

## MAX40002–MAX40005 Evaluation Kits

Evaluates: MAX40002–MAX40005  
MAX40012–MAX40015

### General Description

The MAX40002–MAX40005 evaluation kits (EV kits) are fully assembled and tested PC boards that evaluate the MAX40002ANS02–MAX40005ANS02 single comparators. The MAX40002ANS02–MAX40005ANS02 operate from a  $V_{CC}$  supply between 1.7V to 5.5V, come with an internal reference voltage of 0.2V, and have a wide 0.1V to 5.5V input voltage (IN) range. These EV kits demonstrate the MAX40002ANS02–MAX40005ANS02 in an ultra-small, 0.76mm x 0.76mm, 4-bump wafer-level package (WLP) with 0.35mm bump spacing.

These EV kits are configured to evaluate all devices in the MAX40002–MAX40005/MAX40012–MAX40015 family that have a 4-bump wafer-level package (WLP). To evaluate other WLP devices in this MAX40002–MAX40005/MAX40012–MAX40015 family other than what is pre-installed, replace the U1 IC with the desired part (see [Ordering Information](#) for details).

### Features

- 0.1V to 5.5V Input Voltage Range
- 1.7V to 5.5V External Reference Range (MAX40002ANS–MAX40005ANS)
- 1.7V to 5.5V  $V_{CC}$  Range with Internal Reference (MAX40002ANS\_\_–MAX40005ANS\_\_)
  - 0.2V, 0.5V, 0.9V, and 1.222V Internal Reference Options Available
- Evaluates 4-Bump WLP Package
- Fully Assembled and Tested

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

### Quick Start

#### Required Equipment

Before beginning, the following equipment is needed:

- Three +5V DC power supplies ( $V_{CC}/REF$ , IN, and  $V_{PU}$ )
- One digital multimeter (DMM)

#### Procedure

The MAX40002–MAX40005 EV kits are fully assembled and tested. Follow these steps to verify board operation. **Do not turn on the power supply until all connections are completed.**

- 1) Connect the positive terminal of a DC power supply to the  $V_{CC}$  pad and the ground terminal to the GND pad.
- 2) Connect the positive terminal of a DC power supply to the  $V_{PU}$  pad and the ground terminal to the GND pad (MAX40002/MAX40003/MAX40012/MAX40013 only).
- 3) Connect the positive terminal of a DC power supply to the IN pad and the ground terminal to the GND pad.
- 4) Turn on the  $V_{CC}$  power supply and set it to the desired level.
- 5) Turn on the  $V_{PU}$  power supply and set it to the desired level (MAX40002/MAX40003/MAX40012/MAX40013 only).
- 6) Turn on the IN power supply and set it to the desired level.
- 7) Monitor the output using a DMM at the OUT pad, and study its response to varying voltage at IN (see [Table 1](#) for more information).

**Table 1. How Devices Behave Under Various Input Voltage Conditions**

PART	V <sub>REF</sub>	INPUT POLARITY	INPUT VOLTAGE CONDITIONS	ACTION AT OUTPUT
MAX40002, MAX40004 MAX40012, MAX40014	External	Noninverting	V <sub>IN</sub> > V <sub>REF</sub>	Output goes high
			V <sub>IN</sub> < V <sub>REF</sub>	Output goes low
Inverting		V <sub>IN</sub> > V <sub>REF</sub>	Output goes low	
		V <sub>IN</sub> < V <sub>REF</sub>	Output goes high	
MAX40003, MAX40005 MAX40013, MAX40015	Internal	Noninverting	V <sub>IN</sub> > V <sub>REF_INT</sub>	Output goes high
			V <sub>IN</sub> < V <sub>REF_INT</sub>	Output goes low
Inverting		V <sub>IN</sub> > V <sub>REF_INT</sub>	Output goes low	
		V <sub>IN</sub> < V <sub>REF_INT</sub>	Output goes high	

### Detailed Description of Hardware

The MAX40002–MAX40005 EV kits are fully assembled and tested PC boards that evaluate the 4-bump WLP MAX40002ANS02–MAX40005ANS02 comparators.

