MAXIM

MAX3825 Evaluation Kit

Evaluates: MAX3825

_____*General Description*

The MAX3825 evaluation kit (EV kit) simplifies the evaluation of the MAX3825 quad transimpedance amplifier.

The EV kit includes a circuit that emulates the high-speed current input signal produced by a photodiode array.

The MAX3825 EV kit is fully assembled and tested.

_____*Features*

♦ **Fully Assembled and Tested**

♦ **Includes Photodiode Emulation Circuit**

_____*Component List*

DESIGNATION	QTY	DESCRIPTION
C2, C5, C8, C11, C17–C24, C26, C27	14	0.1µF ±10% ceramic capacitors (0402) Murata GRM36X7R104K010A
C3, C6, C9, C12–C16, C28	9	0.01µF ±10% ceramic capacitors (0402) Murata GRM36X7R103K016A
C25	1	10µF ±10% tantalum capacitor AVX TAJC106K016
R1, R5, R9, R13, R18	5	681Ω ±1% resistors (0402)
R2, R6, R10, R14, R19	5	221Ω ±1% resistors (0402)
R3, R7, R11, R15, R20	5	4.99kΩ ±1% resistors (0402)
R4, R8, R12, R16, R21	5	53.6Ω ±1% resistors (0402)
R17	0	Not installed
L1	1	56nH inductor Coilcraft 0805HT-56NTKBC
J1–J4, J15	5	SMA connectors (PC-mount)
J5–J12, J16	9	SMA connectors (edge-mount)
TP1–TP4, J13, J14	6	Test points
U1	1	MAX3825U/D die
None	1	MAX3825 Rev C EV kit circuit
None	1	MAX3825 EV kit data sheet
None	1	MAX3825 data sheet
None	—	1mil Au wire for bond pad wiring
None	—	Conductive epoxy

_____*Ordering Information*

PART	TEMP. RANGE	IC PACKAGE
MAX3825EVKIT	0°C to +85°C	Dice

_____*Component Suppliers*

SUPPLIER	PHONE	FAX
AVX	843-946-0238	843-626-3123
Coilcraft	847-639-6400	847-639-1469
Murata	770-436-1300	770-436-3020

Note: *Please indicate that you are using the MAX3825 when contacting these component suppliers.*

For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

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Quick Start

1) Connect a signal source to the input of channel 1, J1. Set the signal amplitude to 50mVp-p (this may require some attenuation between the source and the MAX3825 EV kit). The signal should have a data rate of 2.488Gbps.

2) Connect the differential CML outputs of channel 1, J11 and J12, to the 50Ω inputs of a high-speed oscilloscope.

3) Connect a +3.3V supply to the VCC terminal and ground to the GND terminal.

4) The differential signal at the oscilloscope should be between 150mVp-p and 250mVp-p.

Detailed Description

The MAX3825 EV kit evaluates a MAX3825 quad transimpedance amplifier (TIA) DC-coupled to a high-speed photodiode array with an input current of 10µAp-p to 2mAp-p. This EV kit allows characterization without using a photodiode array by providing a simple circuit that emulates the array's photocurrent using standard 50Ω test equipment.

Each channel's input transmission line is terminated with 50Ω to ground and AC-coupled into a resistive network. The TIA's AC input current component is found by dividing the input signal by a voltage-to-current converting 902Ω series resistance. The DC bias current component is adjusted by a separate DC reference (applied to TPn (n = 1, 2, 3, 4) used to set the extinction ratio of a channel's input signal.

The values of the series resistive elements R1, R2, R5, R6, R9, R10, R13, and R14 have been carefully selected not to change the bandwidth of the transimpedance amplifier. Surface-mount resistors may have parasitic capacitance that reduces their impedance at frequencies above 1GHz. The user should carefully evaluate any changes to input series resistors using the calibration network provided on the EV kit.

Photodiode Emulation

The following procedure can be used to estimate the high-speed current signal generated by a photodiode:

1) Select the desired optical power (P_{AVE} in dBm) and extinction ratio (r_e).

