

MAX41400 Evaluation Kit

Evaluates: MAX41400

General Description

The MAX41400 evaluation kit (EV kit) provides a proven design to evaluate the MAX41400 low-power precision instrumentation amplifier with programmable gain in a nine-bump wafer-level package (WLP). The MAX41400 features internal selectable gain from 10V/V to 200V/V. The MAX41400 EV kit can set different device gain with different jumper configurations. The EV kit operates from a single supply voltage between 1.7V and 3.6V, or from dual supplies providing $\pm 0.85\text{V}$ to $\pm 1.8\text{V}$.

Features

- Single- or Dual-Supply Operation
- Configurable Gain
- Configurable Reference Voltage
- Proven PCB layout
- Fully Assembled and Tested

Quick Start

Required Equipment

- MAX41400 EV Kit
- Voltage Calibrator
- $\pm 0.9\text{V}$, 100mA DC power supply(PS1)
- Digital multimeter

[Ordering Information](#) appears at end of data sheet.

Procedure

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

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

- 1) Verify that all jumpers (JU1–JU4) are in their default positions, as shown in [Table 2](#).
- 2) Set the power supply to $\pm 0.9\text{V}$. Connect the positive terminal of the power supply to V_{CC} and the negative terminal of the power supply to V_{SS} . Connect the ground terminal of the power supply to GND.
- 3) Connect GND to REFIN.
- 4) Connect the ground terminal of the power supply to Inverting Input (IN-).
- 5) Connect the positive terminal of the voltage calibrator to Non-Inverting Input (IN+), and connect the ground terminal of the voltage calibrator to the EV kit board ground. Set the voltage calibrator to 1mV.
- 6) Turn on the power supply and voltage calibrator.
- 7) Verify that the DMM measures a 10mV DC voltage at OUT.
- 8) Change gain selection by connecting JU3 to 1-2, repeat step 5 and 6, and verify that the DMM measures 40mV at OUT.
- 9) Change gain selection by connecting JU4 to 1-2, repeat step 5 and 6, and verify that the DMM measures 200mV at OUT.

Detailed Description of Hardware

The MAX41400 EV kit evaluates the MAX41400 instrumentation amplifier, which features programmable gain with gain-selection pin, low power consumption and low offset voltage. The MAX41400 output-voltage range is rail-to-rail. The MAX41400 EV kit voltage gain can be configured to 10V/V, 40V/V, 100V/V, and 200V/V. The EV kit operates from a single supply voltage between 1.7V and 3.6V, or from dual supplies providing ±0.85V to ±1.8V.

REF Input

The reference voltage at REF sets the output-voltage DC signal (OUT) when the differential-input signal ($V_{IN+} - V_{IN-}$) equals zero. The user can connect an external reference voltage directly to the REF connector, or use the resistor-divider network (R3, R6) to provide a reference voltage scaled from V_{DD} . Replace resistors R3 and R6 to modify the voltage applied to REF using following equation:

$$V_{REF} = V_{DD} \times (R3 / (R6 + R3))$$

where V_{DD} is the input supply voltage to the EV kit.

Differential-Input Filter

The MAX41400 EV kit features an optional balanced-differential resistor-capacitor filter across the MAX41400 IN+ and IN- input pins. Replace the resistors (R1, R2) and capacitor (C4) that form the filter with components of appropriate value.

Gain Setting

Connect G1 and G2 to either V_{SS} or V_{DD} for different gain selections. The MAX41400 EV kit can be configured for four gain selections, as shown in [Table 1](#).

Table 1. Gain Selection

JU3 (G1)	JU4 (G2)	GAIN (V/V)
2-3	2-3	10
1-2	2-3	40
2-3	1-2	100
1-2	1-2	200

Table 2. Jumper Descriptions (JU1–JU4)

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	1-2*	Supply V_{SS} and GND independently for dual-supply operation
	2-3	Connect V_{SS} to GND for single-supply operation
JU2	1-2*	Connect SHDN to V_{DD} to place the device in normal operation
	2-3	Connect SHDN to GND to place the device in shutdown mode
JU3	1-2	Gain selection input G1; connect to V_{DD}
	2-3*	Gain selection input G1; connect to V_{SS}
JU4	1-2	Gain selection input G2; connect to V_{DD}
	2-3*	Gain selection input G2; connect to V_{SS}

*Default position.

