

Evaluates: MAX41400 TDFN

General Description

The MAX41400 TDFN evaluation kit (EV kit) provides a proven design to evaluate the MAX41400 low-power precision instrumentation amplifier with programmable gain in a 10-pad TDFN package. The MAX41400 features internal selectable gain from 10V/V to 250V/V. The MAX41400 TDFN EV kit can set different devices' gain with various 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

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

Quick Start

Required Equipment

- MAX41400TDFNEVKIT#
- Voltage Calibrator
- $\pm 0.9\text{V}$, 100mA DC Power Supply (PS1)
- Digital Multimeter

Procedure

The MAX41400 TDFN EV kit is fully assembled and tested. Use the following steps to verify board operation.

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

1. Verify that all jumpers (JU1, SHDN_, G0-G2) 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 VCC and the negative terminal of the power supply to VSS. 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 the inverting input (IN-) pin.
5. Connect the positive terminal of the voltage calibrator to the noninverting input (IN+) pin, 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.
7. Turn on the voltage calibrator.
8. Verify that the DMM measures a 10mV DC voltage at OUT.
9. Change the gain selection by connecting G1 to 1-2. Repeat steps 5 and 6, and verify that the DMM measures 40mV at OUT.
10. Change the gain selection by connecting G2 to 1-2, and G1 and G0 to 2-3. Repeat steps 5 and 6, and verify that the DMM measures 100mV at OUT.
11. Change the gain selection by connecting G1, G2, and G0 to 1-2. Repeat steps 5 and 6, and verify that the DMM measures 250mV at OUT.

Detailed Description of Hardware

The MAX41400 TDFN EV kit evaluates the MAX41400 instrumentation amplifier's TDFN package, which features programmable gain with a gain-selection pin, low power consumption, and low offset voltage. The MAX41400 output-voltage range is rail-to-rail. The MAX41400 TDFN EV kit voltage gain can be configured to 10V/V, 20V/V, 40V/V, 80V/V, 100V/V, 150V/V, 200V/V, and 250V/V. The EV kit operates from a single supply voltage between 1.7V and 3.6V, or from dual supplies providing $\pm 0.85V$ to $\pm 1.8V$.

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 TDFN 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 G0, G1, and G2 to either VSS or VDD for different gain selections. The MAX41400 EV kit can be configured for four gain selections, as shown in [Table 1](#).

Table 1. Gain Selection

G0	G1	G2	GAIN (V/V)
2-3	2-3	2-3	10
1-2	2-3	2-3	20
2-3	1-2	2-3	40
1-2	1-2	2-3	80
2-3	2-3	1-2	100
1-2	2-3	1-2	150
2-3	1-2	1-2	200
1-2	1-2	1-2	250

Table 2. Jumper Descriptions (JU1–JU4)

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	1-2*	Supply VSS and GND independently for dual-supply operation
	2-3	Connect VSS to GND for single-supply operation
SHDN_	1-2*	Connect SHDN_ to VDD to place the device in normal operation
	2-3	Connect SHDN_ to GND to place the device in shutdown mode
G0	1-2	Gain selection input G0; connect to VDD
	2-3*	Gain selection input G0; connect to VSS
G1	1-2	Gain selection input G1; connect to VDD
	2-3*	Gain selection input G1; connect to VSS
G2	1-2	Gain selection input G2; connect to VDD
	2-3*	Gain selection input G2; connect to VSS

*Default position.

