

ZXCT1009EV1 USER GUIDE

DESCRIPTION

The ZXCT1009EV1 is a current monitor evaluation board which measures 0.5A, 2.0A or a 2.5A load current. This current is then translated to a proportional output current which is scaled by an external resistor to give a 2.5V full scale output voltage.

The board also incorporates additional solder pads for a user defined sense resistor to cater for additional load currents which may require measuring.

FEATURES

- Supply Range 2.5 to 20V
- Selectable current measurement range
- 2.5V Output Voltage
- 3 Pin SOT23 package

APPLICATIONS

- Battery Charging
- Power Supplies
- DC motor and solenoid control

ORDERING INFORMATION

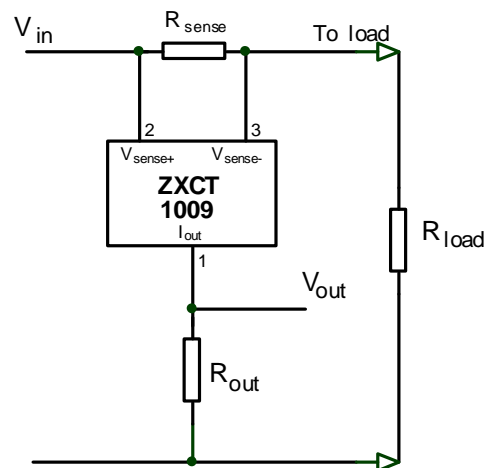
ORDER NUMBER
ZXCT1009EV1

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

PAD NAMES AND DEFINITIONS

NAME	DESCRIPTION
VIN	Supply Voltage
VLOAD	Connection to load/Battery
VOUT	Output Voltage
GND	0V – Ground
SL6,SL7	Solder Links

TYPICAL APPLICATION CIRCUIT



REFERENCE DESIGN

The ZXCT1009EV1 is configured to the reference design below. The target applications are battery chargers, power supply units and automotive current monitoring.

The input voltage range for the ZXCT1009EV1 is 20V down to a minimum of 2.5V, making in suitable for a wide range of applications.

R_{sense}

The board has been designed with three set selectable values of R_{sense}, to measure either a 0.5A, 2.0A or 2.5A range. The value of sense resistor can be chosen by using the solder links SL6 and SL7.

To measure a 0.5A load current, the 200mΩ resistor (R3) should be selected by shorting SL7. To measure a 2.0A current, the 50mΩ resistor (R2) should be selected by shorting SL6. To measure a 2.5A current, short both SL6 and SL7. The 50mΩ in parallel with the 200mΩ will give a 40mΩ resistance. RST is also available if a user defined current load level is required to be measured. This allows the user to scale in a more appropriate value of sense resistor. If the value of sense resistor is changed, the maximum power dissipation of the resistor must be appropriate to the load current level.

NB The board is set by default to measure 0.5A i.e. SL7 is shorted, utilizing the 200mΩ resistor.

For further information on choosing a value of sense resistor please refer to the ZXCT1008 datasheet or Applications note 39.

V_{out}

If the preset selectable values of sense resistor are chosen, the device will output 2.5V at both the 0.5A and 2.0A current levels. The board has been designed for each of the sense resistors to develop 100mV across them at the three levels of current.

If a RST is used at a different current level, the value of V_{out} will change.

Configuration table for ZXCT1008EV1

LOAD CURRENT (A)	R _{sense} (mΩ)	V _{OUT} (V)	SOLDER LINK CONFIGURATION
0.5	200	2.5	Short SL7
2.0	50	2.5	Short SL6
2.5	40	2.5	Short SL7 and SL6

Configuration for different LOAD currents.

The board can be configured to accommodate different load currents if necessary. If surface mount sense resistors are to be used, remove R2 and R3 and replace with a required value. RST can be used if a through hole sense resistor is used. It is important to ensure an appropriate value of R_{sense} is selected to obtain the desired accuracy for a given output current.

NB Changing the sense resistor value will change the output current. It may therefore be necessary to change R5 to obtain the required output voltage.

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

Choose a value of sense resistor to accommodate the required accuracy on the output.