Ordering Information

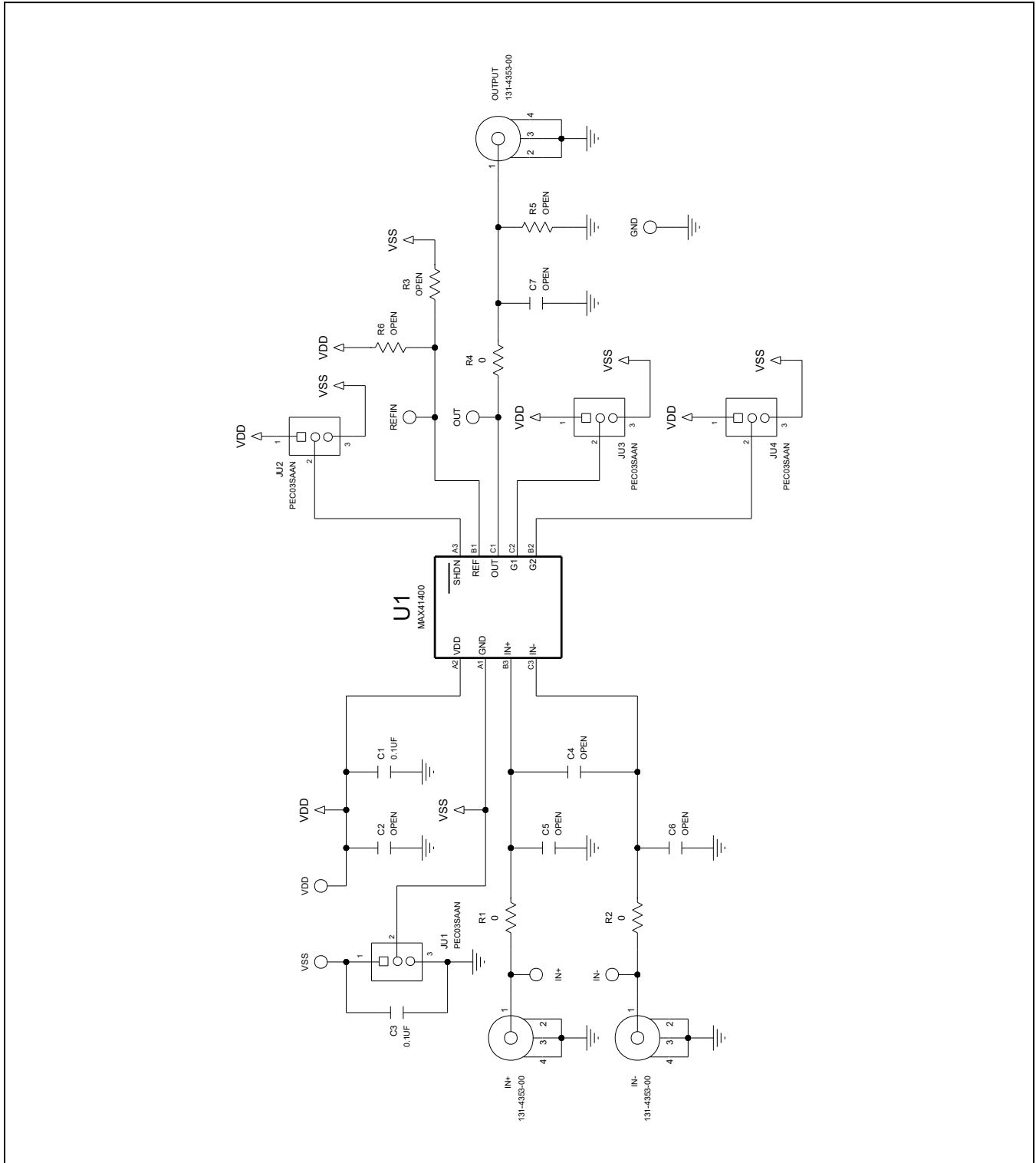
PART	TYPE
MAX41400EVKIT#	EV Kit

#Denotes RoHS compliant.

