAJB335K016
C27	1	2.2µF ±10% Murata ceramic capacitor (1206)
D1	1	Red LED, T-1 package
J1–J24	24	SMA connectors (edge-mount) **Note:** Cut center pin to approximately 1/16in length.
J25	1	Test point
J26	1	2-pin header (0.1in centers)
J27–J33	7	3-pin headers (0.1in centers)
L1	1	56nH inductor (0805) Coilcraft 0805HT-56NTKBC

DESIGNATION	QTY	DESCRIPTION
R1, R2, R4, R5, R7, R8, R10, R11, R13, R14, R16, R17, R19, R20, R22, R23, R25, R26, R28, R29	20	43.2Ω ±1% resistors (0402)
R3, R6, R9, R12, R15, R18, R21, R24, R27, R30	10	178Ω ±1% resistors (0402)
R31	1	150Ω ±1% resistor (0603)
U1	1	MAX3754CCM 48-pin TQFP-EP
None	7	Shunts
None	1	MAX3754/MAX3755 data sheet
None	1	MAX3754/MAX3755 EV kit circuit board, Rev A

Component List MAX3755

DESIGNATION	QTY	DESCRIPTION
C1–C24, C28, C29, C30	27	0.1µF ±10% Murata ceramic capacitors (0805)
C25	1	0.047µF ±10% Murata ceramic capacitor (0603)
C26	1	33µF tantalum capacitor (1206) AVX TAJB335K016
C27	1	2.2µF ±10% Murata ceramic capacitor (1206)
D1	1	Red LED, T-1 package
J1–J24	24	SMA connectors (edge-mount) **Note:** Cut center pin to approximately 1/16in length.
J25	1	Test point
J26	1	2-pin header (0.1in centers)
J27–J33	7	3-pin headers (0.1in centers)
L1	1	56nH inductor (0805) Coilcraft 0805HT-56NTKBC
R1, R2, R4, R5, R7, R8, R10, R11, R13, R14, R16, R17, R19, R20, R22, R23, R25, R26, R28, R29	20	0Ω ±1% resistors (0402)
R3, R6, R9, R12, R15, R18, R21, R24, R27, R30	10	Open
R31	1	150Ω ±1% resistor (0402)
U1	1	MAX3755CCM 48-pin TQFP-EP
None	7	Shunts
None	1	MAX3754/MAX3755 data sheet
None	1	MAX3754/MAX3755 EV kit circuit board, Rev A

Quick Start

1) Connect a differential, serial data signal source to the input quad-port bypass circuit (PBC) at IN±. Set the differential input signal amplitude to 500mVp-p. Set the data rate of the input signal to 2.125Gbps or 1.0625Gbps.
2) Select the operational data rate of the device using J33 to connect RATESEL to GND or VCC. Shunt pins 2 and 3 (VCC) to select 2.125Gbps operation. Shunt pins 1 (GND) and 2 to select 1.0625Gbps operation (Table 1).
3) Connect OUT+ and OUT- to a 50Ω oscilloscope using matched 50Ω cables.
4) Connect a +3.3V power supply to the VCC pin on J26, and connect ground to the GND pin on J26.
5) Connect CLKEN, SEL1, SEL2, SEL3, and SEL4 to ground by shunting pins 1 and 2 on J27 through J31 (Table 1).
6) Connect CDREN to VCC by shunting pins 2 and 3 on J32 (Table 1).
7) The output differential voltage signal will be between 1Vp-p and 1.8Vp-p. High-speed sampling oscilloscopes are not capable of displaying signals of this magnitude. Use 14dB attenuators on all outputs to ensure the waveforms are not visually distorted. The L-port outputs of the MAX3754 are already attenuated, so a 6dB attenuator can be substituted on these outputs.

Detailed Description

The MAX3754/MAX3755 EV kits simplify evaluation of the MAX3754/MAX3755 quad-port bypass circuits. The EV kits operate from a single +3.3V power supply and come complete with all the external components necessary to interface with 50Ω test equipment.

Connections

SMA connectors are provided for all high-speed inputs (IN±, LIN1±, LIN2±, LIN3±, and LIN4±) and outputs (OUT±, LOUT1±, LOUT2±, LOUT3±, and LOUT4±). The L-port inputs and outputs are AC-coupled through a 50Ω to 75Ω resistive impedance-conversion network on the MAX3754 EV kit (see *Impedance-Conversion Networks*). The L-port inputs and outputs of the MAX3755 are AC-coupled to 50Ω transmission lines. SMA connectors are also provided for TEST1± and TEST2±, I/O connections for a PC board test strip (see *PC Board Test Strip*).