Choosing 150mV would require a 100mΩ sense resistor.

$$V_{out} = 0.01 \times V_{sense} \times R_{out}$$

Therefore, the required output resistor for a 500mV output would be:

$$R_{out} = 500 \times 10^{-3} / (150 \times 10^{-3} \times 0.01) = 333.33 \Omega$$

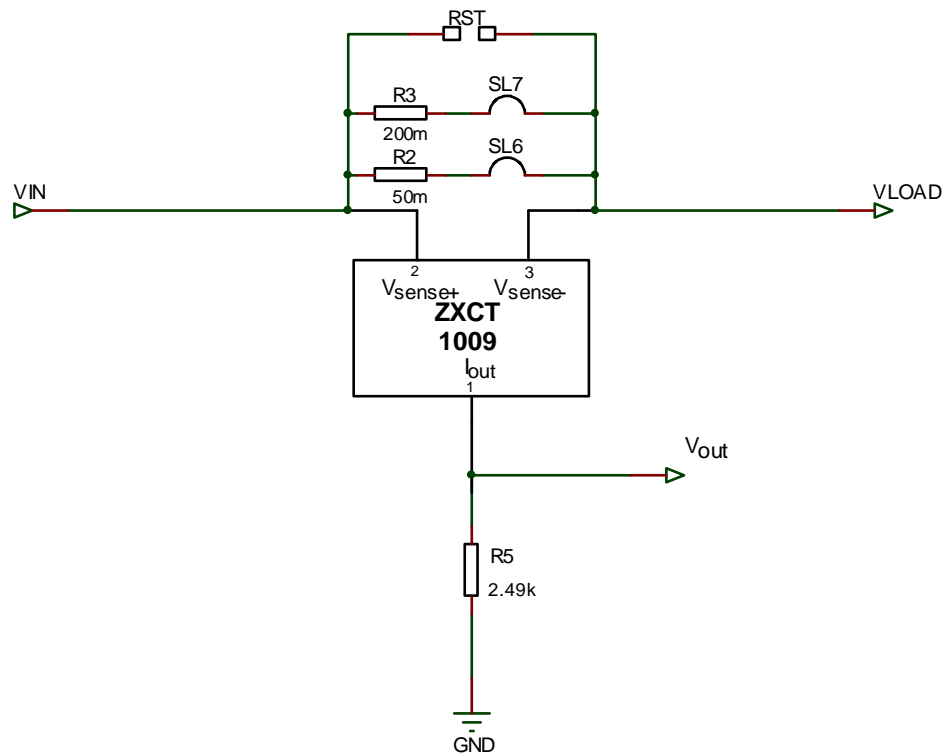
Nearest preferred value: 332Ω

Accuracy

The ZXCT1009 current monitor IC is a 2.5%¹ accurate device. The accuracy of the output voltage will be influenced by the tolerance of the external resistors used. The ZXCT1009EV1 uses a 1% accurate sense resistor and a 0.1% accurate output resistors.

¹ Maximum error at 200mV

Schematic Diagram



Materials List

Ref	Value	Package	Part Number	Manufacturer	Notes
R2	50mΩ	1206	LR1206	Welwyn	SMD Sense Resistor 1%
R3	200mΩ	1206	LR1206	Welwyn	SMD Sense Resistor 1%
R4	0Ω	0805			Zero ohm link
R5	2.49k	0805			SMD ±25ppm 0.1%
ZXCT		SOT23	ZXCT1009F	ZETEX	

ZXCT1009EV1

Set-up and Test

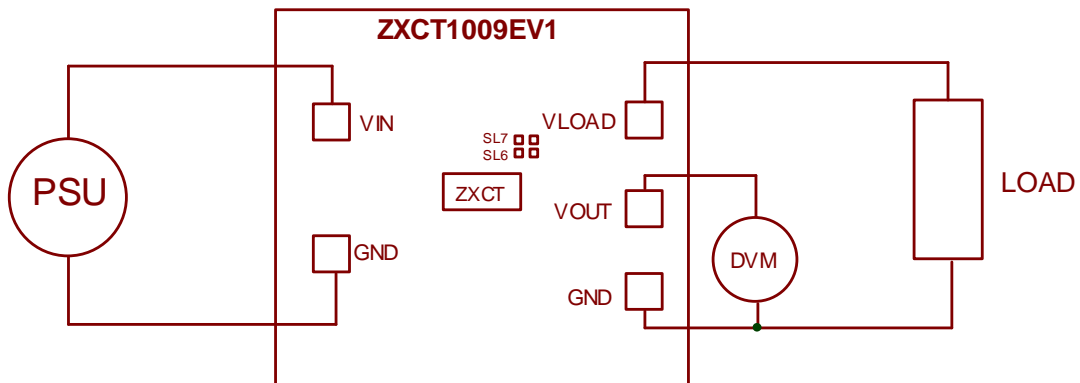
The board is preset to measure 0.5A. SL7 is shorted to connect in the 200mΩ sense resistor. To change the board to measure 2.0A, de-solder SL7 and short SL6.

