



# MAX9622 Evaluation Kit

## General Description

The MAX9622 evaluation kit (EV kit) provides a proven design to evaluate the MAX9622 single, precision, high-bandwidth op amp in a 5-pin SC70 package. The EV kit circuit is preconfigured as a differential amplifier providing an overall gain of 10V/V. BNC connectors are provided for the board input/output, and the components have pads that accommodate 0603 packages, making them easy to solder and replace. The EV kit also evaluates the MAX9623. Request a free sample of the MAX9623 IC from the factory when ordering the MAX9622 EV kit.

## Features

- ◆ 50MHz Gain-Bandwidth (GBW) Product
- ◆ 2.0V to 5.25V Supply Range
- ◆ Preconfigured for 10V/V Gain
- ◆ Also Evaluates the MAX9623 (IC Replacement)
- ◆ 0603 Components
- ◆ Fully Assembled and Tested

## Ordering Information

PART	TYPE
MAX9622EVKIT+	EV Kit

+Denotes lead(Pb)-free and RoHS compliant.

## Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	4.7 $\mu$ F $\pm$ 10%, 6.3V X5R ceramic capacitor (0603) Murata GRM188R60J475K TDK C1608X5R0J475K
C2	1	1 $\mu$ F $\pm$ 10%, 25V X5R ceramic capacitor (0603) Murata GRM188R61E105K TDK C1608X5R1E105M
C3	1	0.1 $\mu$ F $\pm$ 10%, 50V X7R ceramic capacitor (0603) Murata GRM188R71H104K TDK C1608X7R1H104K
C4, C5, C6	0	Not installed, ceramic capacitors (0603)

DESIGNATION	QTY	DESCRIPTION
IN, OUT	2	50 $\Omega$ BNC PCB vertical-mount connectors
R1	1	49.9 $\Omega$ $\pm$ 1% resistor (0603)
R2, R3, R8	0	Not installed, resistors—PCB short (0603)
R4, R5	2	1k $\Omega$ $\pm$ 1% resistors (0603)
R6, R7	2	10k $\Omega$ $\pm$ 1% resistors (0603)
U1	1	High-bandwidth single op amp (5 SC70) Maxim MAX9622AXK+
—	1	PCB: MAX9622 EVALUATION KIT+

Evaluates: MAX9622/MAX9623

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## Component Suppliers

SUPPLIER	PHONE	WEBSITE
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
TDK Corp.	847-803-6100	www.component.tdk.com

**Note:** Indicate that you are using the MAX9622 when contacting these component suppliers.

## Quick Start

### Required Equipment

- 2.0V to 5.5V, 10mA DC power supply (VCC)
- Oscilloscope
- Signal generator

### Procedure

The MAX9622 EV kit is fully assembled and tested. Follow the steps below to verify board operation.

**Caution: Do not turn on the power supply until all connections are completed.**

- 1) This circuit requires a supply voltage of 2.0V to 5.5V. For evaluation purposes, connect a 5.0V supply to the pad labeled VCC.
- 2) Connect the power-supply ground to the GND PCB pad.
- 3) Connect the OUT BNC connector to an oscilloscope.
- 4) Turn on the power supply.
- 5) Apply a signal at the IN BNC connector.
- 6) Verify the output signal on the oscilloscope.

## Detailed Description of Hardware

The MAX9622 EV kit provides a proven layout for the MAX9622 precision, high-bandwidth op amp. The EV kit circuit is preconfigured as a differential amplifier providing an overall gain of 10V/V. The signal is amplified through the op amp with the gain set by resistors R5 and R7. The device accepts a single-supply voltage from 2.0V to 5.5V.

### Op-Amp Configuration

#### Differential Amplifier Gain

The EV kit comes configured as a differential amplifier with  $G = 10$ . Gain is set by a ratio of R7 to  $(R5 + R3)$  if

$R6 = R7$ ,  $R4 = R5$ , and  $R2 = R3$ . The gain is simply given by the following equation (eq. 1):

$$V_{OUT} = IN \times \frac{R7}{R5 + R3} \quad \text{eq. 1}$$

The EV kit comes installed with  $R6 = R7 = 10\text{k}\Omega$ ,  $R4 = R5 = 1\text{k}\Omega$ , and  $R2 = R3 = 0\Omega$ . IN is the input voltage applied at the IN BNC connector. Modify the resistors as required for different gains.

For a fully differential configuration, the tolerance of resistors used greatly impacts the CMRR characteristics of the board. Use 0.1% resistors for enhanced common-mode rejection. To interface to a fully differential input signal with a common mode other than the EV kit ground, cut the trace connection between the power ground and the circuit ground.

### Noninverting Gain

The EV kit can also be used to provide a simple noninverting gain to the input signal. Remove R6 and change R4 to a  $0\Omega$  resistor. The gain is then given by the following equation (eq. 2):

$$V_{OUT} = V_{IN} \times \left[ 1 + \frac{R7}{R5 + R3} \right] \quad \text{eq. 2}$$

where R7 is installed as a  $10\text{k}\Omega$  resistor, R5 is installed as a  $1\text{k}\Omega$  resistor, R3 is a  $0\Omega$  PCB short, and  $V_{IN}$  is the input voltage at IN+ of the op amp. The EV kit provides a gain of 11V/V.

