

## MAX49017 Evaluation Kit

Evaluates: MAX49017

### General Description

The MAX49017 evaluation kit (EV kit) is a fully assembled and tested circuit board to evaluate MAX49017 dual comparator with internal voltage reference. The MAX49017 EVKIT comes with a MAX49017ATA/VY+ installed that operate off a  $V_{CC}$  supply between 1.7V and 5.5V, an internal reference voltage of 1.252V, and have a wide -0.2V to +5.7V input voltage ( $V_{IN}$ ) range. This EV kit demonstrates the MAX49017ATA/VY+ in an 8-pin 2mm x 2mm TDFN package with side-wettable flanks.

### Features

- 1.7V to 5.5V Supply Voltage Range
- -0.2V to  $V_{DD} + 0.2V$  Input Voltage Range
- Configured to Add External Hysteresis
- Dual-Channel Comparator with Built-in 1.252V Voltage Reference
- 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:

- MAX49017 EV kit
- 1.7V to 5.5V, 100mA DC power supply
- Precision voltage calibrator
- Two digital multimeters

#### Procedure

Follow the steps to verify board operation.

**Caution:** Do not turn on power supplies until all connections are completed and turn on  $V_{CC}$  supply before turning on power supplies on the input pins.

- 1) Verify that shunts on J1, J2 are open and shunts on J6 is installed.
- 2) Set a DC power supply to 3.3V connect the positive terminal of the power supply to the  $V_{DD}$  test point and the ground terminal to the GND test point.
- 3) Set precision voltage calibrator to 2.5V. Connect the positive terminal of the calibrator to the INA+ test point and the ground terminal to the GND test point.
- 4) Now short a wire between the INA+ test point and INB+ test point. Also, short a wire between the REF/INA- to INB- test points.
- 5) Enable DC power supply on  $V_{CC}$  first and then turn on voltage calibrator on INA+ test point.
- 6) Verify that OUTA and OUTB are at logic-high (3.3V).
- 7) Decrease the voltage set on INA+ test point to 1V on voltage calibrator and that in turn decreases voltage on INB+ test point as there is a short in between INA+, INB+, as discussed in step 4. Now verify that OUTA and OUTB are now at logic-low (0V).

### Detailed Description of Hardware

The MAX49017 EV kit by default comes with MAX49017 IC, which is a dual comparator with internal voltage reference and push-pull output in 8-pin TDFN package. The EV kit operates from a single 1.7V to 5.5V DC power supply.

#### Default Application Circuit

The EV kit comes preconfigured using a single supply configuration on generic dual comparator configuration.

These EV kits allow users to add external hysteresis in addition to the 2.5mV internal hysteresis through the addition of appropriate resistors on the R1 and R3 pads provided on the EV board for CHA. The amount of hysteresis added is given by the equation below, based on R1, R3 values:

$$\text{HYSTERESIS} = \frac{R3}{R1} \times V_{CC}$$

Similarly, Hysteresis to CHB is added by appropriately choosing R4, R5 resistors.

### Other Application Circuit

This EV kit can be used in window-detector applications.

A window detector application is useful in cases when a battery voltage needs to be monitored and thrown in an interrupt on the comparator output when the battery voltage is out of the predetermined range set by user.

For example, in automotive application, 3.6V is a nominal voltage range, with 2.9V being typical end-of-line discharge state and 4.2V being the maximum charge voltage. It is useful to track whether a car battery voltage is within 2.9V to 4.2V range during operation. When the battery voltage falls out of this voltage range, a comparator in this application circuit will raise an interrupt on the output to alert the user.

To configure the EV kit in the window detector application, install jumper J2 and the appropriate resistors on the R3, R2, and R6 pads. Resistors R3, R2, and R6 pads are available for setting the overvoltage and undervoltage-threshold levels. In this application, by appropriately choosing these resistors, OUTA provides an active-low, undervoltage indication ( $\leq 2.9V$ ), while OUTB provides an active-low, overvoltage indication ( $\geq 4.2V$ ). ANDing the two outputs provides an active-high, power-good signal when battery voltage is within the 2.9V to 4.2V range. For the detailed design procedure involved in calculating R3, R2, and R6, refer to the MAX49017 IC data sheet.