2) Calculate the average current (I_{AVE} in A), and adjust a DC reference in series with an ammeter connected to TPn (n = 1, 2, 3, 4) until the proper bias current is obtained:

$$I_{AVE} = \frac{10^{(P_{AVE}/10)} \times \rho}{1000}$$

(ρ = photodiode responsivity in A/W)

Calculate the AC signal current amplitude, and adjust the signal generator to obtain it.

$$I_{INPUT} = 2 \times I_{AVE} \frac{(r_e - 1)}{(r_e + 1)}$$

For example:

1) Emulate a signal with an average power of -13dBm and an extinction ratio of 10 on channel 1.

2) -13dBm optical power will produce 50µA of average input current (assume photodiode responsivity ρ = 1A/W). Connect a power supply in series with an ammeter to TP1. Adjust the power supply until the ammeter reads 50µA.

3) The signal amplitude is $2 \times I_{AVE}(r_e - 1)/(r_e + 1)$ = 82µAp-p. To generate this current through the 902Ω input resistors, set the signal source to produce an output level of 82µA × 902Ω = 74mVp-p.

Table 1. Connections and Adjustments

CONNECTION	DESCRIPTION
J1–J4	Inputs (IN1, IN2, IN3, IN4)
J5–J12	50Ω CML outputs from the MAX3825 (OUT4+, OUT4-, OUT3+, OUT3-, OUT2+, OUT2-, OUT1+, OUT1-)
VCC (J13)	Power-supply connection pin. Connect a +3.3V power supply.
GND (J14)	Ground
J15	Calibration strip input
J16	Calibration strip output
TP1–TP4	Input bias current voltage supply (IN1, IN2, IN3, IN4)

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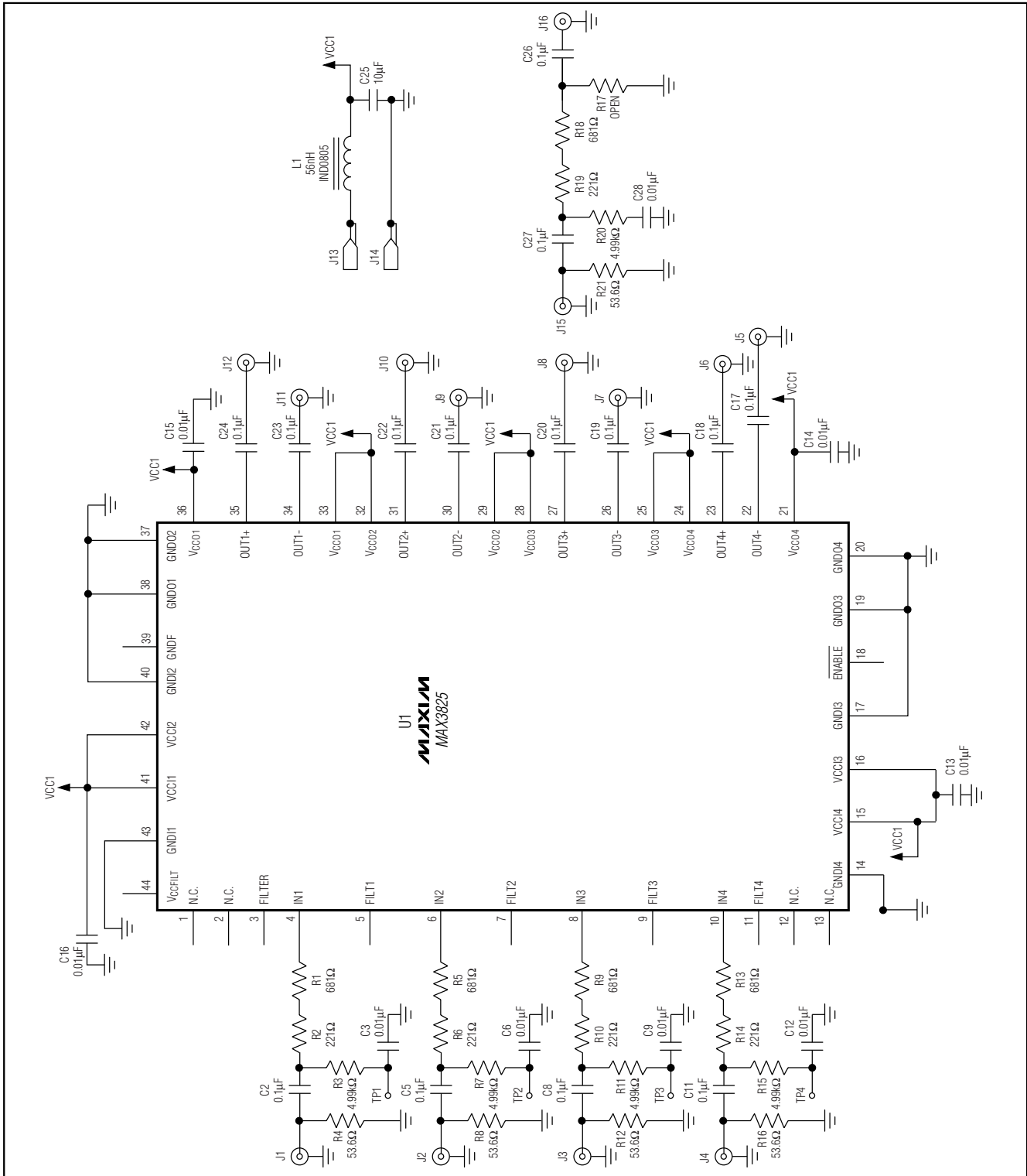
Evaluates: MAX3825