### Capacitive Loads

Some applications require driving large capacitive loads. To improve the stability of the amplifier in such cases, replace resistor R8 with a suitable resistor value to improve amplifier phase margin by isolating the load capacitor. The R8/C4 lowpass filter can also be used as an anti-alias filter or to limit amplifier output noise by reducing its output bandwidth.



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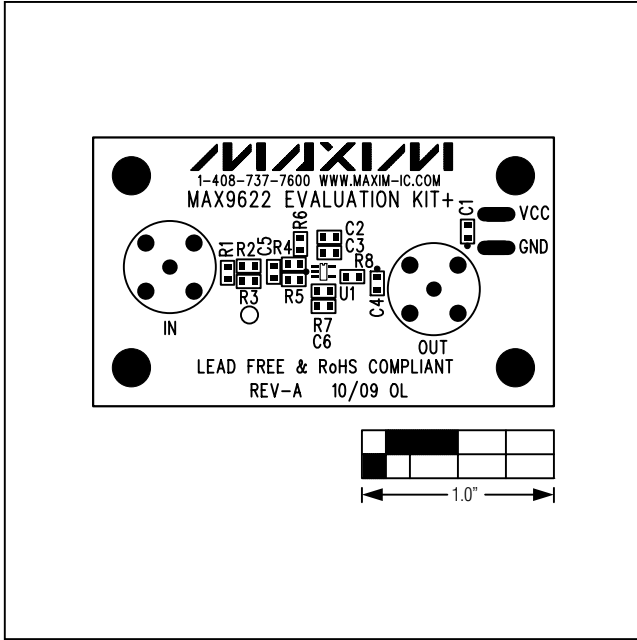


Figure 2. MAX9622 EV Kit Component Placement Guide—Component Side

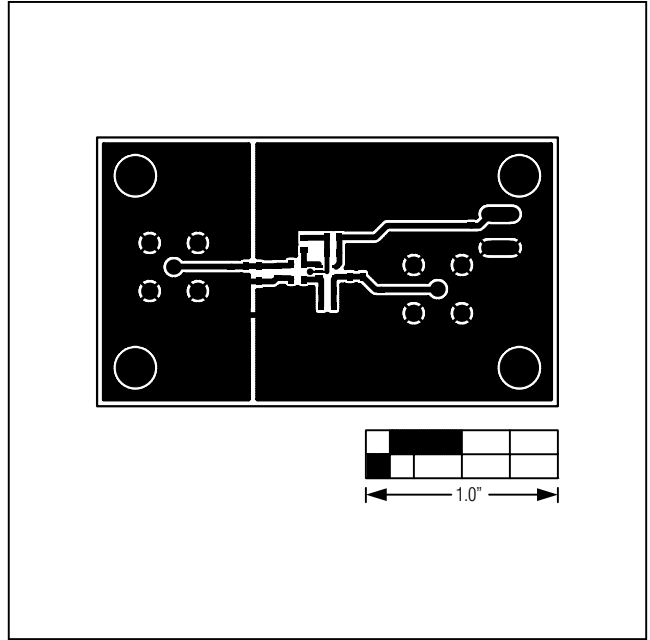


Figure 3. MAX9622 EV Kit PCB Layout—Component Side

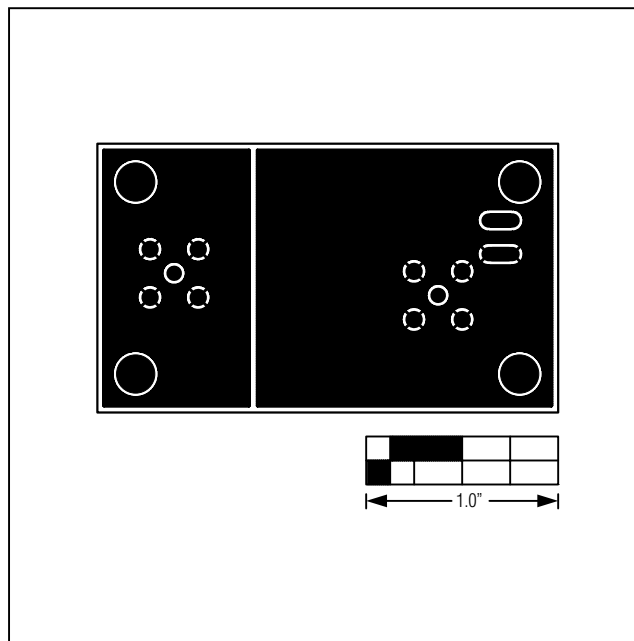


Figure 4. MAX9622 EV Kit PCB Layout—Solder Side

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## Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	11/09	Initial release	—

**Evaluates: MAX9622/MAX9623**

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