

Evaluating the **ADCMP380-2** Ultralow Power Voltage Comparator with Reference

FEATURES

On-board **ADCMP380-2** comparator with configurable hysteresis and an internal reference of 0.5 V with $\pm 2.2\%$ accuracy

Separate voltage supply and input pin (INPUT) for low voltage monitoring

Enable pin (EN) for input condition override

Built in LED for output monitoring

EQUIPMENT NEEDED

Oscilloscope

User defined VCC power supply

User defined INPUT power supply

DOCUMENTS NEEDED

[ADCMP380-2 data sheet](#)

GENERAL DESCRIPTION

Through the system shown in Figure 2, the ADCMP380-EVALZ evaluates the **ADCMP380-2** ultralow power voltage comparator that has a 0.5 V internal reference with $\pm 2.2\%$ accuracy. The internal precision reference and the low input leakage current of the **ADCMP380-2** allows the user to monitor the voltage of interest accurately through circuit resistors (R1, R2, and R4). These resistors can be configured to add a desired hysteresis to the input and prevent oscillations at the output.

A separate supply for the ADCMP380-EVALZ INPUT pin can be used to achieve low voltage monitoring. The user can also place an external jumper on the ADCMP380-EVALZ VCC_SEL pin to combine the voltage supply of the VCC pin and the monitoring INPUT pin on the ADCMP380-EVALZ.

ADCMP380-EVALZ EVALUATION BOARD PHOTOGRAPH

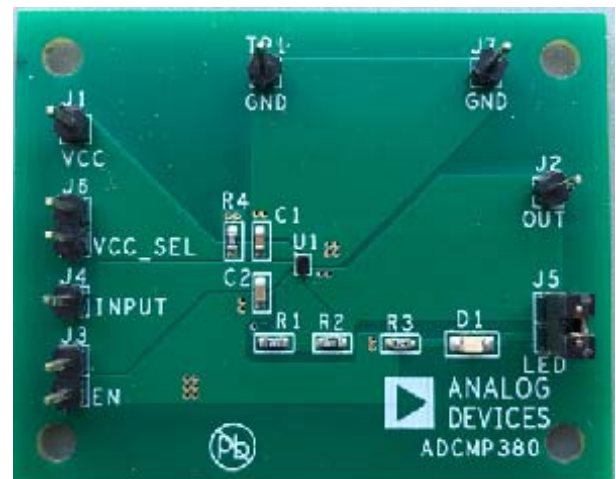


Figure 1.

The ADCMP380-EVALZ has an OUT pin that can be held low regardless of the ADCMP380-EVALZ INPUT pin state when an external jumper is placed on the ADCMP380-EVALZ EN pin, which shorts the EN pin to ground. A built in light emitting diode (LED) is placed at the ADCMP380-EVALZ OUT pin to monitor the pin status depending on the ADCMP380-EVALZ INPUT pin configuration.

The user can replace the on-board comparator with the **ADCMP380-1** to have an internal reference of 1 V that is accurate up to $\pm 1.6\%$. The examples in this user guide only evaluate the **ADCMP380-2**. The level of monitored input and output voltages differ when using the **ADCMP380-1** model.

For full details on the **ADCMP380-2** and **ADCMP380-1**, see the **ADCMP380** data sheet, which must be consulted in conjunction with this user guide when using the ADCMP380-EVALZ.

