

# ZXLD1321EV1 USER GUIDE

## DESCRIPTION

The ZXLD1321 is an inductive DC-DC converter, with an internal switch, designed for driving single or multiple LEDs in series up to a total of 1A output current.

Applications cover commercial environments with input voltages ranging from 1.2V to 12V.

The device employs a variable 'on' and 'off' time control scheme with adjustable peak switch current limiting and supports step-up (Boost) mode and self-powering Bootstrap operating modes, offering higher power efficiency and lower system cost than conventional PFM 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 ZXLD1321 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 to the ADJ pin. 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

- 1.2V to 12V Input Voltage Range
- Up to 1A output current
- Typical efficiency (\*) : >85%
- Bootstrap operation enables input voltage down to 1V
- User-defined thermal control of LED output current using external thermistor
- 12µA typical standby current
- Adjustable Soft-Start
- Drives up to 5 white LEDs in series

## ORDERING INFORMATION

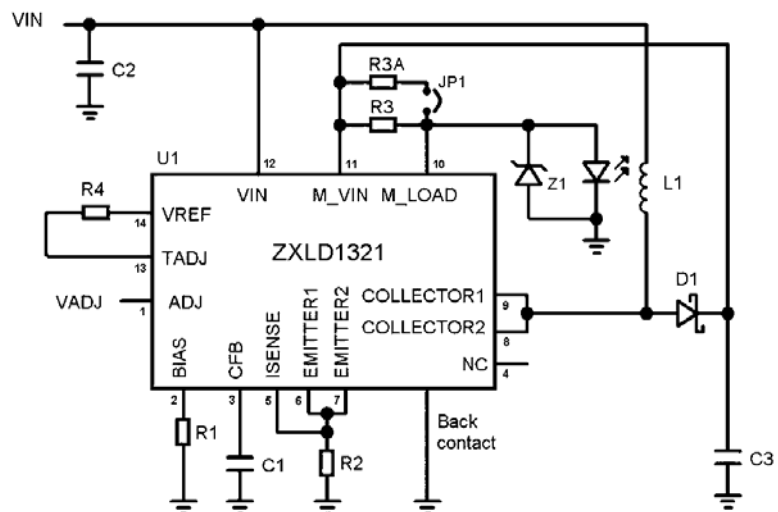
ORDER NUMBER
ZXLD1321EV1

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

## APPLICATIONS

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

## TYPICAL APPLICATION CIRCUIT



**REFERENCE DESIGN**

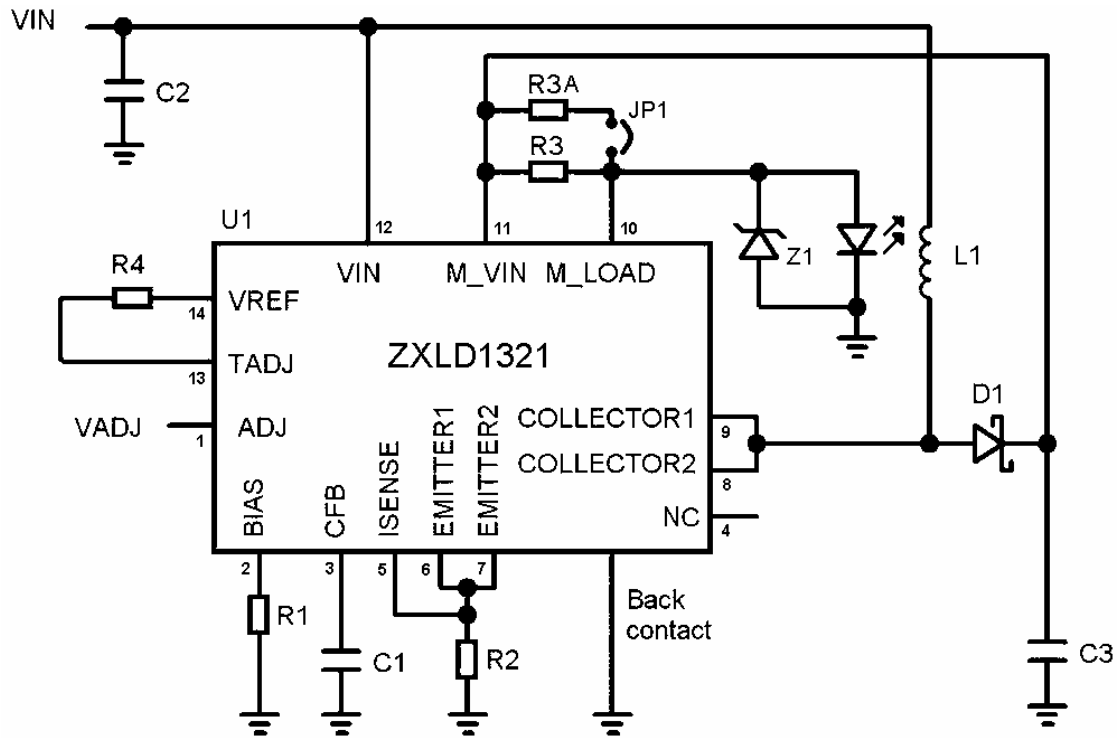
The ZXLD1321EV1 is configured to the reference design below. The target application is 700mA/1000mA high current LED driver for single or multiple LEDs with wide input voltage range.