Power-supply connections (VCC and ground) are provided through a 2-pin header (J26). A test point is provided to monitor the LOCK output if visual inspection of the onboard LED is not possible. The control inputs (CLKEN, SEL1, SEL2, SEL3, SEL4, CDREN, and RATESEL) are connected to individual three-pin headers that allow the selection of V_{CC} or ground with a shunt.

Impedance Conversion Networks

The MAX3754 high-speed L-port inputs and outputs (LIN_± and LOUT_±) are connected to SMA connectors through a 75Ω to 50Ω impedance-conversion network. These networks allow the MAX3754 to see 75Ω, while the 50Ω transmission lines see 50Ω when looking into the inputs and outputs. The impedance conversion provides a convenient interface between the 75Ω inputs and outputs of the MAX3754 IC and 50Ω test equipment.

A side effect of the impedance-conversion network is signal attenuation. The input voltage at the IC is 0.64 times the signal injected into the EV kit. The measured output voltage is 0.43 times the output voltage from the IC. For example, a differential signal of 600mV applied to the input of the EV kit produces an input signal of 384mV (= 0.64 × 600mV) across IN±. A differential signal of 600mV observed after the output impedance-conversion network implies the actual output is 1400mV (= 600mV/0.43).

PC Board Test Strip

The PC board attenuates high frequencies, causing deterministic jitter and other measurement errors. A test strip is provided to measure these effects independently for calibrating data measured from the MAX3754/MAX3755. The test loop consists of two pairs of SMA connectors (TEST1±, TEST2±) that are AC-coupled to a 50Ω microstrip transmission line. The test strip is laid out to allow modeling of the MAX3754/MAX3755 L-port input and output paths. All test-loop microstrip line lengths are equivalent to the corresponding lengths that connect to the MAX3754/MAX3755 high-speed L-port inputs and outputs. The test loop allows measurement of the electrical effects of the EV kit PC board and impedance-conversion networks of the L-ports independent of the MAX3754/MAX3755 IC.

Loss-of-Lock Monitor

The MAX3754/MAX3755 EV kits are provided with a loss-of-lock monitor LED. The LED is illuminated when the internal phase-locked loop loses lock on the incoming signal. This output should not be used as a loss-of-signal indicator. The MAX3754/MAX3755 needs edge transitions to guarantee a valid signal level of this output.

Table 1. Functional Adjustments and Controls

CONTROL	NAME	FUNCTION	
		SHUNT POSITIONS 1 AND 2	SHUNT POSITIONS 2 AND 3
J27	CLKEN	Disable clock output at LOUT1± (normal operating mode).	Enable clock output at LOUT1± (test mode) when the CDR is enabled.
J28	SEL1	Port 1 bypass mode.	Port 1 enabled.
J29	SEL2	Port 2 bypass mode.	Port 2 enabled.
J30	SEL3	Port 3 bypass mode.	Port 3 enabled.
J31	SEL4	Port 4 bypass mode.	Port 4 enabled.
J32	CDREN	Disable CDR.	Enable CDR.
J33	RATESEL	1.0625Gbps Operation.	2.125Gbps Operation.

