MAXIM
MAX2130 Evaluation Kit

Evaluates: MAX2130

General Description

The MAX2130 evaluation kit (EV kit) simplifies evaluation of the MAX2130 broadband, high-dynamic range, two-output amplifier for digital TV tuner applications. The EV kit is fully assembled and tested, allowing simple evaluation of all device functions. All signal ports utilize SMA connectors and 50Ω-to-75Ω impedance transformation networks, providing a convenient interface to 50Ω RF test equipment.

Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	1000pF ceramic capacitor (0603)
C2, C3	2	47pF ceramic capacitors (0603)
C4–C7	4	0.1µF ceramic capacitors (0603)
C9	1	10µF, 10V tantalum capacitor, AVX TAJB106M010
C10	0	Not installed
L1	1	Ferrite bead, Murata BLM11A221SG (0603)
R1, R5, R7	3	43.2Ω ±1% resistors (0603)
R2, R4, R6	3	86.6Ω ±1% resistors (0603)
R3	1	15kΩ ±1% resistor (0603)

Test Equipment Required

This section lists the test equipment required for evaluating the MAX2130:

• One power supply capable of providing 150mA of supply current at +5V.

• One HP8648C RF signal generator or equivalent (50Ω) sine-wave source capable of delivering at least +10dBm of output power from 44MHz to 878MHz.

• One HP8561E RF spectrum analyzer or equivalent high-sensitivity spectrum analyzer.

• Two 50Ω SMA cables (RG-58A/U or equivalent).

• One 50Ω SMA terminator

• Optional: digital multimeters (DMMs) to monitor DC supply voltage and supply current.

Features

♦ **Easy Evaluation of MAX2130**

♦ **All Critical Peripheral Components Included**

♦ **SMA Input and Output Signal Connectors**

♦ **50Ω-to-75Ω Impedance Transformation Networks**

♦ **Fully Assembled and Tested**

Ordering Information

PART	TEMP. RANGE	IC PACKAGE
MAX2130EVKIT	-40°C to +85°C	8 µMAX-EP*

*Exposed Paddle

Connections and Setup

1) **DC Power Supply:** Set the power-supply voltage to +5V. Turn the power supply off and connect it to the VCC and GND connections of the EV kit. If desired, place an ammeter in series with the power supply to measure supply current and a voltmeter in parallel with the VCC and GND connections to measure the supply voltage delivered to the device.

2) **RF Signal Source:** Set the signal generator to an RF frequency of 500MHz at an output power level of -14.3dBm. Turn the output of the signal generator off. Connect the signal generator to the IN port SMA connector using a 50Ω SMA cable. Because the IN port of the MAX2130 is internally matched to 75Ω, and the test equipment is a 50Ω source, an external matching network converts the load seen by the signal generator to 50Ω. The power loss of this impedance-matching network is approximately 5.7dB. The actual power delivered to the IN port of the MAX2130 is -14.3dBm - 5.7dBm = -20dBm.

3) **Spectrum Analyzer:** Connect the spectrum analyzer to the OUT1 port SMA connector using a 50Ω SMA cable. Set the center frequency of the spectrum analyzer to 500MHz, the span to 1MHz, and the reference level to 0dBm. Because the MAX2130 is intended to drive a 75Ω load, a 75Ω-to-50Ω impedance-matching network is included between OUT1 of the MAX2130 and the OUT1 port of the EV kit. The power loss of this impedance-matching network is approximately 5.7dB.

4) **50Ω Termination:** Terminate the OUT2 port SMA connector with a 50Ω terminator.

For price, delivery, and to place orders, please contact Maxim Distribution at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

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Analysis

Turn on the power supply and signal generator. The ammeter, if used, should read approximately 90mA. The gain of the IN-to-OUT1 path of the MAX2130 is typically 15.0dB. Applying -14.3dBm to the IN SMA connector, and taking into account the loss of the 50Ω-to-75Ω matching networks, the spectrum analyzer should show an output power of approximately -10.7dBm at the OUT1 port of the EV kit.

$$P_{OUT} = P_{IN} - \text{match loss} + \text{gain} - \text{match loss}$$

$$P_{OUT} = -14.3\text{dBm} - 5.7\text{dB} + 15.0\text{dB} - 5.7\text{dB} = -10.7\text{dBm}$$

Be sure to take into account cable losses when calculating power gain.

