

# MAXIM

## MAX3277 Evaluation Kit

### General Description

The MAX3277 evaluation kit (EV kit) allows complete evaluation of the MAX3277 transimpedance amplifier. The EV kit includes a circuit that emulates the high-speed, zero-to-peak current input signal that would be produced by a photodiode. The kit also includes a calibration circuit that allows accurate bandwidth and jitter measurements.

The MAX3277 EV kit is fully assembled and tested.

### Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	0.01 $\mu$ F $\pm$ 10% ceramic capacitor (0402)
C2	1	10 $\mu$ F $\pm$ 10% tantalum capacitor
C5–C9	5	0.1 $\mu$ F $\pm$ 10% ceramic capacitors (0402)
C11, C12	2	1000pF $\pm$ 10% ceramic capacitors (0402)
J1–J5	5	SMA connectors, edge mount (round contact)
J8	1	1 $\times$ 2-pin header (0.1in center)
L1	1	56nH inductor Coilcraft 0805CS-560XKBC
R1, R6	2	49.9 $\Omega$ $\pm$ 1% resistors (0402)
R2, R5	2	1k $\Omega$ $\pm$ 1% resistors (0402)
R3, R4, R7, R8	4	499 $\Omega$ $\pm$ 1% resistors (0402)
TP1, TP2, J6, J7	4	Test points
U1	1	MAX3277U/D die
None	1	MAX3277 EV kit circuit board
None	1	MAX3275/MAX3277 data sheet

### Features

- ◆ Fully Assembled and Tested
- ◆ Includes Photodiode Emulation Circuit
- ◆ Includes Calibration Circuit for Accurate Bandwidth and Jitter Measurements

### Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX3277EVKIT	0°C to +85°C	MAX3277UID Chip On-Board

### Component Suppliers

SUPPLIER	PHONE	FAX
AVX	843-444-2863	843-626-3123
Coilcraft	408-224-8566	408-224-6304
Murata	415-964-6321	415-964-8165
Ventel	800-950-8365	512-794-0087

**Note:** Please indicate that you are using the MAX3277 when contacting these component suppliers.

Evaluates: MAX3277

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## Quick Start

- 1) Connect a signal source to IN (J3). Set the signal amplitude to 50mV<sub>P-P</sub> (corresponding to 50μA<sub>P-P</sub> current into the TIA). This may require attenuation between the source and the MAX3277 EV kit. The signal should have a data rate of up to 2.125Gbps.
- 2) Apply 30μA to TP1 using a constant current source to emulate the DC component of the input signal.
- 3) Connect OUT+ (J1) and OUT- (J2) to the 50Ω inputs of a high-speed oscilloscope.
- 4) Remove the shunt from jumper J8 to enable DC cancellation loop.
- 5) Connect a 3.3V supply to the VCC terminal (J6) and ground to the GND terminal (J7).
- 6) The differential signal at the oscilloscope should be approximately 165mV<sub>P-P</sub>.

## Detailed Description

The MAX3277 EV kit allows characterization of the MAX3277 TIA without a photodiode. The MAX3277 is designed to accept a DC-coupled input from a high-speed photodiode. Diode currents can have 10μA<sub>P-P</sub> to 2mA<sub>P-P</sub> AC current with a DC component from 5μA to 1mA. The high-speed current source of the photodiode is emulated on the EV kit using separate AC and DC paths. The AC signal is supplied from a standard 50Ω lab source that delivers power to an on-board termination resistor. A current is then generated from the voltage signal by a resistor with low stray capacitance. The effect of the DC photodiode current can be emulated by a current source at TP1. An isolation resistor prevents the DC source from loading the AC path.

The values of the series-resistive elements, R4 and R7, have been selected carefully so that the bandwidth of the transimpedance amplifier is not altered. Surface-

mount resistors have parasitic capacitance that reduces their impedance at frequencies above 1GHz. Changes to R4 and R7 must be evaluated using the calibration network.