**Table 1. Default Jumper Settings**

JUMPER	SHUNT POSITION	DESCRIPTION
J1	Installed	Positive feedback for external hysteresis
	Not Installed*	No feedback is connected
J2	Installed	Inbuilt voltage reference connected to INB+
	Not Installed*	Inbuilt voltage reference is not used for driving INB+
J6	Installed*	Connect $V_{DD}$ pin to test point $V_{DD}$
	Not Installed	$V_{DD}$ pin disconnect from test point $V_{DD}$

\*Default position.

### Ordering Information

PART	TYPE
MAX49017EVKIT#	EV Kit

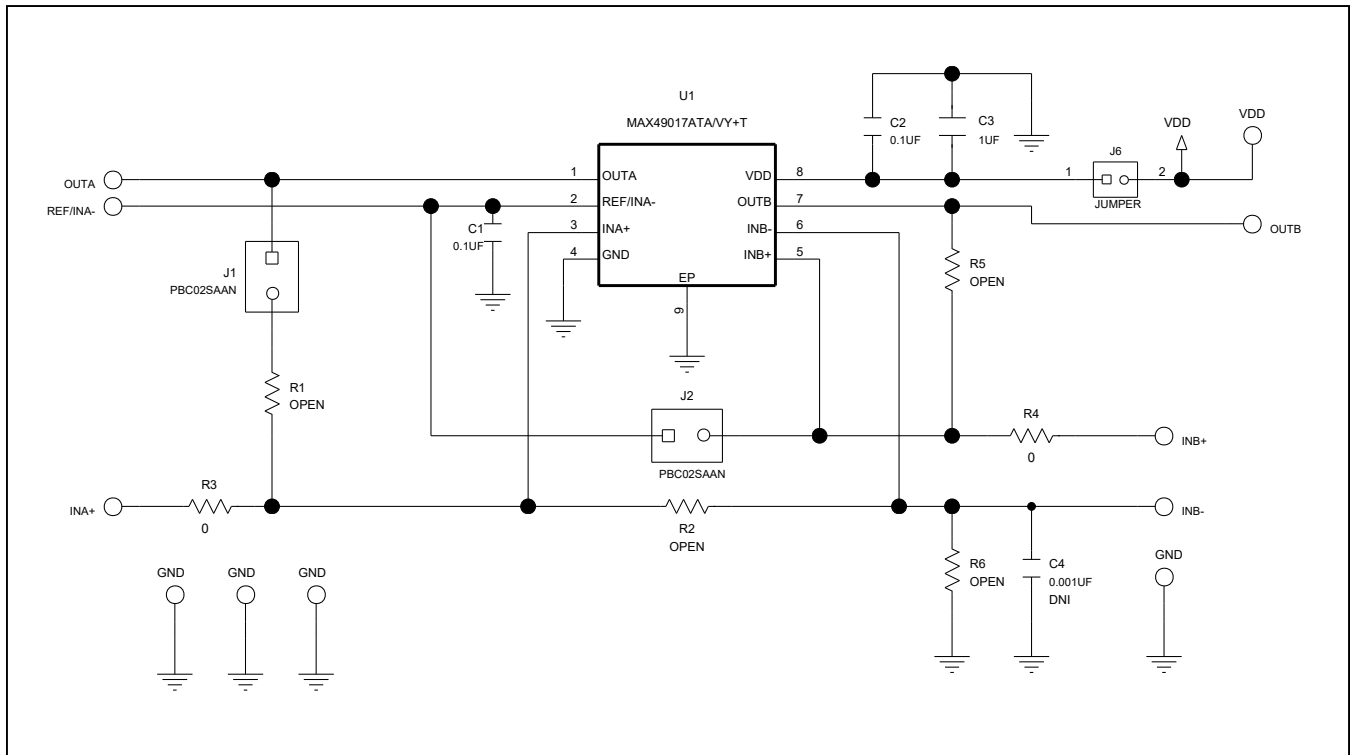
#RoHS compliant.

