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Evaluates: MAX40070

MAX40070 Evaluation Kit

General Description

The MAX40070 evaluation kit (EV kit) is fully assembled and tested PC board that evaluates the MAX40070 single comparator with internal voltage reference. The MAX40070 EV kit has an open-drain output. The EV kit comes with a MAX40070ANA16+ installed that operates of a VDD supply between 3.1V and 36V, an internal reference voltage of 1.6V, and has a wide 0V to +24.2V input voltage (IP) range. The EV kit demonstrates the MAX40070ANA16+ in a tiny, 1.008mm x 1.428mm, 8-bump wafer-level package (WLP) with 0.35mm bump spacing. The EV kit can be used to evaluate the entire family of MAX40070 with 8-bump WLP option.

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

Features

- Low Operating Current of 20µA (typ)
- Input Voltage Range = 0V to 24.2V
- < 2µs Propagation Delay
- Internal High-Precision Voltage Reference
- Internal Current Source for Customized Thresholds and Hysteresis with External Resistors
- Open-Drain Output
- Tiny 8-Bump WLP (0.35mm Pitch) and TDFN (2mm x 2mm) Packages Selectable
- -40°C to 125°C Temperature Range
- Proven PCB Layout
- Fully Assembled and Tested

MAX40070 EV Kit Files

FILE	DESCRIPTION
MAX40070_WLP_ EVKIT _A_SCHEMATIC	EVKIT SCHEMATIC
MAX40070_WLP_EVKIT_A_MARKETING_PCB	EVKIT PCB LAYOUT
BUILD_BOM_MAX40070_WLP_EVKIT_A	EVKIT BILL OF MATERIALS
MAX40070_WLP_EVKIT_A_ODB	EVKIT ODB

319-100832; Rev 0; 10/21

One Analog Way, Wilmington, MA 01887 U.S.A. | Tel: 781.329.4700 |

Quick Start

Required Equipment

- MAX40070 EV kit
- +5V/+36V power supplies
- Digital multimeters (DMMs)

Procedure

The MAX40070 EV kit is fully assembled and tested. Follow steps below to verify board operation. **Caution: Do not turn on the power supply until all connections are completed.**

1) Connect the positive terminal of a DC power supply to the VDD test point and the ground terminal to the GND test point.
2) Connect the positive terminal of a DC power supply to the VPU test point and the ground terminal to the GND test point.
3) Connect the positive terminal of a DC power supply to the IP test point and the ground terminal to the GND test point.
4) Place the jumpers' position as described in Table 1.
5) Turn on the VDD power supply and set it to any voltage between 3.1V and 36V.
6) Monitor the output voltage at the REF test point using a DMM. This should be 1.6V.
7) Turn on the VPU power supply and set it to any voltage between 2V and 6V.
8) Turn on the IP power supply and set it to the desired level.
9) Monitor the output using a DMM at the OUT test point and study its response while varying voltage at IP. Ideally, the voltage at the OUT test point should be at logic-high (VPU) when voltage applied on IP is greater than 17.6V(1.6V x 11) and should be at logic-low (0V) when voltage applied on IP is less than 17.6V. The ratio of the IP pin is 11, refer to the IC data sheet for detail.

Detailed Description of Hardware

The MAX40070 EV kit is fully assembled and tested board that evaluates the 8-bump WLP MAX40070ANA16+ open-drain output comparator. The EV kit requires a 3.1V to 36V supply voltage for normal operation. The EV kit allows users to add external reference and hysteresis in addition to the internal ones through the appropriate resistors R3 and R2 provided on the EV kit board. The 3uA is from internal current source, refer to the IC data sheet for detail.

The amount of external threshold is given by the equation below, based on R3 value:

External Threshold = 3uA x R3

The amount of external hysteresis is given by the equation below, based on R2 value:

Hysteresis = 3uA x R2

The VPU test point on the EV kit is utilized to apply a pull-up supply voltage between 2V and 6V for the open-drain output for proper operation.

The MAX40070 can be disabled by placing J1 to 1-2 position, which decreases the IDD to 400nA(TYP).

