MAX9643 Evaluation Kit
Evaluates: MAX9643

General Description

The MAX9643 evaluation kit (EV kit) is an assembled and tested PCB used to evaluate the MAX9643 60V, high-speed, precision, unidirectional current-sense amplifier. The EV kit features a wide -1.5V to 60V input common-mode range.

Features

- **-1.5V to 60V Input Common-Mode Range**
- **Ability to Test with External Sense Voltage**
- **Proven PCB Layout**
- **Fully Assembled and Tested**

Ordering Information appears at end of data sheet.

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2, C5, C7	4	1µF ±10%, 50V X7R ceramic capacitors (0805) Murata GRM21BR71H105K
C3, C4	2	0.1µF ±10%, 50V X7R ceramic capacitors (0603) Murata GRM188R71H104K
C6	0	Not installed, ceramic capacitor (0603)
R1	1	0.1Ω ±1%, 0.5W sense resistor (2010) IRC LRC-LRF2010LF-01-R100-F

DESIGNATION	QTY	DESCRIPTION
R3, R4, R5	0	Not installed, resistors—short (PC trace) (0603)
RS+, RS-	2	Test points
U1	1	60V, high-speed, precision, current-sense amplifier (8 TDFN-EP) Maxim MAX9643TATA+
—	1	PCB: MAX9643 EVALUATION KIT

Component Suppliers

SUPPLIER	PHONE	WEBSITE
IRC, Inc.	361-992-7900	www.irctt.com
Murata Americas	770-436-1300	www.murataamericas.com

Note: *Indicate that you are using the MAX9643 when contacting these component suppliers.*

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at www.maximintegrated.com.

19-5858; Rev 1; 5/15

Quick Start

Recommended Equipment

- MAX9643 EV kit
- 12V, 2A power supply (VBATT)
- 5V power supply (VCC)
- Electronic load capable of sinking 1A
- Digital voltmeter (DVM)

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on power supplies until all connections are completed.**

1) Set the input power supply to 12V and connect the positive terminal to the VBATT PCB pad. Connect the ground of the power supply to the GND PCB pad.
2) Set the VCC power supply to 5V and connect the positive terminal to the VCC PCB pad. Connect the ground of the VCC supply to the GND PCB pad.
3) Set the electronic load to sink 1A.
4) Connect the electronic load's positive terminal to the LOAD PCB pad. Connect the load's ground to the GND PCB pad.
5) Connect the DVM across the OUT and GND PCB pads.
6) Turn on the 5V power supply.
7) Turn on the 12V power supply.
8) Adjust the electronic load current (I_{LOAD}) between 0 and 1A and verify that V_{OUT} is proportional to V_{SENSE}, according to the following equation:

$$V_{OUT} = V_{SENSE} \times A_V$$

where $V_{SENSE} = I_{LOAD} \times R1$ and $A_V = 2.5V/V$.

Detailed Description of Hardware

The MAX9643 EV kit evaluates the MAX9643 unidirectional high-side, current-sense amplifier, ideal for a wide variety of high-performance industrial power-supply applications. The current-sense amplifier provides an analog voltage output proportional to the load current through the external sense resistor (R1). Various test points and test pads are provided for ease of evaluation.

Monitoring the Load Current

The EV kit monitors the load current through a current-sense resistor by converting the sense voltage to a voltage output (V_{OUT}). High-side current monitoring does not interfere with the ground path of the load being measured, making it useful for a variety of high-reliability systems. The output voltage is given by the following equations:

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

$$V_{OUT} = V_{SENSE} \times A_V$$

where I_{LOAD} is the current load applied to the device, R_{SENSE} is the current-sense resistor R1, and A_V is the device gain.

Applications

The device has an internal charge pump to generate a negative voltage rail to bias both the input stage and output stage of the current-sense amplifier. The EV kit uses a 1µF flying capacitor (C1), which is placed as close as possible to the CP1 and CP2 pins of the device to minimize loop area.

The use of a negative voltage rail for its input stage allows the input common-mode voltage range to extend 1.5V below ground. The internal negative rail also allows the output voltage range to extend down to true ground.

Evaluating the 10V/V Gain Version

To evaluate the EV kit with the 10V/V gain version, replace U1 with the MAX9643UATA+ device.

Additional Features

To evaluate the EV kit with an external sense voltage, cut the trace between the resistor pads (R3 and R4), and connect the external sense voltage directly to the RS+ and RS- test points. Take care to minimize the loop caused when wiring the RS+ and RS- test points to the external sense voltage to reduce noise pickup.

