

## General Description

The MAX40010 evaluation kit (EV kit) provides a proven design to evaluate the MAX40010 dual-channel, high-precision, high-voltage, current-sense amplifier. This EV kit demonstrates the MAX40010 in a 5-PIN SOT-23 package.

The EV kit PCB comes with a MAX40010TAWT+ installed, which is the 20V/V gain version. Other gain options are available. Contact the factory for the pin-compatible MAX40010LAWT+ ( $G = 12.5V/V$ ), MAX40010FAWT+ ( $G = 50V/V$ ), and MAX40010HAWT+ ( $G = 100V/V$ ).

## EV Kit Contents

- MAX40010 EV Kit Board

## Features

- Precision, Real-Time Current Monitoring
- +2.7V to +76V Input Common-Mode Range
- Proven PCB Layout
- Fully Assembled and Tested

Ordering Information appears at end of data sheet.

## Quick Start

### Required Equipment

The following items are required for operation:

- MAX40010 EV kit
- +3.3V, 1A DC power supply
- +5V, 3A DC power supply
- An electronic load capable of sinking 3A (i.e., HP6060B)
- Two digital voltmeters

### Procedure

The MAX40010 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 made.**

- 1) Connect the positive terminal of the +3.3V supply to the VDD test point and the negative terminal of the supply to the nearest GND test point.
- 2) Connect the positive terminal of the +5V supply to the VSENSE+ test point and the negative terminal of the supply to the nearest GND test point.
- 3) Set the electronic load to sink 2.5A.
- 4) Connect the positive terminal of the electronic load to the VSENSE- test point and the negative terminal of the supply to the nearest GND test point.
- 5) Connect the first voltmeter between test points RS+ and RS- to measure  $V_{SENSE}$ .
- 6) Connect the second voltmeter between VOUT and the nearest GND test points.
- 7) Turn on the power supplies.
- 8) Enable the electronic load.
- 9) Verify that the first voltmeter displays 125mV and the second voltmeter displays 2.5V.

### Detailed Description of Hardware

The MAX40010 EV kit provides a proven design to evaluate the MAX40010 high-side, dual-channel, current-sense amplifier, which offers precision accuracy specifications of input offset voltage ( $V_{OS}$ ) less than  $12\mu V$  (max) and gain error less than 0.1% (max).

### Applying the $V_{RS+}$ Supply and the Load

The EV kit is installed with a MAX40010TAWT+, which has a 20V/V gain. The current-sense resistors ( $R_{SENSE}$ ) value is  $0.05\Omega$  with  $\pm 0.5\%$  tolerance. The  $V_{OUT}$  for each channel 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 2.7V to 76V.