There are some examples for different threshold and hysteresis combination:

- J4, J5, and J7 installed: VREF mode, internal hysteresis
- J4 DNI, J5, and J7 installed: VREF mode, customized hysteresis
- J4, J5, J7 DNI, J6 installed: IREF mode, external hysteresis and customized threshold
- J4, J5 DNI, J7 installed: VREF mode, external hysteresis and customized threshold

Table 1. Jumper Descriptions

JUMPER	SHUNT POSITION	DESCRIPTION
J1	1-2	Connects VPU to shut down the MAX40070 (U1).
	2-3*	Connects GND to enable the MAX40070 (U1).
J2	Not Installed*	
J3	Not Installed*	
J4	Installed*	No external hysteresis.
J5	Installed*	No external Ref.
J6	Not Installed*	No external Ref.
J7	Installed*	Internal Ref.
J8	Not Installed*	

**Default position.*

Component List

SUPPLIER	PHONE	WEBSITE
KEYSTONE	(516) 328-7500	www.keyelco.com/
WURTH ELECTRONICS INC	+1 877 6902207	www.we-ics.com
TDK	+81 3 67 78 10 00	www.tdk-electronics.tdk.com/
KEMET	+91-95131-45888	www.kemet.com/en/us.html
AVX	+1 (864) 967-2150	www.avx.com/
LITE-ON ELECTRONICS INC.	0515-83368598	www.liteon.com/en-us
SAMTEC	1-800-726-8329	www.samtec.com/
VISHAY	1-800-344-4539	www.vishay.com/
PANASONIC	0571-87257895	www.panasonic.cn/
BOURNS	+1 951-781-5500	www.bourns.com/
YAGEO	+886 2 6629 9999	www.yageo.com/en/Home
MAXIM	408-601-1000	www.maximintegrated.com/en.html

Note: *Indicate that you are using the MAX40070 when contacting these component suppliers.*

Ordering Information

PART	TYPE
MAX40070EVKIT#	EV Kit

#Denotes RoHS compliance.

MAX40070 EV Kit Bill of Materials

ITEM	QTY	REF DES	MAXINV	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
1	1	C1	20-0001U-P6	GRM188R71E105KA12;TMK107B7105KA; 06033C105KAT2A;C1608X7R1E105K080AE	MURATA;TAIYO YUDEN;AVX;TAIYO YUDEN	1UF	CAP; SMT (0603); 1UF; 10%; 25V; X7R; CERAMIC	
2	1	C2	20-000U1-03	885012206071;C1608X7R1E104K080AA; C0603C104K3RAC;GRM188R71E104KA01; C1608X7R1E104K;06033C104KAT2A	WURTH ELECTRONICS INC;TDK;KEMET;MURATA;TDK;AVX	0.1UF	CAP; SMT (0603); 0.1UF; 10%; 25V; X7R; CERAMIC	
3	1	C3	20-0005P-I2	C0805C509C5GAC	KEMET	5PF	CAP; SMT (0805); 5PF; 50V; C0G; CERAMIC	
4	2	C4, C5	EC111000006353	06033C101KAT2A	AVX	100PF	CAP; SMT (0603); 100PF; 10%; 25V; X7R; CERAMIC	
5	8	ENB, GND_1, HYST, IM, IP, OUT, REF, VPU	02-TPCOMP5007-00	5007	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; WHITE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST	
6	1	GND	02-TPCOMP5006-00	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; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST	
7	1	J1	01-TSW10307TS3P-17	TSW-103-07-T-S	SAMTEC	TSW-103-07-T-S	CONNECTOR; THROUGH HOLE; TSW SERIES; SINGLE ROW; STRAIGHT; 3PINS	
8	7	J2-J8	01-TSW10207TS2P-17	TSW-102-07-T-S	SAMTEC	TSW-102-07-T-S	CONNECTOR; THROUGH HOLE; TSW SERIES; SINGLE ROW; STRAIGHT; 2PINS; -55 DEGC TO +105 DEGC	
9	4	MH1-MH4	02-SOM35016H-00	9032	KEYSTONE	9032	MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON	
10	1	R1	80-0100K-25	CRCW0805100KFK;RK73H2ATTD1003; ERJ-6ENF1003	VISHAY DALE;KOA SPEER;PANASONIC	100K	RES; SMT (0805); 100K; 1%; +/-100PPM/DEGC; 0.1250W	
11	1	R2	80-003K3-25	CRCW08053K30FK	VISHAY DALE	3.3K	RES; SMT (0805); 3.3K; 1%; +/-100PPM/DEGC; 0.1250W	
12	1	R3	80-0499K-25	CRCW0805499KFK	VISHAY DALE	499K	RES; SMT (0805); 499K; 1%; +/-100PPM/DEGC; 0.1250W	
13	1	U1	00-SAMPLE-01	MAX40070_WLP	MAXIM	MAX40070_WLP	EVKIT PART - IC; CC10; HIGH VOLTAGE COMPARATOR; PACKAGE OUTLINE DRAWING: 21-100566; PACKAGE CODE: N81B1+1; 0.35MM PITCH; WLP8	
14	1	U2	00-SAMPLE-03	MAX40070_TDFN	MAXIM	MAX40070_TDFN	EVKIT PART - IC; CC10; HIGH VOLTAGE COMPARATOR; PACKAGE OUTLINE DRAWING: 21-100514; LAND PATTERN NUMBER: 90-100183 PACKAGE CODE: T822C+6C; 0.50MM PITCH; TDFN8	
15	1	VDD	02-TPCOMP5005-00	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; RECOMMENDED FOR BOARD THICKNESS=0.062IN	
16	1	PCB	N/A	CC10_WLP_LABS_P1	MAXIM	PCB	PCB:CC10_WLP_LABS_P1	-
TOTAL	33							

