LOW OFFSET HIGH-SIDE CURRENT MONITOR

DESCRIPTION

The ZXCT1022 is a precision high side current sense monitor. Using this type of device eliminates the need to disrupt the ground plane when sensing a load current.

The ZXCT1022 provides a fixed gain of 100 for applications where minimal sense voltage is required.

The very low offset voltage enables a typical accuracy of 3% for sense voltages of only 10mV, giving better tolerances for small sense resistors necessary at higher currents.

The wide input voltage range of 20V down to as low as 2.5V make it suitable for a range of applications. With a minimum operating current of just 25μ A, combined with its SOT23-5 package make it suitable for portable battery equipment too.

APPLICATIONS

- Battery chargers
- Smart battery packs
- DC motor control
- Over current monitor
- Power management
- Level translating

Vin

• Programmable current source

TYPICAL CIRCUIT APPLICATION

R_{sense}

FEATURES

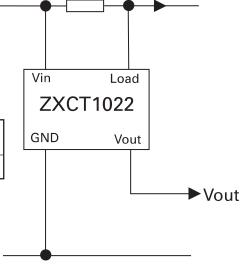
- Accurate high-side current sensing
- Output voltage scaling
- 2.5V 20V supply range
- 25µA quiescent current
- 1% typical accuracy
- SOT23-5 package

ORDERING INFORMATION

DEVICE	REEL	TAPE	QUANTITY PER
	SIZE	WIDTH	REEL
ZXCT1022E5TA	7″	8mm	3,000 units

DEVICE MARKING

1022



F **ZETEX**

To load

Absolute Maximum Ratings

Voltage on any pin	-0.6V to 20V
V _{sense}	-0.6V to Vin + 0.5V
Operating temperature	-40 to 85°C
Storage temperature	-55 to 150°C
Package power dissipation	(T _A = 25°C)
SOT23	450mW

SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			Min	Тур	Мах	1
V _{in}	V _{CC} range		2.5		20	V
Vout	Output voltage	V _{sense} = 0V	0	30	100	mV
	(ZXCT1022)	V _{sense} = 10mV	0.97	1.0	1.03	V
		V _{sense} = 30mV	2.91	3.0	3.09	V
		$V_{sense} = 100 mV$	9.7	10.0	10.3	V
R _{out}	Output resistance		10	15	20	ΚΩ
T _c	Output temperature coefficient			50	300	ppm
l _q	Ground pin current	V _{sense} = 0V		25	35	μA
V _{sense} ⁽²⁾	Sense voltage		0		1.5	V
I _{sense}	Load pin input current				100	nA
Acc	Accuracy	V _{sense} = 10mV	-3		3	%
Gain	V _{out} / V _{sense}	V _{sense} = 10mV	0.97	1.0	1.03	V
BW	Bandwidth	V _{sense} = 10mV		300		kHz
		V _{sense} = 100mV		2		MHz

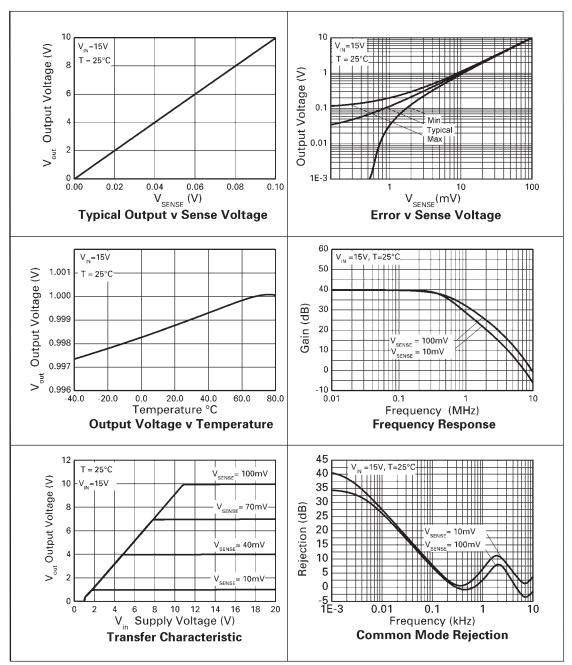
ELECTRICAL CHARACTERISTICS Test Conditions $T_A = 25^{\circ}C$, $V_{in} = 15V$

