MAX4475 Evaluation Kit

Evaluates: MAX4475, MAX4488

General Description

The MAX4475 evaluation kit (EV kit) is a fully assembled and tested circuit board that contains all the components necessary to evaluate both MAX4475 and MAX4488 ICs. The MAX4475 EV kit printed circuit board (PCB) comes installed with MAX4475AUT/V+ in 6-SOT23 package.

The device is a rail-to-rail output op amp offering 10MHz Gain Bandwidth product (MAX4475) and 42MHz Gain Bandwidth product (MAX4488). The EV kit operates from a single 2.7V to 5.5V DC power supply or from ±1.35V to ±2.75V split supply.

Features

- +2.7V to +5.5V Supply Voltage Range Across V_{DD} and V_{SS}
- 42MHz Gain Bandwidth Product (MAX4488)
- 10MHz Gain Bandwidth Product (MAX4475)
- Ultra-Low Distortion (0.0002% with 1kΩ Load)
- Proven PCB Layout
- Fully Assembled and Tested

Ordering Information **appears at end of data sheet.**

Quick Start

Required Equipment

Before beginning, the following equipment is needed:

- MAX4475 EV kit
- 2.7V to 5.5V, 100mA DC power supply
- Precision voltage calibrator
- Digital multimeter

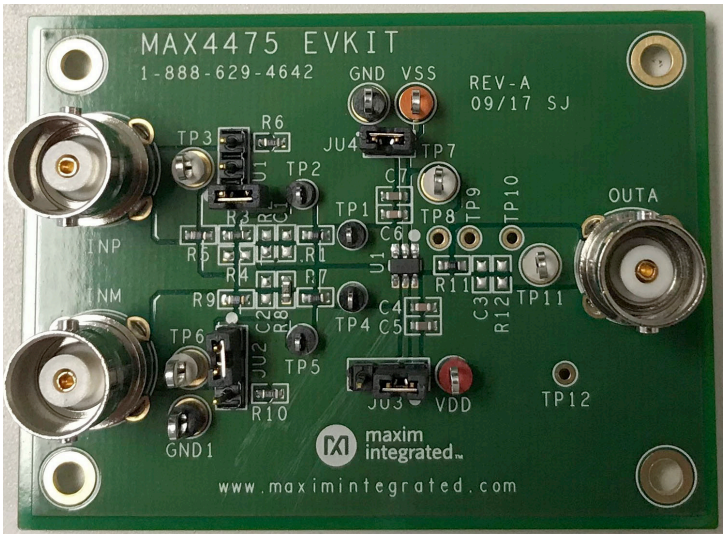
Procedure

The 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 and turn on V_{DD}, V_{SS} supplies before turning on voltage calibrator on the input pins.

1) Make sure JU1 jumper is uninstalled and JU2 jumper is in 1-2 position before applying supply voltage.
2) Connect positive terminal of the +5V supply to the VDD test point and the GND terminal of supply to the GND test point. Make sure JU3 is in 1-2 position and JU4 is installed. JU4 is opened if split supply operation is desired.

EV Kit Board Photo



maxim integrated™

3) Connect the positive terminal of the precision voltage calibrator to the INP/TP3 test point.
4) Connect the DMM to monitor the voltage on the OUTA/TP11 test point.
5) Turn on the 5V power supply connected to VDD test point, turn on the precision voltage calibrator on INP/TP3 test point and set 0.1V. Observe the output at the OUTA/TP11 test point on the DMM. DMM should read approximately 1V. Also, vary IN+ voltage between 0V to 0.45V and see if DMM on OUTA test point is showing a gained up voltage by 10V/V to the voltage applied on INP test point. Once above step is confirmed, EV kit is tested for functionality.

Detailed Description of Hardware

The MAX4475 EV kit contains the MAX4475 IC, which is rail-to-rail output op amps with low noise and wide bandwidth in 6-SOT23 package. The EV kit operates from a single 2.7V to 5.5V DC power supply. The EV kit is meant to work using split supplies as well where the voltage between V_{DD} and V_{SS} is +2.7V to +5.5V.

Default Application Circuit

The EV kit comes preconfigured in a Non-Inverting amplifier configuration with Gain set as 10V/V.