0.5 Ampere load test

1. Ensure SL7 is shorted.
2. Connect a linear power supply of +10V between the VIN and GND terminals.
3. Set a load current of 0.5A.
4. Turn on the power supply
5. Check with a DVM the supply voltage is +10V between the VIN and GND terminals.
6. Measure VOUT with a DVM. The nominal output voltage should read 2.5V.

The output current can be set by using either an external power resistor or an electronic load. The accuracy of the current set will have an influence on the output voltage.

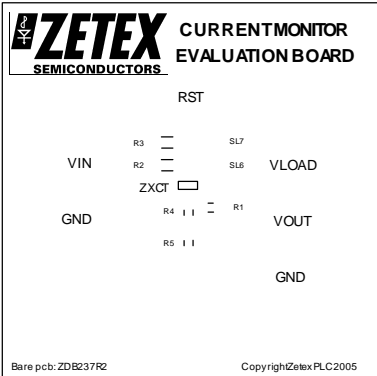
Connection Diagram



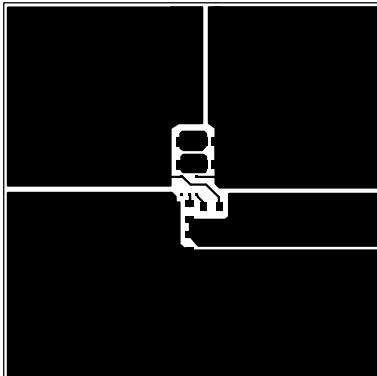
The ZXCT1009EV1 board can also be used to evaluate the following Zetex current monitors IC's:

- ZXCT1008
- ZXCT1011

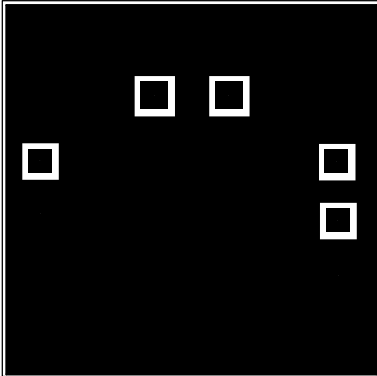
Layout



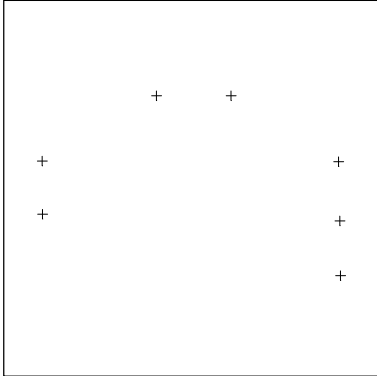
Top Silk



Top Copper



Bottom Copper



Drill File



Zetex plc.
Fields New Road, Chadderton, Oldham, OL9 8NP, United Kingdom
Telephone: (44) 161 622 4422 (Sales), (44) 161 622 4444 (General Enquiries)
Fax: (44) 161 622 442

Zetex GmbH
Streitfeldstraße 19
D-81673 Munchen
Germany
Telefon: (49) 89 45 49 49 0
Fax: (49) 89 45 49 49 49

Zetex Inc.
47 Mall Drive, Unit 4
Commack NY 11725
USA
Telephone: (631) 543-7100
Fax: (631) 864-7630

Zetex (Asia) Ltd.
3701-04 Metroplaza, Tower 1
Hing Fong Road,
Kwai Fong, Hong Kong
Telephone: (852) 26100 611
Fax: (852) 24250 494

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