

# ZXLD383EV1 USER GUIDE

## DESCRIPTION

The ZXLD383 is a single or multi-cell LED driver designed for applications requiring step-up voltage conversion from a very low input voltage. The IC generates constant current pulses that are ideal for driving single or multiple LEDs over a wide range of operating voltages. It includes an on/off enable input that can be driven directly from a photocell array or an open collector/drain logic output. The enable input features an ultra-low-voltage-drop diode to ground, eliminating the need for a photocell array isolation diode in Garden Light applications.

The ZXLD383 uses a PFM control technique to drive an internal switching transistor which exhibits a low saturation resistance. This ensures high efficiency, even for input voltages as low as 1.0V.

The IC can start up under full load and operates down to an input voltage of below 0.9V.

The ZXLD383 is offered in the space-saving SOT23-5 package or in die form, offering an excellent cost-versus-performance solution for single-cell LED driving applications.

## FEATURES

- 85% Efficiency
- User adjustable output current
- Single cell operation (0.9V minimum)
- Low-saturation-voltage switching transistor
- SOT23-5 package
- Available also in Die form
- Simple Application circuit

## APPLICATIONS

- Garden lights
- Door/Pathway illumination
- LED flashlights and torches
- LED backlights
- White LED drivers
- Gated Boost Supply Generators

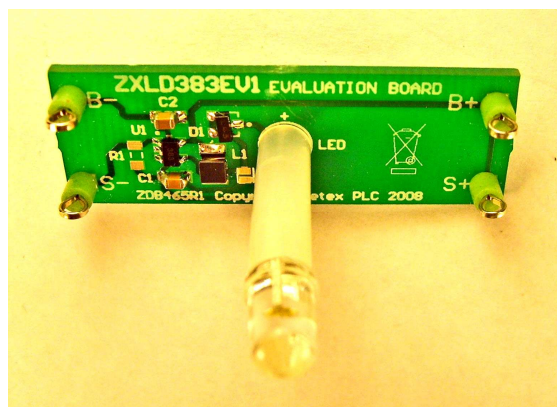
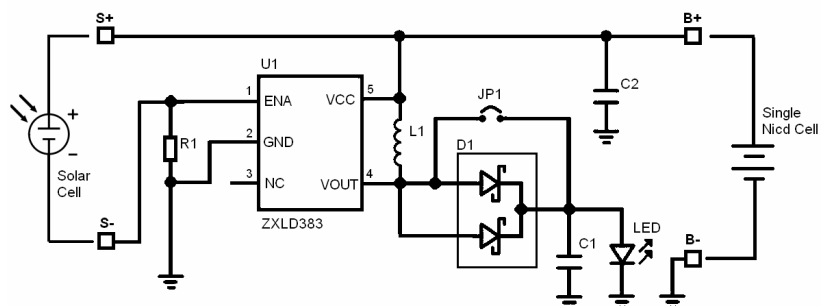
## ORDERING INFORMATION

<b>ORDER NUMBER</b>
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ZXLD383EV1
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Please note that evaluation boards are subject to availability and qualified leads.

## TYPICAL APPLICATION CIRCUIT



REFERENCE DESIGN

The ZXLD383EV1 evaluation board is designed to drive a 5mm type white LED. The target application is single-cell LED driving for garden lights.

The board is designed to accept a single rechargeable NiCd cell as the voltage source, with a voltage range from 1.4V down to 0.9V. The positive and negative of the NiCd cell should be connected to the B+ and B- terminals respectively.

For battery charging purposes, the positive and negative output terminals of the solar cell should be connected to the S+ and S- terminals respectively.

During daytime, current produced from the solar cell will charge up the NiCd cell through the internal ultra-low-dropout diode between the ENA pin and the GND pin. Negative voltage appearing at ENA pin will inhibit the LED driver.

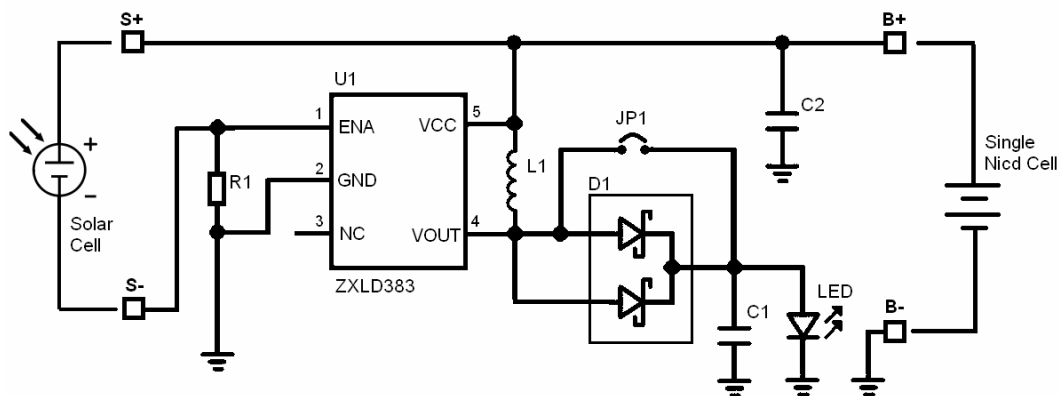
During night-time, the current produced by the solar cell will drop to a low level, which will cause the negative voltage of the ENA pin to drop. This will enable the LED driver. The change-over threshold may also be adjusted by the optional bypass resistor R1.

