



MAX9610 Evaluation Kit

General Description

The MAX9610 evaluation kit (EV kit) provides a proven design to evaluate the MAX9610 high-side current-sense amplifier, which offers precision accuracy specifications of V_{OS} less than $500\mu V$ (max) and gain error less than 0.5% (max). This EV kit demonstrates the MAX9610 in a tiny $1mm \times 1.5mm \times 0.8mm$, 6-pin μDFN package. The MAX9610 is also available in a 5-pin SC70, but that package is not compatible with this EV kit.

The MAX9610 EV kit PCB comes with a MAX9610FELT+ installed, which is the 50V/V gain version. Contact the factory for free samples of the pin-compatible MAX9610TELT+ and MAX9610HELT+, which are 25V/V and 100V/V gain versions, respectively.

Features

- ◆ Precision Current Monitoring
- ◆ Multiple Fixed Gains Available
 - 25V/V (MAX9610T)
 - 50V/V (MAX9610F)
 - 100V/V (MAX9610H)
- ◆ 1.6V to 5.5V Input Common-Mode Range
- ◆ Lead(Pb)-Free and RoHS Compliant
- ◆ Proven PCB Layout
- ◆ Fully Assembled and Tested

Ordering Information

PART	TYPE
MAX9610EVKIT+	EV Kit

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

Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	1 μF $\pm 10\%$, 50V X7R ceramic capacitor (1206) Murata GRM31MR71H105KA TDK C3216X7R1H105K
C2	0	Not installed, ceramic capacitor (0603)
R1	1	0.05 Ω $\pm 0.5\%$, 0.5W 4-terminal current-sense resistor (1206) Ohmite LVK12R050DER

DESIGNATION	QTY	DESCRIPTION
TP1, TP2	2	Test points
U1	1	Precision current-sense amplifier (6 μDFN) Maxim MAX9610FELT+
—	1	PCB: MAX9610 Evaluation Kit+

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
Ohmite Mfg. Co.	866-964-6483	www.ohmite.com
TDK Corp.	847-803-6100	www.component.tdk.com

Note: Indicate that you are using the MAX9610 when contacting these component suppliers.

Evaluates: MAX9610F/MAX9610H/MAX9610T

MAX9610 Evaluation Kit

Quick Start

Recommended Equipment

- MAX9610 EV kit
- 3.6V, 1A DC power supply
- An electronic load capable of sinking 800mA (e.g., HP 6060B)
- Two digital voltmeters

Procedure

The MAX9610 EV kit is fully assembled and tested. Follow the steps below to verify the board operation.

Caution: Do not turn on power supply or the electronic load until all connections are completed.

- 1) Connect the negative terminal of the 3.6V supply to the GND pad closest to the VBATT pad and the positive terminal of the supply to the VBATT pad.
- 2) Set the electronic load to sink 800mA.
- 3) Connect the electronic load's negative terminal to the GND pad closest to the bottom of the EV kit and the positive terminal to the LOAD pad.
- 4) Connect the first voltmeter across test points TP1 and TP2 to measure V_{SENSE} .
- 5) Connect the second voltmeter across the closest GND pad and the VOUT pad.
- 6) Turn on the power supply.
- 7) Turn on the electronic load.
- 8) Verify that the first voltmeter reading is approximately 40mV and the second voltmeter is approximately 2V.

Detailed Description of Hardware

The MAX9610 evaluation kit (EV kit) evaluates the MAX9610 unidirectional high-side, current-sense amplifier, which features a 1.6V to 5.5V input common-mode range. The input range is excellent for monitoring the current of a single-cell lithium-ion (Li+) battery, which at full charge is 4.2V, typically 3.6V in normal use, and less than 2.9V when ready to be recharged.

Applying the V_{RS+} Supply and the Load

The EV kit is installed with a MAX9610FELT+, which has a gain of 50V/V. The current-sense resistor (R_{SENSE}) value is 0.05Ω with $\pm 0.5\%$ tolerance. The V_{OUT} is given by:

$$V_{OUT} = I_{LOAD} \times R_{SENSE} \times A_V$$

where A_V is the gain and I_{LOAD} is the current load applied to the device.

Normal operating V_{RS+} and V_{RS-} range is 1.6V to 5.5V.