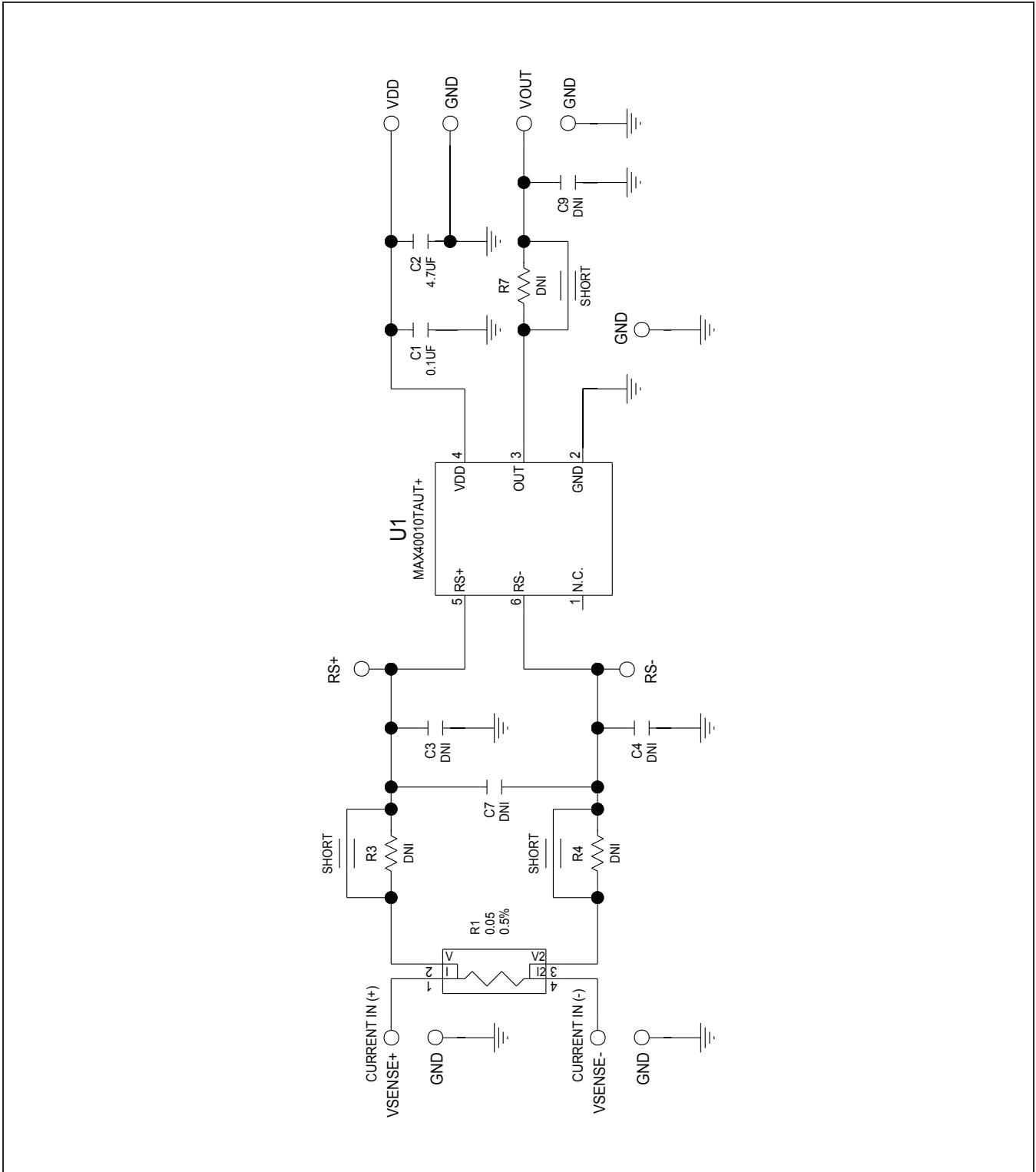
### Measuring the Load Current

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 its  $V_{OUT}$  pin. 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 a gain error affects accuracy at large currents—both errors effect accuracy at intermediate currents. By minimizing both offset and gain errors, accuracy can be optimized over a wide dynamic range.

