

# MAXIM

## MAX3663 Evaluation Kit

**Evaluates: MAX3663**

### General Description

The MAX3663 evaluation kit (EV kit) is an assembled demonstration board that provides easy optical or electrical evaluation of the MAX3663, a 622Mbps laser driver with current monitors and automatic power control (APC) circuitry. Although the MAX3663 EV kit is shipped in the electrical configuration, this EV kit also provides configuration instructions for optical operation.

### Component Suppliers

SUPPLIER	PHONE	FAX
AVX	843-448-9411	843-448-1943
Coilcraft	847-639-6400	847-639-1469
Murata	770-436-1300	770-436-3030
Zetex	631-360-2222	631-360-8222

**Note:** Please indicate that you are using the MAX3663 when contacting these component suppliers.

### Features

- ◆ Fully Assembled and Tested
- ◆ +3.3V or +5V Operation
- ◆ On-Board Input Termination
- ◆ Independent Electrical Monitoring of Modulation and Bias Currents

### Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX3663EVKIT	-40°C to +85°C	24 QFN

### Component List for Electrical Configuration

DESIGNATION	QTY	DESCRIPTION
C1, C2, C6, C12, C20	5	0.01 $\mu$ F $\pm$ 10% ceramic capacitors (0402)
C4, C7, C10, C11	4	1 $\mu$ F $\pm$ 10% ceramic capacitors (0603)
C5	1	Do not install
C8	1	100pF $\pm$ 10% ceramic capacitor (0402)
C16	1	0.1 $\mu$ F $\pm$ 10% ceramic capacitor (0603)
C19	1	10 $\mu$ F $\pm$ 10%, 10V min tantalum capacitor case B AVX TAJC106K016
C21	1	5pF $\pm$ 5% ceramic capacitor (0402)
D1	1	LED
J1, J2, J3	3	SMA connectors, edge mount
JU1–JU4	4	3-pin headers, 0.1in centers
L2	1	Open
L3	1	1.2 $\mu$ H inductor Coilcraft 1008LS-122XKBC
Q1	1	PNP transistor Zetex FM591A
R1, R2, R24	3	1.5k $\Omega$ $\pm$ 5% resistors (0402)
R3	1	1k $\Omega$ $\pm$ 5% resistor (0603)
R4, R17, R25, R27, R29	5	Do not install

DESIGNATION	QTY	DESCRIPTION
R5	1	12.4 $\Omega$ $\pm$ 1% resistor (0402)
R6, R7, R21	3	84.5 $\Omega$ $\pm$ 1% resistors (0603)
R8, R9	2	124 $\Omega$ $\pm$ 1% resistors (0603)
R10, R11	2	20 $\Omega$ $\pm$ 1% resistors (0402)
R12	1	10 $\Omega$ $\pm$ 1% resistor (0402)
R13, R22	2	0 $\Omega$ resistors (0603)
R14	1	50k $\Omega$ variable resistor Bourns 3296W
R15	1	200k $\Omega$ variable resistor Bourns 3296W
R16	1	100k $\Omega$ variable resistor Bourns 3296W
R18	1	110 $\Omega$ $\pm$ 5% resistor (0603)
R20	1	0 $\Omega$ resistor (0402)
R23	1	15 $\Omega$ $\pm$ 5% resistor (0603)
R26, R28	2	392 $\Omega$ $\pm$ 1% resistors (0402)
U1	1	MAX3663 24-pin QFN
U2	1	MAX495ESA 8-pin SOIC
VCC, GND, TP1–TP13	15	Test points
None	1	MAX3663 data sheet
None	1	MAX3663ETG EV kit PC board, rev A

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## Component Modifications for Optical Configuration

DESIGNATION	QTY	DESCRIPTION
D3	1	User-supplied laser diode
J3	1	Remove
L2	1	Ferrite bead Murata BLM18HG601SN1
R5	1	Remove
R13	1	Remove
R19	1	20 $\Omega$ $\pm$ 5% resistor (0402)
R20	1	5 $\Omega$ $\pm$ 5% resistor (0402)
R22	1	Remove
R23	1	Remove

### Quick Start

#### Electrical Setup (Default)

In the electrical configuration, an APC test circuit is included to emulate a semiconductor laser with a monitor photodiode. Monitor diode current is provided by Q1, which is controlled by an operational amplifier (U2). The APC test circuit, consisting of U2 and Q1, applies the simulated monitor diode current to the MAX3663's MD pin. The ratio of  $I_{BIAS} / I_{MD}$  is  $R24 / R23 = 100$ . To ensure proper operation in the electrical configuration, set up the evaluation board as follows:

- 1) Verify that inductor L2 is not installed.
- 2) Shunt JU4 to ground to enable the output.

