

MAXIM

MAX3793 Evaluation Kit

Evaluate: MAX3793

General Description

The MAX3793 evaluation kit is a fully assembled electrical demonstration kit that provides easy evaluation of the MAX3793 4.25Gbps +3.3V trans-impedance amplifier. The evaluation kit also provides mounting for an optical TO header.

Note that the MAX3793 evaluation kit provides an electrical interface to the IC that is similar, but not exactly the same as a photodiode.

Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	470pF $\pm 20\%$ Bondable Capacitor (25x25)
C12	1	33 μ F $\pm 10\%$ Tantalum Capacitor (B Case)
C13	1	2.2 μ F $\pm 10\%$ Ceramic Capacitor (0805)
C16	1	0.6pF ± 0.05 pF Bondable Capacitor (12x12)
C2, C6, C11, C14	4	0.1 μ F $\pm 10\%$ Ceramic Capacitor (0402)
C3 – C5, C7 – C10	7	1 μ F $\pm 10\%$ Ceramic Capacitor (0402)
J13, J14, T1 – T8	10	TESTPOINT DIGI-KEY 5000K-ND
J1 – J7	7	SMA connectors (edge-mount, tab contact)
JU1, JU2	2	2-pin headers (0.1in centers)
L1	1	4.7 μ H $\pm 5\%$ Inductor (0603)
R11, R12	2	10k Ω $\pm 1\%$ resistor (0402)
R1, R2, R4, R8	4	324 Ω $\pm 1\%$ resistor (0402)
R13	1	49.9 Ω $\pm 1\%$ resistor (0402)
R3, R6	2	4.99k Ω $\pm 1\%$ resistor (0402)
R5, R7	2	53.6 Ω $\pm 1\%$ resistor (0402)
R9, R10	2	0 Ω $\pm 5\%$ resistor (0603)
U1	1	MAX3793E/D DIE
PD1	1	User Supplied 4 or 5 PIN TO CAN

Features

- ◆ Easy +3.3V Electrical Evaluation of the MAX3793
- ◆ Fully Assembled and Tested
- ◆ EV Kit Designed for 50 Ω Interfaces

Ordering Information

PART	TEMP. RANGE	IC PACKAGE
MAX3793EVKIT	-40°C to +85°C	DIE

Component Suppliers

SUPPLIER	PHONE	FAX
AVX	843-444-2863	843-626-3123
Coilcraft	847-639-6400	847-639-1469
Digi-Key	218-681-6674	218-681-3380
EF Johnson	402-474-4800	402-474-4858
Murata	415-964-6321	415-964-8165

Note: Please indicate that you are using the MAX3793 when ordering from these suppliers.

Quick Start

Procedure

- 1) Connect a signal source to J1 (IN). Set the signal amplitude to 350mV_{P-P} (Corresponding to 500 μ A_{P-P} current into the TIA). Set the data rate to 4.25Gbps.
- 2) Apply 250 μ A to the DC_IN input (TP1) using a DC current source to emulate the DC component of the input signal. A voltage source connected from TP1 to GND may be used if a DC current source is not available.
- 3) Connect OUT1+ (J3) and OUT1- (J2) to the 50 Ω inputs of a high-speed oscilloscope.
- 4) Install the shunt on JU1 to enable the average current monitor.
- 5) Connect a +3.3V supply to VCC (J13) and ground to GND (J14).
- 6) The differential signal at the oscilloscope should be approximately 240mV_{P-P}.

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Detailed Description

The MAX3793 accepts a DC-coupled input from a high-speed photodiode, for optical modulation amplitudes ranging from -20dBm to 0dBm. The MAX3793 evaluation board facilitates characterization of the MAX3793 TIA with or without a photodiode. The user must assemble the TO header sections, if used.

DIE Mount Section

The DIE mount section provides photodiode emulation using a simplified electrical photodiode model. The model provides a 50Ω electrical input termination, resistors that convert the high speed input voltage to high speed current. A DC path is provided to model the average photodiode current.

