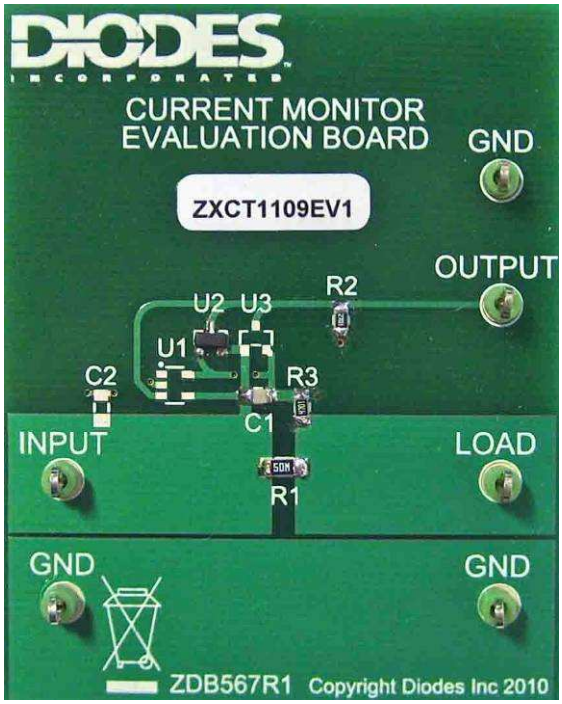
ZXCT1109EV1 USER GUIDE

Performance

- **Current Monitor with wide supply range: 2.5V to 36V**
- **Demonstrates high-side current monitoring up to 4A**
- **Resistors on PCB set sense voltage and voltage gain**
- **Ambient temperature range -40℃ to +125℃**

Ordering Information

Order Number
ZXCT1109EV1



Introduction

The ZXCT1109EV1 evaluation circuit can simply be used to demonstrate the ZXCT1109 Current Monitor integrated circuit which is suitable for a wide range of power systems including automotive, industrial and white goods applications as well as portable and battery management systems.

The PCB is designed to accept one of three different current monitor products, the ZXCT1110 (U1), ZXCT1109 (U2) or ZXCT1107 (U3).

In this case the ZXCT1109 is fitted, but if desired, using conventional lab soldering and de-soldering techniques, this device can be removed and an alternative device fitted.

The ZXCT1109 provides an output voltage proportional to the current in an external load from two external resistors, a sense resistor and a gain set resistor, both are included on this PCB. This enables rapid evaluation of the ZXCT1109 for end user product design.

The construction is a double-sided FR4 printed circuit board, 63.5 x 50.8 x 1.6 mm with 2oz/sq ft copper (70µm).