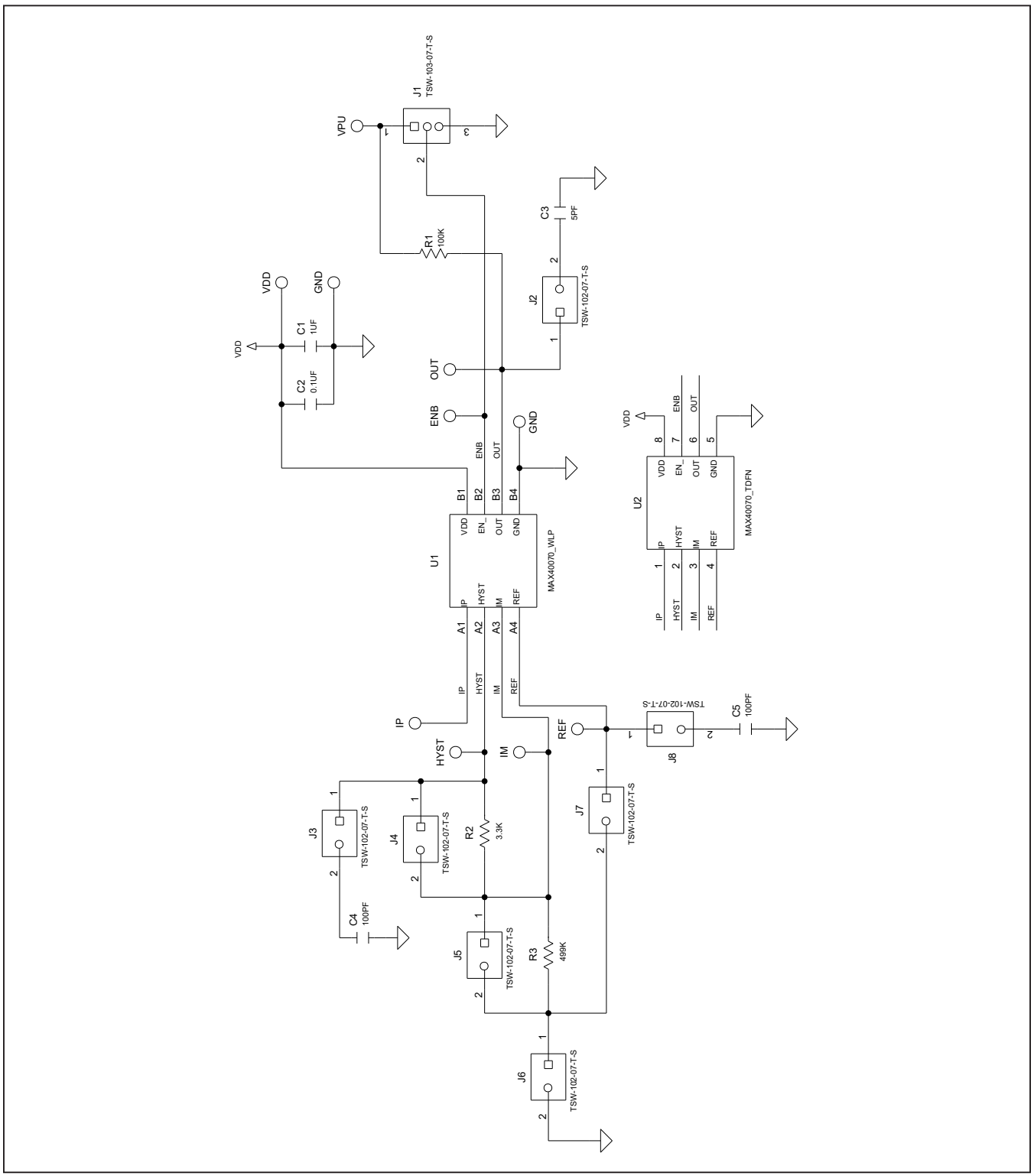
PURCHASE(DNP)