4 and 5 Pin TO Header Layout

The TO header assembly layout provides a user-assembled interface for evaluation of 4 and 5 pin TO headers. (See the MAX3793 datasheet for a suggested TO header layout.)

Photodiode Emulation

Use the following procedure to emulate the high-speed current signal generated by a photodiode:

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

Calculate the average current (I_{AVE} in Amps) as follows:

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

where ρ is photodiode responsivity in A/W

Calculate the AC signal current (I_{INPUT} in A_{P-P}) as follows, and adjust the signal generator to obtain it:

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

For example, to emulate a signal with an average power of -18dBm and an extinction ratio of 8 on the electrical circuit.

-18dBm optical power will produce 8.7μA of average input current (assume a photodiode responsivity of 0.55A/W). Install a current meter between an external DC source and the DC_IN (TP1) test point. Adjust the source to provide 8.7μA.

The signal amplitude is $2I_{AVE}(r_e - 1)/(r_e + 1) = 13.5\mu A$. To generate this current through the 648Ω series input resistors and the 50Ω internal resistance, set the signal source to produce an input of 10mV_{P-P} on the IN (J1) input.

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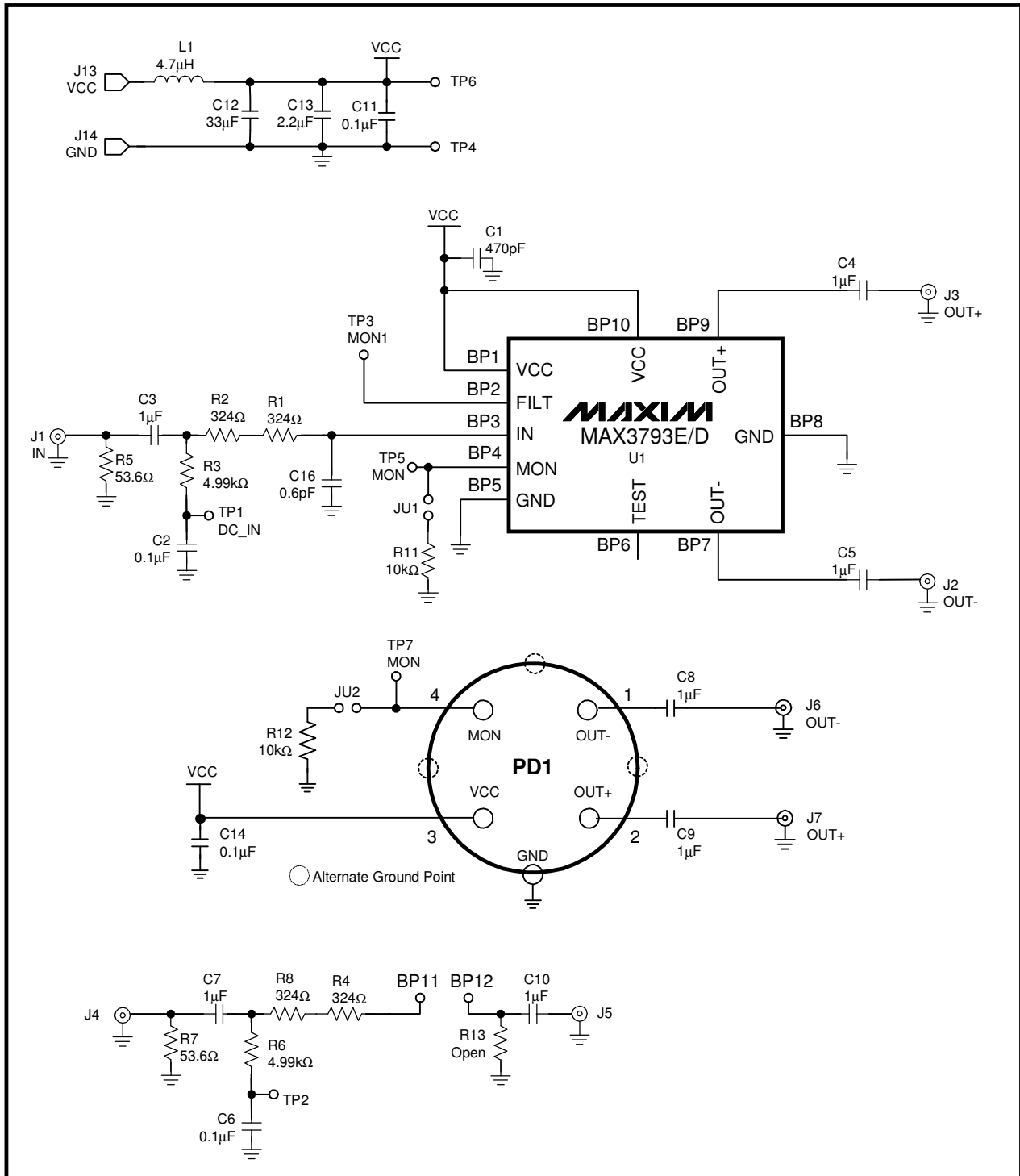


