

ZXCT1051 EV1

ZXCT1051EV1 EVALUATION BOARD USER GUIDE

DESCRIPTION

The ZXCT1051EV1 is intended for the evaluation of the ZXCT1051 device. The ZXCT1051 is a current monitor providing a fixed voltage gain of 10. The device is suitable for high side or low side sensing.

The device produces a voltage output proportional to the current sampled by a small inline sensing resistor, R_{sense} . The voltage output is scaled by the choice of R_{sense} .

As delivered the board is set up to provide an output of 1.5V from a current of 1.5A using a 100 m Ω sampling resistor.

There is a second (20m Ω) resistor that can be selected by means of a solder link and provides an output of 1.5V for a load current of 7.5A.

Additionally provision is made for a wire ended sampling resistor of the users choice.

The printed circuit board is common to other devices in the ZXCT family. For the ZXCT1051, the FLAG pin is not used.

FEATURES

- Supply Range 4.2 to 40V for 1.5V output.
- Selectable current measurement range
- 0 to (Vcc-2)V input Voltage
- 5 Pin SOT23-5 package

APPLICATIONS

- Battery Charging
- Power Supplies
- Over Current Monitoring
- Short circuit detection
- DC motor control



ORDERING INFORMATION

ORDER NUMBER
ZXCT1051EV1

Please note evaluation boards are subject to availability and qualified leads.

PAD NAMES AND DEFINITIONS

NAME	DESCRIPTION
V1	Supply Voltage
V2	Connection to Load
VOUT	Output Voltage
FLAG	Not used
GND	0V / Ground
SL1,SL2	Solder Links
Vcc	Supply for the output buffer

The ZXCT1051EV1 is configured with SL1 shorted, which gives an output of 1.5V for a 1.5A current flow.

The input voltage range for the ZXCT1051EV1 is 20V, down to a minimum of (2.7V +Vout). For example, if the required full scale output voltage is 1.5 V the input range is 4.2V to 20V.

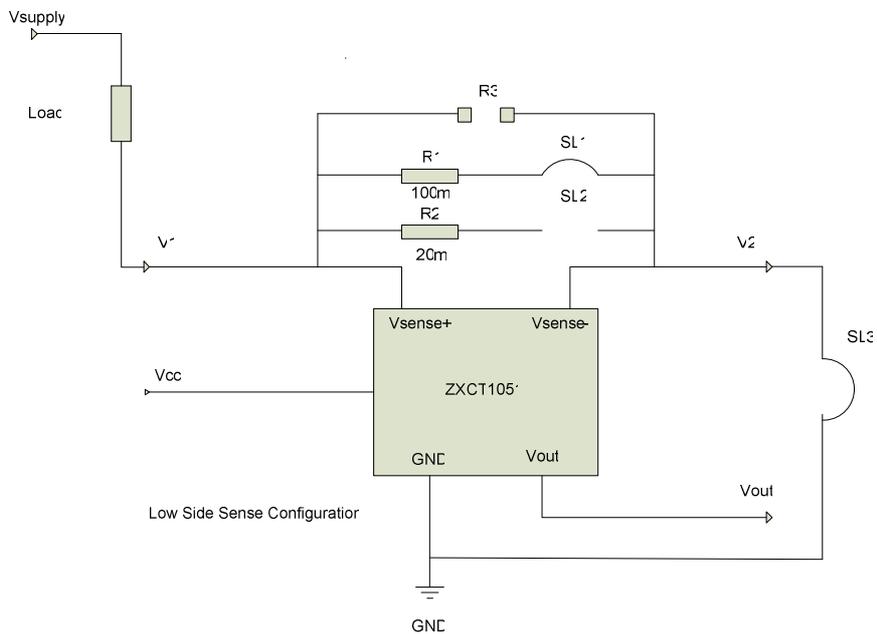
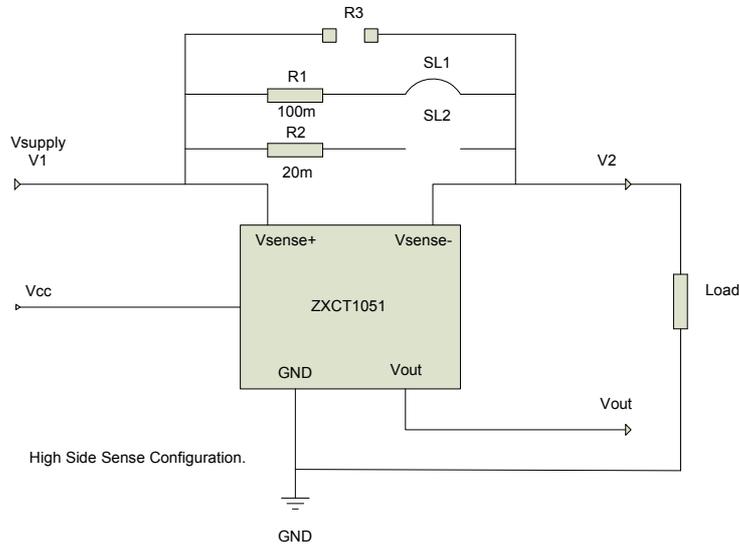
The input Voltage for the output buffer must be between 2.7V and 20V.