ITEM	QTY	REF DES	MAXINV	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
TOTAL	0							

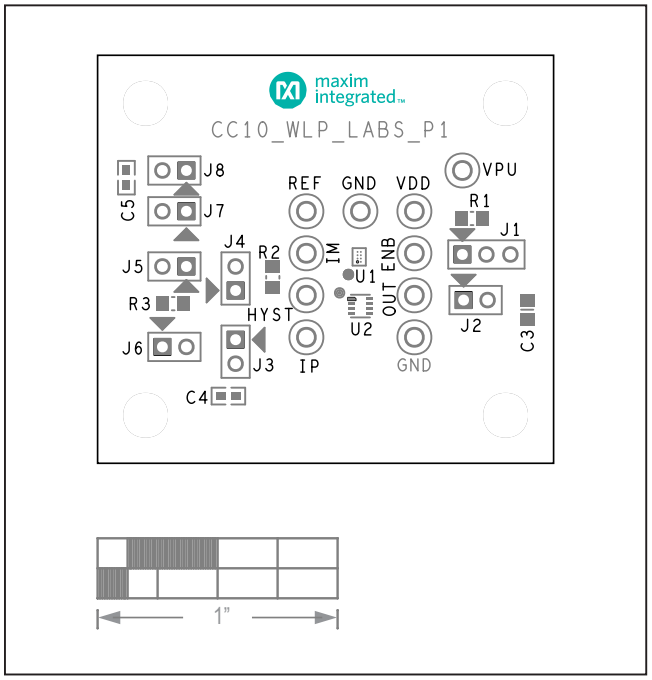
hot assembled on PCB and will be shipped with PCB)

ITEM	QTY	REF DES	MAXINV	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
TOTAL	0							