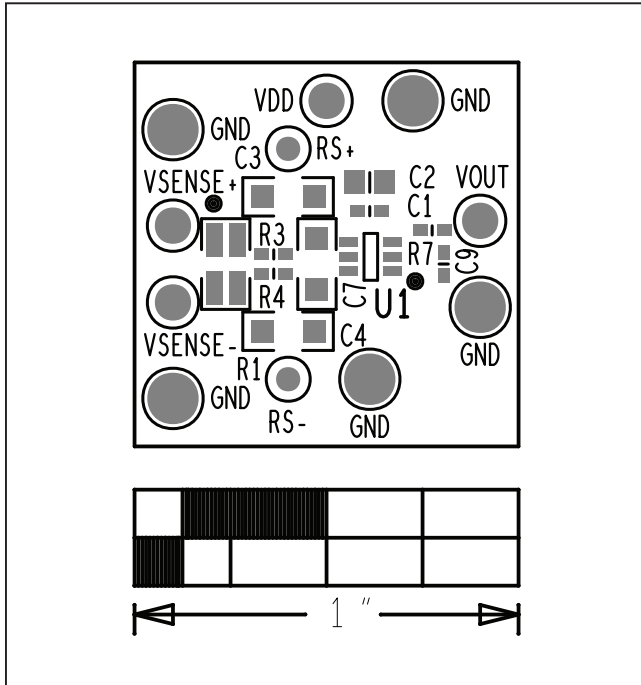
### MAX40010 EV Kit Bill of Materials

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
1	C1	-	1	C0603C104K4RAC; GCM188R71C104KA37; C1608X7R1C104K; GRM188R71C104K; C0603X7R160-104KNE	KEMET/MURATA/TDK/ VENKEL LTD.	0.1UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1UF; 16V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R;	
2	C2	-	1	GRM21BR71C475KA73	MURATA	4.7UF	CAPACITOR; SMT (0805); CERAMIC CHIP; 4.7UF; 16V; TOL=10%; MODEL=GRM SERIES; TG=-55 DEGC TO +125 DEGC; TC=X7R	
3	GND, TP1-TP4	-	5	5011	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	
4	R1	-	1	LVK12R050DE	OHMITE MFG CO.	0.05	RESISTOR; 1206; 0.05 OHM; 0.5%; 50PPM; 0.5W; METAL FILM	
5	RS+, RS-	-	2	5000	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	
6	U1	-	1	MAX40010TAUT+	MAXIM	MAX40010TAUT+	EVKIT PART-IC; MAX40010TAUT+; PACKAGE OUTLINE: 21-0058; PACKAGE CODE: U6SN-1; SOT6	
7	VDD, VOUT, VSENSE+, VSENSE-	-	4	5010	KEYSTONE	N/A	TESTPOINT WITH 1.80MM HOLE DIA, RED, MULTIPURPOSE;	
8	C3, C4, C7	DNP	0	C1206C102K1RAC	KEMET	1000PF	CAPACITOR; SMT (1206); CERAMIC CHIP; 1000PF; 100V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R	
9	C9	DNP	0	C0603C181K5GAC	KEMET	180PF	CAPACITOR; SMT (0603); CERAMIC CHIP; 180PF; 50V; TOL=10%; MODEL=C0G; TG=-55 DEGC TO +125 DEGC; TC=+/-	
10	R3, R4, R7	DNP	0	CRCW06030000ZS; MCR03EZPJ000; ERJ-3GEY0R00	VISHAY DALE/ROHM /PANASONIC	0	RESISTOR; 0603; 0 OHM; 0%; JUMPER; 0.10W; THICK FILM	
11	PCB	-	1	MAX40010	MAXIM	PCB	PCB Board:MAX40010 EVALUATION KIT	