Figure 1. MAX3793 EV Kit Schematic Diagram

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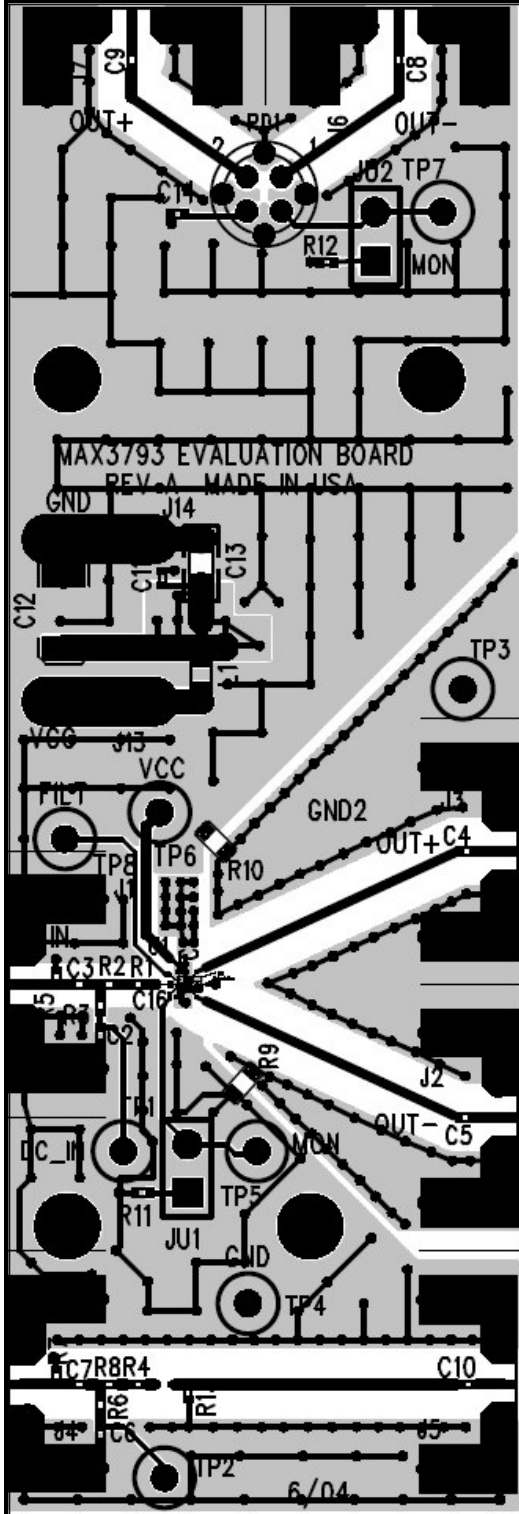