If the ZXLD1321EV1 is connected to 1 off-board LED, the supply voltage is: VIN=2V ~ 3.4V.

The ZXLD1321EV1 boards are initially set at LED current of around 700mA with 150mΩ (R3) current sensing resistor. In order to boost the LED current to 1000mA, the on-board 300mΩ (R3A) could be made parallel to R3 by means of soldering jumper pad JP1.

For other reference designs or further applications information please refer to the ZXLD1321 datasheet.

**SCHEMATIC DIAGRAM**

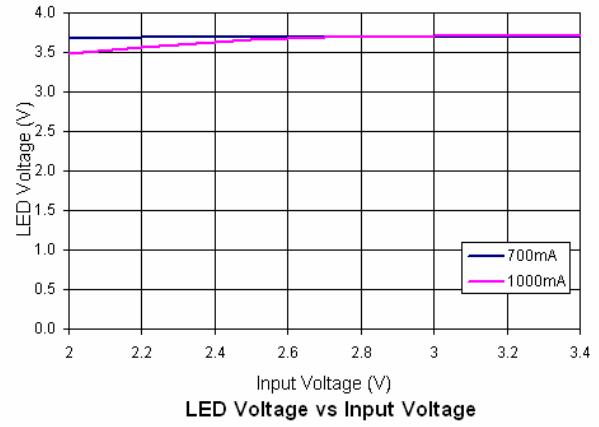
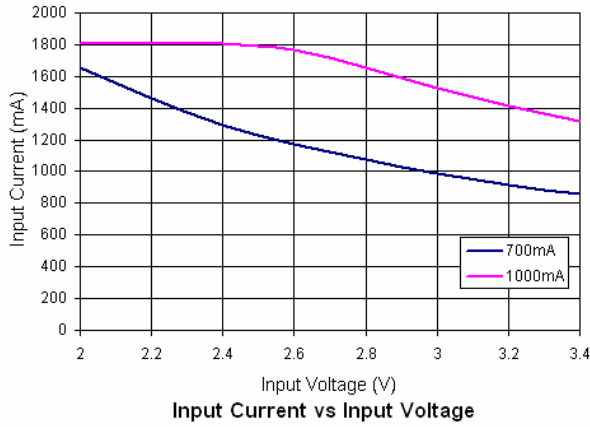
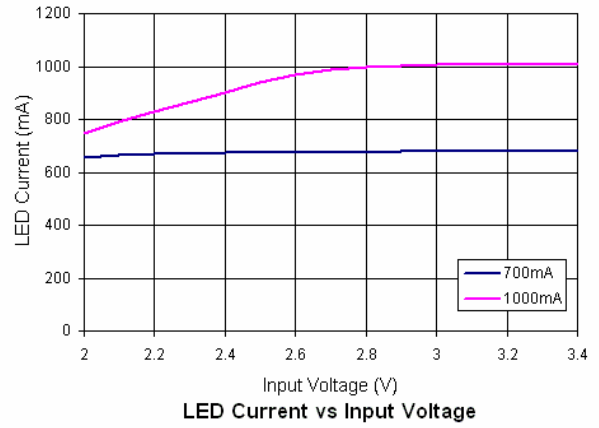
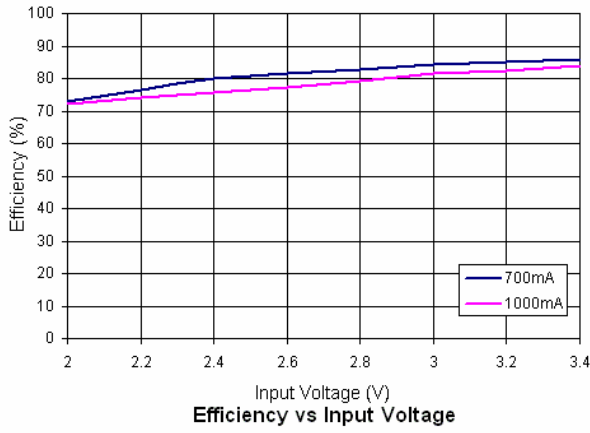