### V<sub>CC</sub>/REF Supply Selection

The V<sub>CC</sub>/REF pad on the EV kit is used to either supply a 1.7V to 5.5V V<sub>CC</sub> voltage (internal reference devices) or a 1.7V to 5.5V external reference voltage to the IC. Refer to the MAX40002–MAX40005 and MAX40012–MAX40015 data sheets for more information.

### V<sub>PJ</sub> Pad

The V<sub>PJ</sub> pad on the EV kit is used to connect a pullup supply voltage up to 5.5V for the open-drain output devices (MAX40002/MAX40003/MAX40012/MAX40013) for proper operation. Remove R1 and eliminate V<sub>PJ</sub> if evaluating the push-pull output devices (MAX40004/MAX40005/MAX40014/MAX40015).

### Ordering Information

PART*	U1 IC (INSTALLED)	V <sub>REF</sub> (V)	TYPE	SWAP U1 IC TO EVALUATE
MAX40002EVKIT#	MAX40002ANS02+	0.2	EV Kit	MAX40012
MAX40003EVKIT#	MAX40003ANS02+	0.2	EV Kit	MAX40013
MAX40004EVKIT#	MAX40004ANS02+	0.2	EV Kit	MAX40014
MAX40005EVKIT#	MAX40005ANS02+	0.2	EV Kit	MAX40015

#Denotes RoHS-compliant

**MAX40002–MAX40005 EV Kit Bill of Materials\***

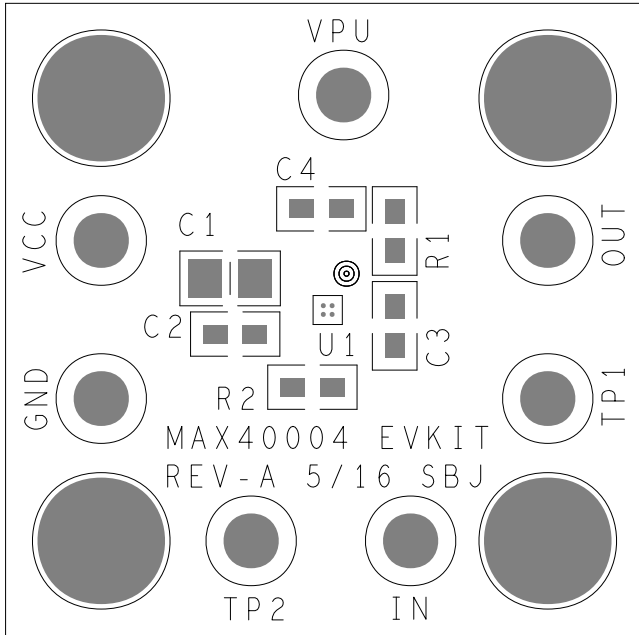
ITEM	REF_DES	DNI/ DNP	QTY	MFG PART #	MFCTR	VALUE	DESCRIPTION
1	C1	-	1	GRM21BR71A475KA73; LMK212B7475KG-T	MURATA/TAIYO YUDEN	4.7UF	CAPACITOR; SMT (0805); CERAMIC CHIP; 4.7UF; 10V; TOL=10%; MODEL=GRM SERIES; TG=-55 DEGC TO +125 DEGC; TC=X7R
2	C2, C4	-	2	C1608X7R1E104K080AA	TDK	0.1UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1UF; 25V; TOL=10%; MODEL=C SERIES; TG=-55 DEGC TO +125 DEGC; TC=X7R
3	GND, TP1, TP2	-	3	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;
4	IN, OUT, VCC, VPU	-	4	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;
5	U1	-	1	MAX40004ANS+	MAXIM	MAX40004ANS+	EVKIT PART-IC; COMP; 600NA; 4-BUMP ULTRA-TINY COMPARATOR; PACKAGE OUTLINE: 21-100103; PACKAGE CODE: N40C0+1; WLP4
6	C3	DNP	0	C1608X7R1E104K080AA	TDK	0.1UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1UF; 25V; TOL=10%; MODEL=C SERIES; TG=-55 DEGC TO +125 DEGC; TC=X7R
7	R1, R2	DNP	0	ERA-3ARB104	PANASONIC	100K	RESISTOR; 0603; 100K OHM; 0.1%; 10PPM; 0.1W; THIN FILM
8	PCB	-	1	MAX40004	MAXIM	PCB	PCB Board:MAX40004 EVALUATION KIT
TOTAL			12				

\*Specified for the MAX40004. For other variants, change U1 to the desired device. All other components are the same.