Figure 1. MAX3825 Evaluation Kit Schematic
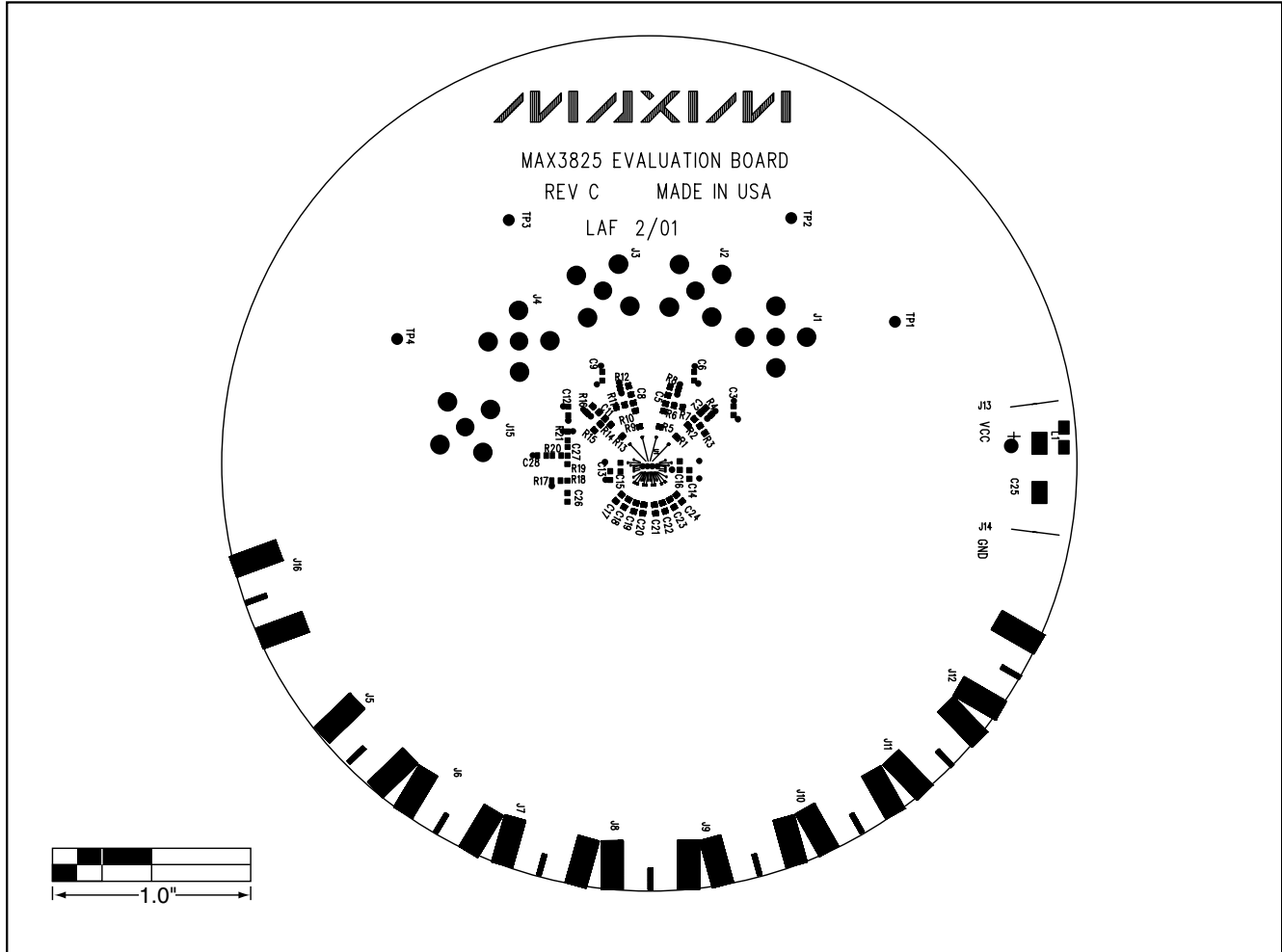