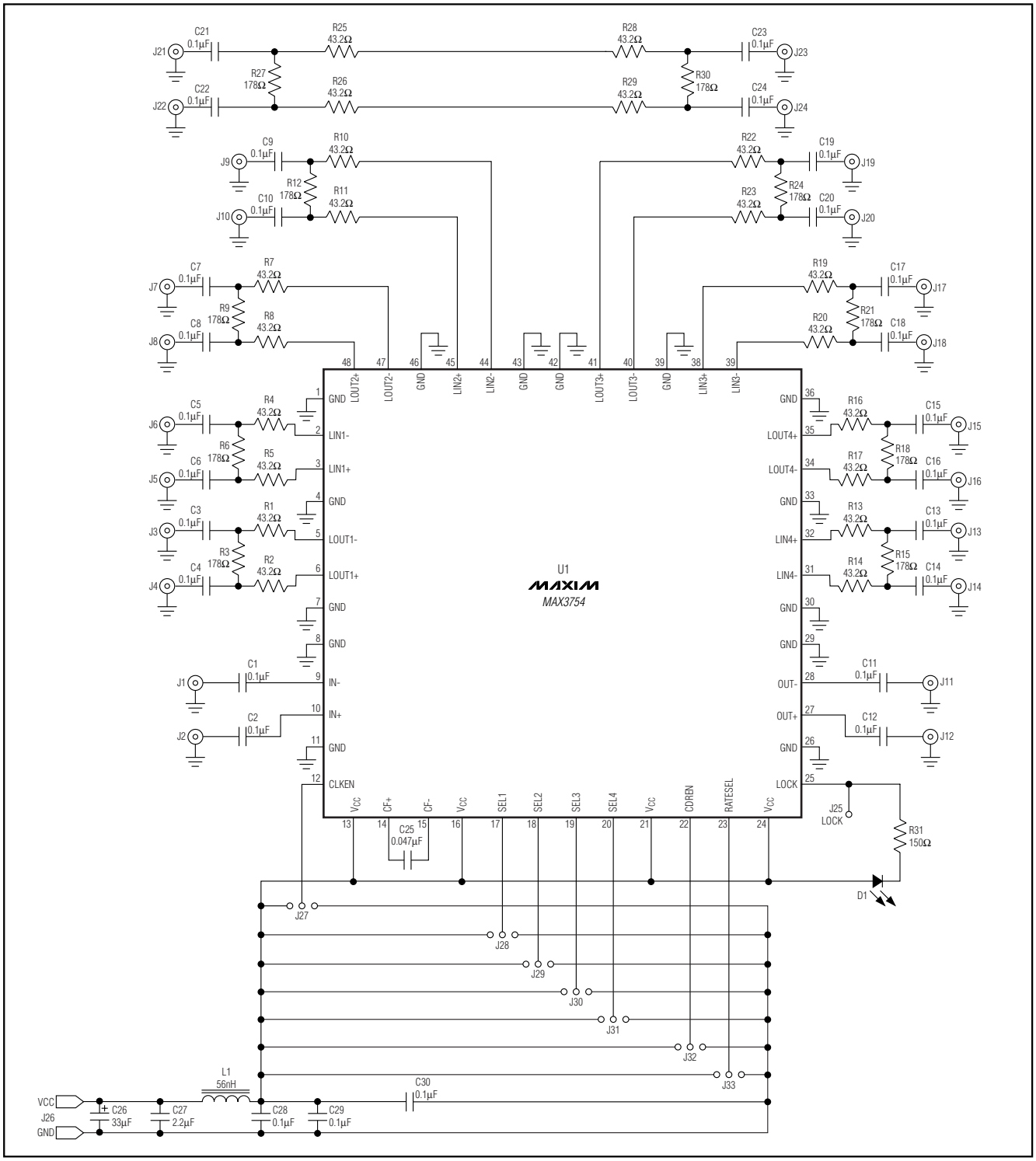

Figure 1. MAX3754 Evaluation Kit Schematic