Ordering Information

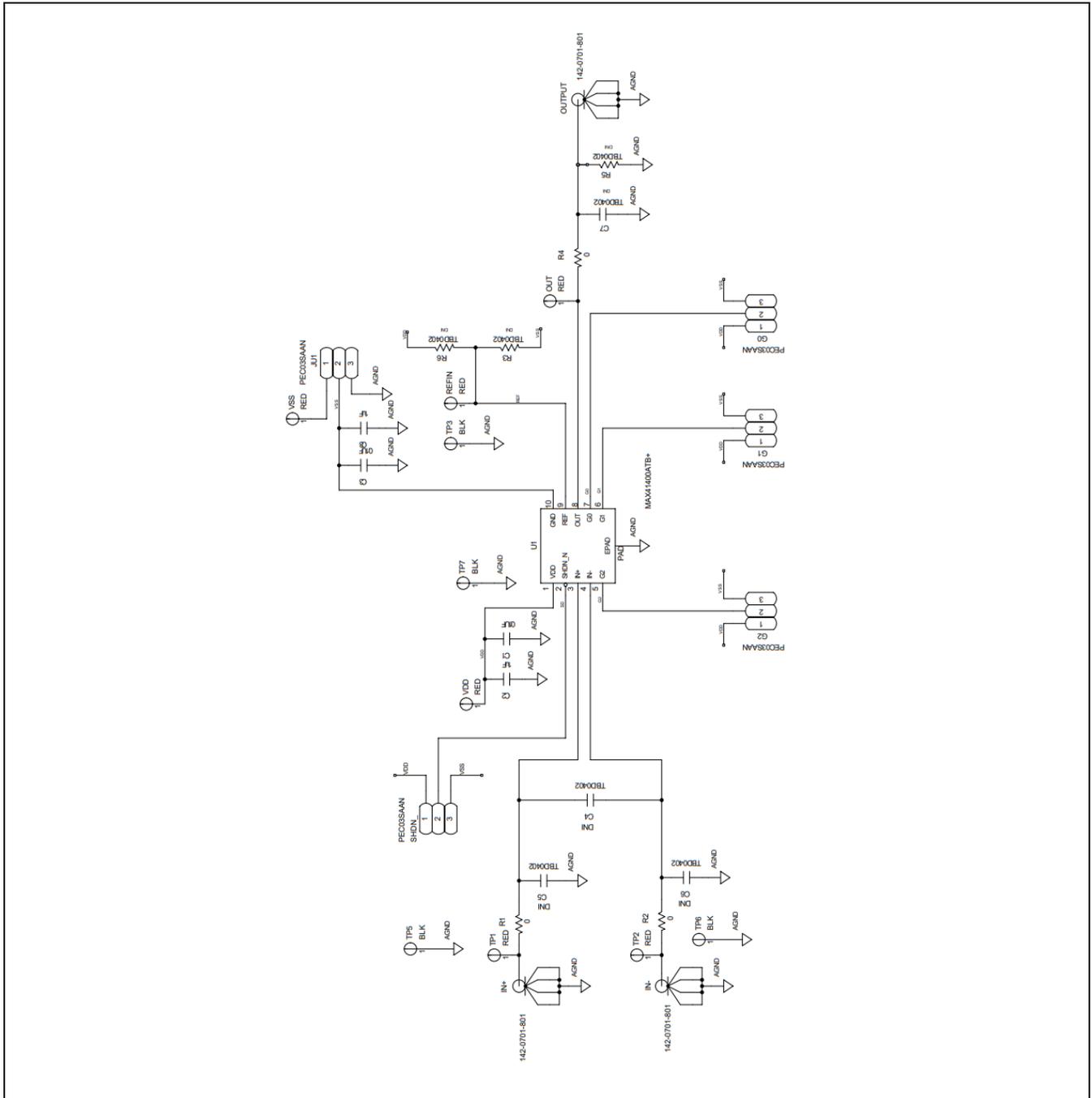
PART	TYPE
MAX41400TDFNEVKIT#	TDFN EV Kit

#Denotes RoHS-compliant.