**Note:** When performing the following resistance checks, manually set the ohmmeter to a high range to avoid forward biasing the on-chip ESD protection diodes.

- 3) Shunt JU2 to R14. Adjust R14, the MOD (R<sub>MODSET</sub>) potentiometer, for 10k $\Omega$  resistance between pins 2 and 3 (test point 5 and ground).
- 4) Shunt JU1 to R15. Adjust R15, the BIAS (R<sub>BIASMAX</sub>) potentiometer, for 10k $\Omega$  resistance between pins 2 and 3 (test point 4 and ground).
- 5) Shunt JU3 to R16. Adjust R16, the APC (R<sub>APCSET</sub>) potentiometer, for 10k $\Omega$  resistance between pins 2 and 3 (test point 6 and ground).
- 6) Power up the board with a +3.3V supply.
- 7) Apply a differential input signal (max amplitude  $\leq$ 800mV per side) to J1 and J2 (DATA+ and DATA-).

- 8) Attach a high-speed oscilloscope with 50 $\Omega$  inputs to J3.
- 9) Adjust R<sub>BIASMAX</sub> (R15) and R<sub>APCSET</sub> (R16) until the desired laser bias current is achieved (refer to the note in the *Applications Information* section of the MAX3663 data sheet).
- 10) Adjust R<sub>MODSET</sub> (R14) until the desired laser-modulation current is achieved.

**Note:** See the *Adjustment and Control Descriptions* table.

#### Optical Setup

For optical operation, the electrical APC test circuit must be disabled. For optical evaluation of the MAX3663, configure the EV kit as described in the *Component Modifications for Optical Configuration* table:

- 1) Shunt JU4 to ground to enable the output.
- 2) Connect a TO-style header laser and monitor diode (Figure 1) as follows:
  - Keeping the leads to the laser diode as short as possible, connect the laser diode on the component side of the board between R20 and V<sub>CC</sub> with the cathode connected to R20 and the anode connected to V<sub>CC</sub>.
  - Connect the monitor diode on the underside of the board with the anode connected to the MAX3663's MD pin and the cathode connected to V<sub>CC</sub>.

**Note:** When performing resistance checks, manually set the ohmmeter to a high range to avoid forward biasing the on-chip ESD protection diodes.

- 3) Shunt JU2 to R14. Adjust R14, the MOD (R<sub>MODSET</sub>) potentiometer, for maximum resistance between pins 2 and 3 (test point 5 and ground).
- 4) Shunt JU1 to R15. Adjust R15, the BIAS (R<sub>BIASMAX</sub>) potentiometer, for maximum resistance between pins 2 and 3 (test point 4 and ground).
- 5) Shunt JU3 to R16. Adjust R16, the APC (R<sub>APCSET</sub>) potentiometer, for desired optical power. (Refer to the *Design Procedure* section of the MAX3663 data sheet.)
- 6) Power up the board with a +3.3V supply.
- 7) Apply a differential input signal ( $\leq$ 800mV per side) to J1 and J2 (DATA+ and DATA-).
- 8) Attach the laser-diode output to an optical/electrical converter.

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- 9) Adjust R15 until LED D1 is no longer illuminated. Laser power can be monitored at the laser diode with an optical/electrical converter (refer to the note in the *Applications Information* section of the MAX3663 data sheet).
- 10) Adjust R14 until the desired optical amplitude is achieved. Optical amplitude can be observed on an oscilloscope connected to an optical/electrical converter.

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## Adjustment and Control Descriptions

See *Quick Start* first.