Op Amp Configurations

The EV kit provides flexibility to easily reconfigure the op amp into any of the three common circuit topologies: inverting amplifier, non-inverting amplifier, and differential amplifier.

These configurations are described in the next few sections.

Noninverting Configuration

The MAX4475 EV kit comes preconfigured as a non-inverting amplifier. The gain is set by the ratio of R8 and R9. The MAX4475 EV kit comes preconfigured for a gain of 10. The output voltage for the non-inverting configuration is given by the equation below:

$$V_{OUTA} = \left(1 + \frac{R8}{R9}\right) V_{INP}$$

Inverting Configuration

To configure the EV kit as an inverting amplifier, remove the shunt 1-2 on JU2 and install a shunt on jumper JU1 on position 1-2 and feed an input signal on the INM pad.

$$V_{OUTA} = -\left(\frac{R8}{R9}\right) V_{INM}$$

Differential Amplifier

To configure the MAX4475 EV kit as a differential amplifier, replace R2, R3, R8, and R9 with appropriate resistors. When R2 = R8 and R3 = R9, the CMRR of the differential amplifier is determined by the matching of the resistor ratios R2/R3 and R8/R9.

$$V_{OUTA} = GAIN\ (V_{INP} - V_{INM})$$

where

$$GAIN = \frac{R8}{R9} = \frac{R2}{R3}$$

Transimpedance Amplifier

To configure the MAX4475 EV kit as a transimpedance amplifier (TIA), short jumper JU1 on 1-2, replace R3, R9 with a 0 ohm resistor and populate R8 pad with 100kΩ resistor. The output voltage of the TIA is the input current multiplied by the feedback resistor:

$$V_{OUT} = (I_{INM} + I_{BIAS-}) \times R8 + V_{OS}$$

where I_{INM} is the input current source applied at the INM test point, IBIAS- is the input bias current into IN- pin, and V_{OS} is the input offset voltage of the op amp. Use capacitor C2 to stabilize the op amp by rolling off high-frequency gain due to a large cable capacitance if desired.

Capacitive Loads

Some applications require driving large capacitive loads. To improve stability of the amplifier in such cases, replace R11 with a suitable resistor value to improve amplifier phase margin.

Table 1. Default Jumper Settings

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	1-2	IN+ to GND
	2-3	IN+ terminated by 50Ω to GND
	Not Installed*	IN+ terminal floating
JU2	1-2*	IN- to GND
	2-3	IN- terminated by 50Ω to GND
	Not Installed	IN- terminal floating
JU3	1-2*	Device in active or normal mode
	2-3	Device in Shutdown mode
JU4	Installed*	Single-supply operation
	Not Installed	Split-supply operation

**Default position.*

Component Suppliers

SUPPLIER	WEBSITE
Murata Electronics North America Inc.	www.murata-northamerica.com

Note: *Indicate that you are using the MAX4475 EV kit when contacting these component suppliers.*

Ordering Information

PART	TYPE
MAX4475EVKIT#	EV Kit

#RoHS compliant.