NOTES

(2) Vsense= Vin - Vload

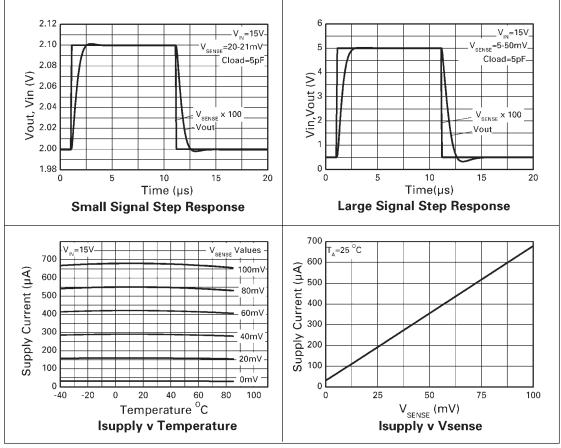
T_C Limits are determined by characterization.





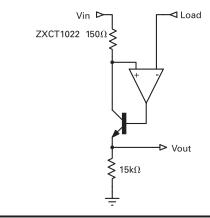
TYPICAL CHARACTERISTICS





TYPICAL CHARACTERISTICS

BLOCK DIAGRAM





Application information

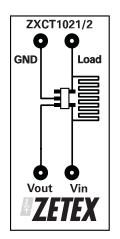
The ZXCT1022 has a fixed dc voltage gain of 100. No external scaling resistors are required for the output. Output voltage is simply defined as:



Where V_{sense} = V_{in} - V_{Load}

PCB trace shunt resistor for low cost solution

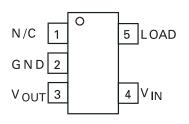
The figure below shows a PCB layout suggestion for a low cost solution where a PCB resistive trace in replacement for a conventional shunt resistor, can be used. The resistor section is 25mm x 0.25mm giving approximately $150m\Omega$ using 1 oz copper. Smaller resistances can be used if required.



Total circuit solution: 1 component. Shows area of 150m $\!\Omega$ sense resistor compared to SOT23 package.

Practical tolerance of the PCB resistor will be around 5% depending on manufacturing methods.

PINOUT

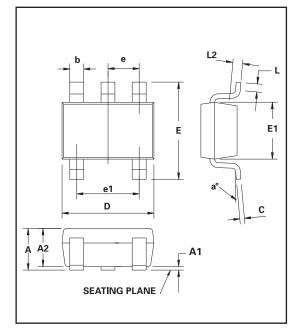


Top view

PIN NAME	PIN FUNCTION
N/C	Not internally connected
GND	Ground
V _{out}	Voltage output referenced to GND. Intended to drive high impedance loads
Load	High impedance negative sense voltage input
V _{in}	Supply and positive sense voltage input



PACKAGE DIMENSIONS SOT23-5



DIM	Millimetres		Inches		
	MIN	MAX	MIN	МАХ	
A	0.90	1.45	0.035	0.057	
A1	0.00	0.15	0.00	0.006	
A2	0.90	1.3	0.035	0.051	
b	0.35	0.50	0.014	0.020	
С	0.09	0.20	0.0035	0.008	
D	2.80	3.00	0.110	0.118	
E	2.60	3.00	0.102	0.118	
E1	1.50	1.75	0.059	0.069	
е	0.95 REF		0.037 REF		
e1	1.90 REF		0.075 REF		
L	0.10	0.60	0.004	0.024	
a°	0	10	0	10	

PACKAGE DIMENSIONS

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