Target applications are battery chargers, power supply units and other applications where current measurement is a requirement.

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ZXCT1051EV1 Schematics



Sense resistor

The board has been designed with two selectable values of sense resistor. The value of the sense resistor can be chosen by using the solder links SL1 and SL2.

The board is also tracked for a user defined through hole resistor (R_3).

The 100m Ω resistor (R_1) is selected by shorting SL1 and opening SL2. This results in an output of 1.5V for a load current of 1.5A (assuming that R_3 is not fitted).

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The 20mΩ resistor (R2) is selected by shorting SL2 and opening SL1, resulting in an output of 1.5V for a load current of 7.5A (assuming that R3 is not fitted).

If both links are shorted the effective resistance is 33.33mΩ giving an output of 1.5V for a current of 9A (assuming that R3 is not fitted).

If both links are open only the optional leaded resistor R3 (if fitted) is in circuit.

The maximum power dissipation rating of the resistor must be appropriate to the load current level.

N.B. The board is set by default with SL1 shorted and SL2 open, using the 100mΩ resistor.

For further information on choosing a value of sense resistor please refer to the ZXCT1051 datasheet.

Vout

If the preset selectable values of sense resistor are chosen, the device will produce 1.5V for a 1.5A load current or 1.5V for a 7.5A load current, depending on which link is closed. The output is directly proportional to the differential voltage across the sense pins of the device.

Configuration table for ZXCT1081EV1

LOAD CURRENT (A)	R _{sense} (mΩ)	VOUT (V)	SOLDER LINK CONFIGURATION
1.5	100	1.5	Short SL1
7.5	20	1.5	Short SL2
9.0	16.67	1.5	Short SL1 & SL2

Vcc

The Vcc pin is the supply for Vout buffer and may be between 2.7V and 20V.

Configuring for High Side or Low Side Measurements.

As delivered the board is configured for Low side measurements and SL3 is closed. To configure for High side measurements, open SL3. The connections for each case are shown in the diagrams above.

Configuration for different LOAD currents.

The board can be configured for different load currents by changing the smd resistors or fitting a suitable wire ended resistor and opening both solder links. It is important to ensure an appropriate value of R_{sense} is selected to obtain the desired accuracy for a given output current.

The value of Vout is 10 times the voltage dropped across the sensing resistor, (providing that the voltage on V1 is more than 2.7V higher than the Vout.).

Choosing a larger value for R_{sense} gives a higher output voltage for a given current resulting in better resolution but at the expense of increased voltage drop and higher dissipation in R_{sense}

The ZXCT1051 is optimized for values of V_{sense} between 0 and 150mV but may be used up to 800mV.

Example: Scaling for 1.5A load current and a 500mV output.

The ZXCT1051 has a fixed gain of 10. $V_{out} = 10 \times V_{sense}$
 To obtain a 500mV output, 50mV is required between V_{sense+} and V_{sense-}.
 The value for R_{sense} is thus 50mV /1.5A = 33mΩ.

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Accuracy

The ZXCT1051 current monitor IC is a 2%¹ accurate device. The accuracy of the output voltage will be influenced by the tolerance of the external sense used. The ZXCT1051EV1 utilizes 1% accurate sense resistors.

¹ Total error at +100mV sense voltage

COMPONENTS LIST

Ref	Value	Package	Part Number	Manufacturer	Notes
R1	100mΩ	1206	LR1206-R10FI	Welwyn	SMD Sense Resistor 1%
R2	20mΩ	2512	LRF2512-R020FW	Welwyn	SMD Sense Resistor 1%
ZXCT		SOT235	ZXCT1051E5	ZETEX	

SET-UP AND TEST

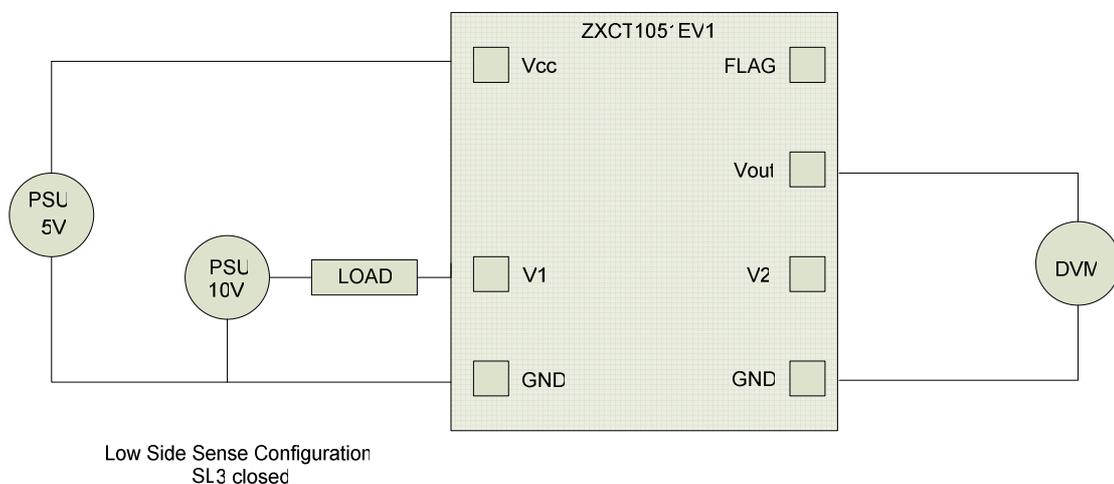
The board is preset to give an output Voltage of 1.5V for a load current of 1.5A (SL1 is shorted to connect in the 100mΩ (R1) sense resistor). The default configuration is 'low side sense'. To change the board to give an output Voltage of 1.5V for a current of 7.5A, de-solder SL1 and short SL2. This connects the 20mΩ (R2) sense resistor.

