



MAX4073 Evaluation Kit

General Description

The MAX4073 evaluation kit (EV kit) is an assembled and tested PCB used to evaluate the MAX4073 high-side current-sense amplifier, which is designed for low-cost, compact, current-sense applications. The EV kit has a 2V to 28V input common-mode sense-voltage range that is independent of the supply voltage. The EV kit comes assembled with the MAX4073F IC (internal gain = 50V/V), but can also evaluate the MAX4073T/MAX4073H (internal gains of 20/100, respectively) ICs.

Ordering Information

PART	TYPE
MAX4073EVKIT+	EV Kit

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

Features

- ◆ High-Side Current Sensing
- ◆ Multiple Fixed Gains Available
 - 20V/V (MAX4073T)
 - 50V/V (MAX4073F)
 - 100V/V (MAX4073H)
- ◆ 3V to 28V Operating Supply (VCC)
- ◆ 2V to 28V Common-Mode Range Independent of Supply Voltage
- ◆ Lead(Pb)-Free and RoHS Compliant
- ◆ Fully Assembled and Tested

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C5	2	0.1 μ F \pm 10%, 50V X7R ceramic capacitors (0603) Murata GRM188R71H104K TDK C1608X7R1H104K
C2, C4, C7, C8	0	Not installed, capacitors (0603)
C3, C6	2	1 μ F \pm 10%, 50V X7R ceramic capacitors (0805) Murata GRM21BR71H105K TDK C2012X7R1H105K
RS+, RS-	2	Test points

DESIGNATION	QTY	DESCRIPTION
R1	1	0.07 Ω \pm 1% current-sense resistor (1206) Vishay/Dale WSL1206R0700FEB
R2, R3	0	Not installed, resistors—short (PC trace) (0603)
U1	1	High-side current-sense amplifier (5 SC70) Maxim MAX4073FAXK+
—	1	PCB: MAX4073 Evaluation Kit+

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
Vishay	402-564-3131	www.vishay.com

Note: Indicate that you are using the MAX4073 when contacting these component suppliers.

Evaluates: MAX4073F/MAX4073H/MAX4073T

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Quick Start

Recommended Equipment

- 12V, 1A power supply (VBAT)
- 5V power supply (VCC)
- Electronic load capable of sinking 1A
- Digital voltmeter (DVM)

Procedure

The MAX4073 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. Connect the ground of the power supply to the GND pad and connect the positive terminal to the VSOURCE pad.
- 2) Set the VCC power supply to 5V. Connect the ground of the VCC supply to the GND pad and connect the positive terminal to the VCC pad.
- 3) Set the electronic load to sink 1A.
- 4) Connect the electronic load's ground to the GND pad. Connect the load's positive terminal to the LOAD pad.
- 5) Connect the DVM across the OUT pad and the GND pad.
- 6) Turn on the 5V power supply.
- 7) Turn on the 12V power supply.
- 8) Adjust the electronic load current (ISENSE) between 0A and 1A and verify that V_{OUT} is proportional to V_{SENSE} according to the following equation:

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

where $V_{SENSE} = I_{SENSE} \times R_1$ and A_V is the gain of the device (50V/V for MAX4073F).

Detailed Description of Hardware

The MAX4073 EV kit is a current-sense amplifier that measures the load current and provides an analog voltage output. The EV kit is installed with a MAX4073FAXK+, which has a gain of 50V/V. With the installed current-sense resistor (R_{SENSE}) value of 0.07Ω, and a full-scale I_{SENSE} of 1A, the full-scale V_{SENSE} is set to 70mV. The V_{OUT} is given by:

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

where I_{SENSE} is the load current and A_V is the gain of the device. Set the full-scale output range by selecting R_{SENSE} and the appropriate gain version of the MAX4073.