COMPONENT	NAME	FUNCTION
D1	APC Fail Indicator LED	Refer to the <i>Design Procedure</i> section of the MAX3663 data sheet. Set the APC current, and then increase the bias current until the LED goes off (the LED is illuminated when the APC loop is open and off when the APC loop is closed).
J3	Electrical Output SMA	Electrical Output. Remove for optical operation.
JU1	RBIASMAX Selector	Selects RBIASMAX resistor. Shunt to supplied potentiometer R15 or to fixed resistor R17.
JU2	RMODSET Selector	Selects RMODSET resistor. Shunt to supplied potentiometer R14 or to fixed resistor R25.
JU3	RAPCSET Selector	Selects RAPCSET resistor. Shunt to supplied potentiometer R16 or to fixed resistor R4.
JU4	OUTPUT DISABLE	Enable/Disable the Output Currents. Shunt to V <sub>CC</sub> to disable the part. Shunt to ground or leave open to enable the part.
R14	RMODSET	Laser Modulation Current Adjustment
R15	RBIASMAX	Laser Bias-Current Adjustment. In open-loop mode, R15 adjusts the laser bias current. In closed-loop operation, R15 adjusts the maximum laser bias current.
R16	RAPCSET	Automatic Power-Control Adjustment. For closed-loop operation, R16 adjusts the monitor-diode current level.
TP1	Fail Indicator Test Point	TTL low level indicates a failure in the APC loop.

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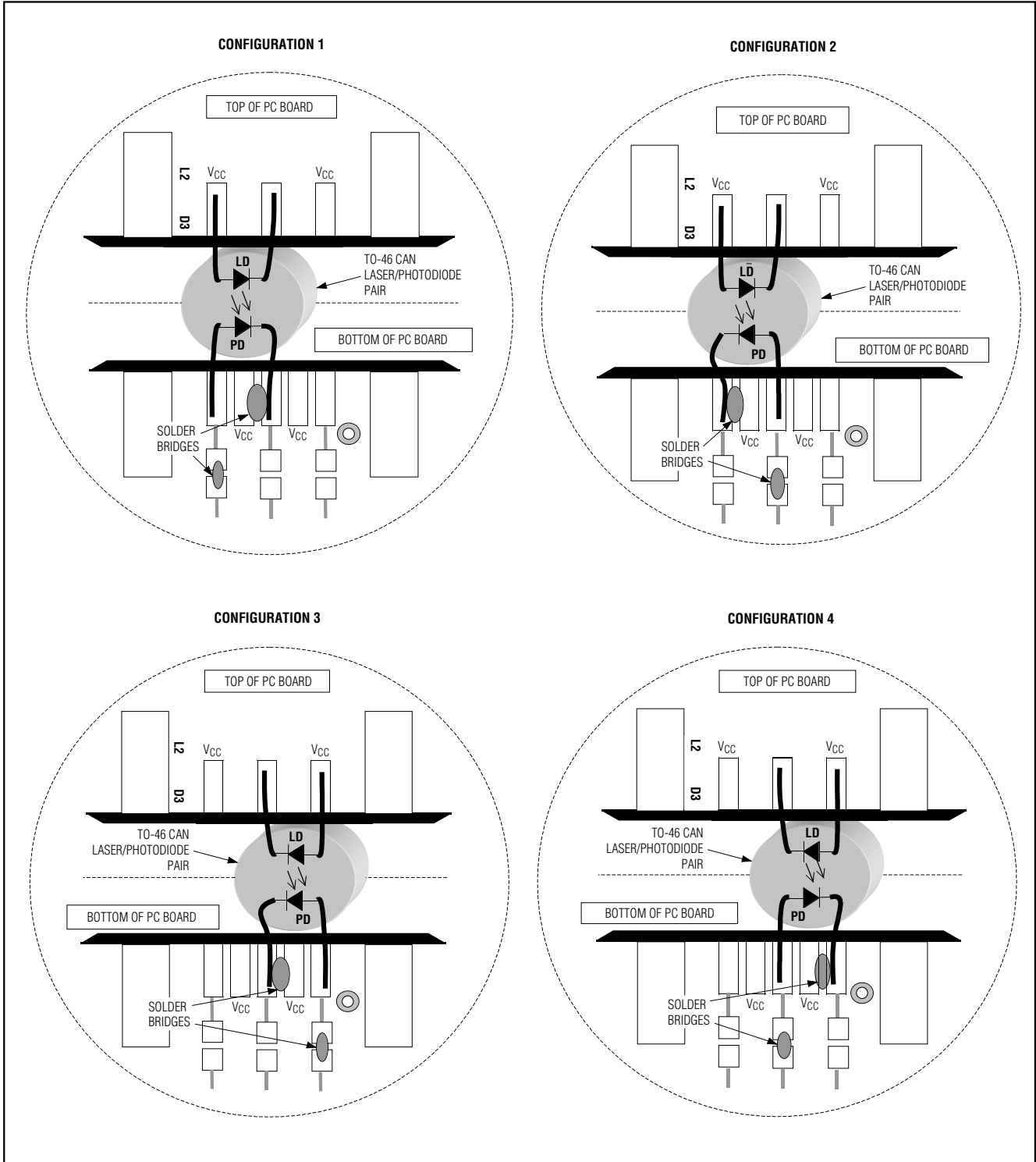