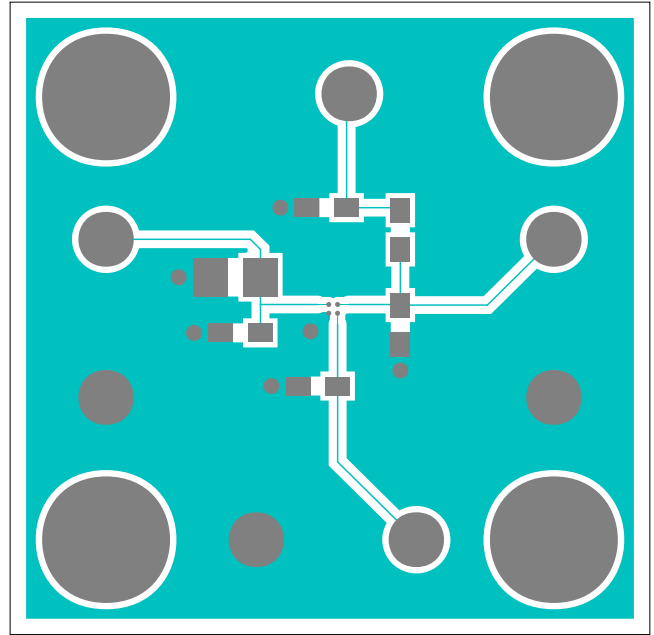
MAX40002–MAX40005  
Evaluation Kits

Evaluates: MAX40002–MAX40005  
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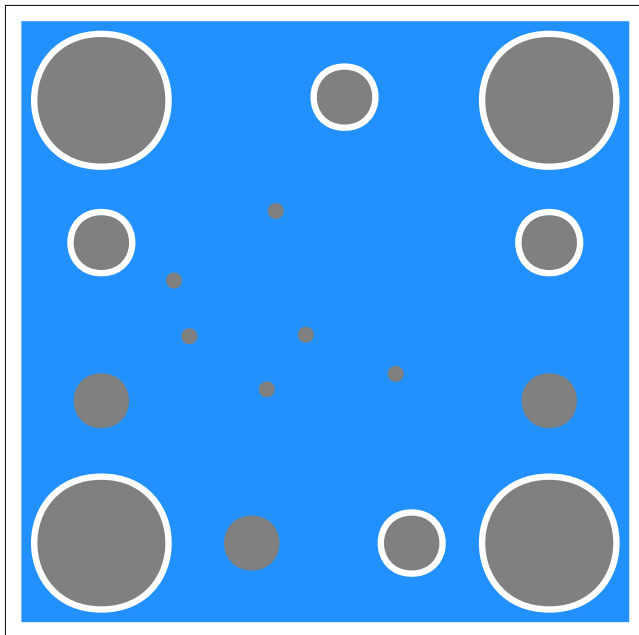
MAX40002–MAX40005 EV Kit PCB Layout Diagrams\*