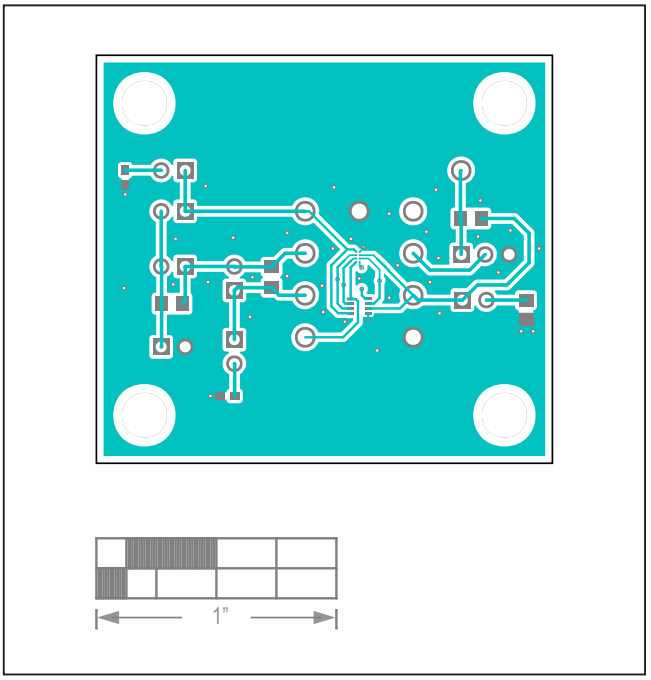
MAX40070 EV Kit Schematic



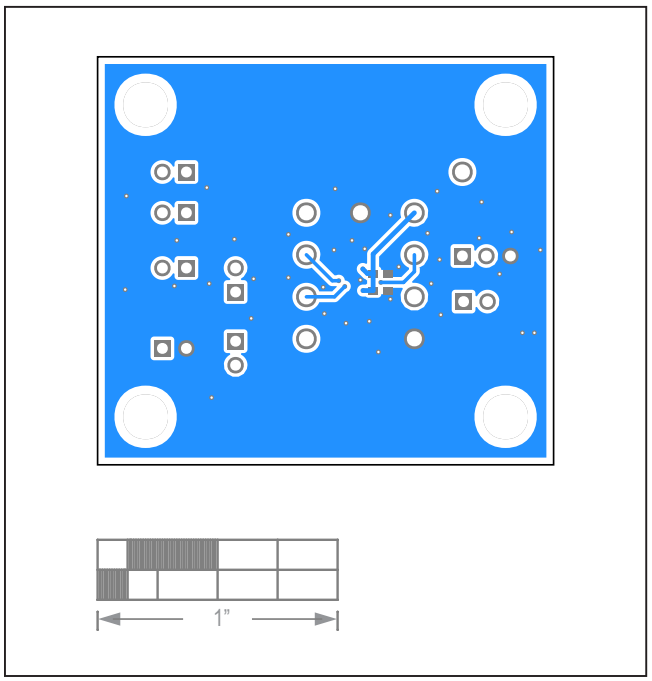
MAX40070 EV Kit PCB Layouts



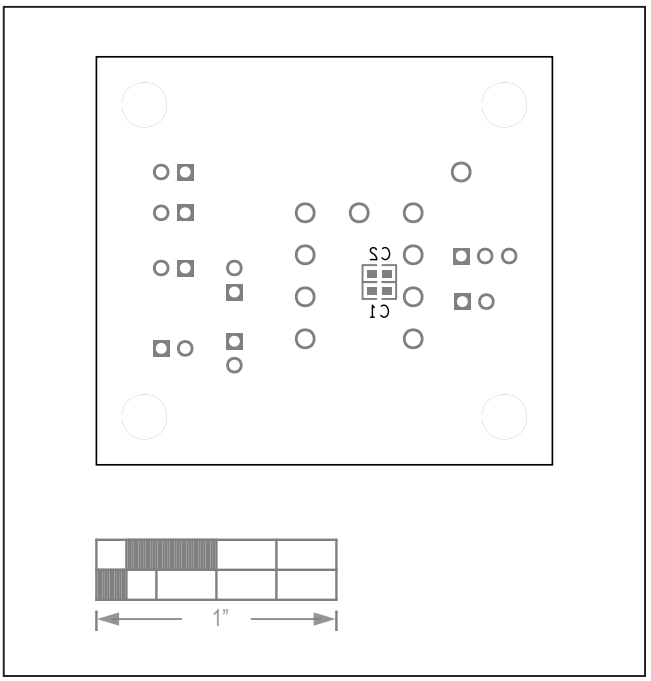
MAX40070 EV Kit PCB Layout—Silk Top



MAX40070 EV Kit PCB Layout—Top



MAX40070 EV Kit PCB Layout—Bottom



MAX40070 EV Kit PCB Layout—Silk Bottom

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	10/21	Initial release	—