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REVISION HISTORY

3/2020—Revision 0: Initial Version

EVALUATION BOARD CONNECTION DIAGRAM

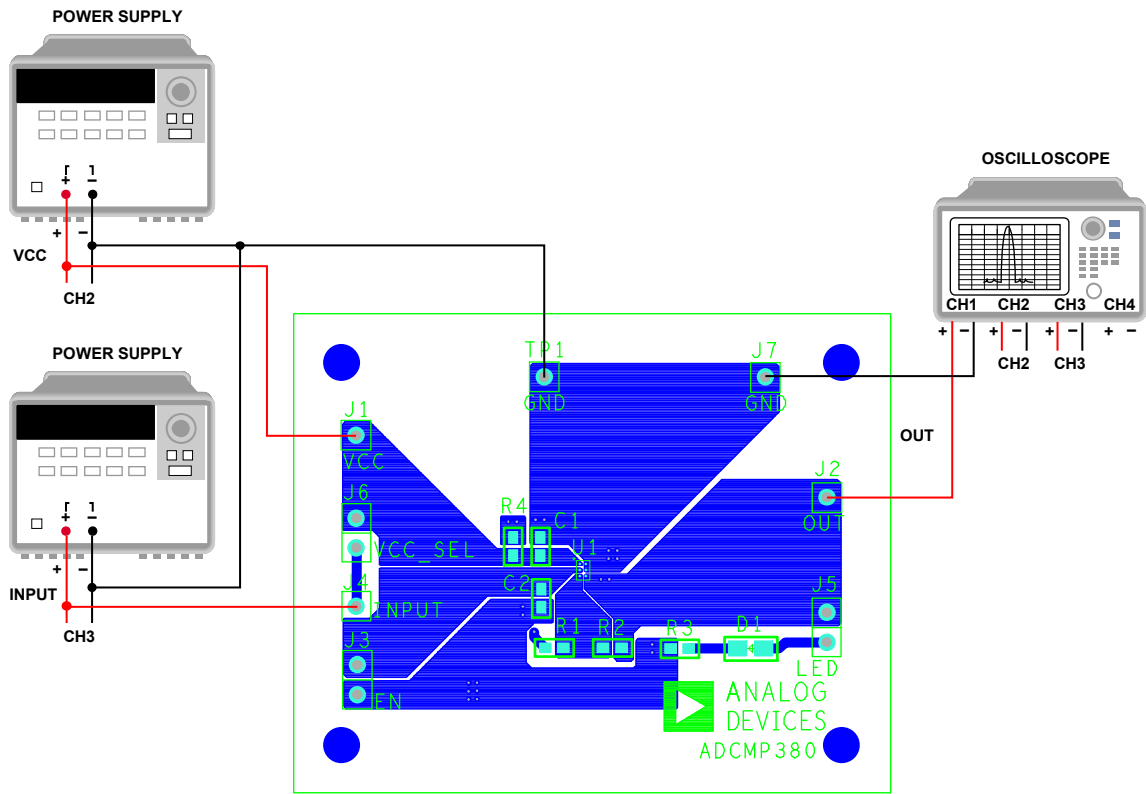


Figure 2. ADCMP380-EVALZ Connection Diagram

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USING THE EVALUATION BOARD

This section explains how to evaluate the performance of the [ADCMP380-2](#) using the ADCMP380-EVALZ. For this procedure, refer to Figure 2, Figure 3, and Figure 4 and take the following steps:

1. Connect the power supplies and the oscilloscope to the ADCMP380-EVALZ, as shown in the Figure 2 connection diagram.
2. Use Channel 1, Channel 2, and Channel 3 on the oscilloscope to monitor the ADCMP380-EVALZ OUT pin, VCC pin, and INPUT pin, respectively.
3. Use an external jumper to short the ADCMP380-EVALZ LED pin and to monitor the OUT pin with the built in LED.
4. Set the ADCMP380-EVALZ VCC and INPUT supply pins to 3 V and 1 V, respectively.
5. Take the following steps to check the comparator output:
 - a. Apply the voltage to the ADCMP380-EVALZ VCC and INPUT supply pins to turn on the built in LED and cause the ADCMP380-EVALZ OUT pin to go high.
 - b. Use an external jumper to short the ADCMP380-EVALZ EN pin to ground. The built in LED turns off and the ADCMP380-EVALZ OUT pin goes low.
 - c. Remove the external jumper from the ADCMP380-EVALZ EN pin. The built in LED turns from off to on and the ADCMP380-EVALZ OUT pin goes from low to high.
6. Take the following steps to check the comparator input:
 - a. Vary the supply voltage of the ADCMP380-EVALZ INPUT pin slowly from 1 V to 0 V while monitoring the ADCMP380-EVALZ OUT pin waveform until the OUT pin goes low. Record the INPUT pin voltage at the point where the OUT pin goes low. This voltage is called the $V_{IN\ FALLING}$ of the INPUT pin.
 - b. Vary the supply voltage of the ADCMP380-EVALZ INPUT pin slowly from 0 V to 1 V while monitoring the ADCMP380-EVALZ OUT pin waveform until the OUT pin goes high. Record the INPUT pin voltage at the point where the OUT pin goes high. This voltage is called the $V_{IN\ RISING}$ of the INPUT pin.