Figure 2. MAX3793 EV Kit Component Placement Guide - Component Side

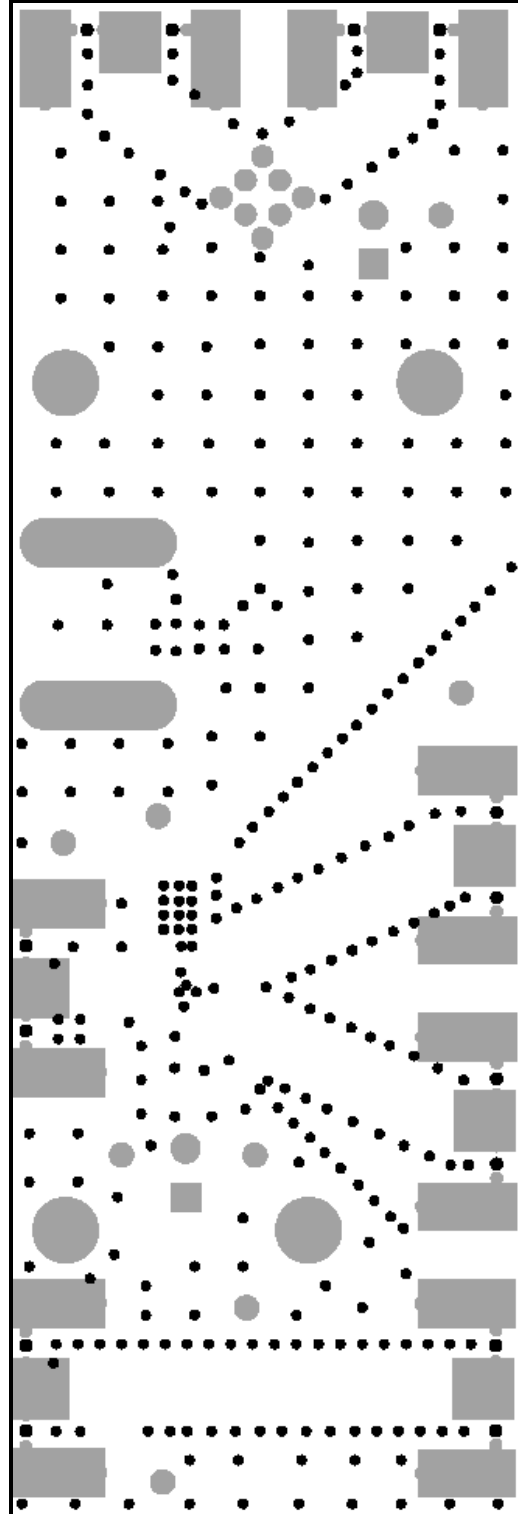


Figure 3. MAX3793 EV Kit PC Board Layout - Solder Side

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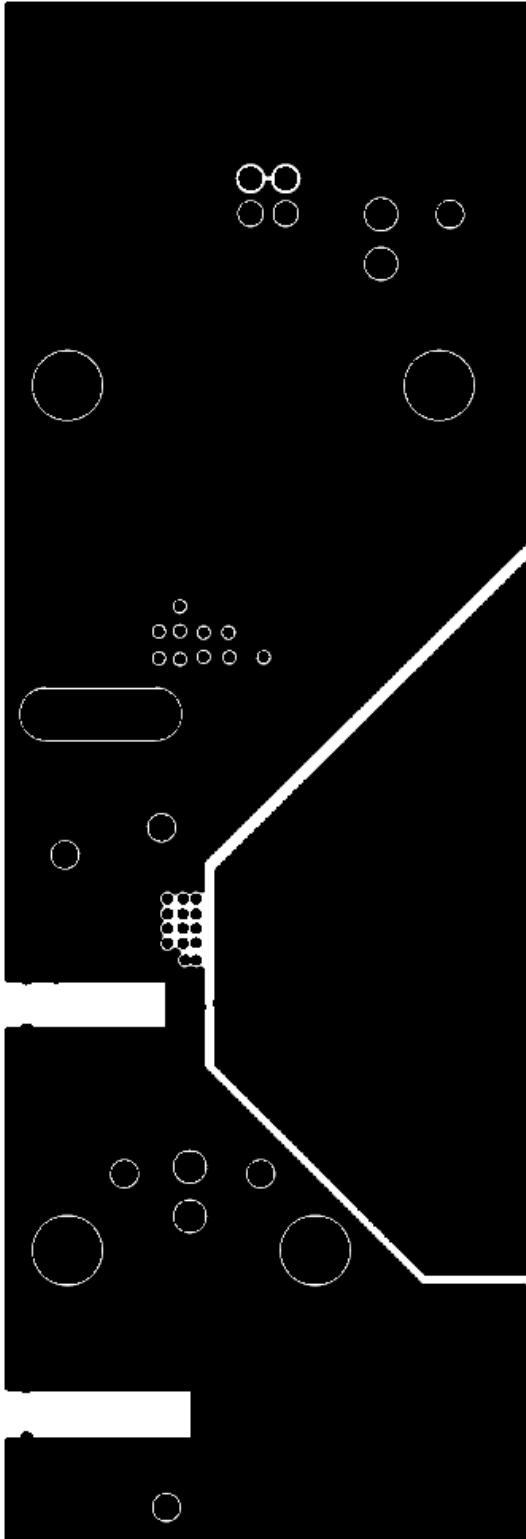