**Materials List**

Ref	Value	Package	Part Number	Manufacturer	Contact Details
U1	LED Driver	DFN14	ZXLD1321DCA	Zetex	<a href="http://www.zetex.com">www.zetex.com</a>
D1	Schottky Diode	SOT23-6	ZHCS2000	Zetex	<a href="http://www.zetex.com">www.zetex.com</a>
L1	10uH 2A		MSS7341-103ML NPIS64D100MTRF 744-777910	Coilcraft NIC Comps. Würth	<a href="http://www.coilcraft.com">www.coilcraft.com</a> <a href="http://www.niccomp.com">www.niccomp.com</a> <a href="http://www.we-online.com">www.we-online.com</a>
C1	10nF 10V	0603	Generic	Generic	
C2	2.2uF 25V	1206	GRM31MR71E225K	Murata	<a href="http://www.murata.com">www.murata.com</a>
C3	4.7uF 50V	1206	GRM31CR71H475K	Murata	<a href="http://www.murata.com">www.murata.com</a>
R1	430Ω	0805	Generic	Generic	
R2	25mΩ	0603	Generic	Generic	
R3	150mΩ	0805	Generic	Generic	
R3A	300mΩ	0805	Generic	Generic	
R4	5.1KΩ	0603	Generic	Generic	
Z1	18V 3W Zener	DO-214AC	BZG03C18	Vishay	<a href="http://www.vishay.com">www.vishay.com</a>