1.5 Ampere load test (low side sense)

1. Ensure SL2 and SL3 are shorted.
2. Connect a 10Ω load capable of dissipating at least 15W between a linear 15V PSU and V1.
3. Connect a linear power supply of +5V between the Vcc and GND terminals.
4. Check with a DVM the supply voltage is +15V between the V1 and GND terminals.
5. Measure VOUT with a DVM. The nominal output voltage should read 1.5V.

The device may also be evaluated with lower power loads and lower currents by increasing the value of R_{sense} . As the device reacts only to the voltage across this resistor such tests are equally valid.

CONNECTION DIAGRAM

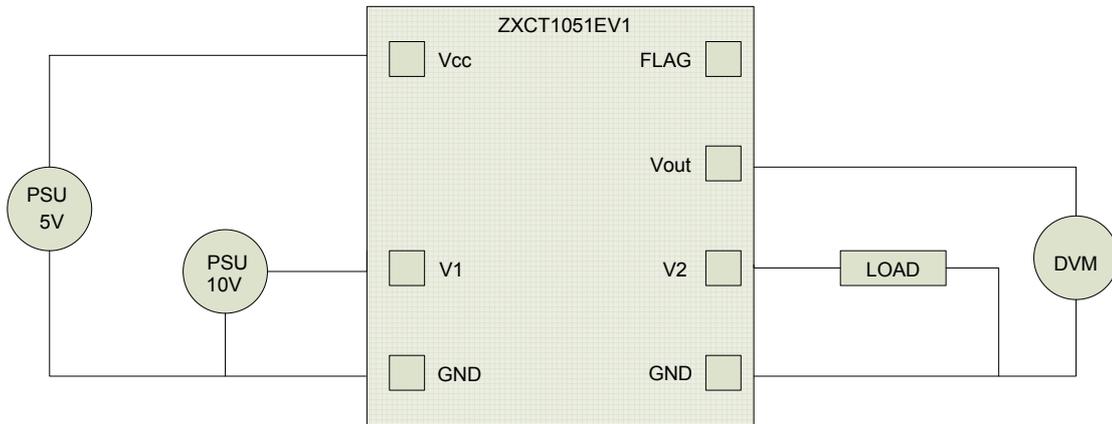


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1.5 Ampere load test (high side sense)

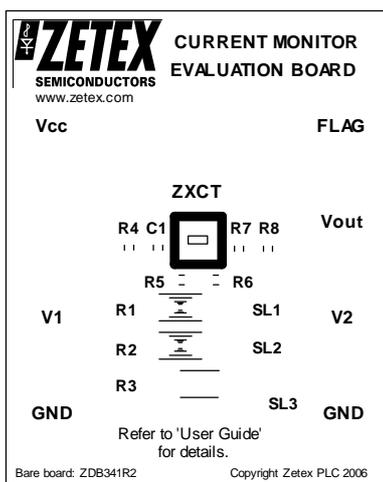
6. Ensure SL2 is shorted and SL3 is open.
7. Connect a 10Ω load capable of dissipating at least 15W between V2 and GND.
8. Connect a linear power supply of +5V between the Vcc and GND terminals.
9. Connect a linear PSU of 15V between V1 and GND.
10. Check with a DVM the supply voltage is +15V between the V1 and GND terminals.
11. Measure VOUT with a DVM. The nominal output voltage should read 1.5V.

The device may also be evaluated with lower power loads and lower currents by increasing the value of R_{sense} . As the device reacts only to the voltage across this resistor such tests are equally valid.

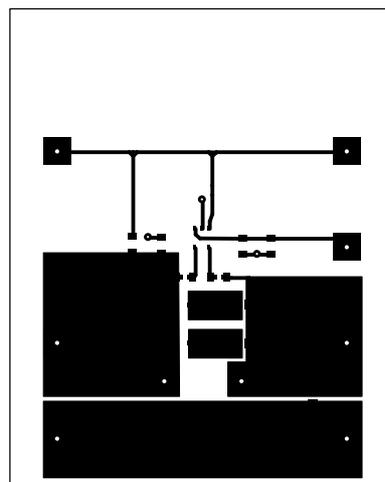


High Side Sense Configuration,
SL3 open

EVALUATION BOARD



Top Silk



Top Copper

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