Figure 1. Attachment of Laser Diode/Monitor Diode to MAX3663 EV Kit

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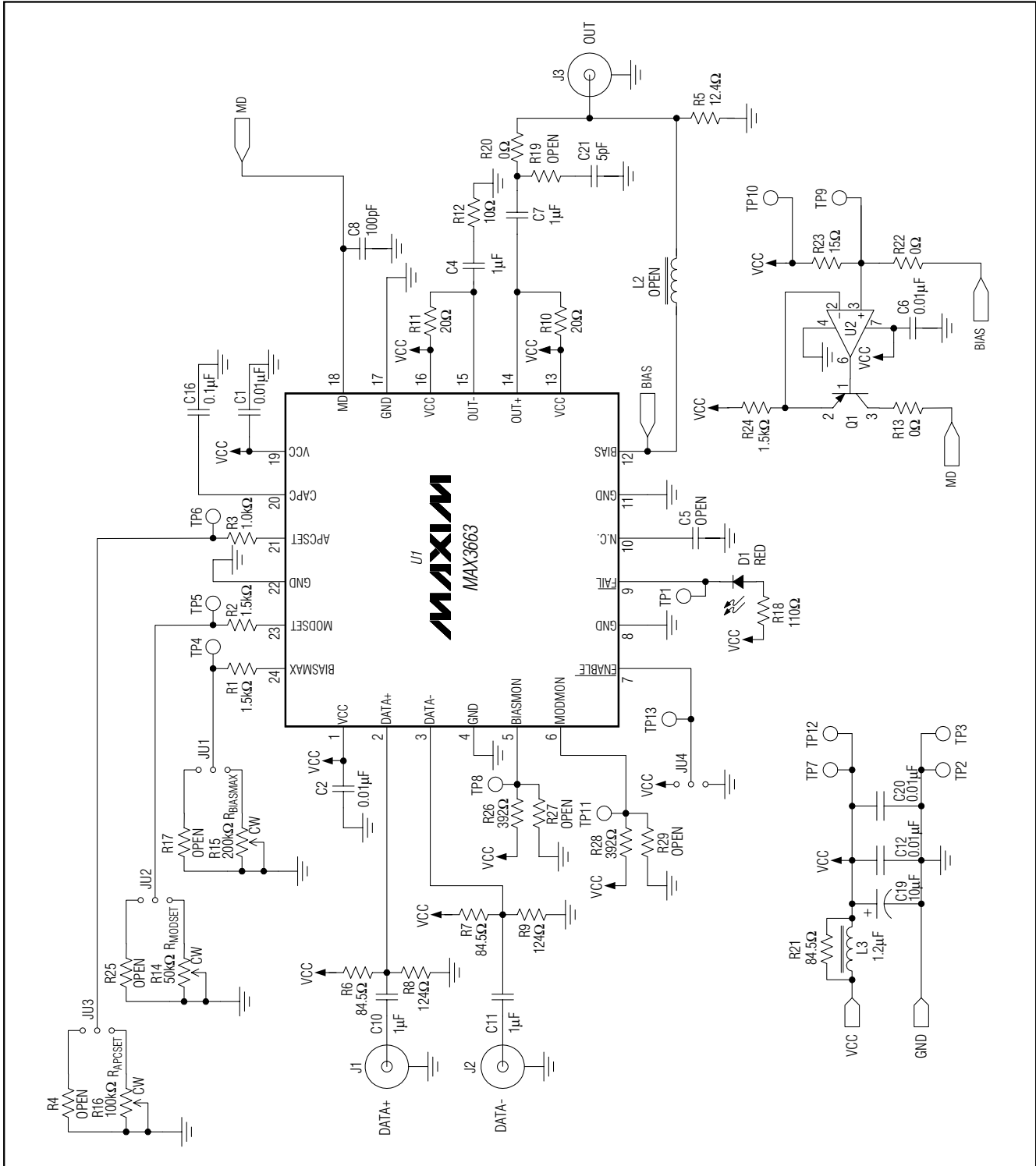