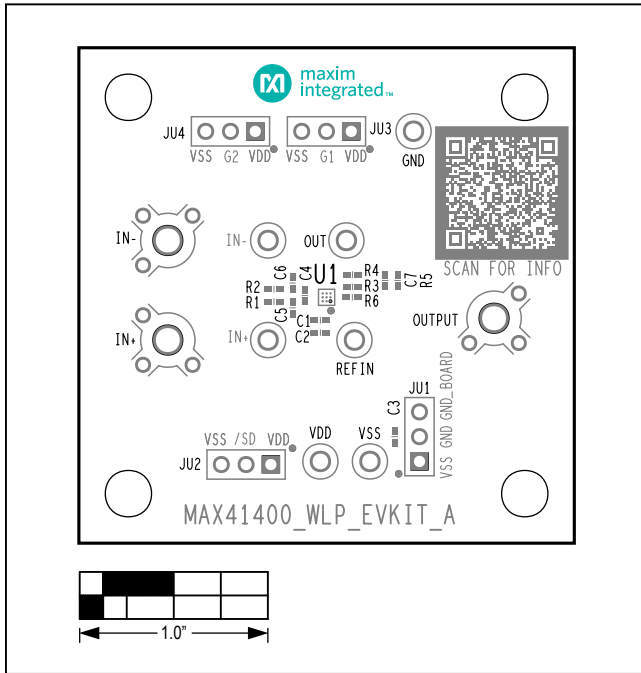
MAX41400 EV Kit Bill of Materials

ITEM	REF_DES		QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	C1, C3		2	GRM155R71E104ME14	MURATA	0.1 μ F	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.1 μ F; 25V; TOL = 20%; TG = -55°C TO +125°C; TC = X7R
2	GND		1	5006	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.125IN; TOTAL LENGTH = 0.35IN; BOARD HOLE = 0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
3	IN+, IN-, OUTPUT		3	131-4353-00	TEKTRONICS	131-4353-00	CONNECTOR; WIREMOUNT; CIRCUIT BOARD TEST POINT MINIATURE PROBE; STRAIGHT; 4PINS
4	JU1-JU4		4	PEC03SAAN	SULLINS	PEC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS
5	OUT, REFIN, TP1, TP2, VDD, VSS		6	5005	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.125IN; TOTAL LENGTH = 0.35IN; BOARD HOLE = 0.063IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
6	R1, R2, R4		3	ERJ-2GE0R00	PANASONIC	0	RESISTOR; 0402; 0 Ω ; 0%; JUMPER; 0.10W; THICK FILM
7	SPACER1-SPACER4		4	9032	KEYSTONE	9032	MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON
8	SU1-SU4		4	S1100-B; SX1100-B; STC02SYAN	KYCON; KYCON; SULLINS ELECTRONICS CORP.	SX1100-B	TEST POINT; JUMPER; STR; TOTAL LENGTH = 0.24IN; BLACK; INSULATION = PBT; PHOSPHOR BRONZE CONTACT = GOLD PLATED
9	U1		1	MAX41400	MAXIM	MAX41400	EVKIT PART - IC; MAX41400; PACKAGE OUTLINE DRAWING: 21-100443
10	PCB		1	MAX41400WLP	MAXIM	PCB	PCB:MAX41400WLP
11	R3, R5, R6	DNP	0	N/A	N/A	OPEN	PACKAGE OUTLINE 0402 RESISTOR
12	C2, C4-C7	DNP	0	N/A	N/A	OPEN	PACKAGE OUTLINE 0402 NON-POLAR CAPACITOR
TOTAL			29				