Measuring the Load Current

The load current is measured as a voltage drop (V_{SENSE}) across an external sense resistor. This voltage is then amplified by the current-sense amplifier and presented at the V_{OUT} pad. Like all differential amplifiers, the output voltage has two components of error (an offset error and a gain error). The offset error affects accuracy at low currents and the gain error affects accuracy at large currents—both errors affect accuracy at intermediate currents. By minimizing both offset and gain errors, accuracy is optimized over a wide dynamic range.

Evaluating Other Gain Versions

The MAX9610 EV kit can also be used to evaluate other gain versions of the MAX9610 (25V/V or 100V/V = T or H suffix, respectively). Replace U1 of the MAX9610 EV kit with a different version of the MAX9610.

MAX9610 Evaluation Kit

Evaluates: MAX9610F/MAX9610H/MAX9610T

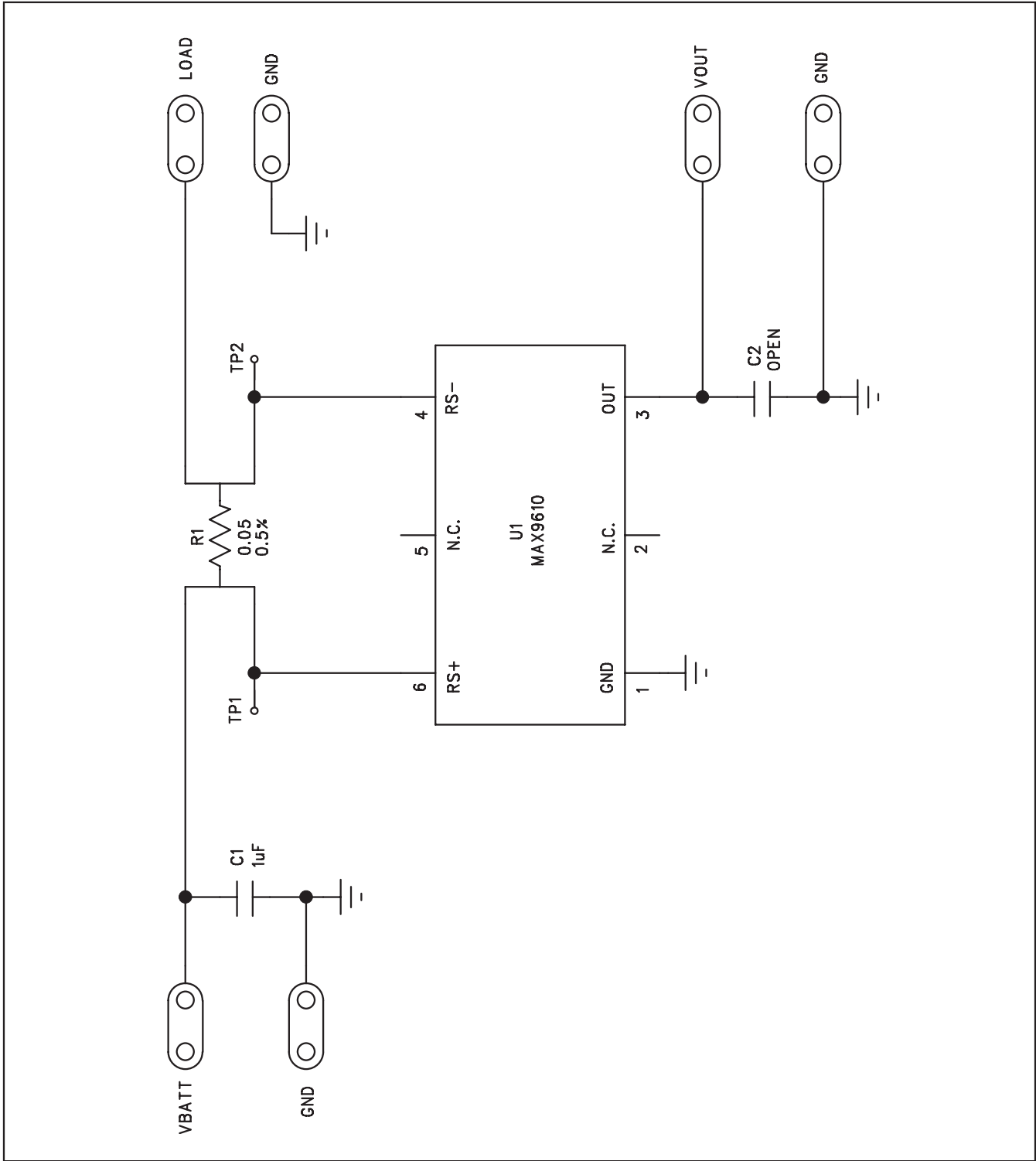


Figure 1. MAX9610 EV Kit Schematic

MAX9610 Evaluation Kit

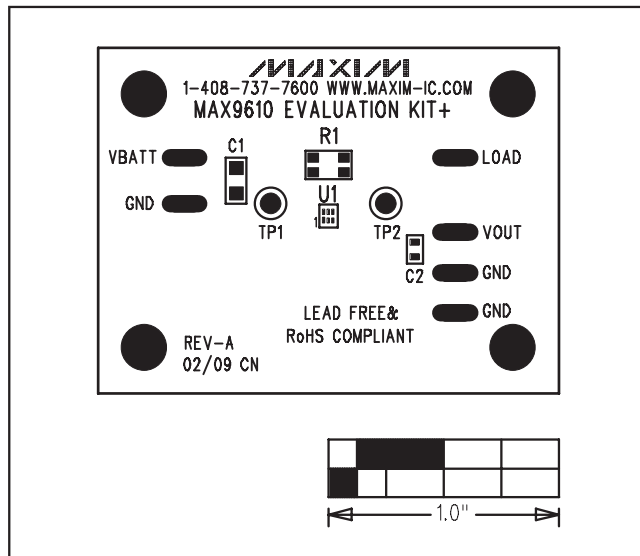


Figure 2. MAX9610 EV Kit Component Placement Guide—Component Side

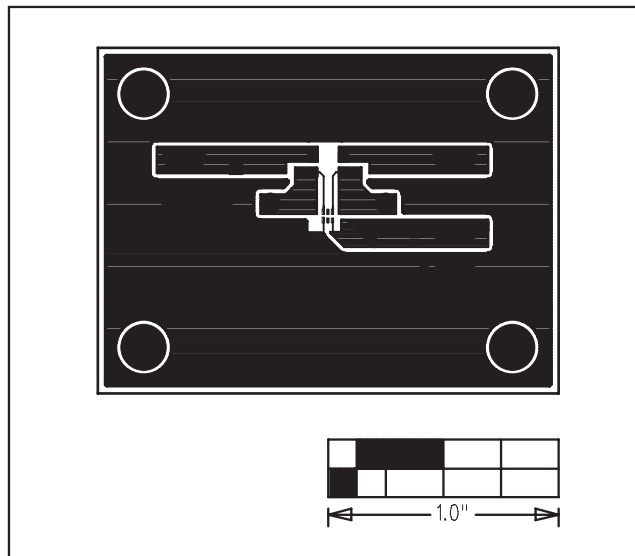


Figure 3. MAX9610 EV Kit PCB Layout—Component Side

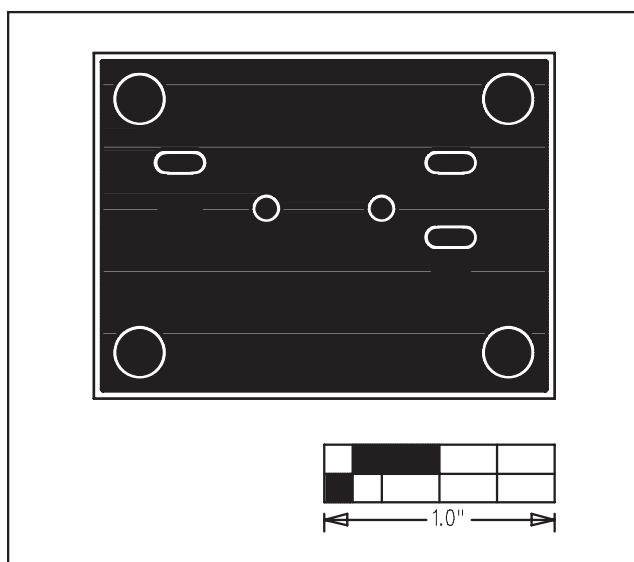


Figure 4. MAX9610 EV Kit PCB Layout—Solder Side

Maxim cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim product. No circuit patent licenses are implied. Maxim reserves the right to change the circuitry and specifications without notice at any time.

4 **Maxim Integrated Products, 120 San Gabriel Drive, Sunnyvale, CA 94086 408-737-7600**

© 2009 Maxim Integrated Products

Maxim is a registered trademark of Maxim Integrated Products, Inc.