ZXCT1084EV1 USER GUIDE

Performance

- **Current Monitor with wide supply range: 2.7V to 60V**
- **Independent chip supply and supply-to-be-monitored**
- **Low quiescent current (25µA typ)**
- **Fixed gain of 25**
- **Accuracy 2%**
- **Ambient temperature range -40 to 105℃**

Introduction

This evaluation circuit simply demonstrates the ZXCT1084 60V High-Side Current Monitor with a fixed gain of 25. The circuit is suitable for a wide range of power systems including automotive and industrial applications as well as portable and battery management systems.

The sensitivity of the PCB can be selected using solder bridge links to either 1.25V or 2.5V per Ampere of load current.

The construction is a double-sided FR4 printed circuit board, 51 x 64 x 1.6 mm with 2oz/sq ft copper (70µm).

Ordering Information

Order Number
ZXCT1084EV1

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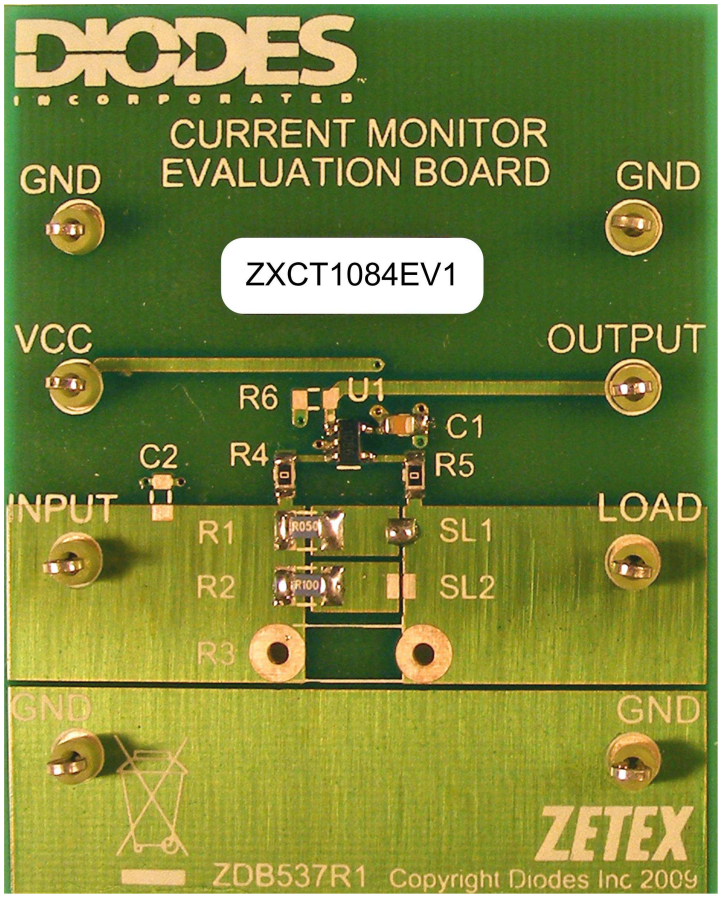
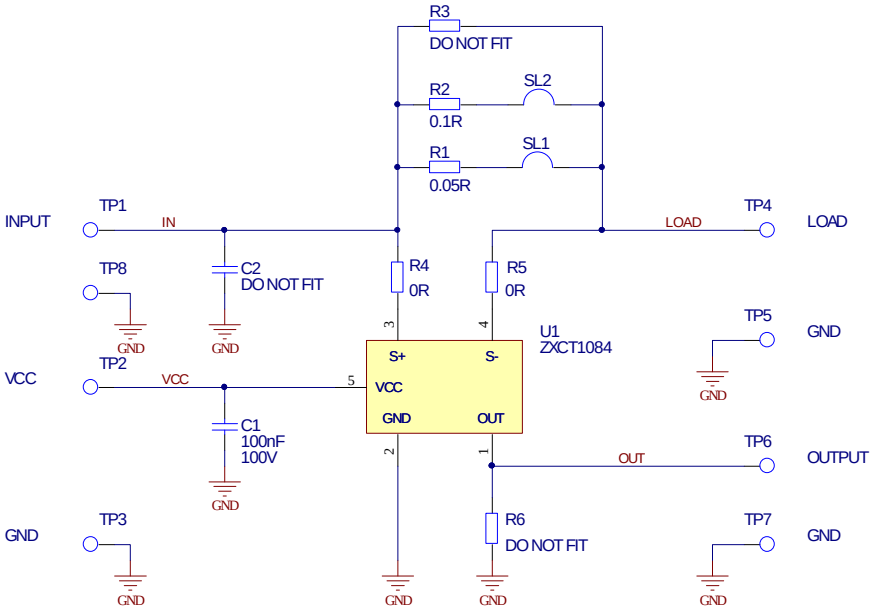
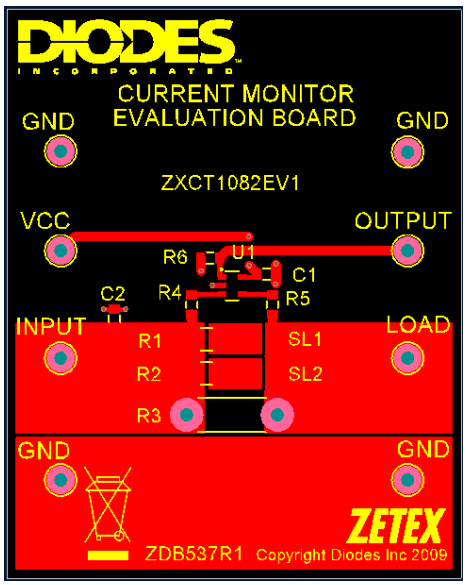