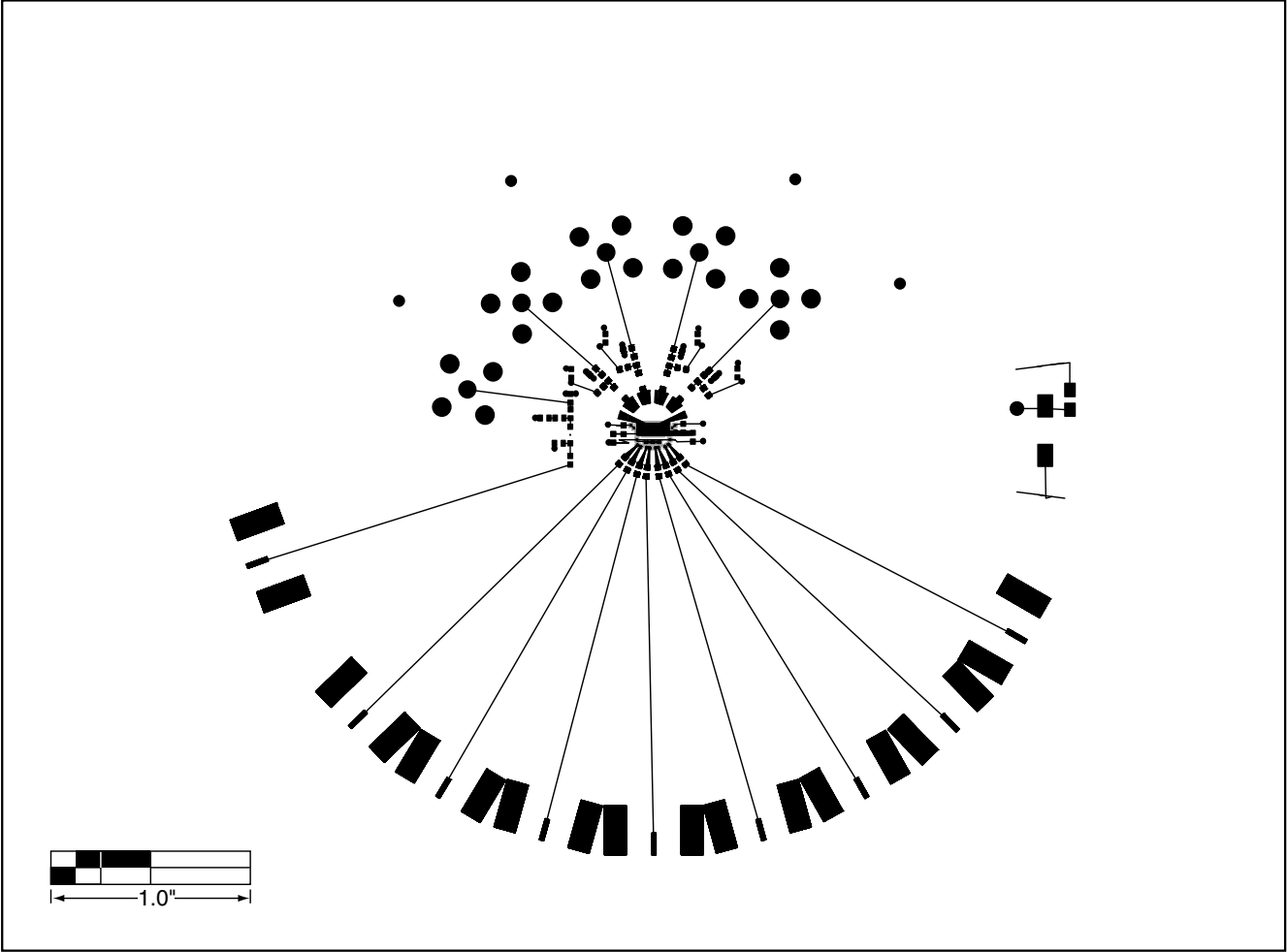Figure 2. MAX3825 Evaluation Kit Component Placement Guide—Component Side