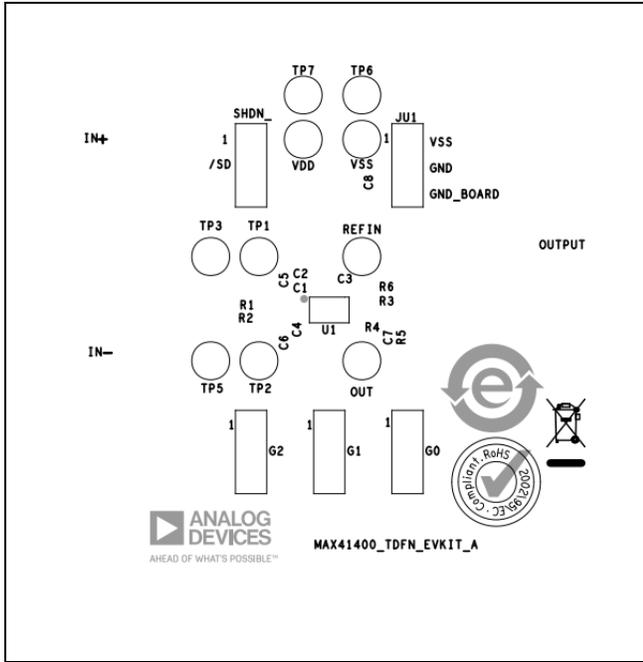
MAX41400 TDFN EV Kit Bill of Materials

ITEM	REF_DES	DNI	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	C1, C3		2	8.85012E+11	WURTH ELEKTRONIK	0.1UF	CAP CER 0.1UF 25V 20% X5R 0402
2	C2, C8		2	C1608X7R1E105K080AE	TDK	1UF	CAP CER 1uF 25V 10% X7R 0603 SOFT TERMINATION
3	G0, G1, G2, JU1, SHDN_		5	PEC03SAAN	SULLINS	PEC03SAAN	CONN-PCB 3POS MALE HDR UNSHROUDED SINGLE ROW ST, 2.54MM PITCH, 3.05MM SOLDER TAIL
4	IN+, IN-, OUTPUT		3	142-0701-801	CINCH CONNECTIVITY SOLUTIONS	142-0701-801	CONN-PCB COAX SMA END LAUNCH
5	OUT, REFIN, TP1, TP2, VDD, VSS		6	5005	KEYSTONE ELECTRONICS	RED	CONN-PCB TEST POINT RED
6	R1, R2, R4		3	ERJ-2GE0R00X	PANASONIC	0	RES SMD 0 OHM JUMPER 1/10W 0402 AEC-Q200
7	TP3, TP5, TP6, TP7		4	5006	KEYSTONE ELECTRONICS	BLK	CONN-PCB TEST POINT BLK
8	U1		1	MAX41400ATB+	ANALOG DEVICES	MAX41400ATB+	IC LOW-POWER, PRECISION INSTRUMENTATION AMP WITH PROGRAMMABLE GAIN PRELIM
9	PCB		1	08-084080B	ANALOG DEVICES	PCB	PCB:MAX41400TDFNEVKIT
10	SPACER1-SPACER4		3	SX1100-B	KYCON	SX1100-B	MINI SHUNT CONNECTOR; BLACK OPEN TOP
11	SPACER1-SPACER4		4	1902C	KEYSTONE	1902C	STANDOFF, NYLON HEX FEMALE 6.35MM O.D, 4-40 THREAD, 1/2 INCH LONG
12	SPACER1-SPACER4		4	NY PMS 440 0025 PH	B&F FASTENER SUPPLY	NY PMS 440 0025 PH	SCREW, MACHINE NYLON PAN HEAD PHILLIPS 4-40 THREAD, 1/4 INCH LONG
13	C4, C5, C6, C7	DNI	4	N/A	N/A	OPEN	PACKAGE OUTLINE 0402 CAPACITOR
14	R3, R5, R6	DNI	3	N/A	N/A	OPEN	PACKAGE OUTLINE 0402 RESISTOR