Figure 4. MAX3793 EV Kit PC Board Layout - Ground Plane

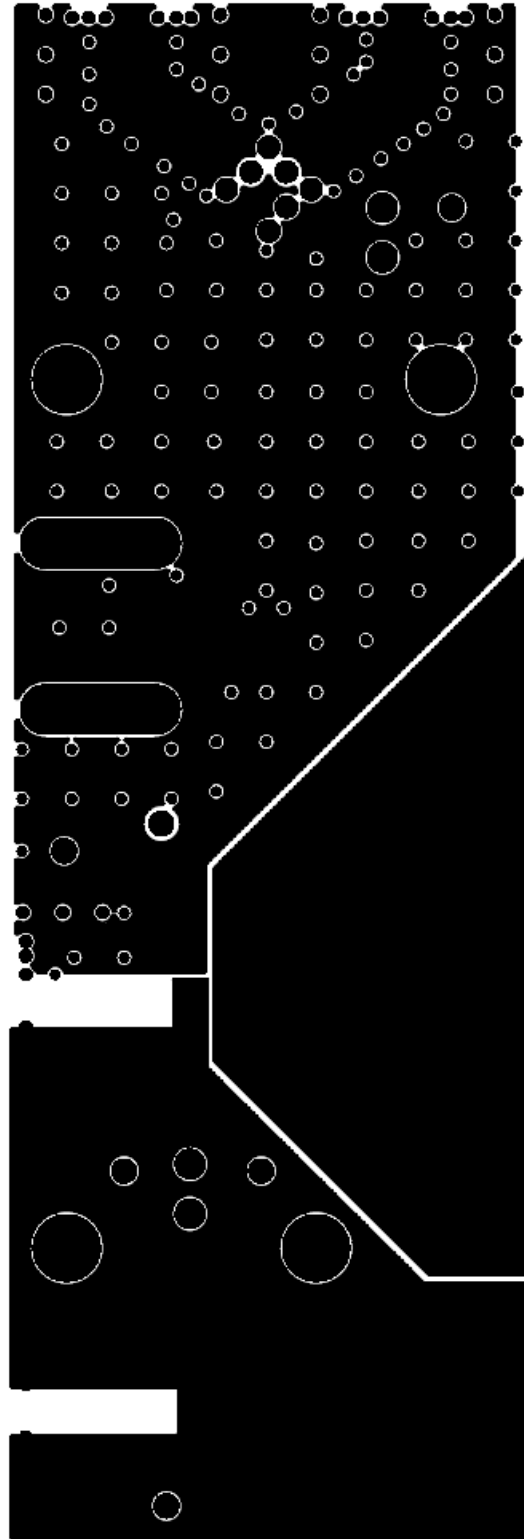


Figure 5. MAX3793 EV Kit PC Board Layout - Power Plane

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