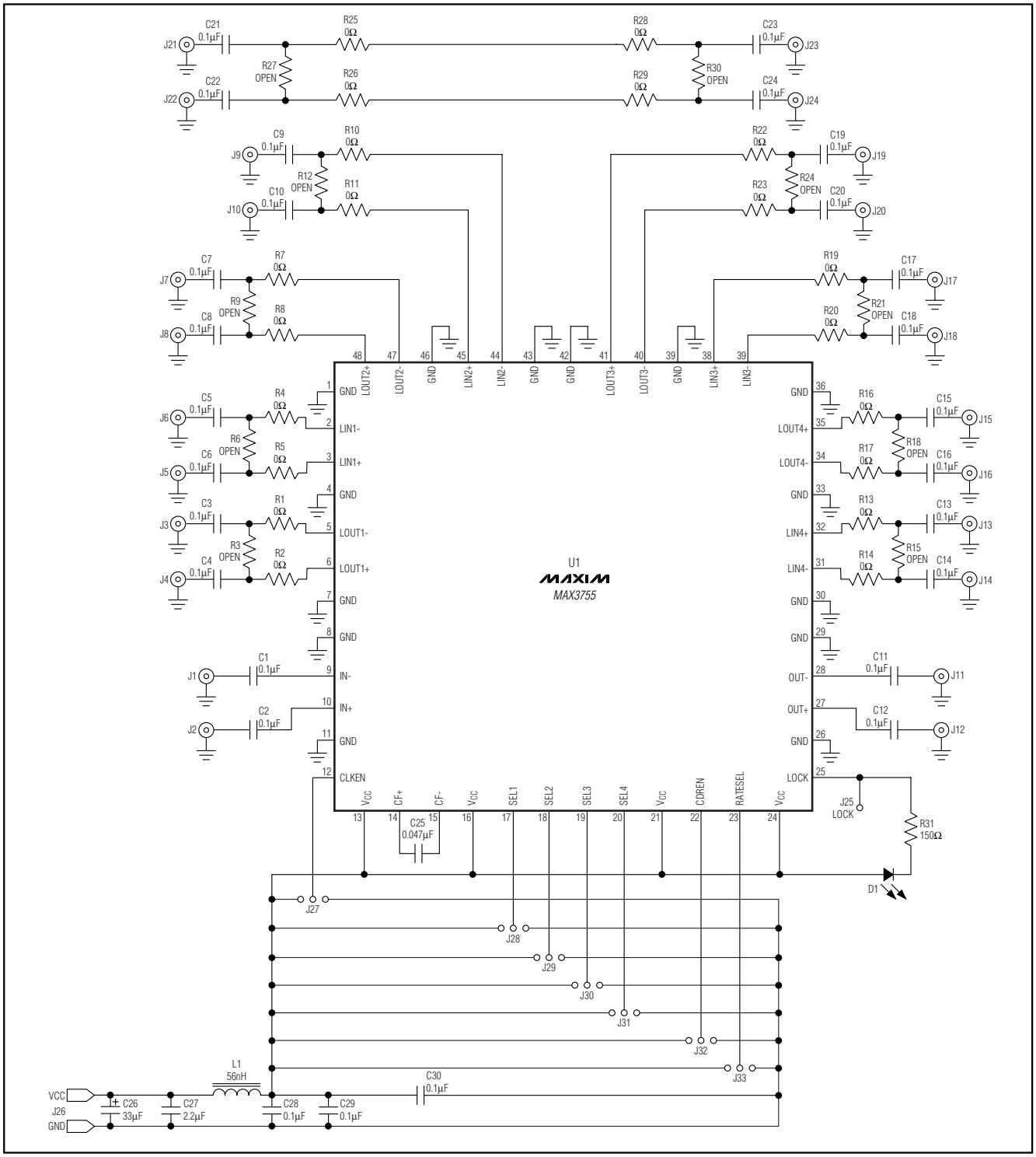

Figure 2. MAX3755 Evaluation Kit Schematic

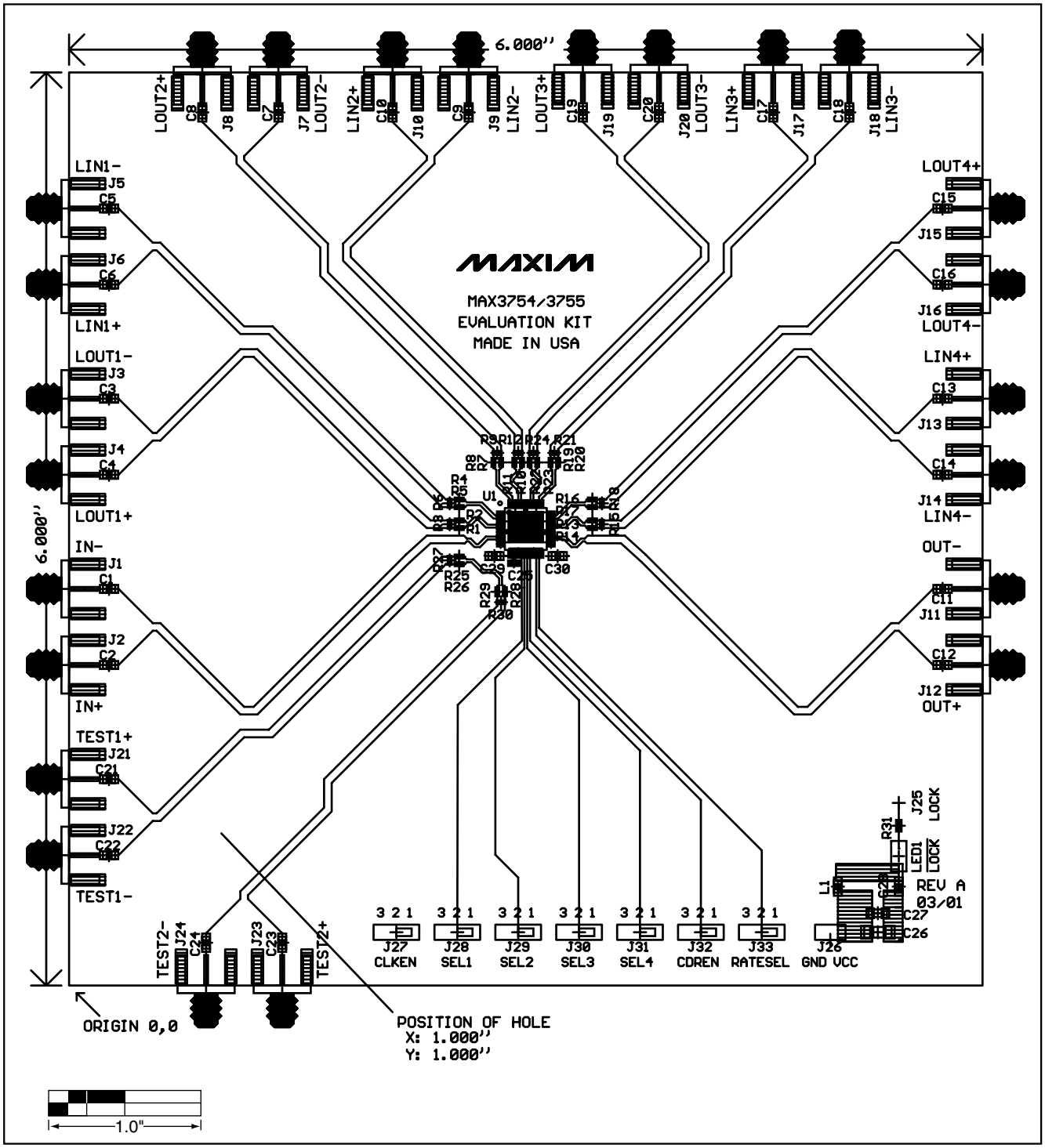

Figure 3. MAX3754/MAX3755 Evaluation Kit Component Placement Guide—Component Side