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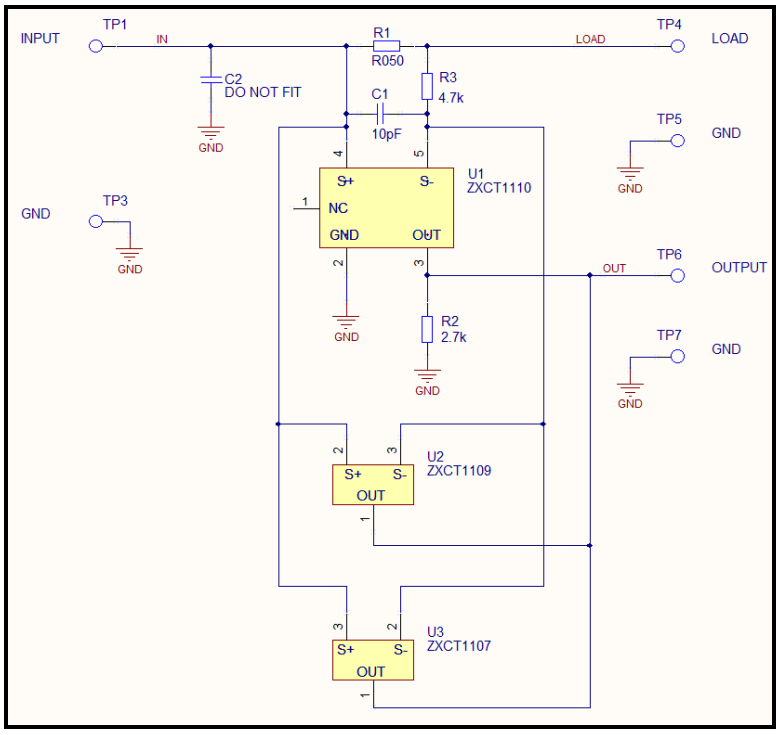
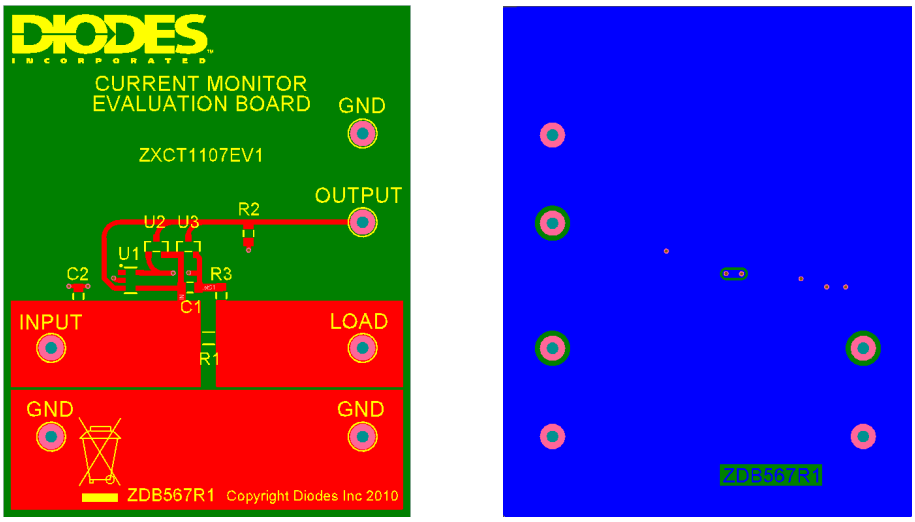


Fig. 1 – ZXCT1109EV1 Schematic



Top **Bottom**

Fig. 2 – ZXCT1109EV1 PCB Layout

Symbol	Parameter	Min	Max	Units
Vin	Input Voltage	2.5	36	V
T_A	Operating Ambient Temperature	-40	125	℃

Table 1 – Recommended Operating Conditions

Count	Designator	Description	Package	Manufacturer	Part Number
1	C1	Capacitor SMD, 10pF 100V COG	0805	generic	
0	C2	NOT FTTED			
1	R1	Resistor, SMD, 0R05 1% 500mW 100ppm/℃	1206	generic	Farnell 109-9913
1	R2	Resistor, SMD, 2.7k 1% 125mW, 250ppm/℃	0805	various	
1	R3	Resistor, SMD, 4.7k 1% 125mW, 250ppm/℃	0805	various	
0	U1	NOT FTTED			
0	U2	ZXCT1109	SOT23	Diodes	ZXCT1109SA-7
1	U3	NOT FTTED			

Table 2 – ZXCT1109EV1 Parts List

Count	Designator	Description	Function	Manufacturer	Part Number
1	TP1	Loop Terminal, 2.15mm, green	Input	Hughes	100-108
1	TP3	Loop Terminal, 2.15mm, green	Ground	Hughes	100-108
1	TP4	Loop Terminal, 2.15mm, green	Load	Hughes	100-108
1	TP5	Loop Terminal, 2.15mm, green	Ground	Hughes	100-108
1	TP6	Loop Terminal, 2.15mm, green	Output	Hughes	100-108
1	TP7	Loop Terminal, 2.15mm, green	Ground	Hughes	100-108

Table 3 – ZXCT1109EV1 I/O and Test Points

Detailed Description

As can be seen from the test setup in Figure 3, the ZXCT1109EV1 is designed to connect a power supply between test points TP1 and TP3, a load and DMM between test points TP4 and TP5, and a DMM to measure the output voltage between test points TP6 and TP7.

The sense resistor is R1=50mΩ (+/-1%) such that a load current of 2A produces a nominal sense voltage input to the ZXCT1109 of 100mV. From the datasheet, a sense input of 100mV produces a nominal output current of 408uA (**+/- 3.4%** at 25^{o}C).