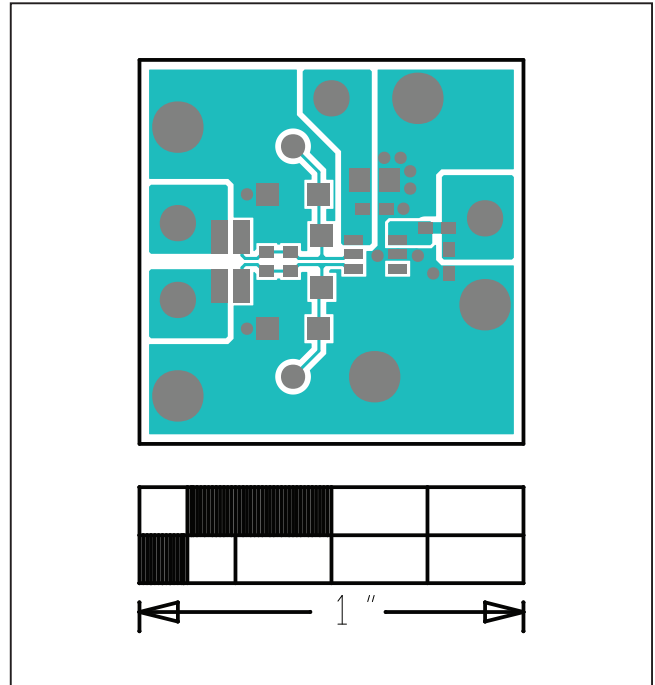
MAX40010 EV Kit Schematic



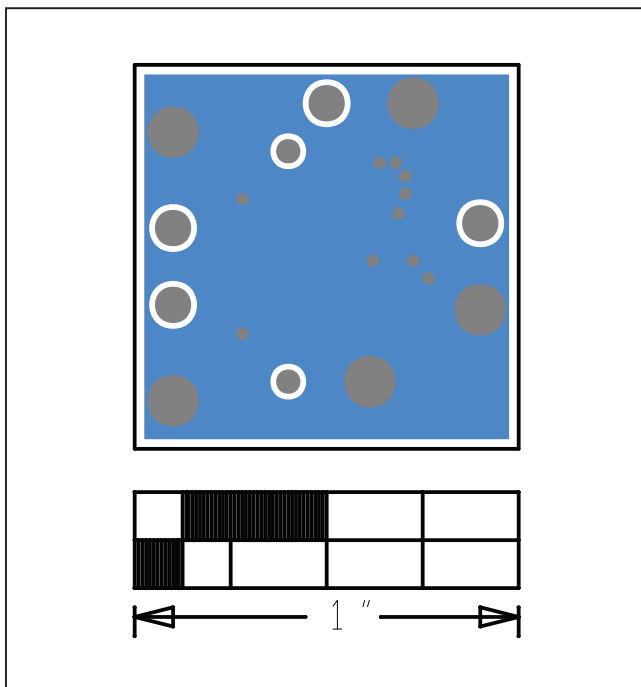
MAX40010 EV Kit PCB Layout



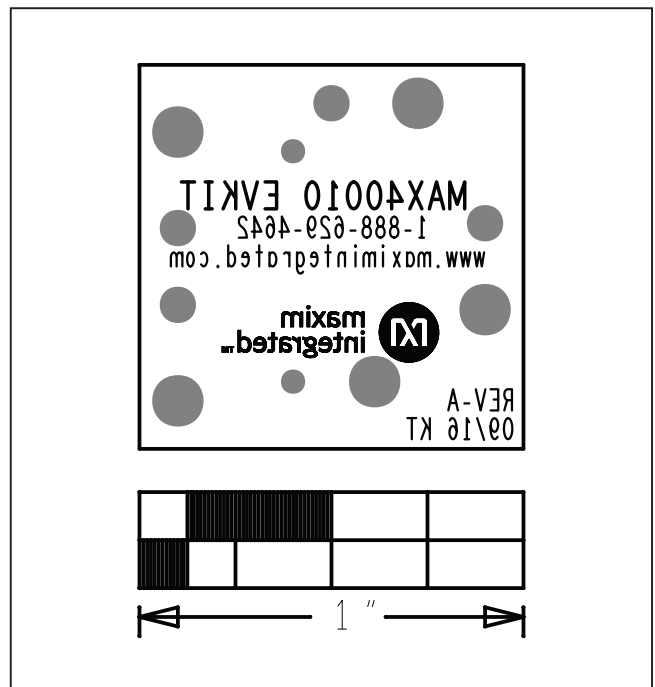
MAX40010 EV Kit—Top Silkscreen



MAX40010 EV Kit—Top



MAX40010 EV Kit—Bottom



MAX40010 EV Kit—Bottom Silkscreen

### Ordering Information

PART	TYPE
MAX40010EVKIT#	EV Kit

*#RoHS-compliant.*

### Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	10/16	Initial release	—

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](http://www.maximintegrated.com).

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