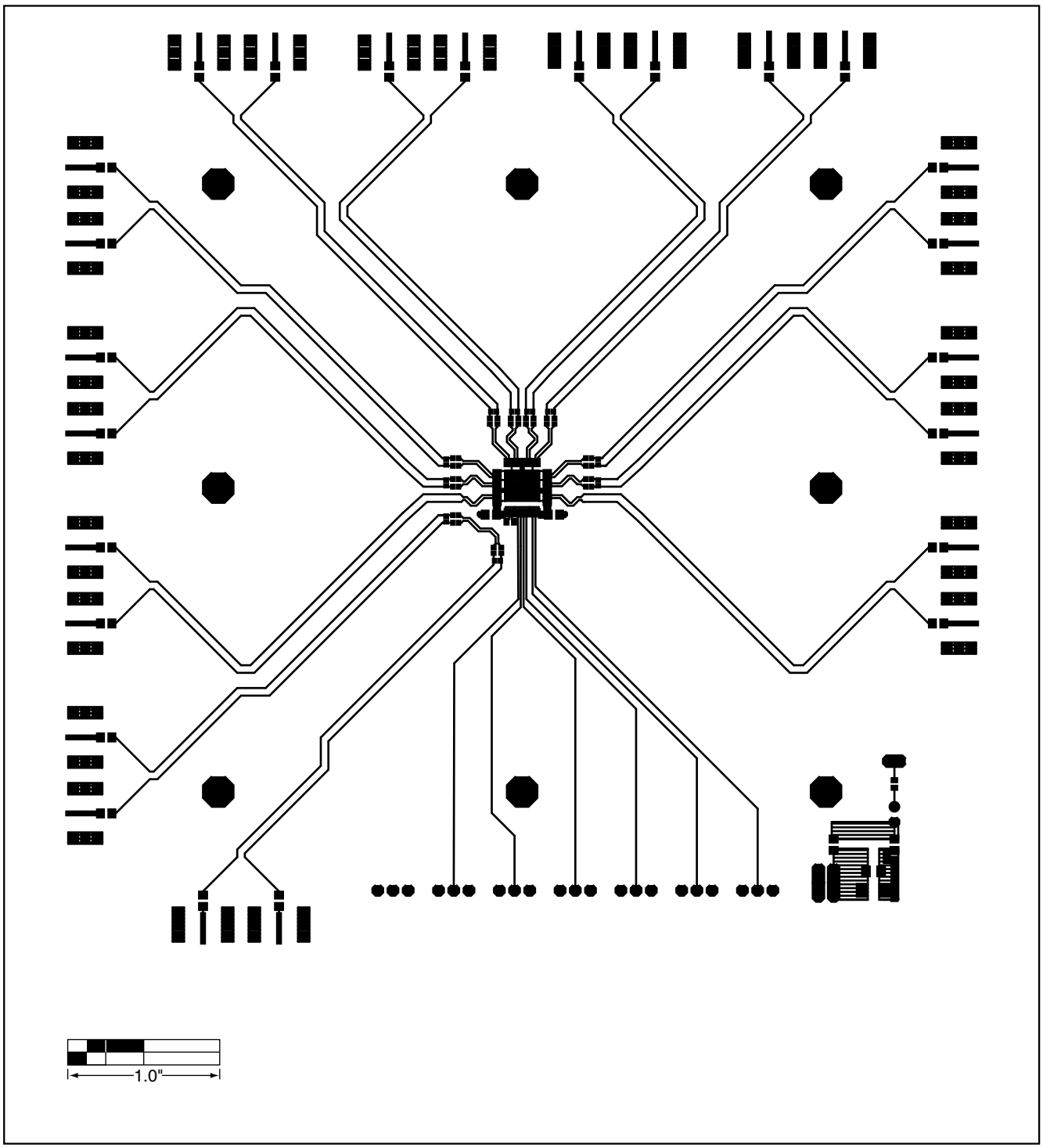

Figure 4. MAX3754/MAX3755 Evaluation Kit PC Board Layout—Component Side

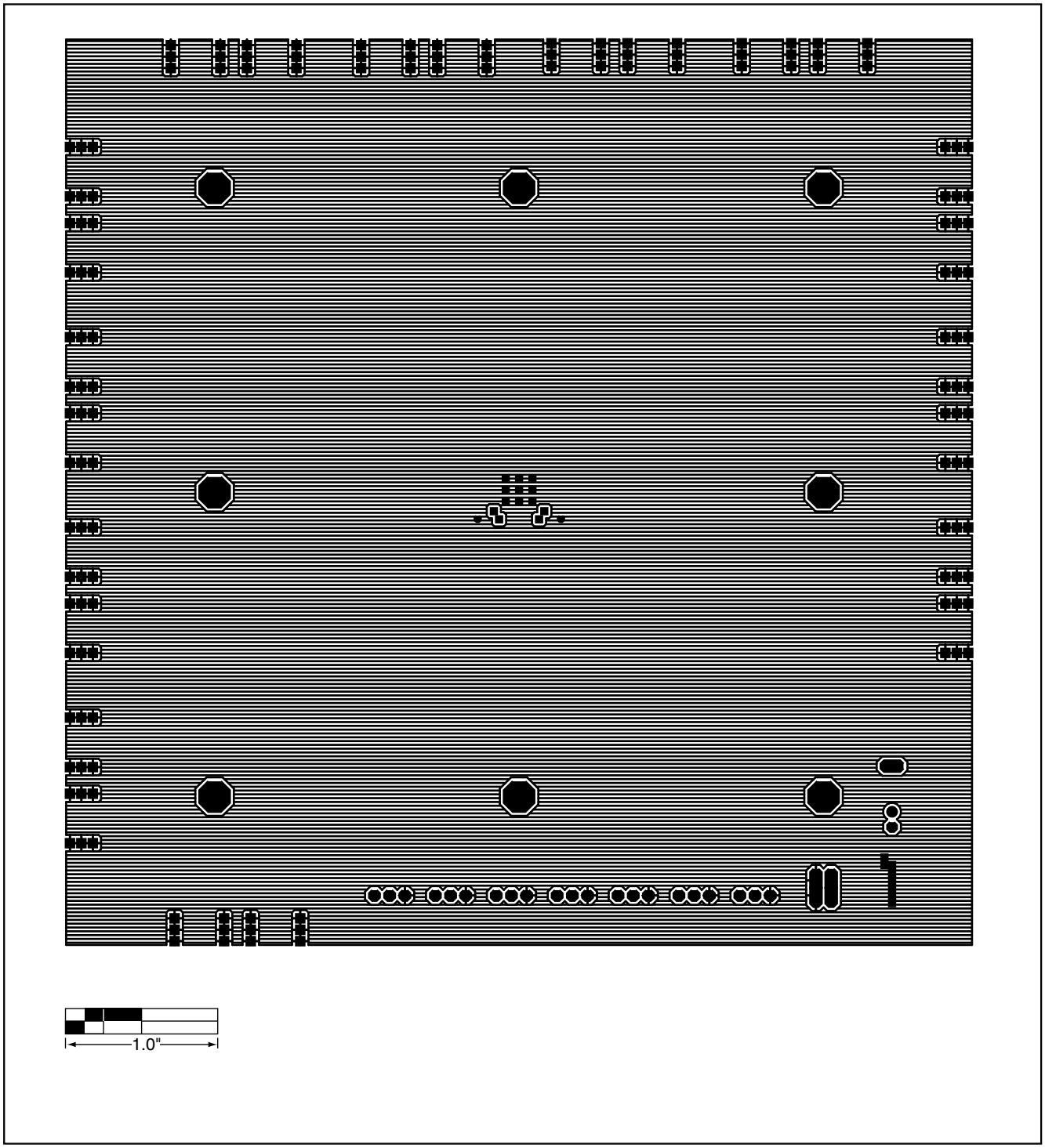