To evaluate the IN-to-OUT2 path gain, connect the spectrum analyzer to the OUT2 port SMA connector using a 50Ω SMA cable and terminate the OUT1 port with the 50Ω terminator.

The gain of the IN-to-OUT2 path of the MAX2130 is typically 8.7dB. Applying -14.3dBm to the IN SMA connector, and taking into account the loss of the 50Ω-to-75Ω matching networks, the spectrum analyzer should show an output power of approximately -17.0dBm at the OUT2 port of the EV kit.

$$P_{OUT} = P_{IN} - \text{match loss} + \text{gain} - \text{match loss}$$

$$P_{OUT} = -14.3\text{dBm} - 5.7\text{dB} + 8.7\text{dB} - 5.7\text{dB} = -17.0\text{dBm}$$

Once again, be sure to take into account cable losses when calculating power gain.

Adjust resistor R3 to trade off between the linearity and supply current. Please refer to the MAX2130 data sheet for more information.

Layout and Bypassing

Good PC board layout is an essential aspect of RF circuit design. The MAX2130 EV board can serve as a guide for layout of your board. Keep PC board trace lengths as short as possible to minimize parasitics and losses. Keep bypass capacitors as close to the device as possible with low-inductance connections to the ground plane.
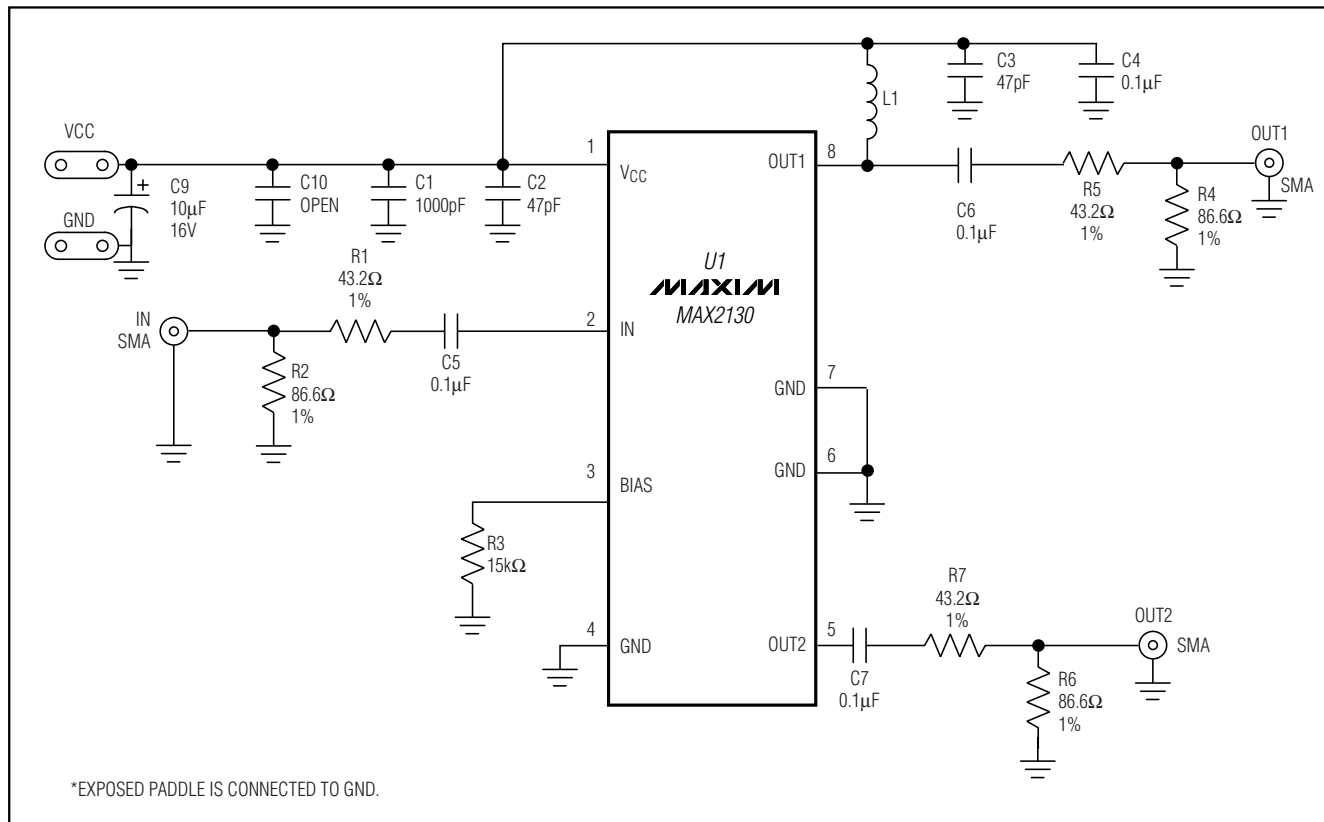
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Figure 1. MAX2130 EV Kit Schematic
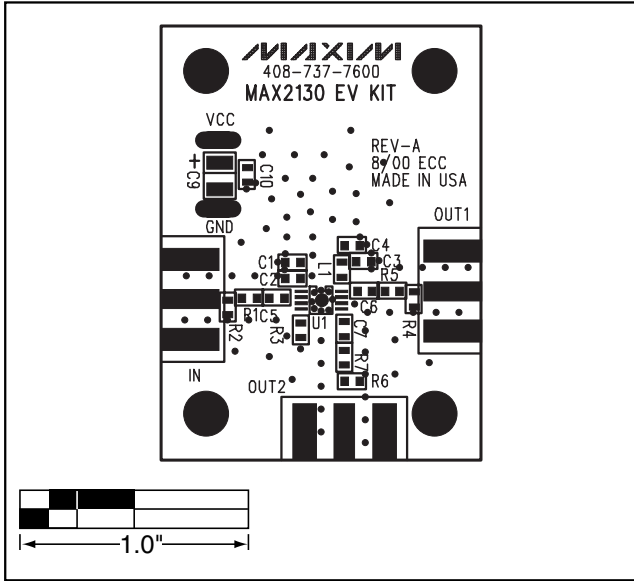
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Figure 2. MAX2130 EV Kit Component Placement Guide—Component Side
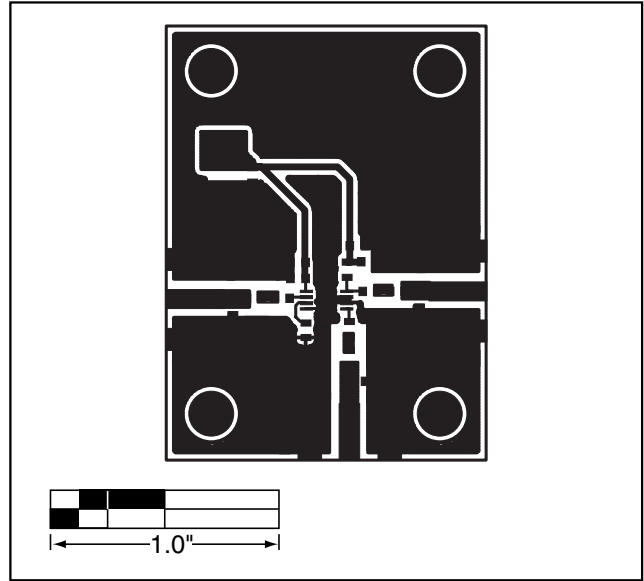