The preferred value of R2=2.7kΩ (+/-1%) will therefore provide a nominal output voltage between TP6 and TP7 of **1.102V**, giving a total voltage output error of **+/-5.4%** for the ZXCT1109EV1 circuit for a 2A load.

As also described in the datasheet, resistor R3 provides S- input protection and together with C1 provides attenuation of possible load generated EMC that might affect the IC input bias conditions.

Quick Start Guide

Suitable test equipment is given in the Table 4.

1. Set the power supply to 10.0V but do not switch on. Set the current limit to 5.0A.
2. Connect up the ZXCT1109EV1 board to the equipment as in **Figure 3** below. Set DMM1 to measure DC voltage. Set DMM2 to measure DC current.
3. Set the electronic load to draw a current of 2A or connect the 5Ω load resistor.
4. Switch on the power supply and adjust the input voltage or the electronic load until DMM2 reads to 2.00A.
5. DMM1 reads the output voltage and should read between **1.042V** and **1.161V** given the total circuit errors of **+/-5.4%** for 100mV sense input voltage.
6. Using an electronic load from zero to 4A load the measurements can be repeated to evaluate the circuit output voltage linearity & errors across the specified input voltage range.

   Figures 4 to 6 demonstrate the product capability and possible V_{S+} errors (refer to datasheet).
7. Switch off the supply and remove the test connections. This concludes the demonstration.

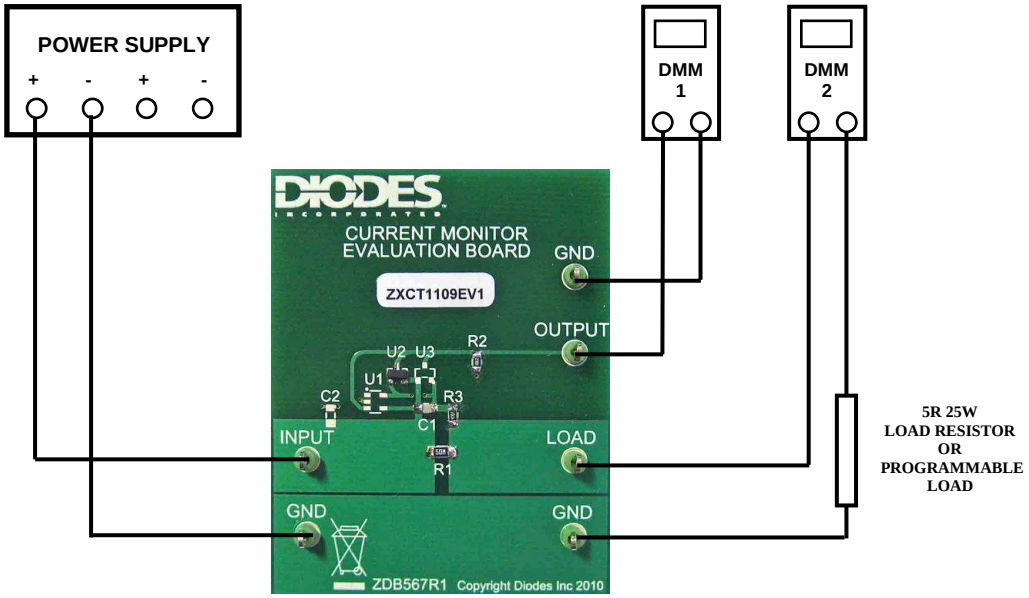


Fig. 3 – ZXCT1109EV1 Demonstration Setup

Count	Description	Manufacturer	Part Number
1	Adjustable Dual PSU 35V / 4A	TTi	354D
2	DMM	Fluke	179
1	Load resistor, 5 ohms ± 5%, 25W up to 2A or Electronic Load up to 4A	Welwyn TTi – 80V/80A/300W or Kikusui – 150V/15A/75W	WH25 5R JI LD300 PLZ70UA & PLZ30F