MAX49017 EV Kit Bill of Materials

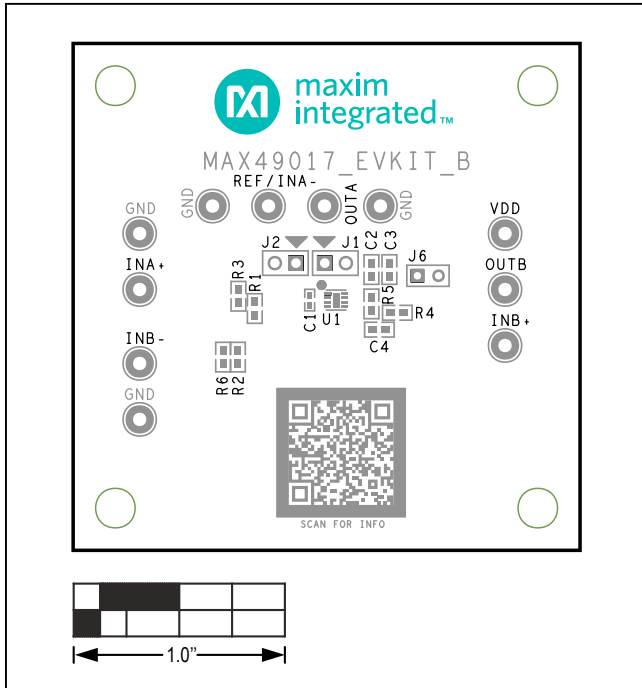
NOTE: DNI--> DO NOT INSTALL(PACKOUT) ; DNP--> DO NOT PROCURE

ITEM	REF_ DES	DNI/ DNP	QTY	MFG PART #	MFG	VALUE	DESCRIPTION
1	A1, TP1-TP3	-	4	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;
2	C1	-	1	C1005X5R1A104K050BA;LMK105BJ104KV	TDK;TAIYO YUDEN	0.1UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.1UF; 10V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R
3	C2	-	1	C1608X8R1E104K080AA	TDK	0.1UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1UF; 25V; TOL=10%; TG=-55 DEGC TO +150 DEGC; TC=X8R
4	C3	-	1	GRMT188R71E105KAT2; CGA3E1X7R1E105K; TMK107B7105KA; 06033C105KAT2A; GCM188R71E105KA64; C1608X7R1E105K080AE; CGA3E1X7R1E105K080AC	MURATA; TDK;TAIYO YUDEN; AVX; MURATA; TAIYO YUDEN;TDK	1UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 1UF; 25V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R
5	INA+, INB+, INB-, OUTA, OUTB, REF/INA-	-	6	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;
6	J1, J2	-	2	PBC02SAAN	SULLINS ELECTRONIC S CORP.	PBC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS
7	J6	-	1	800-10-002-10-001000	MILLMAX	HEADER_2P	CONNECTOR, FEMALE, TH, BREAKAWAY, STR, 2PINS
8	R3, R4	-	2	RC1608J000CS;CR0603-J/-000ELF;RC0603JR-070RL	SAMSUNG ELECTRONIC S;BOURNS; YAGEO PH	0	RESISTOR; 0603; 0 OHM; 5%; JUMPER; 0.10W; THICK FILM
9	SPACER 1- SPACER 4	-	4	9032	KEYSTONE	9032	MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON
10	SU1, SU2, SU6	-	3	S1100-B;SX1100-B;STC02SYAN	KYCON; KYCON; SULLINS ELECTRONIC S CORP.	SX1100-B	TEST POINT; JUMPER; STR; TOTAL LENGTH=0.24IN; BLACK; INSULATION=PBT;PHOSPHOR BRONZE CONTACT=GOLD PLATED
11	U1	-	1	MAX49017ATA/VY+T	MAXIM	MAX49017A TA/VY+T	EVKIT PART - IC; MAX49017ATA/VY+T; 1.7V; DUAL NANOPOWER COMPARATOR WITH BUILT-IN REFERENCE; PACKAGE OUTLINE: 21-100185; PACKAGE LAND PATTERN: 90-
12	VDD	-	1	5010	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SIL;
13	PCB	-	1	MAX49017	MAXIM	PCB	PCB:MAX49017
14	C4	DNP	0	C0603C102M3GAC	KEMET	0.001UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 0.001UF; 25V; TOL=20%; MODEL=C SERIES; TG=-55 DEGC TO +125 DEGC
15	R1, R2, R5, R6	DNP	0	N/A	N/A	OPEN	PACKAGE OUTLINE 0603 RESISTOR
TOTAL			28				