Figure 5. MAX3754/MAX3755 Evaluation Kit PC Board Layout—Ground Plane

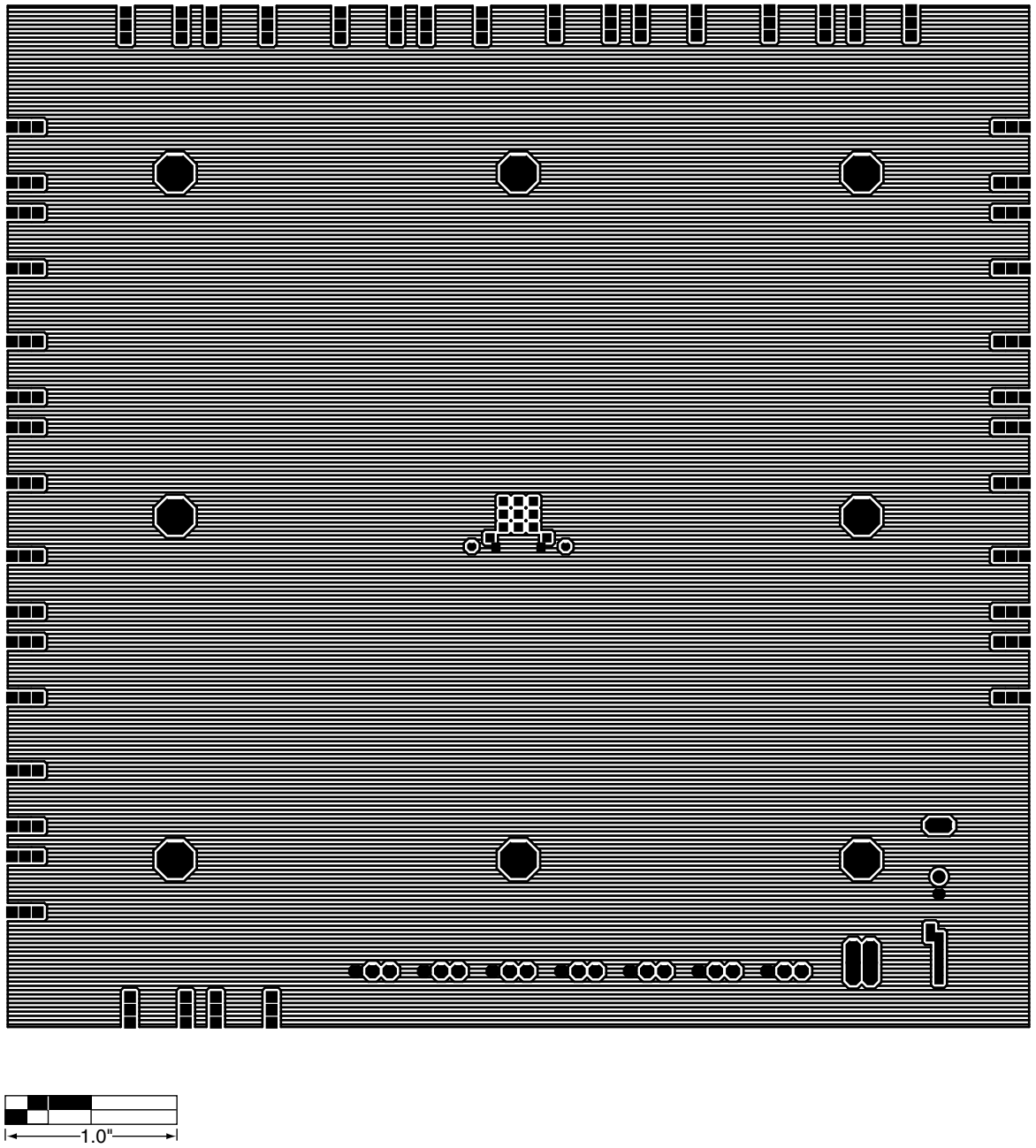

Figure 6. MAX3754/MAX3755 