Table 4 – Suitable Test Equipment

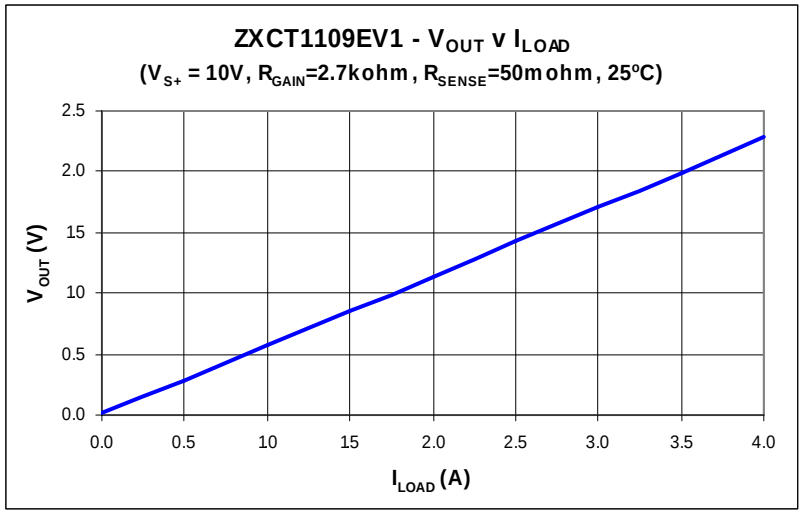


Fig. 4 – ZXCT1109EV1: V_{OUT} v I_{LOAD} @ V_{S+} =10V

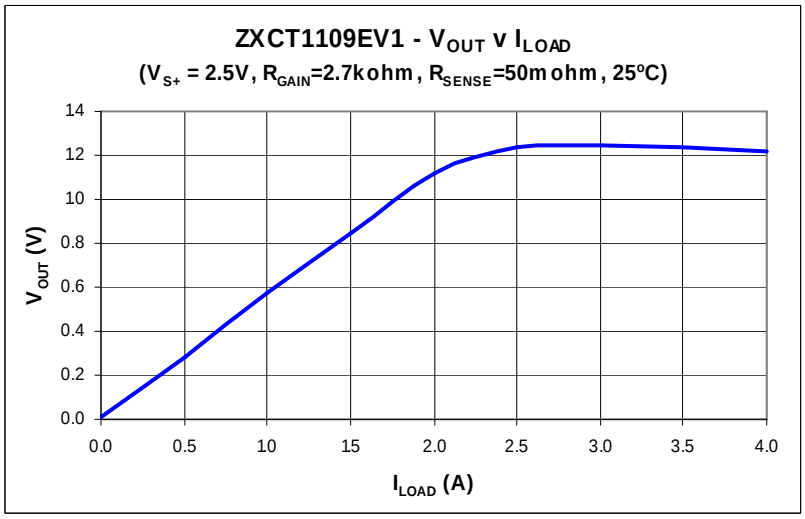


Fig. 5 – ZXCT1109EV1: V_{OUT} v I_{LOAD} @ V_{S+} =2.5V

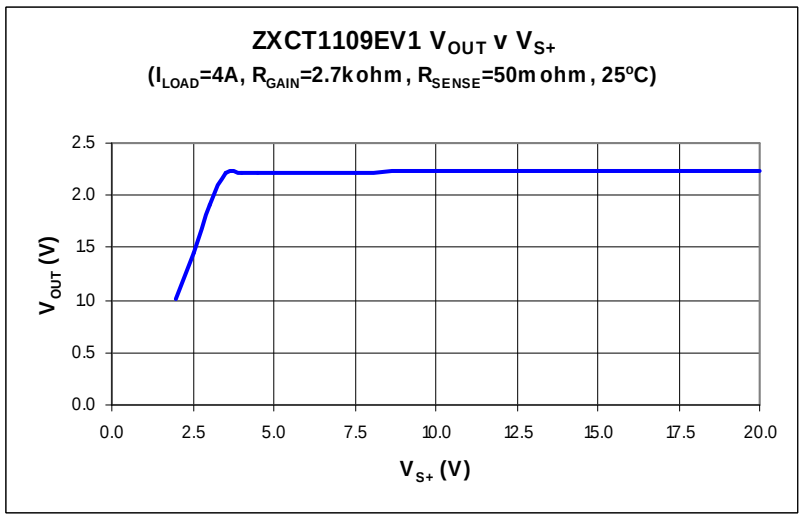


Fig. 6 – ZXCT1109EV1: V_{OUT} v V_{S+} @ I_{LOAD} =4A

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