

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+ ($G = 12.5\text{V/V}$), MAX40010FAWT+ ($G = 50\text{V/V}$), and MAX40010HAWT+ ($G = 100\text{V/V}$).

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 0.05Ω 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.

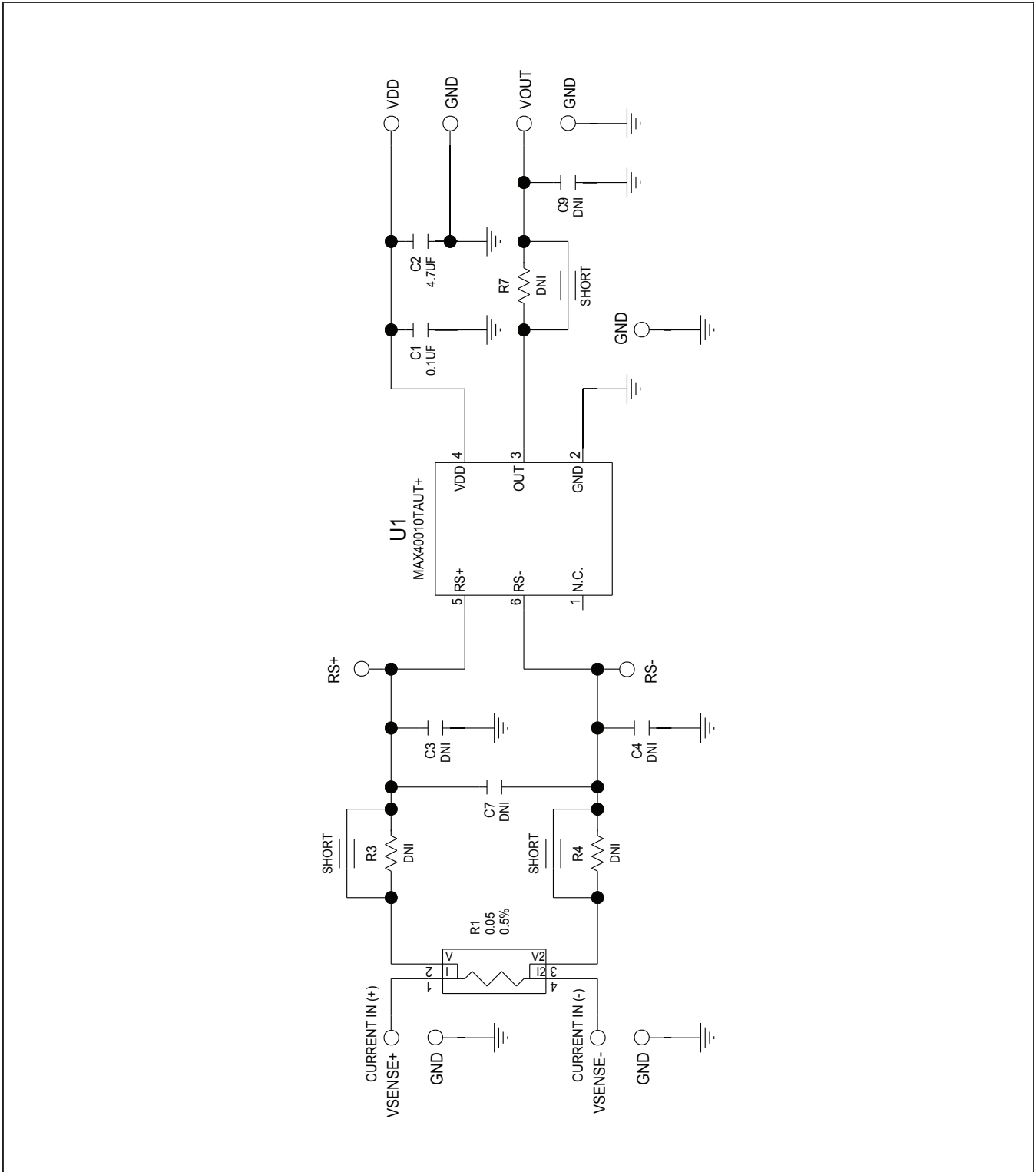
Measuring the Load Current

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.