Resistors R3 and R4, when utilized, allow an input differential filter or an input common-mode filter to be designed to study its effects on noise rejection in power electronic circuits, for example. Pads for an output filter (R5/C6) are also available on the PCB.

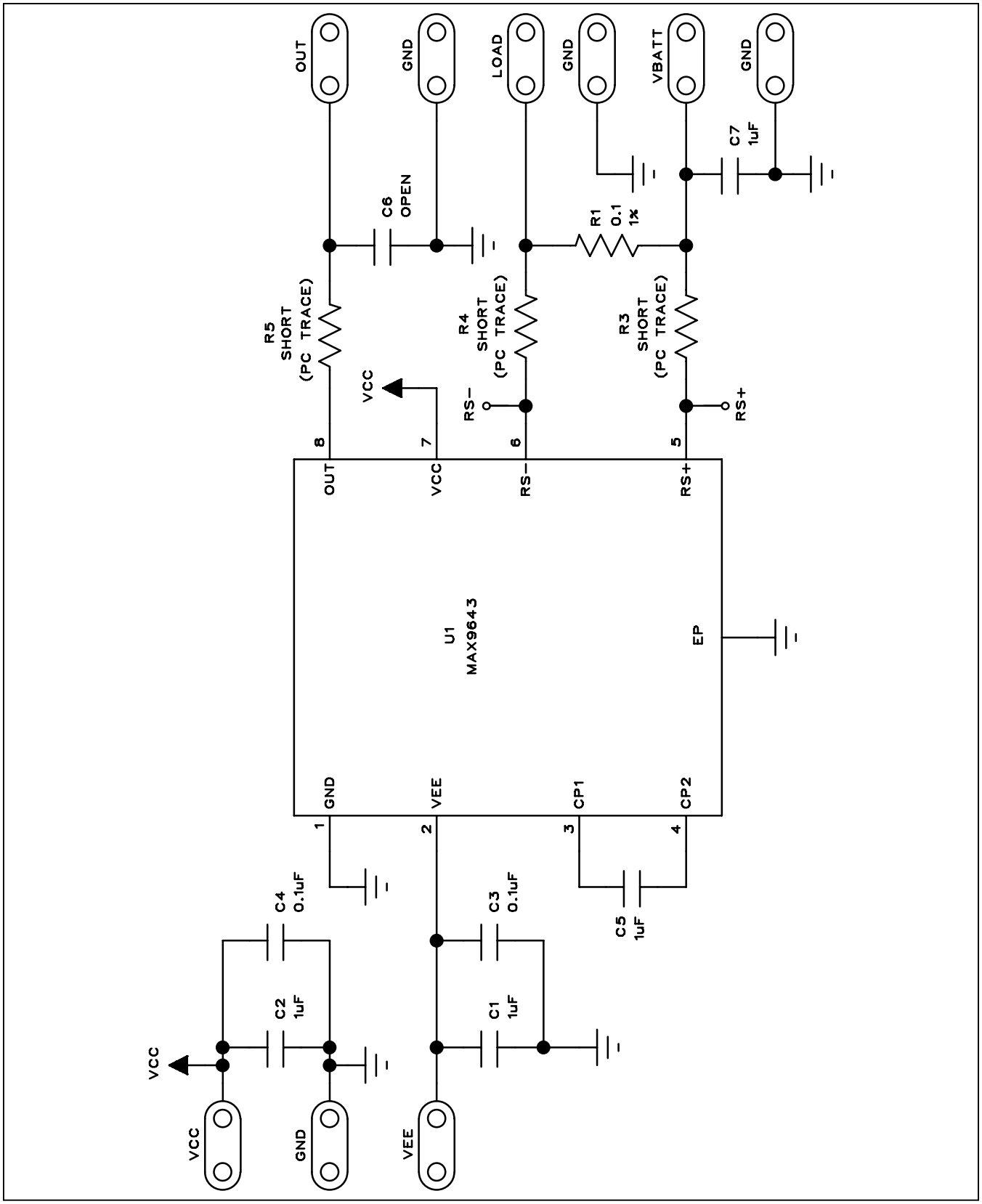


Figure 1. MAX9643 EV Kit Schematic

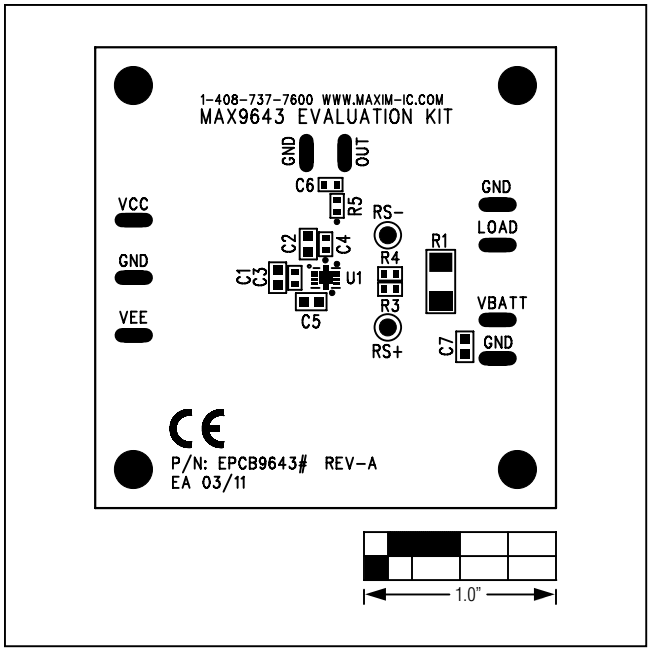


Figure 2. MAX9643 EV Kit Component Placement Guide—Component Side