Evaluation Kit PC Board Layout—Power Plane

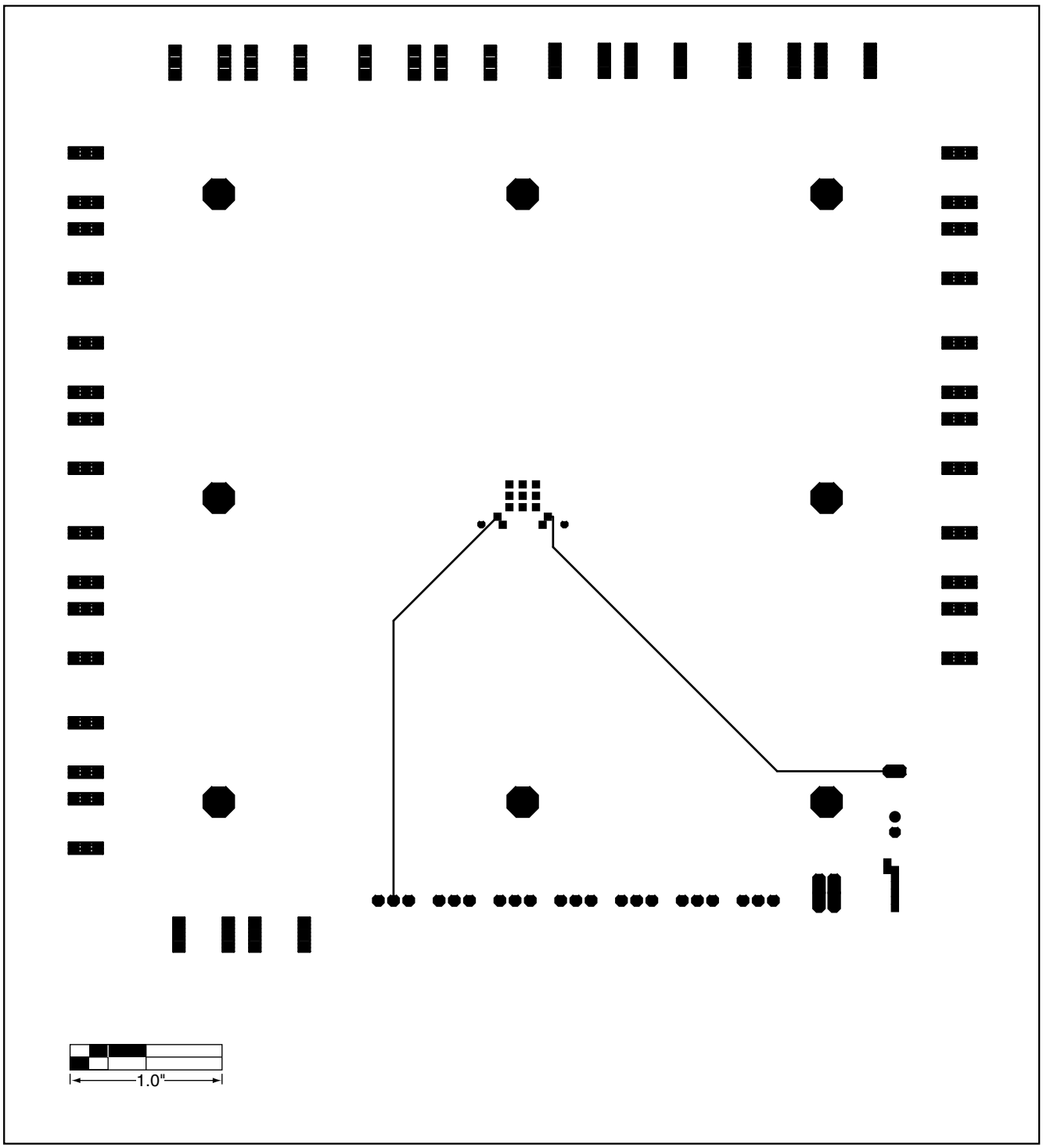

Figure 7. MAX3754/MAX3755 Evaluation Kit PC Board Layout—Solder Side