Figure 3. MAX3825 Evaluation Kit PC Board Layout—Component Side

MAX3825 Evaluation Kit
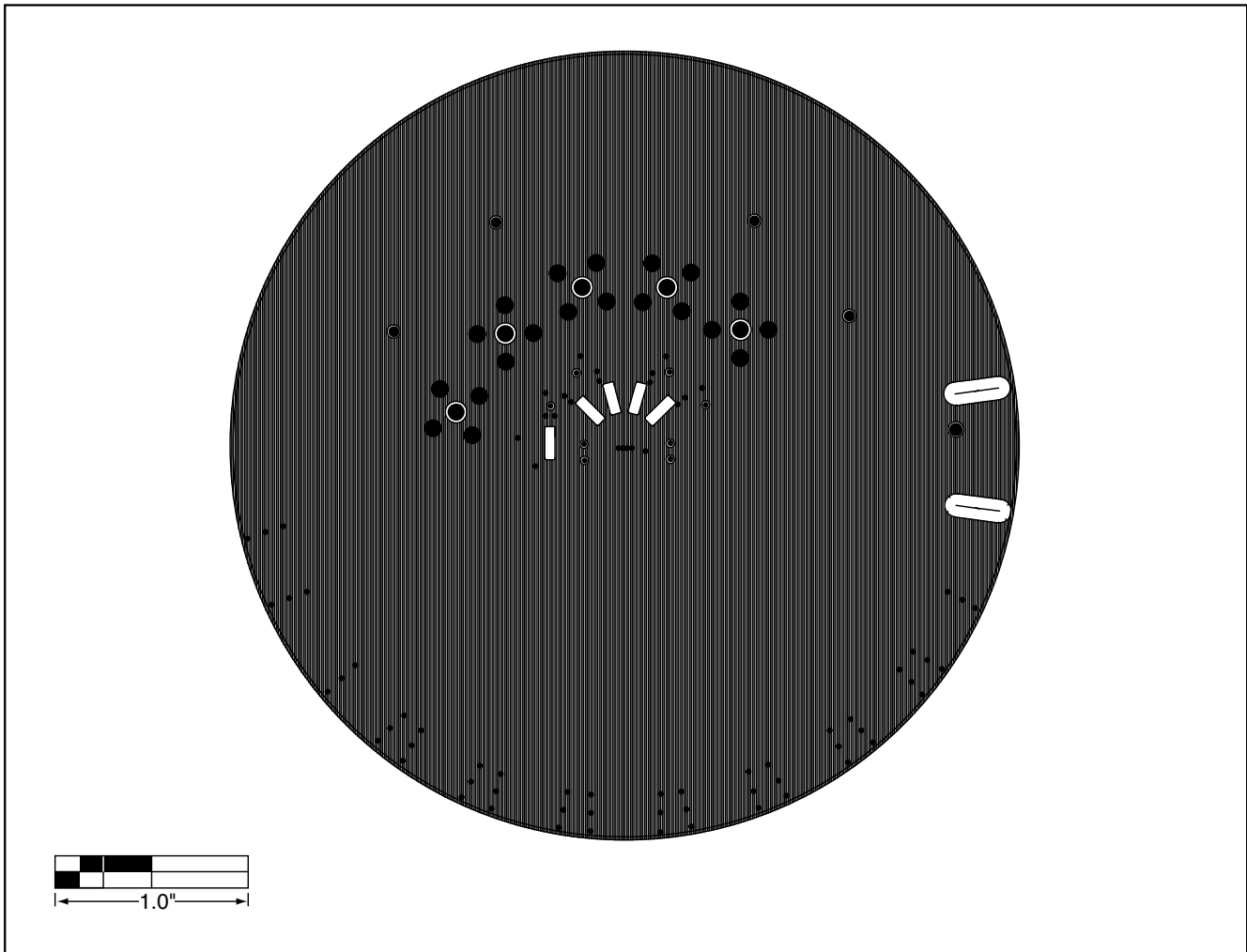