ZXLD1322EV1 USER GUIDE

DESCRIPTION

The ZXLD1322 is an inductive DC-DC converter, with an internal switch, designed for driving single or multiple LEDs in series up to a total of 700mA output current.

Applications cover input voltages ranging from 2.5V to 15V. Depending upon supply voltage and external components, this can provide up to 12W of output power.

The device employs a variable 'on' and 'off' time control scheme with adjustable peak switch current limiting and operates in Buck/Boost modes, offering higher power efficiency and lower system cost than conventional PFM buck/boost circuitry.

The device includes the DC-DC converter, a high-side current monitor and an NPN switching transistor to provide an integrated solution offering small PCB size, competitive cost/performance, high power efficiency of DC-DC conversion and maximum LED brightness/reliability. More importantly, it retains design flexibility to add customer specific features.

The feedback control circuitry inside the ZXLD1322 provides excellent load and current regulation, resulting in very stable LED current over the useful life of the battery and over the full operating temperature range.

The LED current can be adjusted from 100% down to 10% of the set value by applying a dc voltage to the ADJ pin and down to 1% by applying a PWM signal. An on-chip LED protection circuit also allows output current to be reduced linearly above a predetermined threshold temperature using an external thermistor at the TADJ pin.

External resistors set nominal average LED current and coil peak current independently.

The device can be shut down by applying a continuous low level dc voltage to the ADJ pin.

FEATURES

- 2.5V to 15V Input Voltage Range
- Up to 700mA output current
- Typical efficiency (*) : >80%
- User-defined thermal control of LED output current using external thermistor
- 12µA typical standby current
- LED current adjustable from 100% down to 1%
- Adjustable Soft-Start
- Capable of driving 3 LEDs in series (Total LED drop VF+VIN <= 18V)

APPLICATIONS

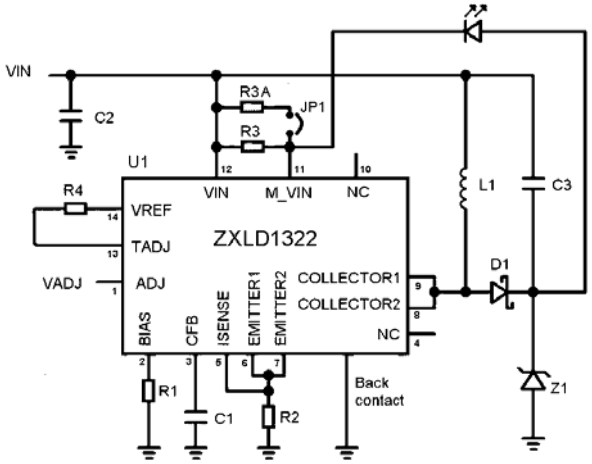
- High Power LED flashlights
- LED back-up lighting
- General LED lighting