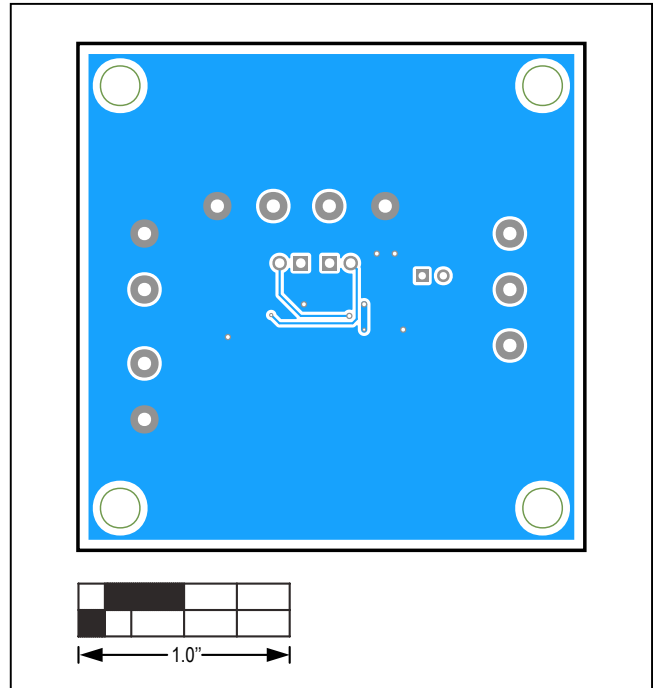
MAX49017 EV Kit Schematic



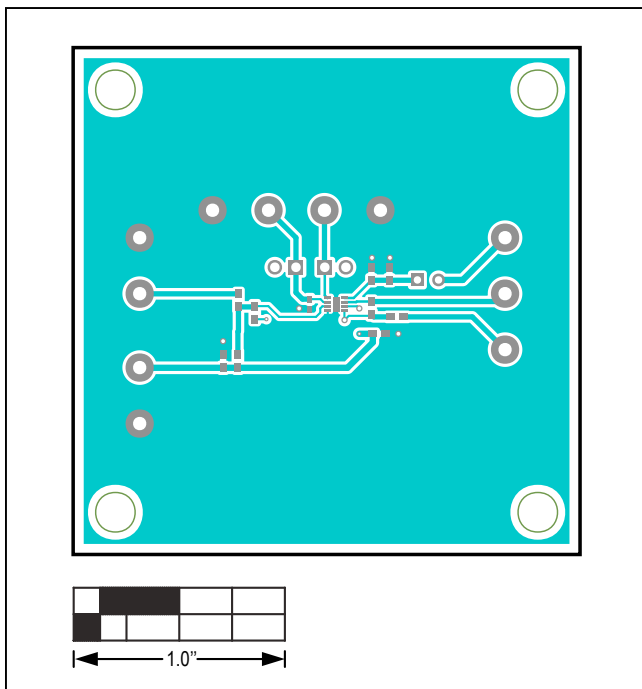
MAX49017 EV Kit PCB Layout Diagrams



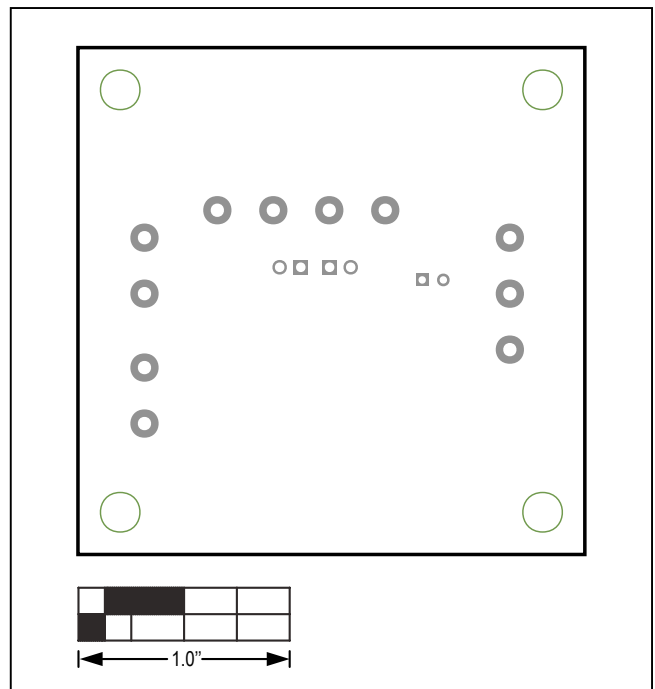
MAX49017 EV Kit—Top Silkscreen



MAX49017 EV Kit—Bottom View



MAX49017 EV Kit—Top View



MAX49017 EV Kit—Bottom Silkscreen

## Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/19	Initial release	—
1	8/19	Updated Bill of Materials	3

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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## MAXESSENTIAL01+

### Description

The Essential Analog toolkit contains a unique collection of Maxim's high-performance, analog building block products. This curated group of parts represent a selection of Maxim's vast product lines, specific to 20 product categories, from key performance areas including power efficiency, precise measurement, reliable connectivity, and robust protection.

The ICs in the toolkit offer the breadth of each product category: low power, low noise, multi-channel, high resolution, high accuracy, and high speed. All these features empower your designs and bring value to your systems.