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 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 MAX4073 EV kit can be used to evaluate other gain versions of the MAX4073 (20V/V, 100V/V = T, H suffix). Replace U1 with a different version of the MAX4073 and refer to *Table 1. Recommended Component Values* in the MAX4073 IC data sheet for additional information.

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Evaluates: MAX4073F/MAX4073H/MAX4073T

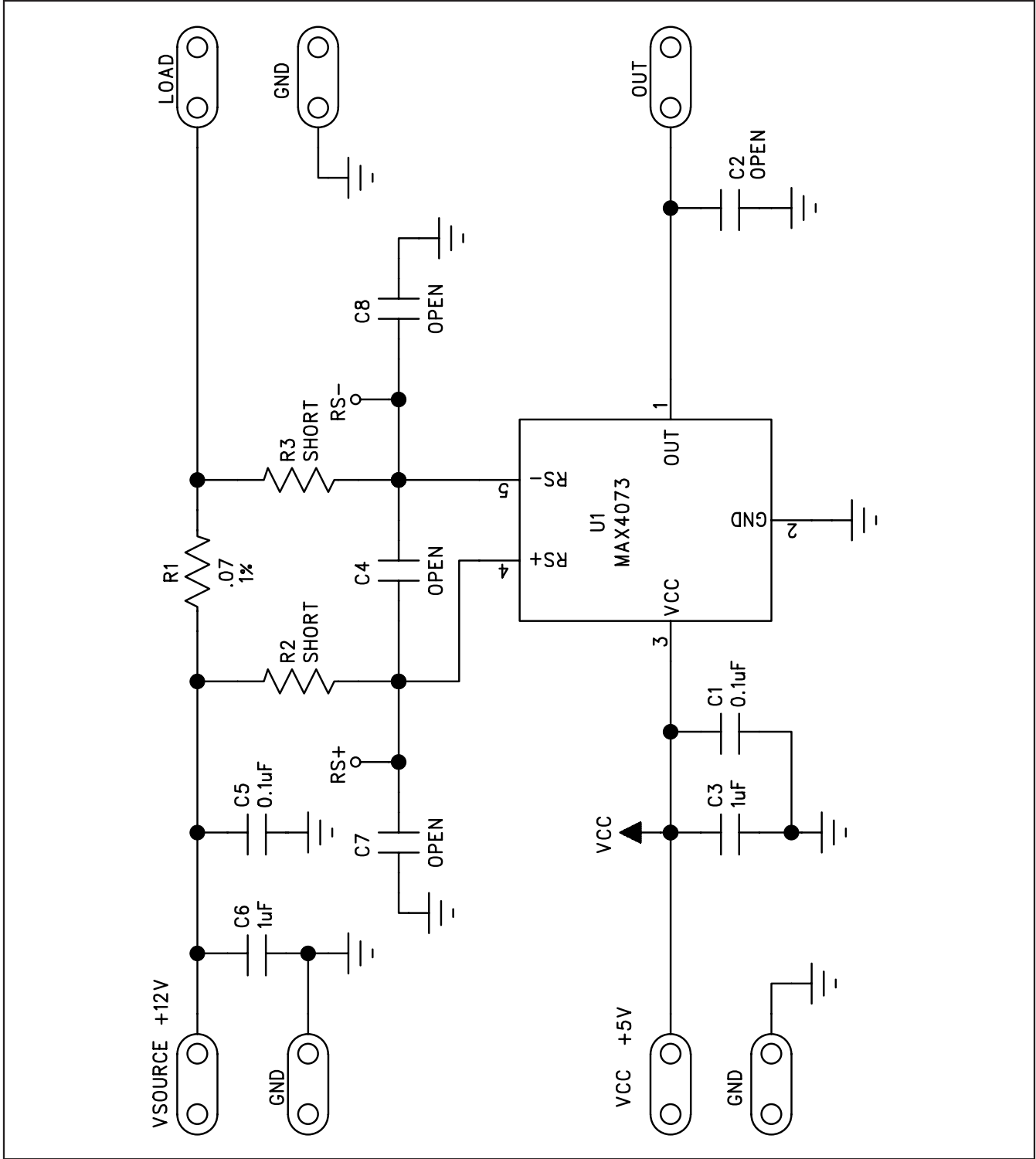


Figure 1. MAX4073 EV Kit Schematic

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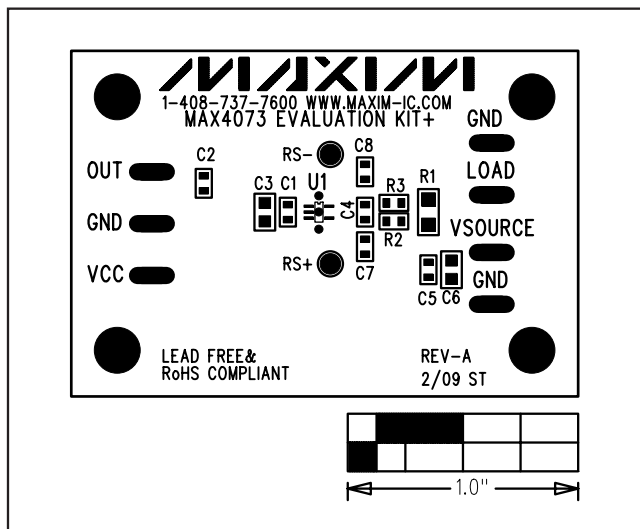


Figure 2. MAX4073 EV Kit Component Placement Guide—Component Side

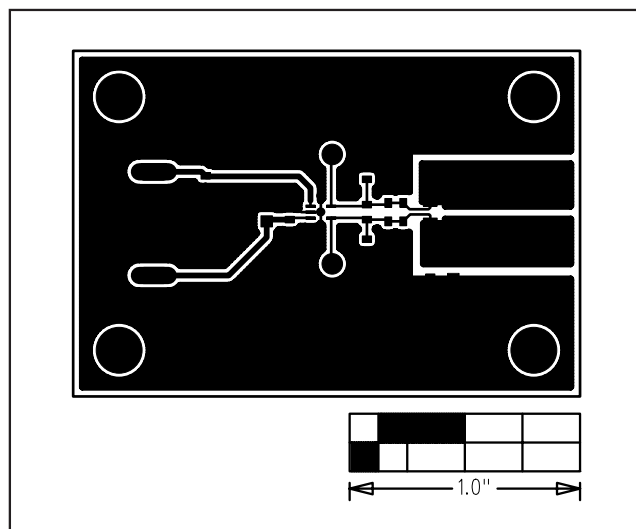


Figure 3. MAX4073 EV Kit PCB Layout—Component Side

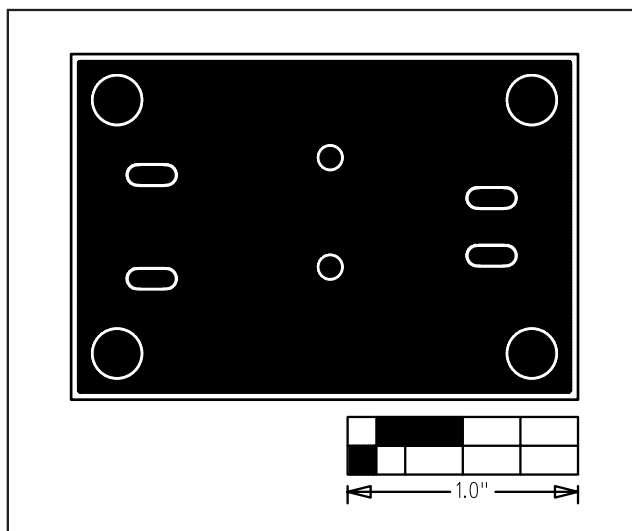


Figure 4. MAX4073 EV Kit PCB Layout—Solder Side

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