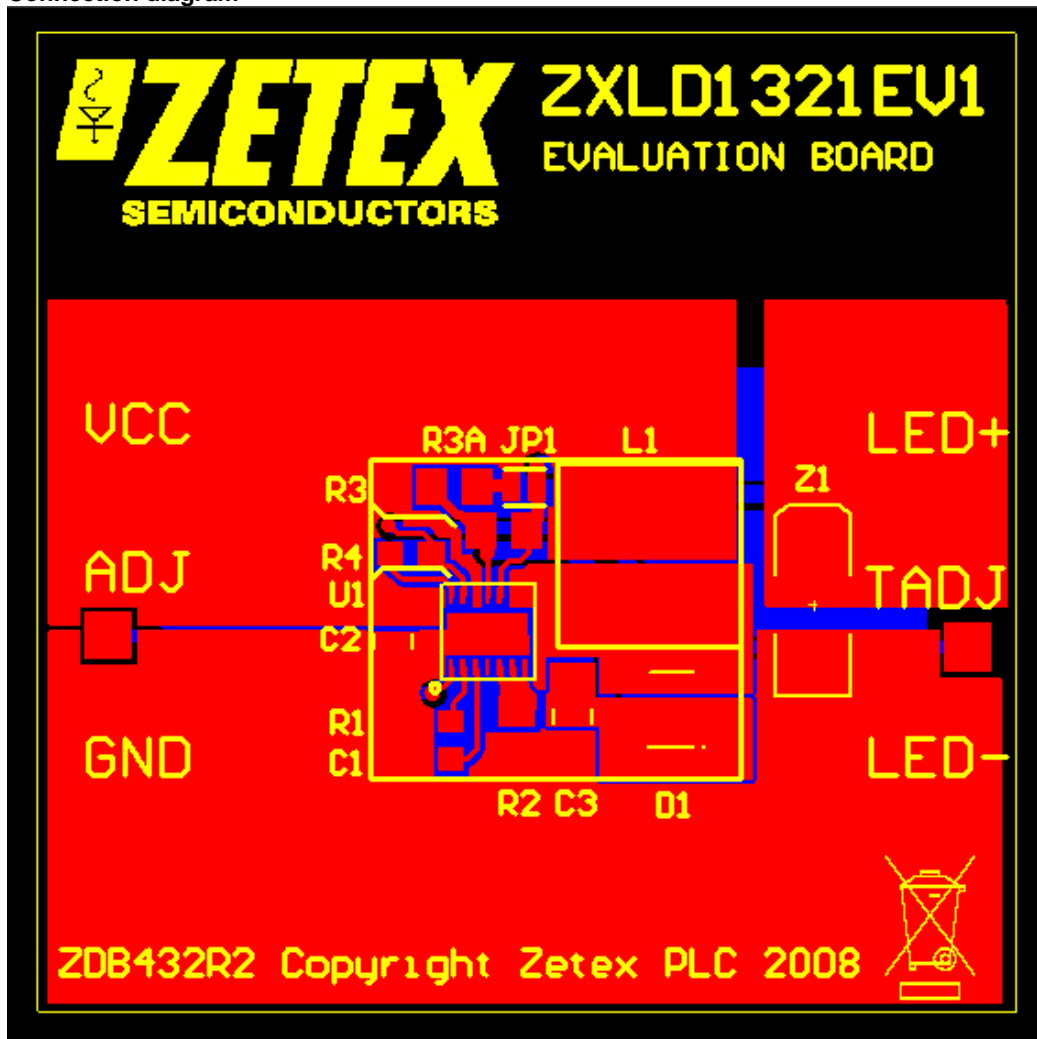
PERFORMANCE

Graphs



## ZXLD1321EV1 OPERATION

## Connection diagram

**ZXLD1321EV1 Set-up and Test**

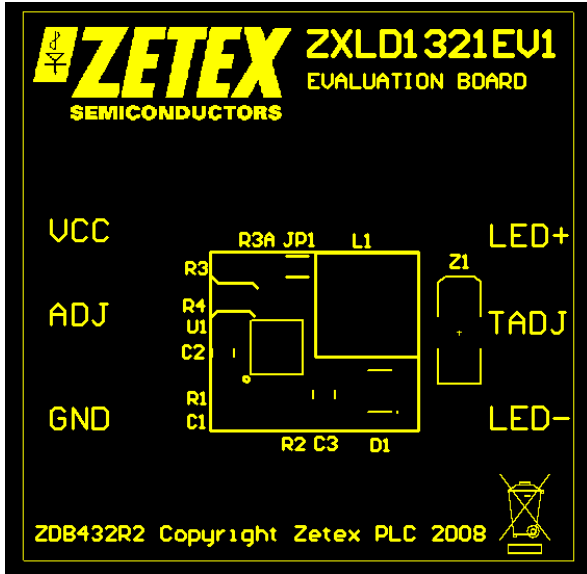
1. Preset the PSU to 3V with a current limit of around 1.8A
2. Connect LED+ and LED- to the Anode and Cathode respectively, of the off-board high power LED .
3. Connect  $V_{IN}$  and GND to positive and zero volts of the PSU supply respectively.
4. Set the PSU to 3V.
5. Turn on the PSU.
6. The LED should illuminate and be regulated at 700mA/1000mA +/-5%.
7. The input current should measure between 0.9A and 1.1A for the 700mA option, and between 1.4 A and 1.6A for the 1A option.