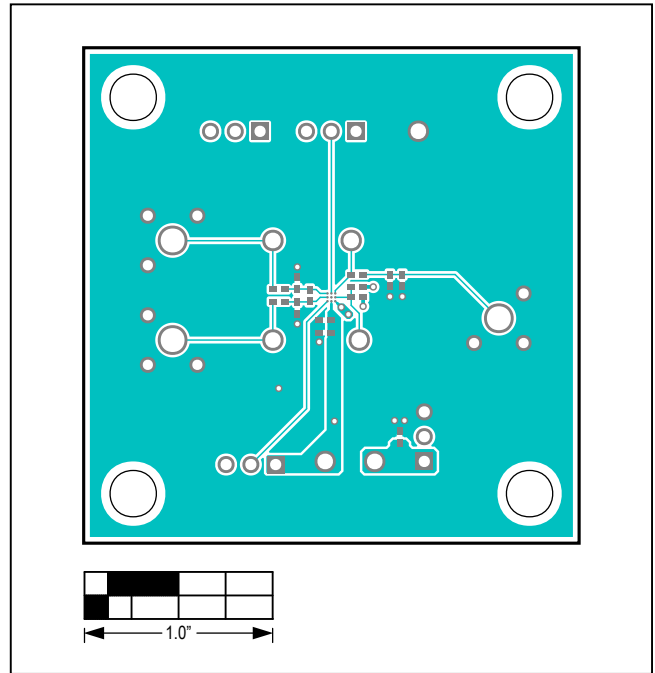
MAX41400 EV Kit Schematic Diagram



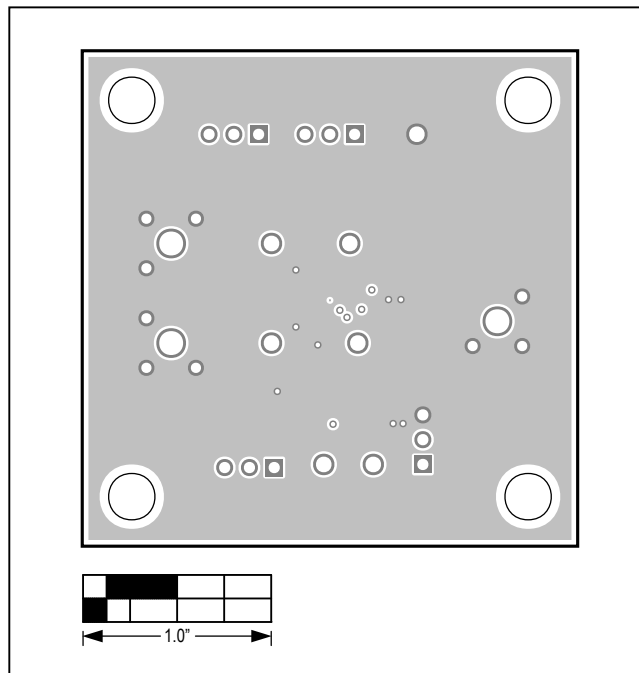
MAX41400 EV Kit PCB Layout Diagrams



MAX41400 EV Kit—Top Silkscreen

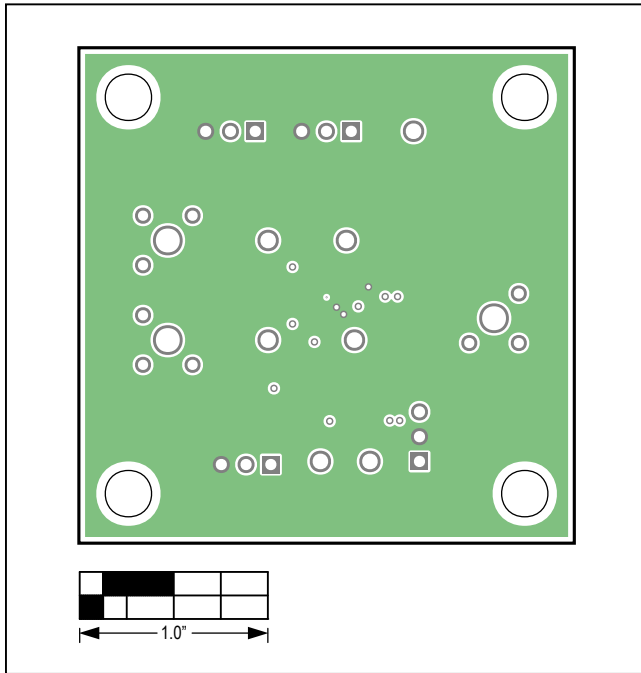


MAX41400 EV Kit—Top View

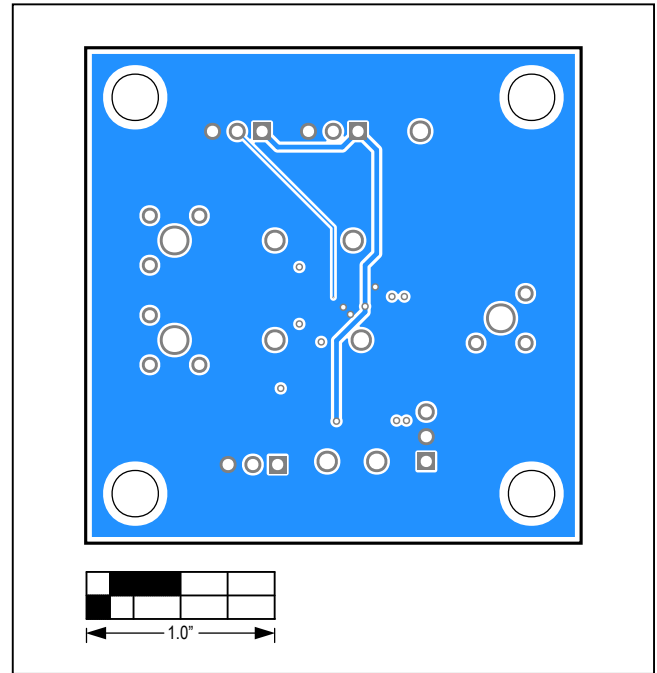


MAX41400 EV Kit—Internal 2

MAX41400 EV Kit PCB Layout Diagrams (continued)



MAX41400 EV Kit—Internal 3



MAX41400 EV Kit—Bottom View