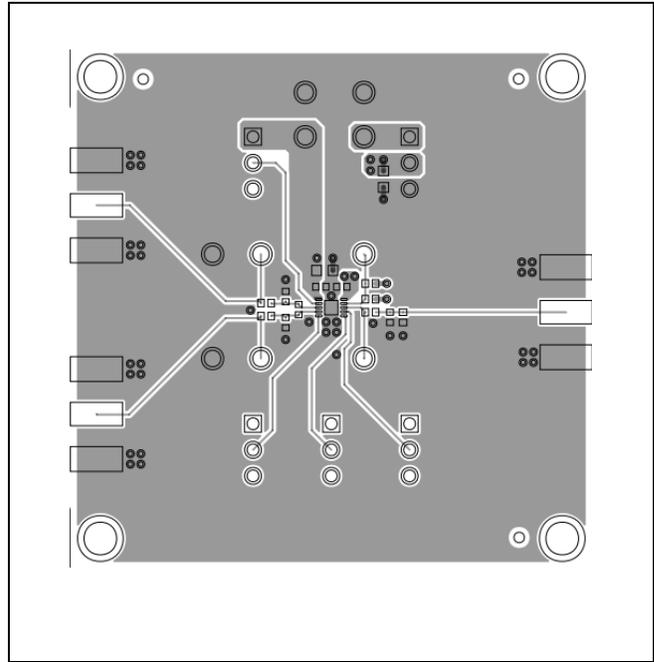
MAX41400 TDFN EV Kit Schematic



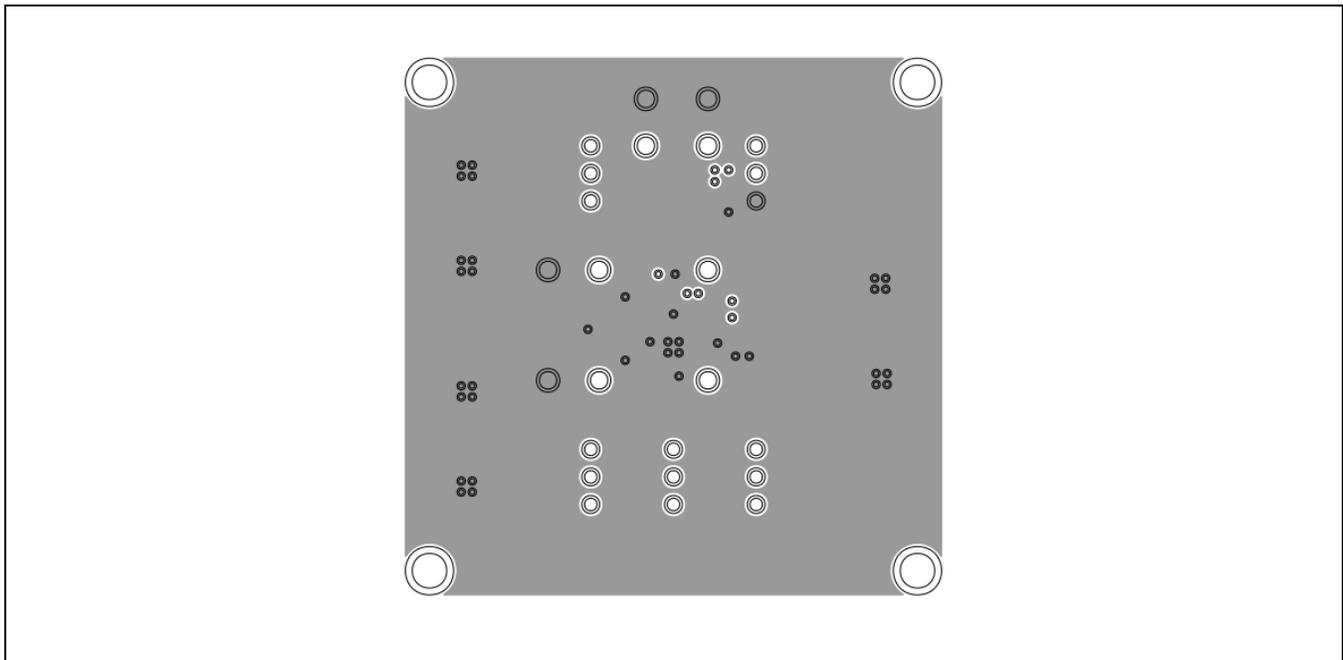
MAX41400 TDFN EV Kit PCB Layout Diagrams