In order to maximize the LED light output efficiency and reliability, the evaluation board is set to operate in low-ripple-LED-current mode with the use of the D1 and C1. The LED current is set at 18mA with using an inductor value of 15uH.

Alternatively, the evaluation board could be configured to operate in standard-mode in order to obtain higher electrical efficiency. This could be done by shorting jumper JP1 and removing output capacitor C1.

For other reference designs or further applications information, please refer to the ZXLD383 datasheet.

SCHEMATIC DIAGRAM

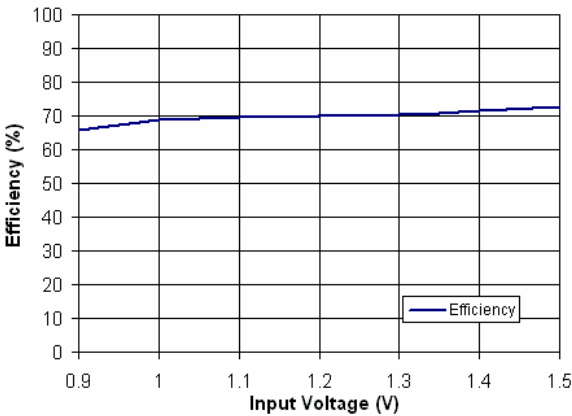


Materials List

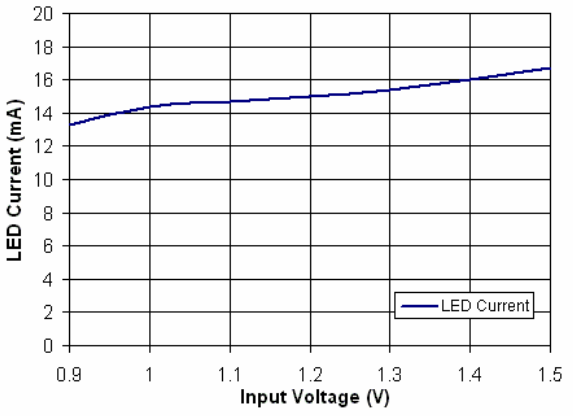
Ref	Value	Package	Part Number	Manufacturer	Contact Details
U1	LED Driver	SOT23-5	ZXLD383ET5TA	Zetex	<a href="http://www.diodes.com">www.diodes.com</a>
D1	Dual Schottky Diode	SOT23	BAT54C	Diodes Zetex	<a href="http://www.diodes.com">www.diodes.com</a> <a href="http://www.diodes.com">www.diodes.com</a>
L1	15uH	1206	LQH32CN150K53	Murata	<a href="http://www.murata.com">www.murata.com</a>
C1 C2	470nF 25V X7R	0805	GRM219R71E474KKA 88B	Murata	<a href="http://www.murata.com">www.murata.com</a>
R1	Not fitted	0805		Generic	
LED	5mm White LED		HLMP-CW30-PS000	Avago	<a href="http://www.avagotech.com">www.avagotech.com</a>
LED Spacer	20mm LED Spacer		Generic		