Schematic

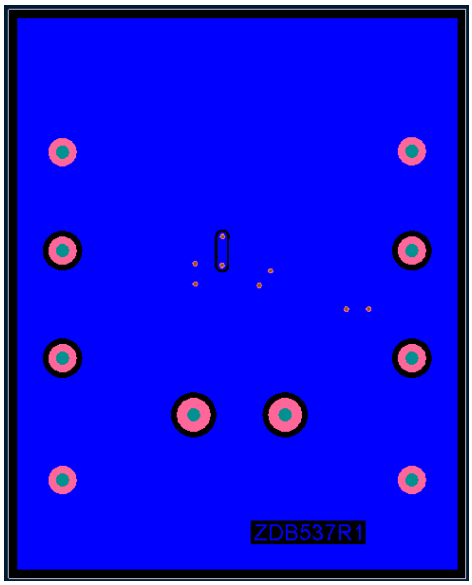


PCB Layout

Top



Bottom



Parts List

Count	Designator	Description	Package	Manufacturer	Part Number
1	C1	Capacitor SMD, 100nF 100V X7R	0805	AVX	08051C104KAZ2A
0	C2	NOT FTTED			
1	R1	Resistor, SMD, 0R05 1% 500mW 100ppm/℃	1206	Welwyn	LR1206-R05FI
1	R2	Resistor, SMD, 0R1 1% 500mW 100ppm/℃	1206	Welwyn	LR1206-R10FI
1	R3	NOT FITTED			
2	R4, R5	Resistor, SMD, 0R 125mW	0805	various	
1	R6	NOT FITTED			
1	U1	ZXCT1084	SOT23-5	Diodes	ZXCT1084E5TA

I/O and Test points

Count	Designator	Description	Function	Manufacturer	Part Number
1	TP1	Loop Terminal, 2.15mm, green	Input	Hughes	100-108
1	TP2	Loop Terminal, 2.15mm, green	Vcc	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
1	TP8	Loop Terminal, 2.15mm, green	Ground	Hughes	100-108

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Units
Vin	Input Voltage	2.7	60	V
Vcc	Supply Voltage	2.7	60	V
Vout	Output Voltage	0	Load voltage -1V	V
T_A	Operating Ambient Temperature	-40	105	℃

Detailed Description

The voltage gain from the sense inputs is set to 25 internally to the chip. Two current sense resistors are provided, which can be selected by solder bridge links. In the initial factory setting, SL1 is connected and SL2 is not, so the sense resistor value is R1=50 milliohms, giving a sensitivity of 1.25V at the Output per Ampere of current in the sense resistor. The second sense resistor provided is 100 milliohms, providing a sensitivity of 2.5V per Ampere. Through-holes are provided for the user to fit an additional resistor R3 if desired.

If SL1 only is bridged, the sensitivity of the PCB assembly to load current is set by R1 which is a 1% tolerance thick film resistor of 50 milliohms.