## Photodiode Emulation

Use the following procedure to emulate 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 Amps). Set the DC current at TP1 to  $I_{AVE}$ :

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

( $\rho$  = photodiode responsivity in A/W)

- 3) Calculate the AC signal current ( $I_{AC}$ ) and adjust the signal generator to obtain it:

$$I_{AC} = 2I_{AVE} \left( \frac{r_e - 1}{r_e + 1} \right)$$

**For example:** To emulate a photodiode with an average power of -16dBm and an extinction ratio of 10:

- 1) -16dBm optical power will produce 25μA of average input current (assume photodiode responsivity of 1A/W). Set the DC current input to 25μA at TP1.
- 2) The AC signal current is  $2I_{AVE} (r_e - 1)/(r_e + 1) = 41\mu A$ . To generate this current through the 1000Ω input resistors, set the signal source to produce an output level of 41μA (1000Ω) = 41mV<sub>P-P</sub>.

# MAX3277 Evaluation Kit

Evaluates: MAX3277

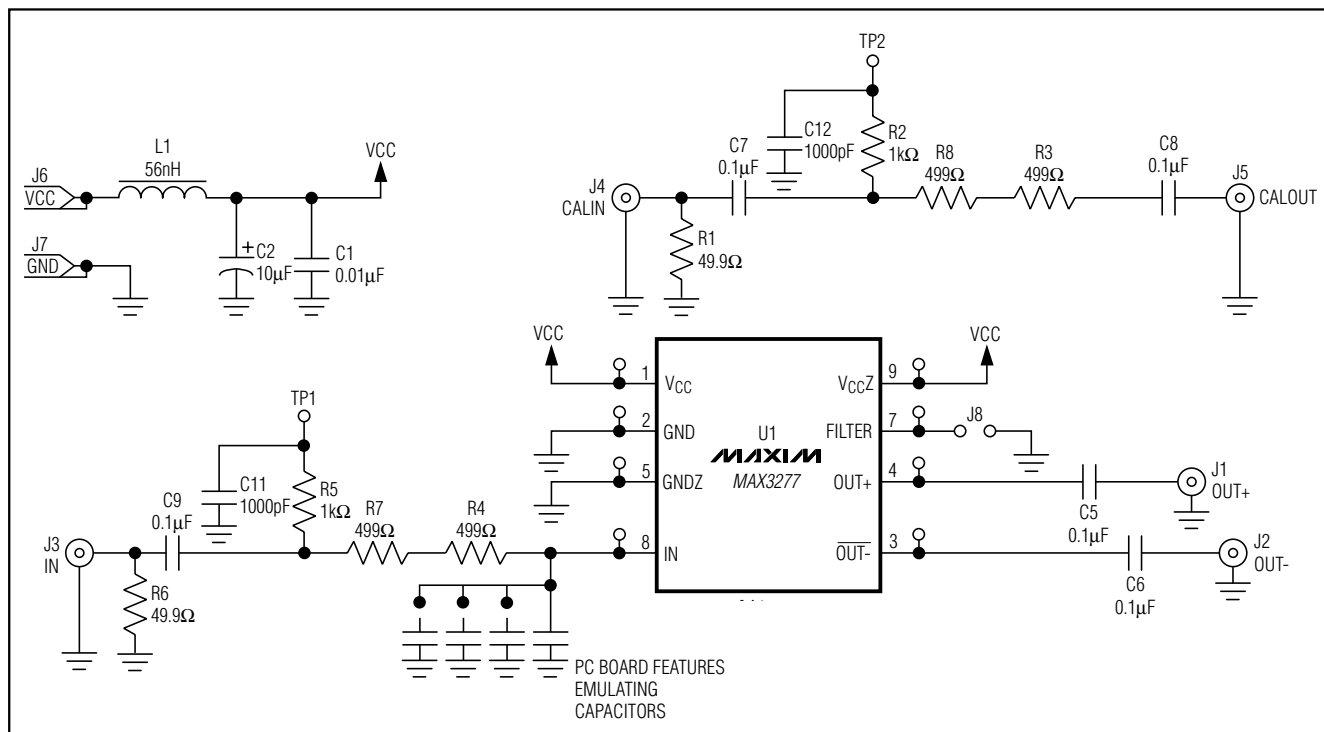


Figure 1. MAX3277 EV Kit Schematic

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Evaluates: MAX3277

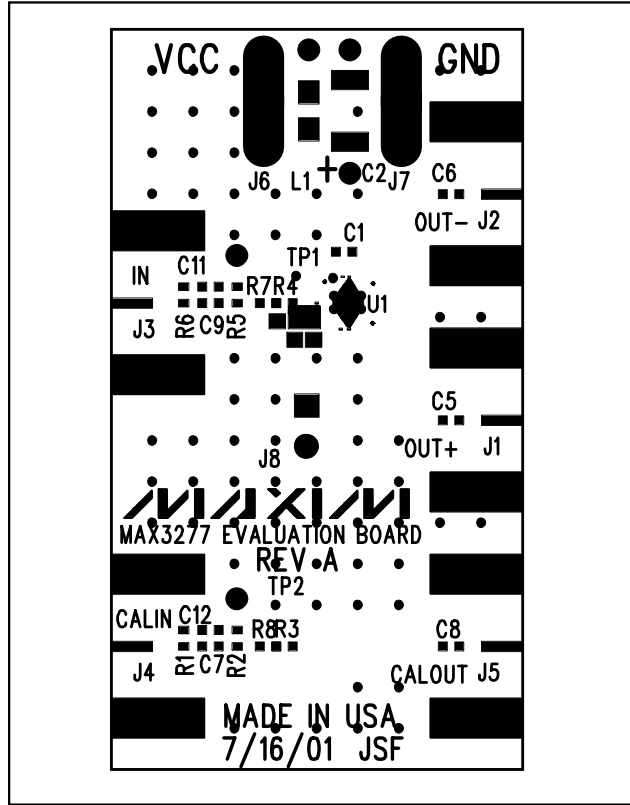


Figure 2. MAX3277 EV Kit Component Placement Guide—Component Side

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Evaluates: MAX3277