Figure 2. MAX3663 EV Kit Schematic—Electrical Configuration

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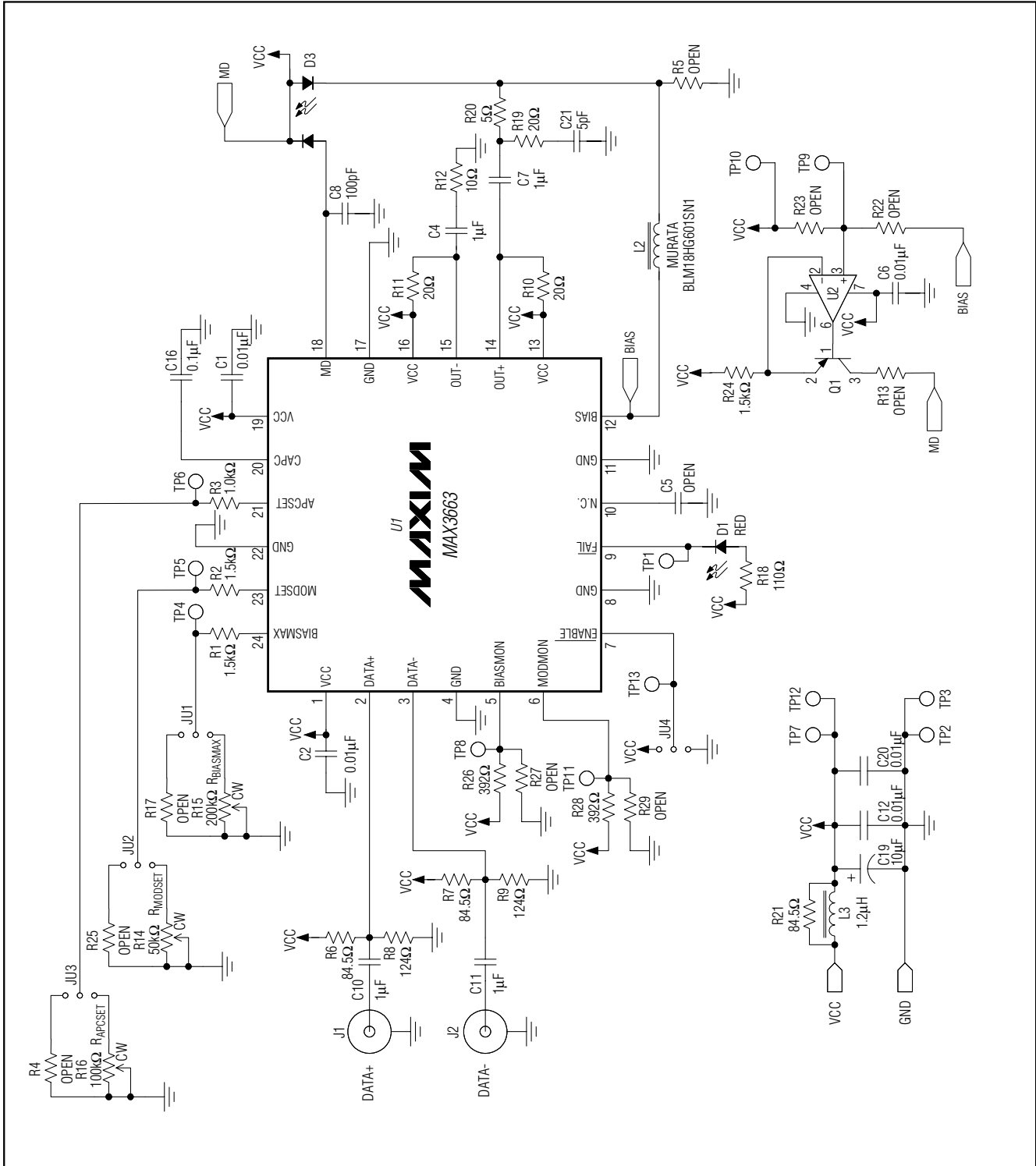