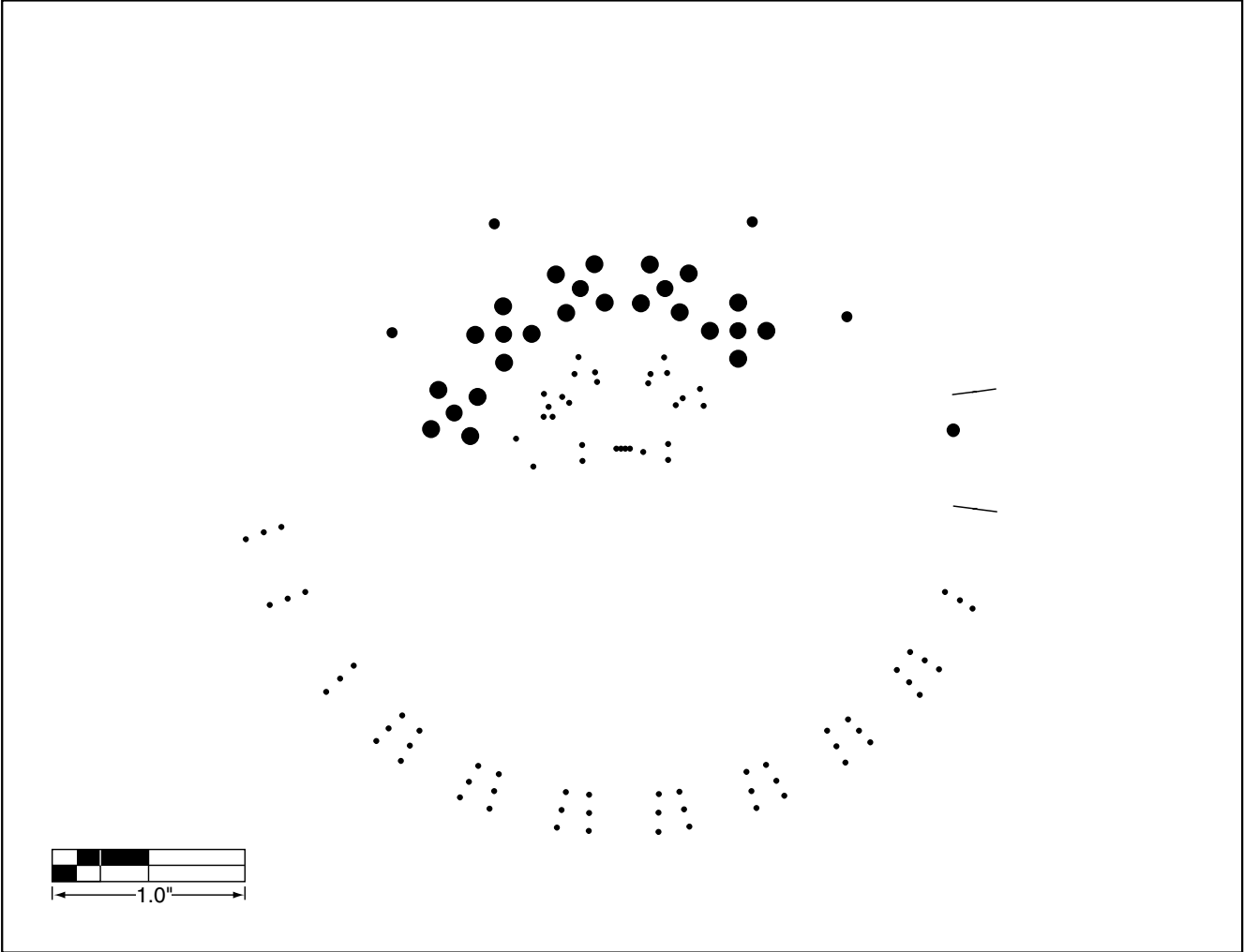
Figure 4. MAX3825 Evaluation Kit PC Board Layout—Ground Plane