ORDERING INFORMATION

ORDER NUMBER
ZXLD1322EV1

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

TYPICAL APPLICATION CIRCUIT



REFERENCE DESIGN

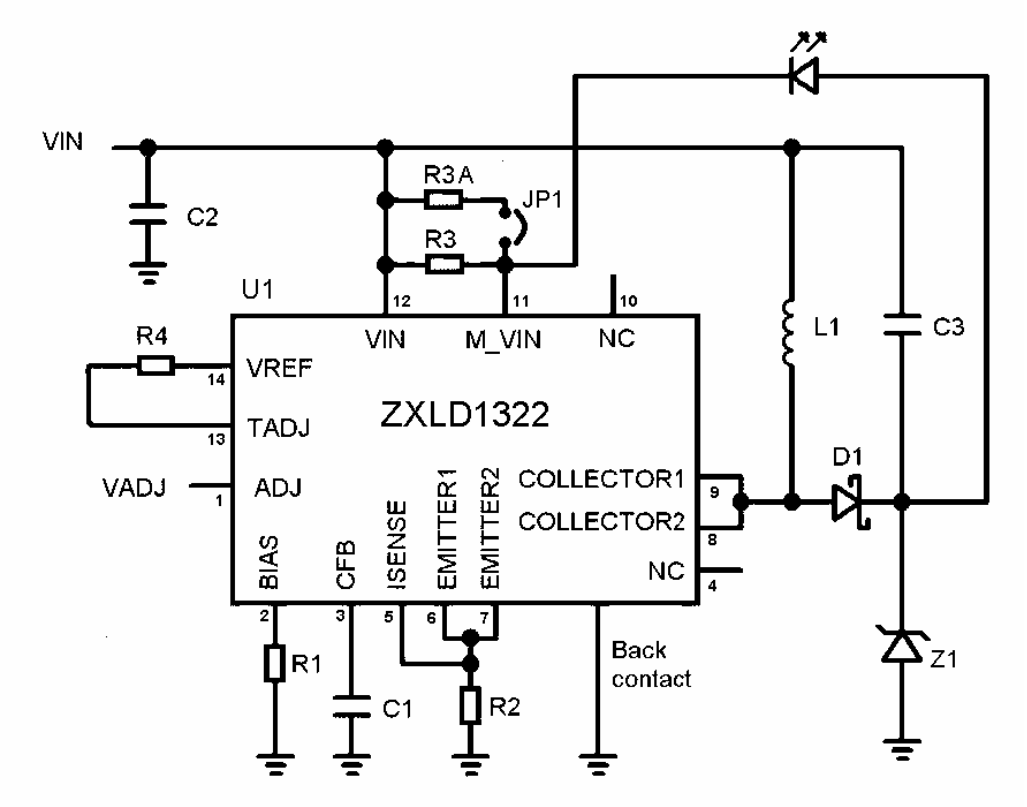
The ZXLD1322EV1 is configured to the reference design below. The target application is 330mA/500mA high current LED driver for single or multiple LEDs with wide input voltage range.

If the ZXLD1322EV1 is connected to 1 off-board LED, the supply voltage is: VIN=2.5V ~ 6V.

The ZXLD1322V1 boards are initially set at LED current of around 330mA with 300mΩ (R3) current sensing resistor. In order to boost the LED current to 500mA, on-board resistor 620mΩ (R3A) could be placed in parallel with R3 by means of soldering jumper pad JP1.

For other reference designs or further applications information please refer to the ZXLD1322 datasheet.

SCHEMATIC DIAGRAM



Materials List

Ref	Value	Package	Part Number	Manufacturer	Contact Details
U1	LED Driver	DFN14	ZXLD1322DCC	Zetex	www.zetex.com
D1	Schottky Diode	SOT23-6	ZHCS2000	Zetex	www.zetex.com
L1	10uH 2A		MSS7341-103ML NPIS64D100MTRF 744-777910	Coilcraft NIC Comps. Wurth	www.coilcraft.com www.niccomp.com www.we-online.com
C1	10nF 10V	0603	Generic	Generic	
C2	4.7uF 50V	1206	GRM31CR71H475K	Murata	www.murata.com
C3	4.7uF 50V	1206	GRM31CR71H475K	Murata	www.murata.com
R1	430Ω	0805	Generic	Generic	
R2	25m Ω	0603	Generic	Generic	
R3	300mΩ	0805	Generic	Generic	
R3A	620mΩ	0805	Generic	Generic	
R4	5.1KΩ	0603	Generic	Generic	
Z1	18V 3W Zener	DO-214AC	BZG03C18	Vishay	www.vishay.com