The $V_{IN\ FALLING}$ and $V_{IN\ RISING}$ values depend on the ADCMP380-EVALZ INPUT pin voltage and the circuit resistors (R1, R2, and R4). The $V_{IN\ FALLING}$ and $V_{IN\ RISING}$ in the ADCMP380-EVALZ configuration must be 0.36345 V to 0.38655 V and 0.5379 V to 0.5621 V, respectively. Note that these values do not consider the resistor tolerance and the device built in hysteresis.

EVALUATION BOARD SCHEMATIC AND ARTWORK

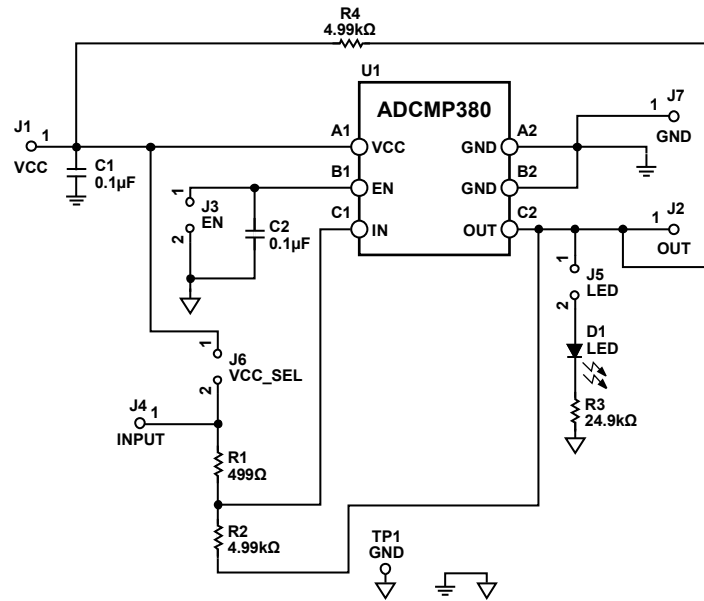


Figure 3. ADCMP380-EVALZ Schematic

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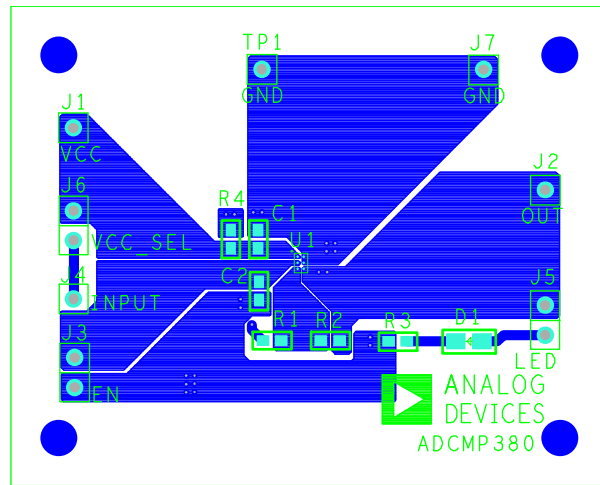


Figure 4. ADCMP380-EVALZ Top Assembly

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ORDERING INFORMATION

BILL OF MATERIALS

Table 1.

Qty	Reference Designator	Description	Manufacturer	Part Number
2	C1, C2	0.1 μ F capacitors	Murata	GRM188R71H104KA93
1	D1	LED	Lumex	SML-LXT0805IW-TR
8	J1 to J7, TP1	Connector headers	Wurth Elektronik	61304011121
1	R1	499 Ω , 1% resistor	Vishay Dale	CRCW0603499RFKEA
2	R2, R4	4.99 k Ω , 1% resistors	Vishay Dale	CRCW06034K99FKEA
1	R3	24.9 k Ω , 1% resistor	Vishay Dale	CRCW060324K9FKEA
1	U1	Ultralow power voltage comparator with reference	Analog Devices, Inc.	ADCMP380-2ACBZ-RL7



ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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