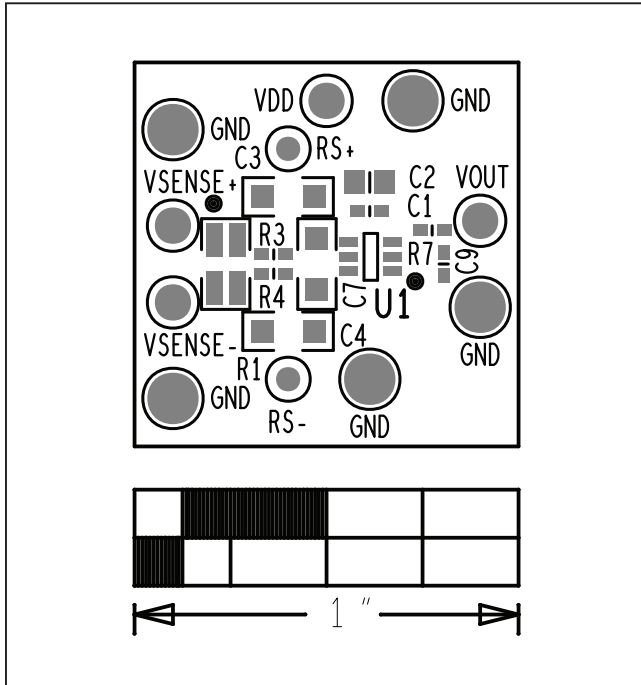
MAX40010 EV Kit Bill of Materials

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	

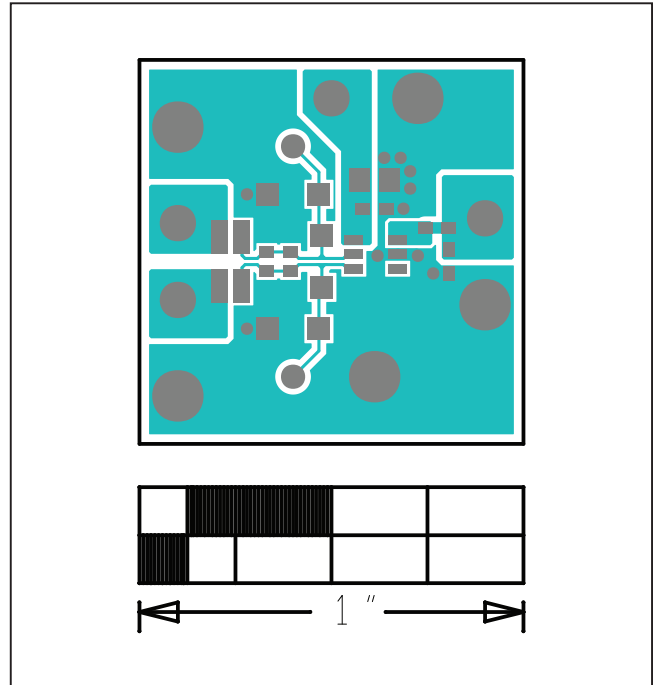
MAX40010 EV Kit Schematic



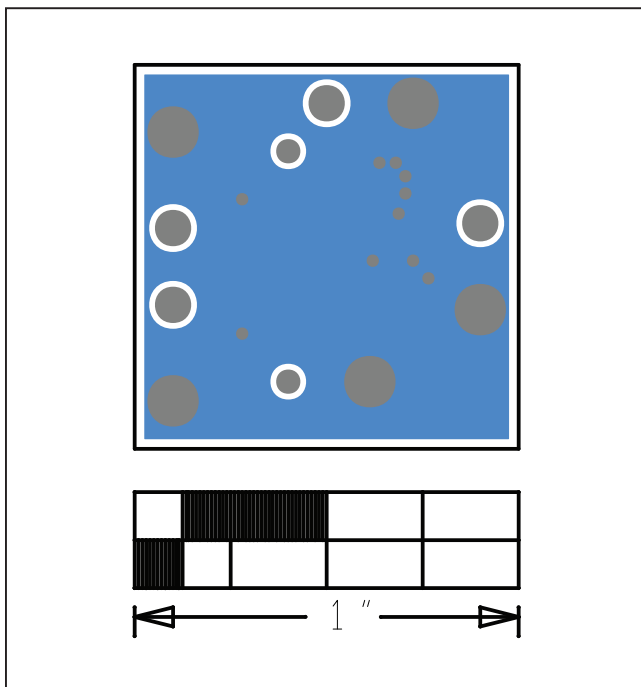
MAX40010 EV Kit PCB Layout



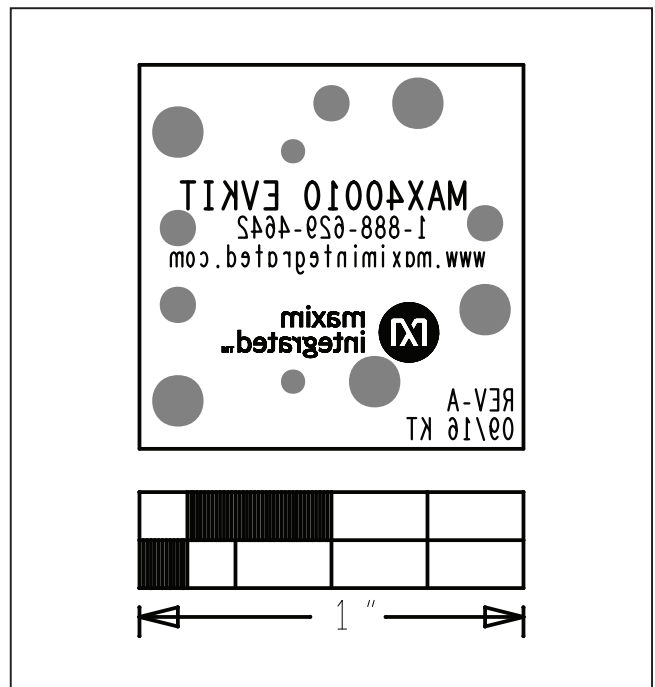
MAX40010 EV Kit—Top Silkscreen



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.

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