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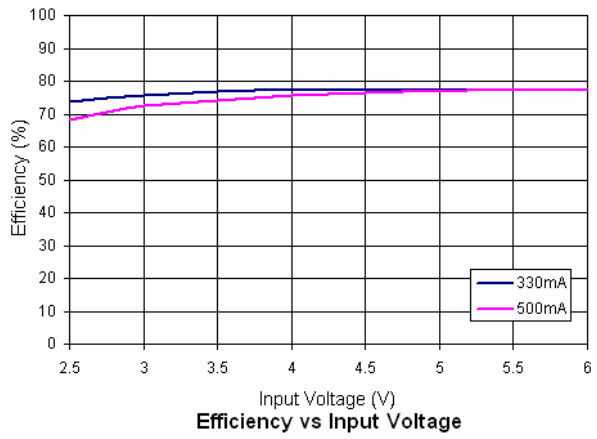
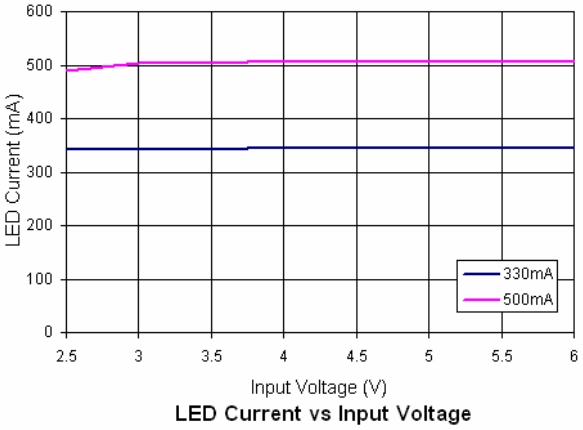
PERFORMANCE