MAX40002–MAX40005 EV Kit—Top Silkscreen



MAX40002–MAX40005 EV Kit—Top



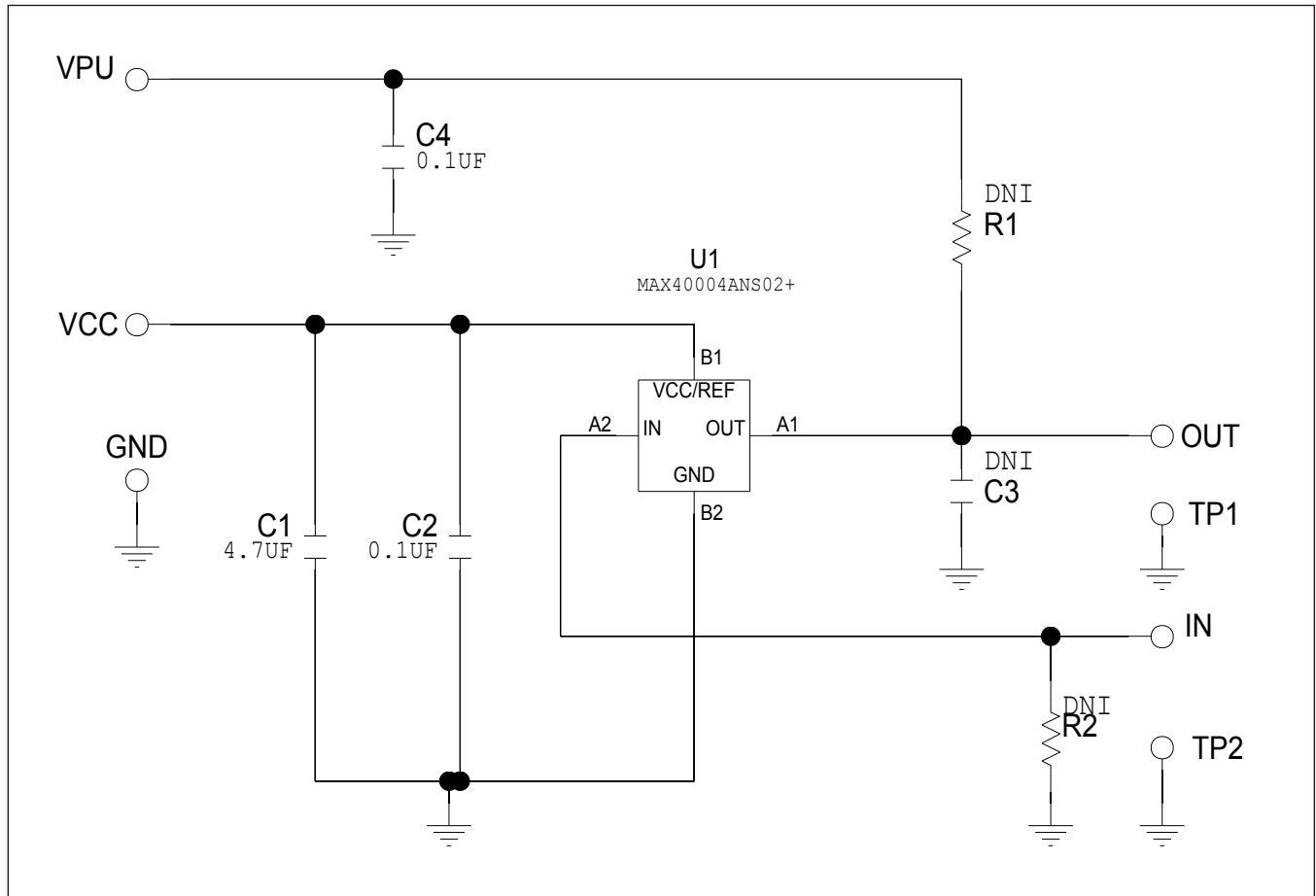
MAX40002–MAX40005 EV Kit—Bottom



MAX40002–MAX40005 EV Kit—Bottom Silkscreen

\*Specified for the MAX40004. For other variants, change U1 to the desired device. All other components are the same.

MAX40002–MAX40005 EV Kit Schematic\*



\*Specified for the MAX40004. For other variants, change U1 to the desired device. All other components are the same.

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## Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	1/17	Initial release	—
1	2/20	Added MAX40012–MAX40015 part numbers to data sheet	1–6

For pricing, delivery, and ordering information, please visit Maxim Integrated's online storefront at <https://www.maximintegrated.com/en/storefront/storefront.html>.

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