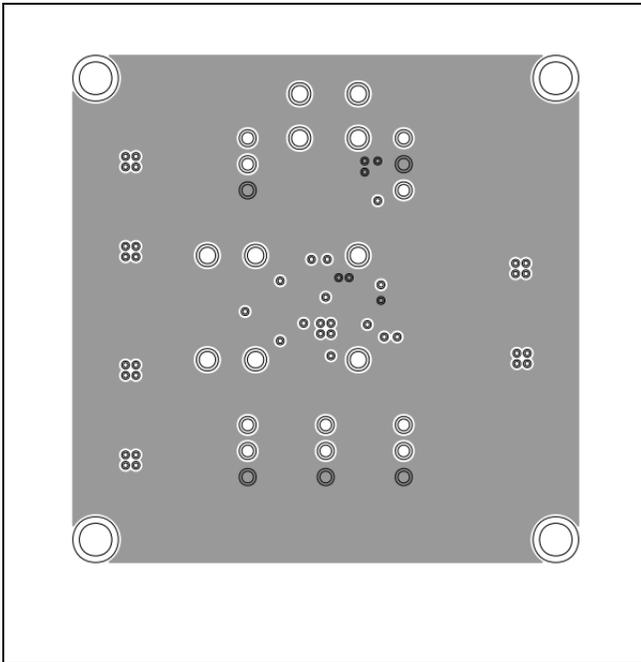
MAX41400 TDFN EV Kit—Top Silkscreen



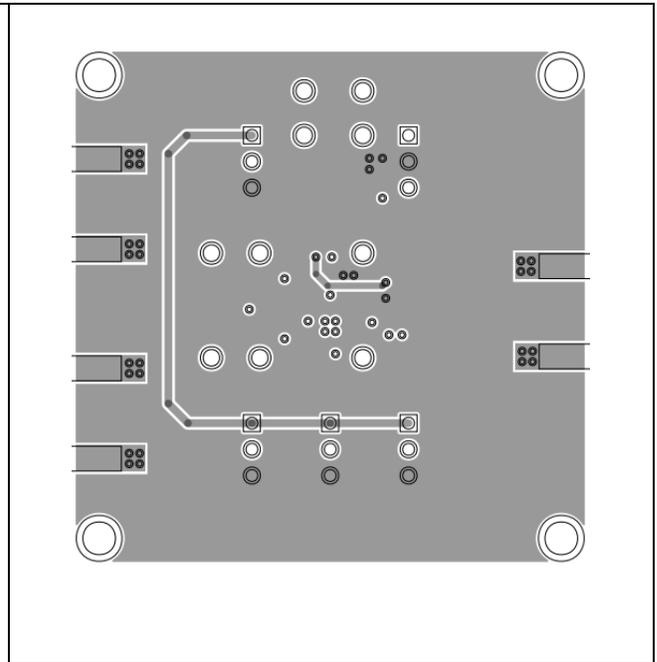
MAX41400 TDFN EV Kit—Top View



MAX41400 TDFN EV Kit—Internal 2



MAX41400 TDFN EV Kit—Internal 3 (PWR)



MAX41400 TDFN EV Kit—Bottom View

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	5/25	Initial release	—
1	11/25	Updated General Description, Procedure, Detailed Description of Hardware, Ordering Information table, BOM, Schematic, PCB Layout Diagrams	All

Notes

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