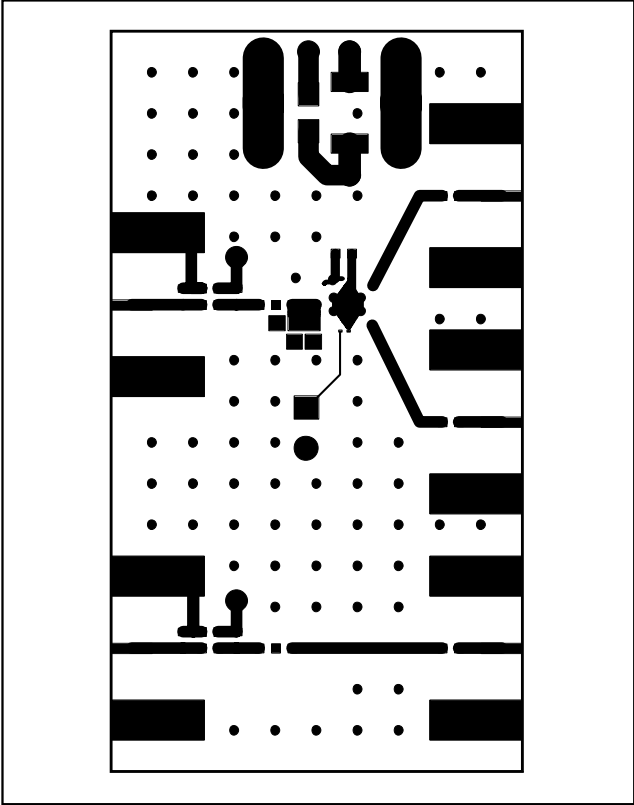


Figure 3. MAX3277 EV Kit PC Board Layout—Component Side

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Evaluates: MAX3277

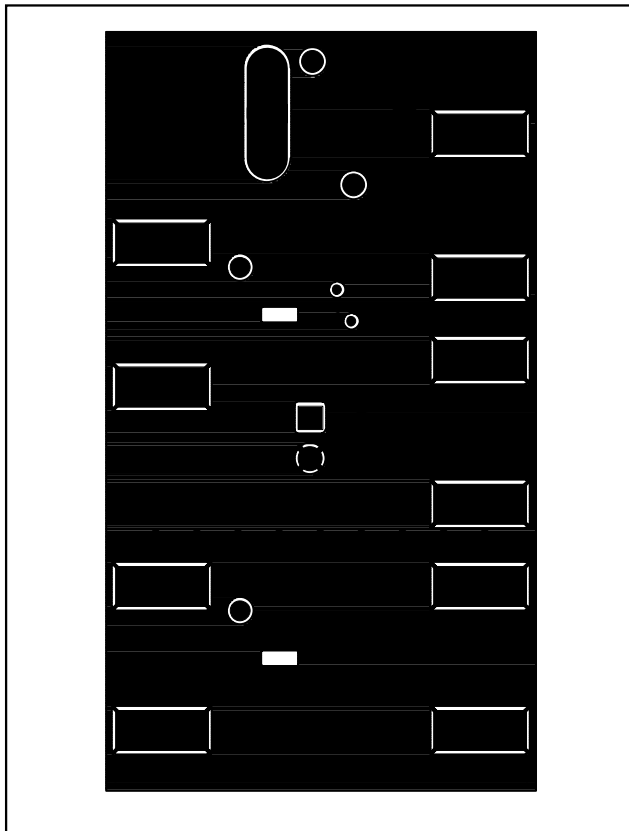


Figure 4. MAX3277 EV Kit PC Board Layout—Solder Side

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Evaluates: MAX3277

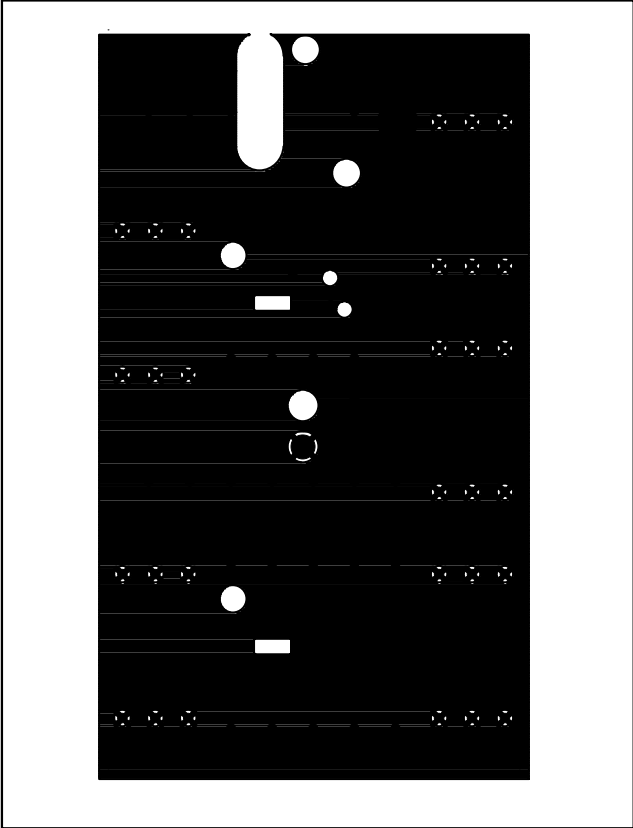


Figure 5. MAX3277 EV Kit PC Board Layout—Ground Plane

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**Evaluates: MAX3277**

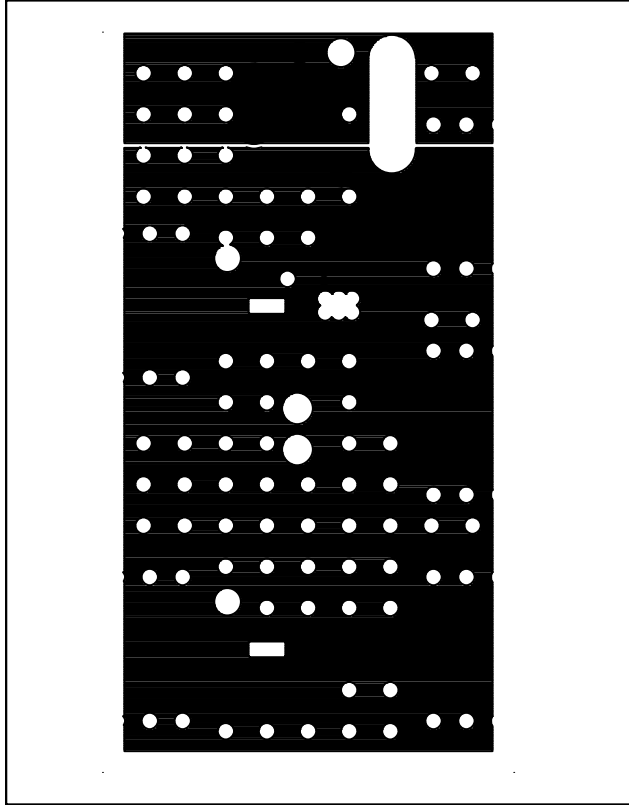


Figure 6. MAX3277 EV Kit PC Board Layout—Power Plane

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