The sense voltage is

$V_{SENSE} = V_{S+} - V_{S-} = I_{LOAD} . R1$, i.e. 50mV per Amp

The voltage gain is

$V_{OUT}/V_{SENSE} = 25.0$

The sensitivity to current is

$V_{OUT}/I_{LOAD} = (V_{OUT}/V_{SENSE}) . (V_{SENSE}/I_{LOAD}) = 25 . R1 = 1.25$ V per Amp.

If SL2 is bridged instead of SL1, the sense resistance will be 0.1R, so the sensitivity will then be 2.5 V per Amp.

A Note on Tolerance

The output voltage tolerance as measured in the Quick Start Guide, below, is approximately +3%, -1%. This consists of the following contributions:

1. The reading is about 2% higher than the nominal value of 1.25V due to the PCB copper resistance, including the solder link, when using the 50 milliohm sense resistor, R1.

2. The tolerance of the sense resistor R1 is ±1%.

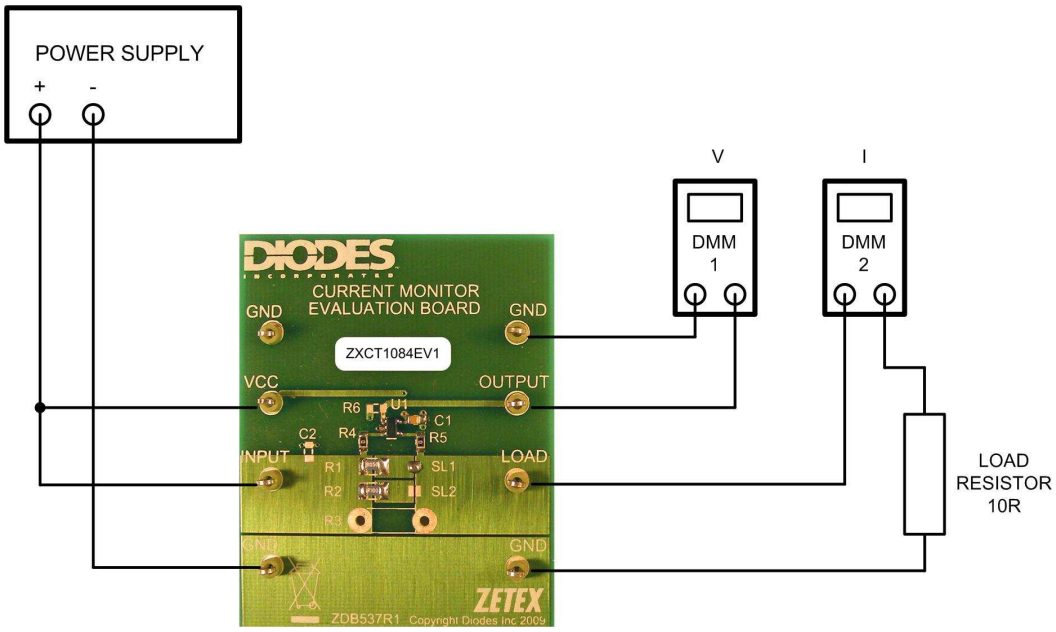
3. The ZXCT1084 tolerance is ±1%.

4. The Fluke DMM has an input resistance of about 11Mohm, while the ZXCT1084EV1 output resistance is 125kohm. This means that the reading will be about 1.1% lower than a perfect voltmeter.

Quick Start Guide

Suitable test equipment is given in the table below.

1. Set the power supply to 10.0V but do not switch on. Set the current limit to 1.5A.
2. Check that on the ZXCT1084EV1 board, solder link SL1 is bridged and SL2 is open.
3. Connect up the ZXCT1084EV1 board to the equipment as in the diagram below. Set DMM1 to measure voltage and DMM2 to measure current.
4. Switch on the power supply. DMM2 should now read about 1.0A. Adjust the supply voltage slightly to obtain exactly 1.000A ± 0.005A.
5. DMM1 now reads between 1.23V and 1.29V. [This tolerance band includes the effects listed above.]
6. You can examine operation at 60V easily if the electronic load is available. Set the load to 1.00A and increase the power supply voltage to 60V.



Suitable Test Equipment

Count	Description	Manufacturer	Part Number
1	Adjustable Power Supply, 60V 2A	Thurlby Thandar	CPX400A
2	Digital Multimeter	Fluke	179
1	Load resistor, 10 ohms ± 5%, 10W, or electronic load, 60V 2A		

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