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

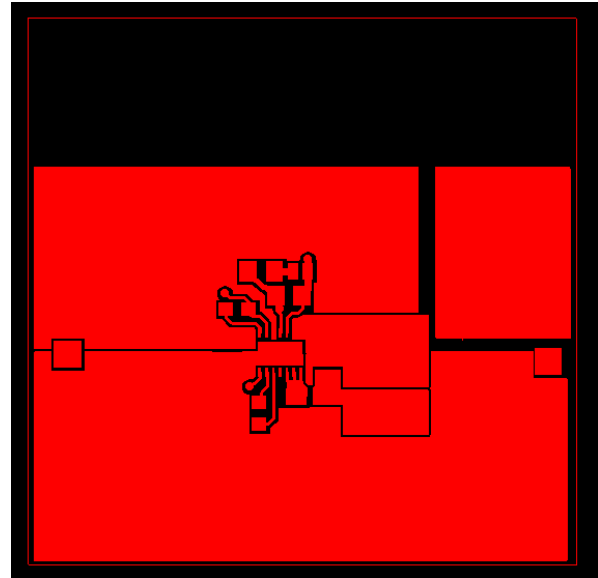
**Layout considerations**

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. Precautions should be taken to avoid noise entering the VIN pin. Input decoupling capacitor C2, between VIN and GND, should be kept as close as possible to the device. Enough copper should be attached to the GND pin (exposed pad) for heat-sinking purposes. In this evaluation board, the copper area is on the bottom layer, connected to the exposed pad through several vias.

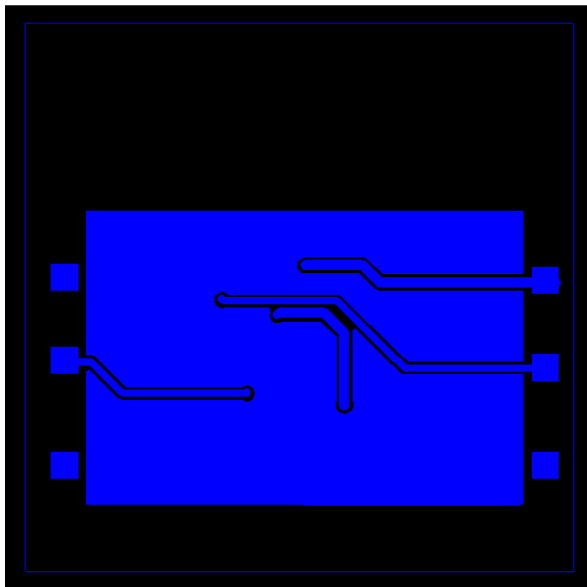
Below is the recommended layout of the ZXLD1321EV1.



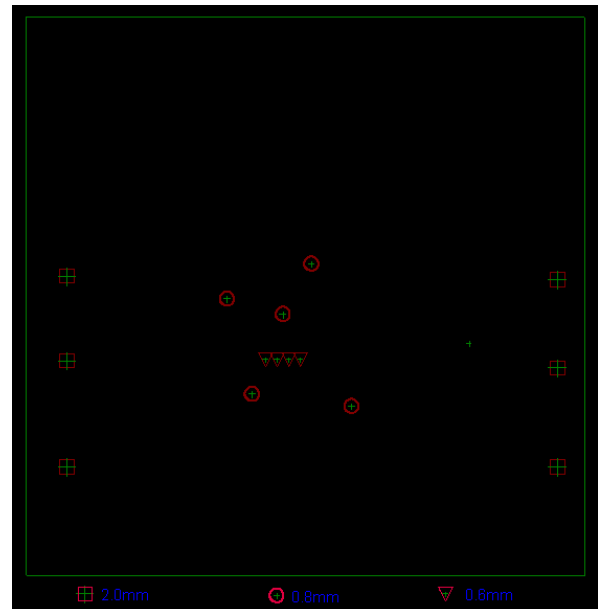
Top Silk



Top Copper



Bottom Copper



Drill File

**NOTES**

**NOTES**

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- "Preview" Future device intended for production at some point. Samples may be available
- "Active" Product status recommended for new designs
- "Last time buy (LTB)" Device will be discontinued and last time buy period and delivery is in effect
- "Not recommended for new designs" Device is still in production to support existing designs and production
- "Obsolete" Production has been discontinued

**Datasheet status key:**

- "Draft version" This term denotes a very early datasheet version and contains highly provisional information, which may change in any manner without notice.
- "Provisional version" This term denotes a pre-release datasheet. It provides a clear indication of anticipated performance. However, changes to the test conditions and specifications may occur, at any time and without notice.
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