MAX4475 EV Kit Bill of Materials

ITEM	QTY	REF DES	VAR STATUS	MAXINV	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	2	C4, C6	Pref	20-000U1-P6B	C1608X7R1E104K080AA	TDK	0.1UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1µF; 25V; TOL = 10%; MODEL = C SERIES; TG = -55°C TO +125°C; TC = X7R
2	2	C5, C7	Pref	20-004U7-L3	C1608X5R1E475K080AC; GRM188R61E475KE11	TDK; MURATA	4.7UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 4.7µF; 25V; TOL = 10%; TG = -55°C TO +85°C; TC = X5R
3	2	GND, GND1	Pref	02-TPMINI5011-00	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; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST
4	3	INM, INP, OUTA	Pref	01-31532952RFX5P-01	31-5329-52RFX	AMPHENOL	31-5329-52RFX	CONNECTOR; FEMALE; THROUGH HOLE; BNC 50Ω PCB RECEPTACLE; STRAIGHT; 5PINS
5	3	JU1-JU3	Pref	01-PEC03SAAN3P-21	PEC03SAAN	SULLINS	PEC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS
6	1	JU4	Pref	01-PEC02SAAN2P-21	PEC02SAAN	SULLINS	PEC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS
7	4	R1, R5, R7, R11	Pref	80-0000R-AA6	CRCW06030000Z0	VISHAY DALE	0	RESISTOR; 0603; 0Ω; 0%; JUMPER; 0.1W; THICK FILM
8	1	R3	Pref	80-0180R-24	CRCW0603180RFK	VISHAY DALE	180	RESISTOR, 0603, 180Ω, 1%, 100PPM, 0.10W, THICK FILM
9	2	R6, R10	Pref	80-0050R-H9	RG1608N-500-W	SUSUMU CO LTD.	50	RESISTOR; 0603; 50Ω; 0.05%; 10PPM; 0.10W; THIN FILM
10	1	R8	Pref	80-001K8-24	CRCW06031K80FK	VISHAY DALE	1.8K	RESISTOR, 0603, 1.8KΩ, 1%, 100PPM, 0.10W, THICK FILM
11	1	R9	Pref	80-0200R-24	CRCW06032000FK	VISHAY DALE	200	RESISTOR; 0603; 200Ω; 1%; 100PPM; 0.10W; THICK FILM
12	4	SU1-SU4	Pref	02-JMPFSTC02SYAN-00	STC02SYAN	SULLINS ELECTRONICS CORP.	STC02SYAN	TEST POINT; JUMPER; STR; TOTAL LENGTH = 0.256IN; BLACK; INSULATION = PBT CONTACT = PHOSPHOR BRONZE; COPPER PLATED TIN OVERALL
13	4	TP1, TP2, TP4, TP5	Pref	02-TPMINI5001-00	5001	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS = 0.062IN; NOT FOR COLD TEST
14	4	TP3, TP6, TP7, TP11	Pref	02-TPMINI5012-00	5012	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.125IN; TOTAL LENGTH = 0.445IN; BOARD HOLE = 0.063IN; WHITE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS = 0.062IN; NOT FOR COLD TEST
15	1	U1	Pref	00-SAMPLE-01	MAX4475AUT/V+	MAXIM	MAX4475AUT/V+	EVKIT PART-IC; PKG. OUTLINE DWG.: 21-0058; SOT23-6
16	1	VDD	Pref	02-TPMINI5010-00	5010	KEYSTONE	N/A	TESTPOINT WITH 1.80MM HOLE DIA, RED, MULTIPURPOSE; NOT FOR COLD TEST
17	1	VSS	Pref	02-TPMINI5013-00	5013	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.125IN; TOTAL LENGTH = 0.445IN; BOARD HOLE=0.063IN; ORANGE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS = 0.062IN; NOT FOR COLD TEST
18	1	PCB	-	EPCB4475	MAX4475	MAXIM	PCB	PCB:MAX4475
TOTAL	38							