Figure 3. MAX3663 EV Kit Schematic—Optical Configuration

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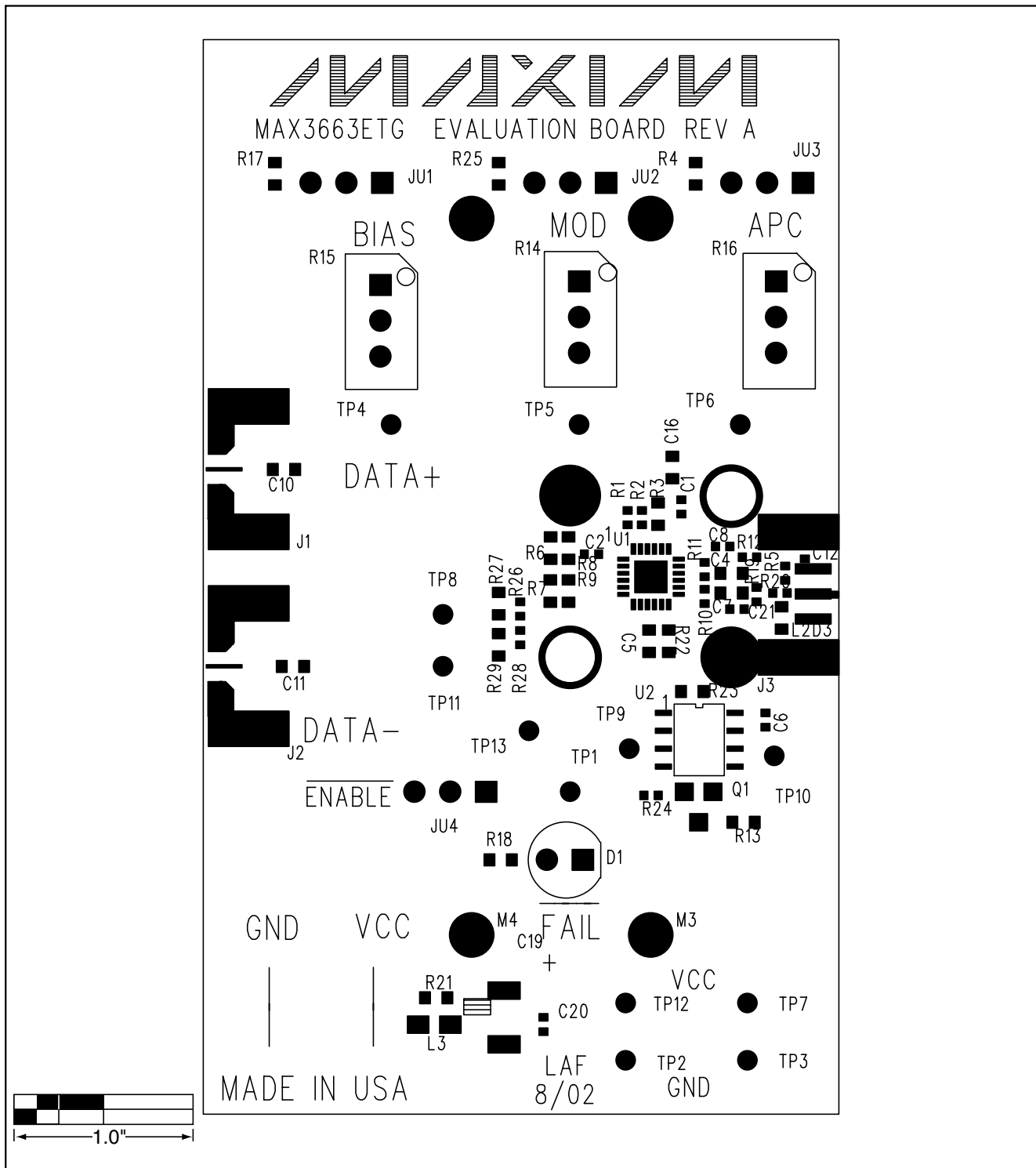