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Figure 5. MAX3825 Evaluation Kit PC Board Layout—Power Plane

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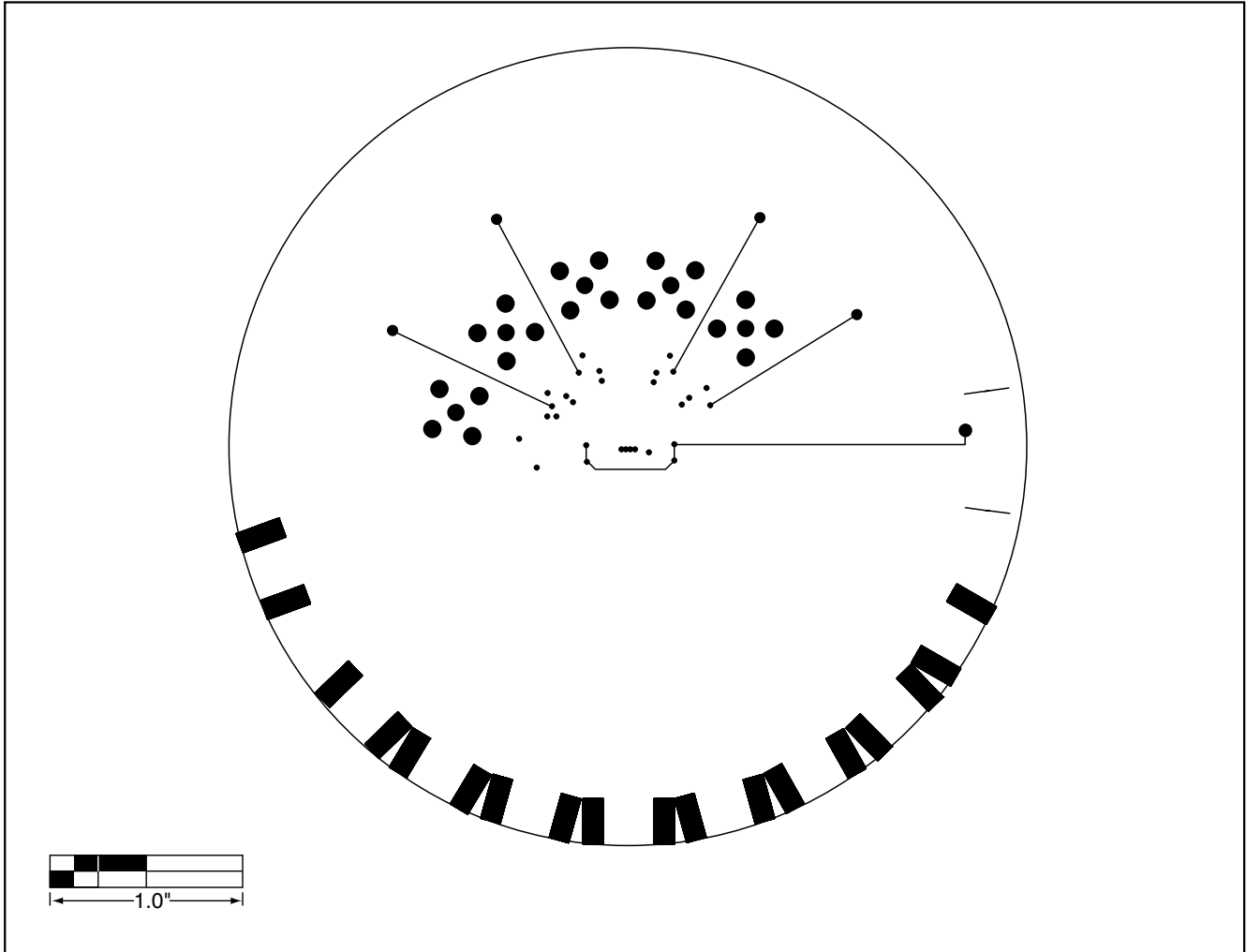
Figure 6. MAX3825 Evaluation Kit PC Board Layout—Solder Side