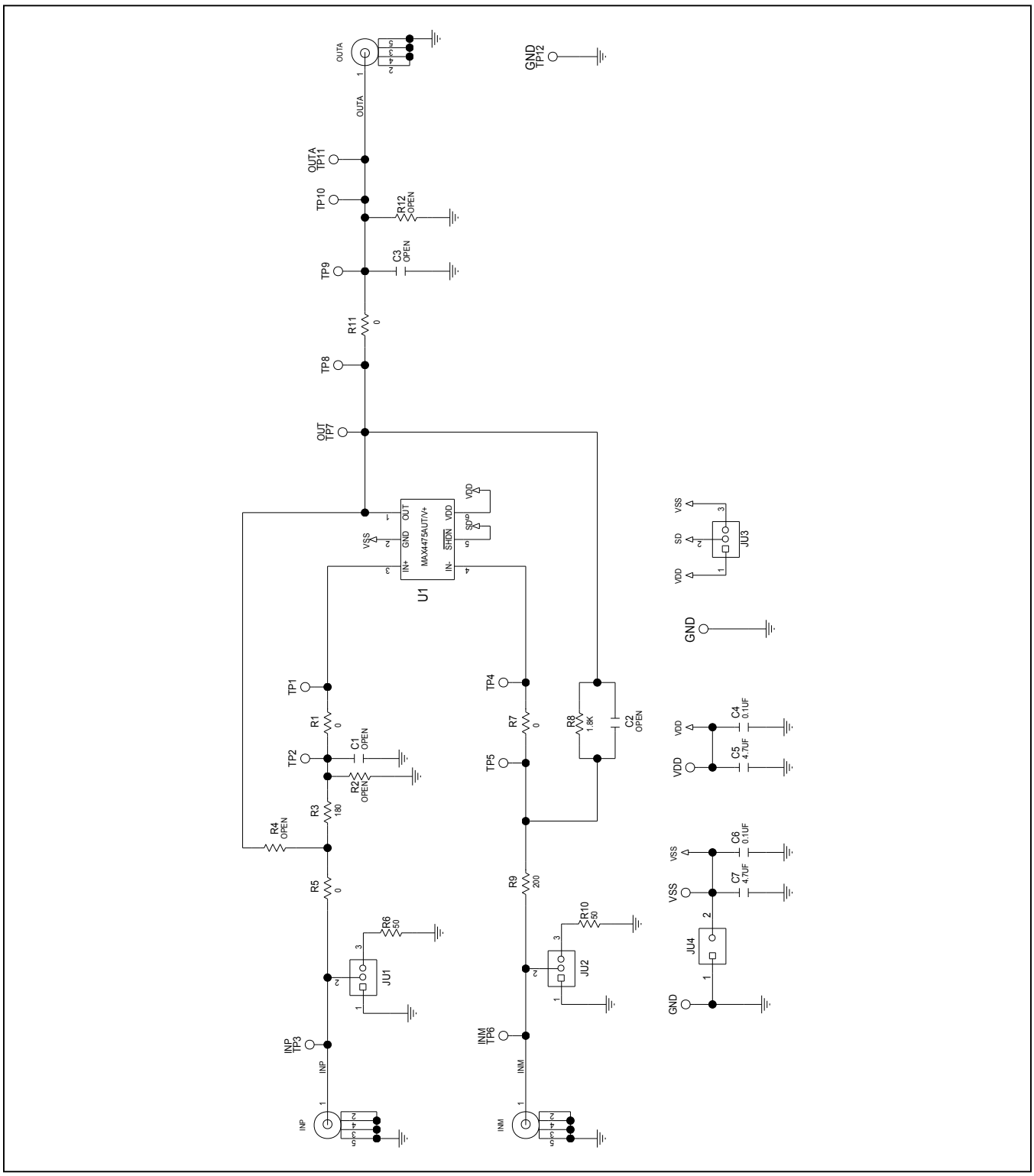
DO NOT PURCHASE(DNP)

ITEM	QTY	REF DES	VAR STATUS	MAXINV	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	3	C1-C3	DNP	N/A	N/A	N/A	OPEN	PACKAGE OUTLINE 0603 NON-POLAR CAPACITOR - EVKIT
2	3	R2, R4, R12	DNP	N/A	N/A	N/A	OPEN	PACKAGE OUTLINE 0603 RESISTOR - EVKIT
TOTAL	6							

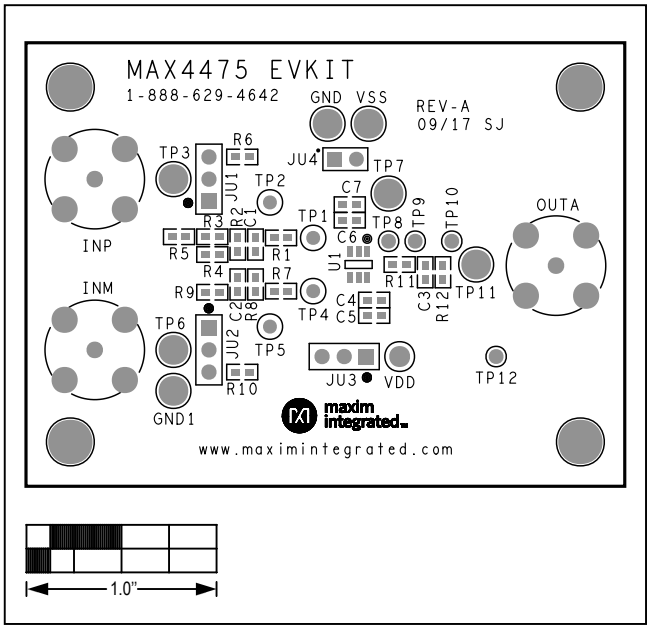
PACKOUT (These are purchased parts but not assembled on PCB and will be shipped with PCB)