PERFORMANCE

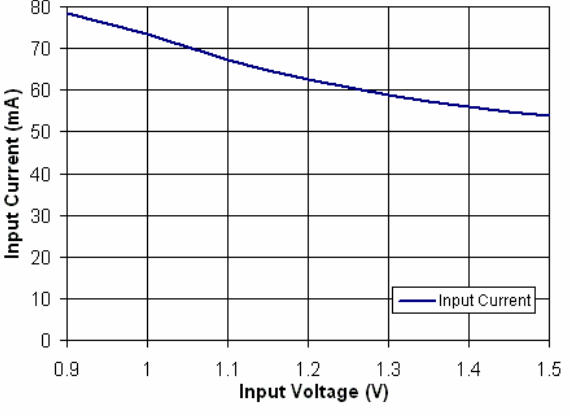
Graphs



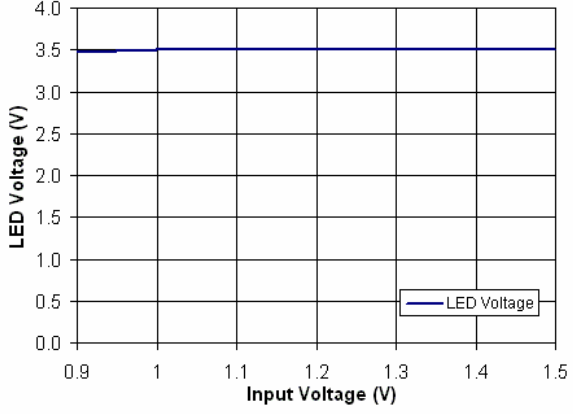
Efficiency vs Input Voltage



LED Current vs Input Voltage

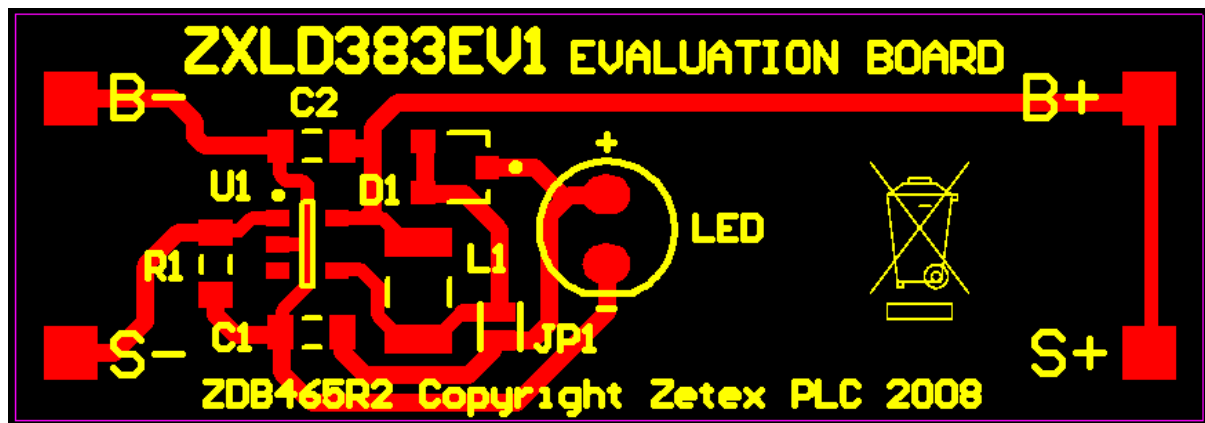


Input Current vs Input Voltage



LED voltage vs Input Voltage

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**ZXLD383EV1 OPERATION****Connection diagram****ZXLD383EV1 Set-up and Test**

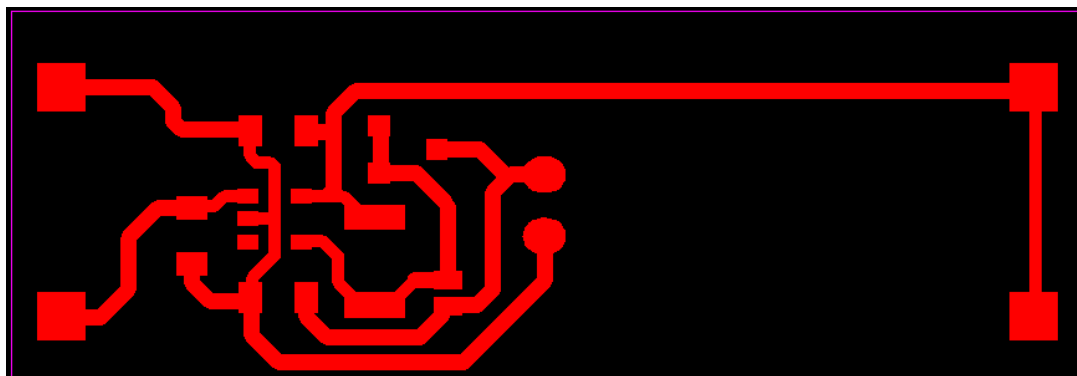
1. Set a PSU to 1.5V with a current limit of around 100mA.
2. Connect a wire between the S+ and S- terminals.
3. Connect B+ and B- to positive and zero volts respectively, of the power supply.
4. Turn on the PSU.
5. The LED should illuminate.
6. The input current should measure between 45mA - 65mA.
7. Turn off the PSU
8. Disconnect the wire between S+ and S-.
9. Connect a wire between S- and B-
10. Turn on the PSU
11. The LED should stay off.  
End of test

**Layout considerations**

PCB tracks should be kept as short as possible to minimize ground bounce. 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. Recommended layout of the ZXLD383EV1 is shown below.



Top Silk



Top Copper

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- "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

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- "Draft version" This term denotes a very early datasheet version and contains highly provisional information, which may change in any manner without notice.
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