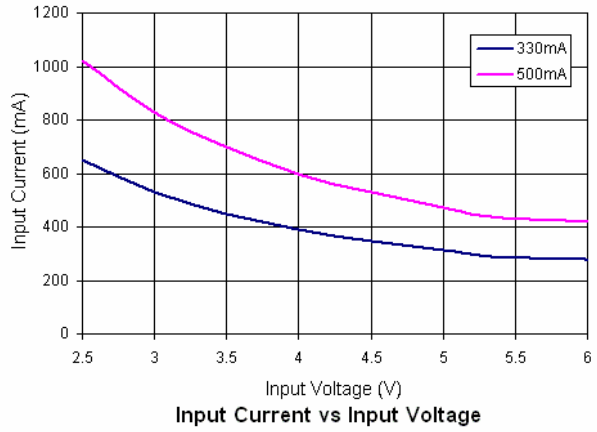
Graphs



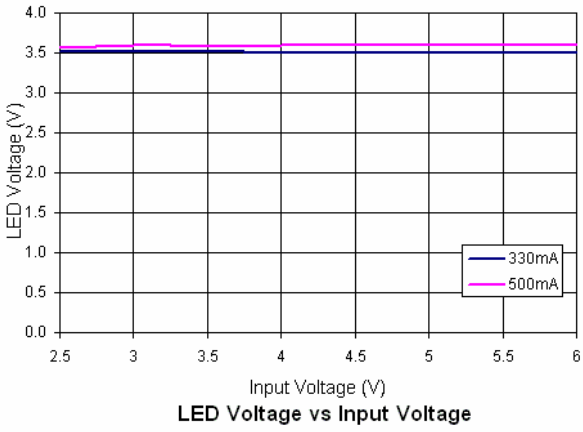
Efficiency vs Input Voltage



LED Current vs Input Voltage



Input Current vs Input Voltage



LED Voltage vs Input Voltage

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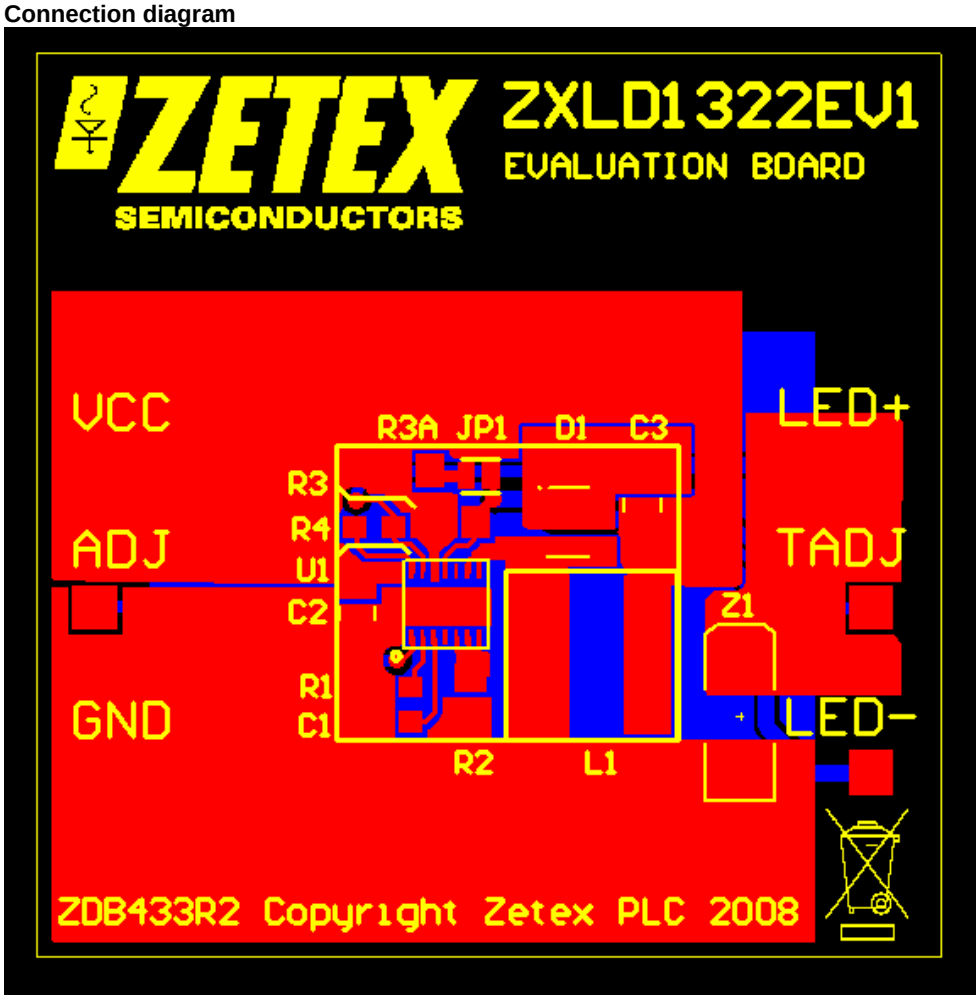
ZXLD1322EV1 OPERATION

Connection diagram



ZXLD1322EV1 Set-up and Test

1. Preset the PSU to 3V with a current limit of around 700mA.
2. Connect LED+ and LED- to the Anode and Cathode respectively, of the off-board high power LED.
3. Connect V_{IN} and GND to the positive and zero volts respectively, of the PSU supply.
4. Set the PSU to 4V.
5. Turn on the PSU.
6. The LED should illuminate and be regulated at 330mA/ 500mA +/-5%.
7. The input current should measure between 300mA and 500mA for the 330mA option and between 400mA and 600mA for the 500mA option.

Caution: Please make sure that the LED is properly connected before applying power. A LED with an appropriate current rating should be used.

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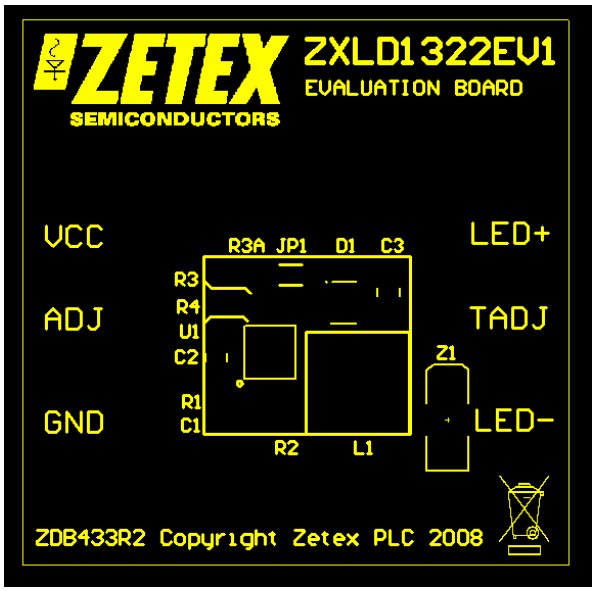
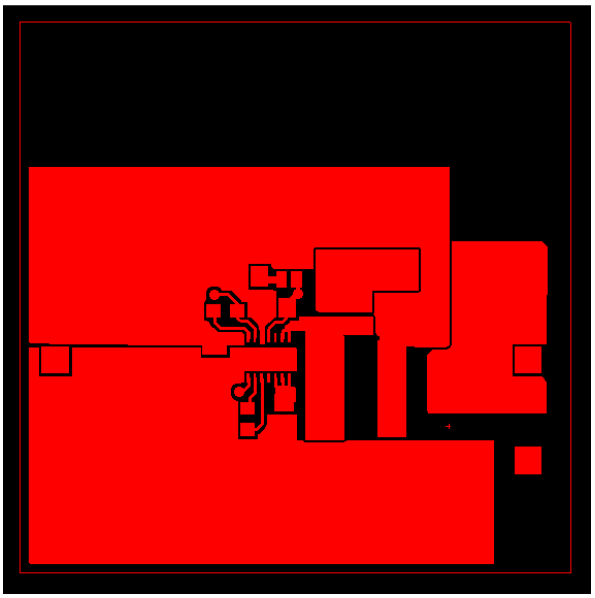
Layout considerations