At 6.4cm x 8.9cm x 1.3cm, the box itself is small, lightweight, and easy to carry. Products are guarded from ESD using a gel and ESD-protected box.

A guide that labels each of the part types inside the box supports the toolkit. Go to the Maxim website to find more information for the individual part numbers.

When planning your next design, pick up an Essential Analog toolkit to review Maxim's high-performance analog products.

### Key Features

- Small, 6.4cm x 8.9cm x 1.3cm Package
- ESD Protection-Lined Package
- Accelerate Your Design with Quick Access



What's Included in the Box?

Efficient Power				
Buck	Boost	Buck-Boost	LDO	Continua
MAX38640 MAX15026	MAX17225 MAX668	MAX77827 MAX77816	MAX38902B MAX1510	MAX38888
Precision Measurement				
ADC	DAC	Audio Amp	Op Amp	CSA
MAX11410 MAX11168	MAX5541 MAX5715	MAX98357A MAX98390	MAX40075 MAX40100	MAX44284 MAX40201
Rugged Connectivity				
RS-485	RS-232	CAN	BTR Switch	Wireless
MAX14780E MAX3485AE	MAX13235E MAX33250E	MAX13054A MAX33054E	MAX14778 MAX14763	MAX41460 MAX7034
Robust Protection				
Supervisor	Temp Sensor	Isolator	Ideal Diode/V <sub>REF</sub>	RTC
MAX16150 MAX16140	MAX6680 MAX31875	MAX12930 MAX22445	MAX40203 MAX6078A	MAX31341B DS3231MZ