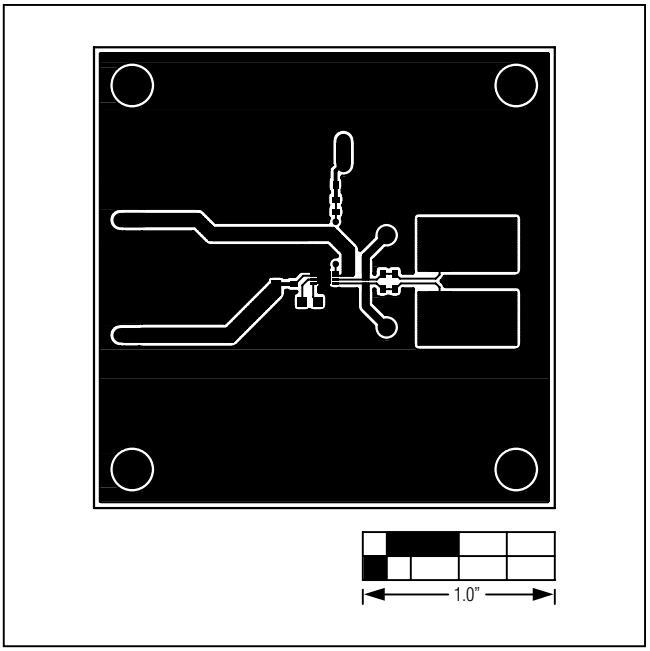


Figure 3. MAX9643 EV Kit PCB Layout—Component Side

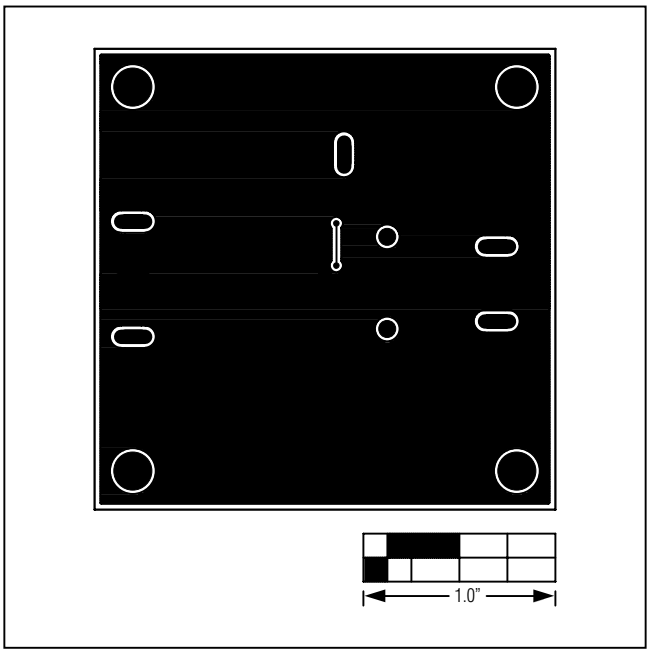


Figure 4. MAX9643 EV Kit PCB Layout—Solder Side

Ordering Information

PART	TYPE
MAX9643EVKIT#	EV Kit

#Denotes RoHS compliant.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	5/11	Initial release	—
1	5/15	Deleted automotive reference from *Detailed Description of Hardware* section	2

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