The PCB tracks should be kept as short as possible to minimize ground bounce, and the ground pin of the device should be soldered directly to the ground plane. It is particularly important to mount the coil and the input/output capacitors close to the device to minimize parasitic resistance and inductance, which will degrade efficiency. The VIN pin is prone to noise. Input decoupling capacitor C2 should be kept as close as possible between the VIN and GND pin. Enough copper should be attached to the GND pin (exposed pad) for heat-sinking purposes. In this EV board, the copper area is at the bottom layer, connected to the exposed pad through a few plated through holes.

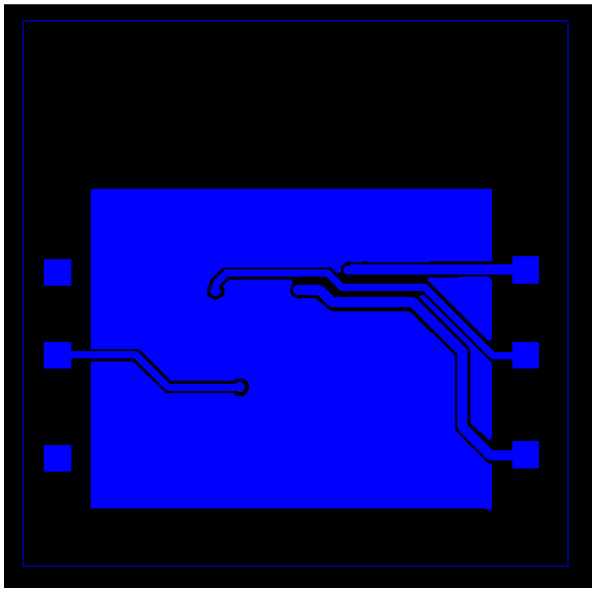
Below is the recommended layout of the ZXLD1322EV1.



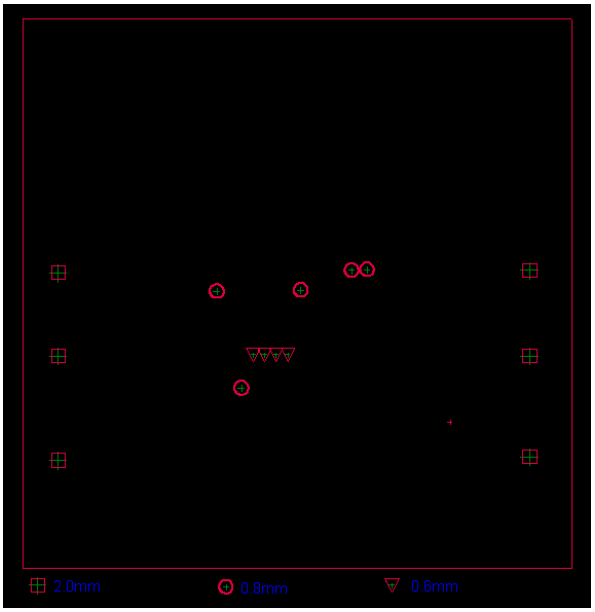
Top Silk



Top Copper



Bottom Copper



Drill File

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Notes

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Notes

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