ITEM	QTY	REF DES	VAR STATUS	MAXINV	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	1	PACKOUT_BOX	DNI	88-00712-MDM	88-00712-MDM	N/A	?	BOX;+;MEDIUM BROWN 9 3/8" X 7 1/4" X 2 1/2
2	1	PACKOUT_BOX	DNI	87-02159-000	87-02159-000	N/A	?	ESD BAG;+;BAG; STATIC SHIELD 5X8;W/ESD LOGO
3	1	PACKOUT_BOX	DNI	85-MAXKIT-PNK	85-MAXKIT-PNK	N/A	?	PINK FOAM;FOAM;ANTI-STATIC PE 12inX12inX5MM - PACKOUT
4	1	PACKOUT_BOX	DNI	EVINSERT	EVINSERT	N/A	?	WEB INSTRUCTIONS FOR MAXIM DATA SHEET
5	1	PACKOUT_BOX	DNI	85-84003-006	85-84003-006	N/A	?	LABEL(EV KIT BOX) - PACKOUT
TOTAL	5							

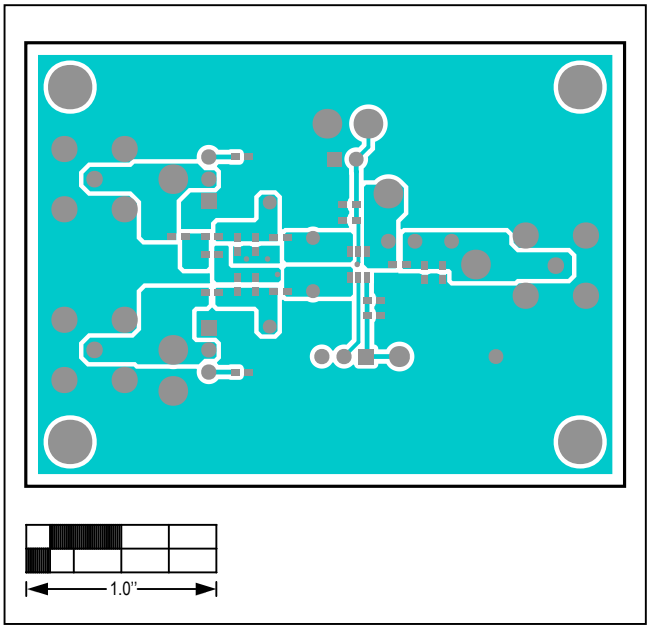
MAX4475 EV Kit Schematic



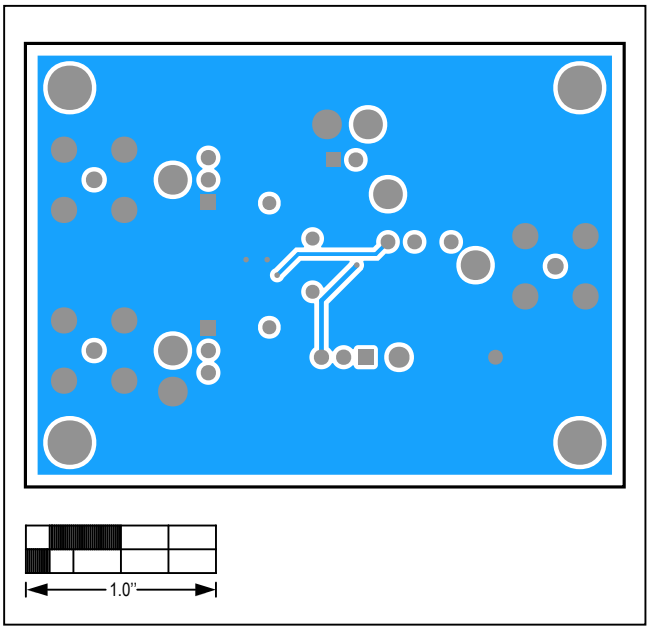
MAX4475 EV Kit PCB Layout Diagrams



MAX4475 EV Kit—Top Silkscreen



MAX4475 EV Kit—Top



MAX4475 EV Kit—Bottom

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	1/18	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.