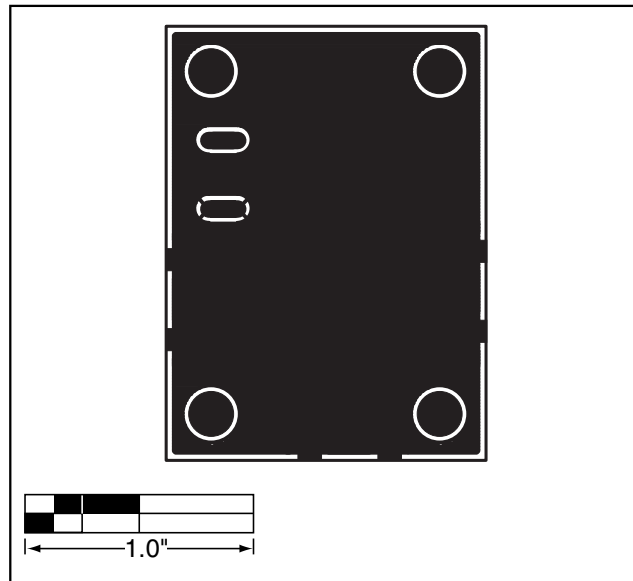Figure 3. MAX2130 EV Kit PC Board Layout—Component Side

Figure 4. MAX2130 EV Kit PC Board Layout—Ground Plane

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