Figure 4. MAX3663 EV Kit Component Placement Guide—Component Side

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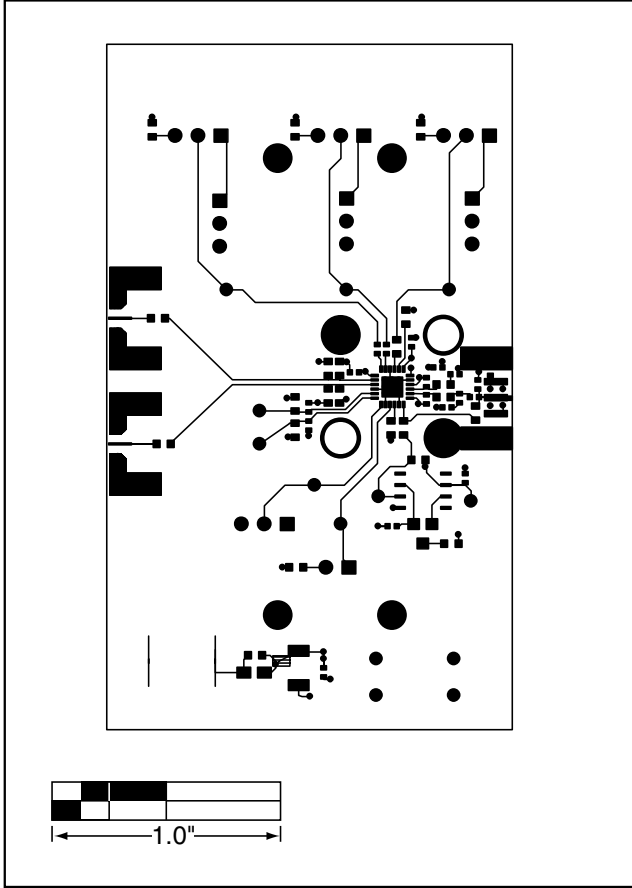


Figure 5. MAX3663 EV Kit PC Board Layout—Component Side

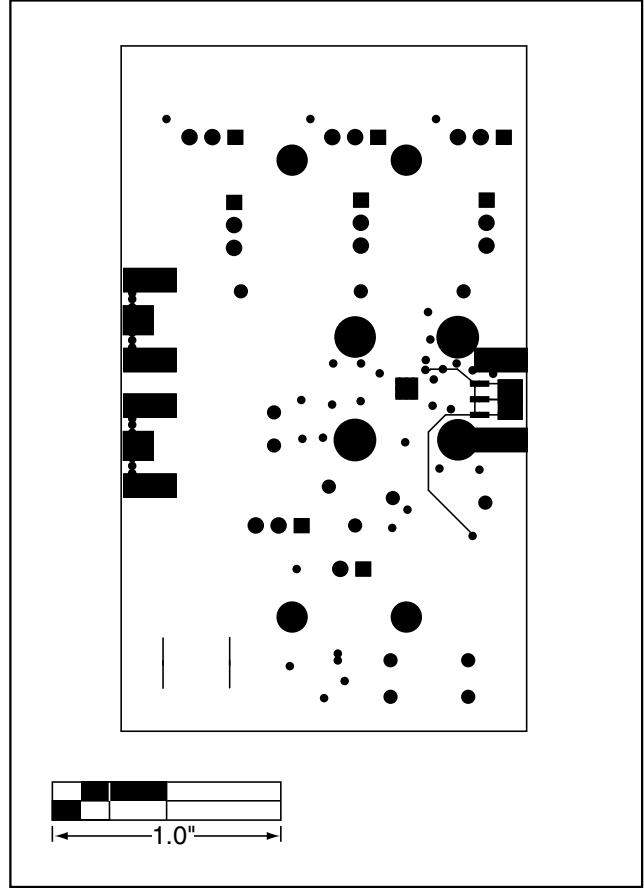


Figure 6. MAX3663 EV Kit PC Board Layout—Solder Side



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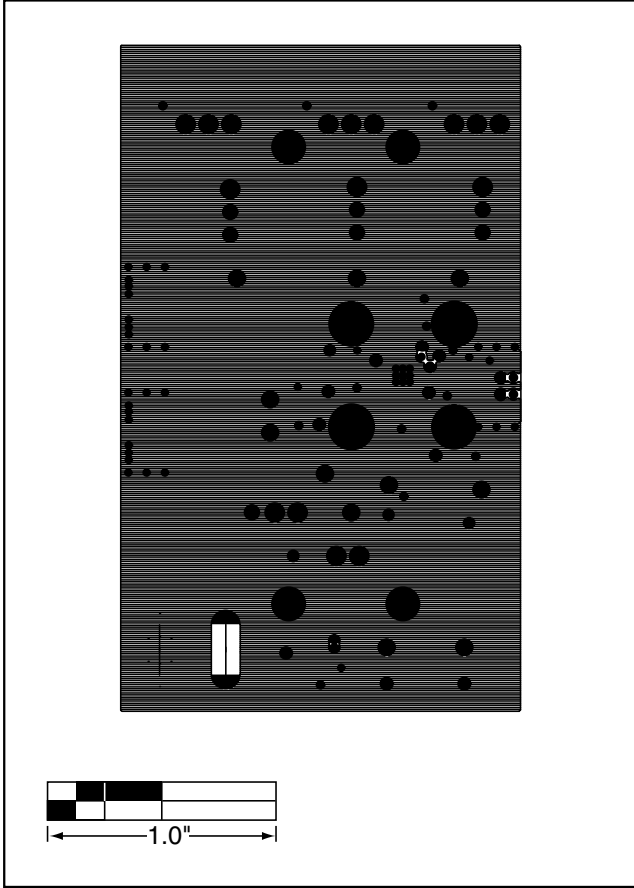


Figure 7. MAX3663 EV Kit PC Board Layout—Ground Plane

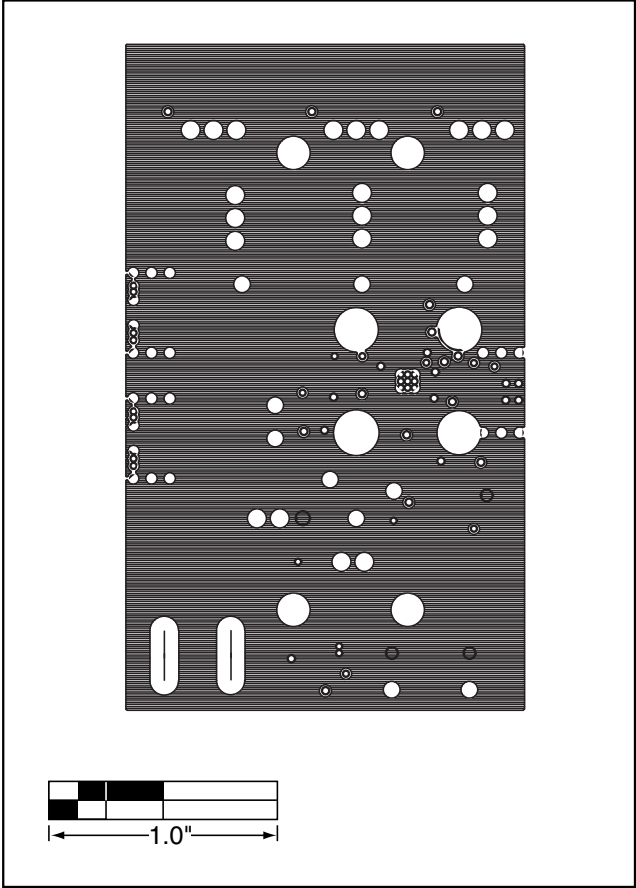


Figure 8. MAX3663 EV Kit PC Board Layout—Power Plane

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