ZXSC310EV3 USER GUIDE

DESCRIPTION

The ZXSC310 is a single or multi cell LED driver in an SOT23-5 package. The use of an external switching BJT or Mosfet enables various circuit topologies.

The ZXSC310EV3 is configured as a buck-boost converter to drive a 1W LED from 3 NiCd/NiMH or Alkaline batteries.

FEATURES

- Drives a 1W white LED at 350mA
- Typical efficiency of 75%

APPLICATIONS

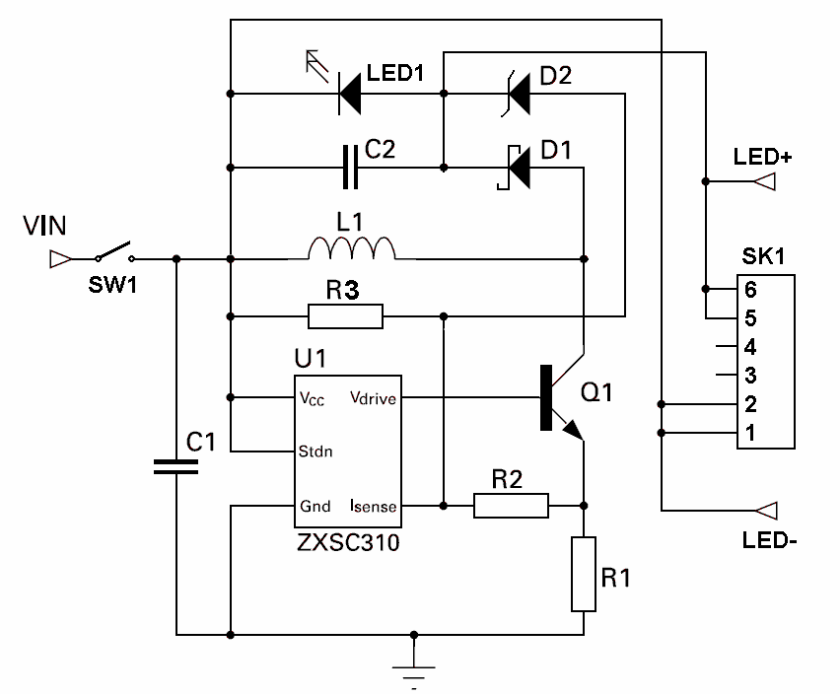
- LED torches
- High Power LED driving

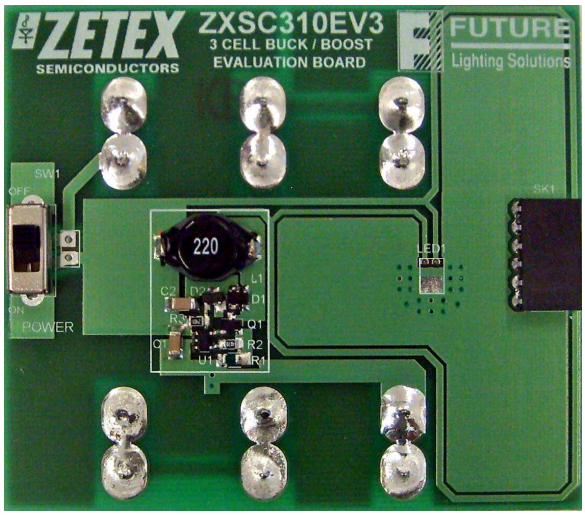
ORDERING INFORMATION

ORDER NUMBER
ZXSC310EV3

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

TYPICAL APPLICATION CIRCUIT





ZXSC310EV3 EVALUATION BOARD

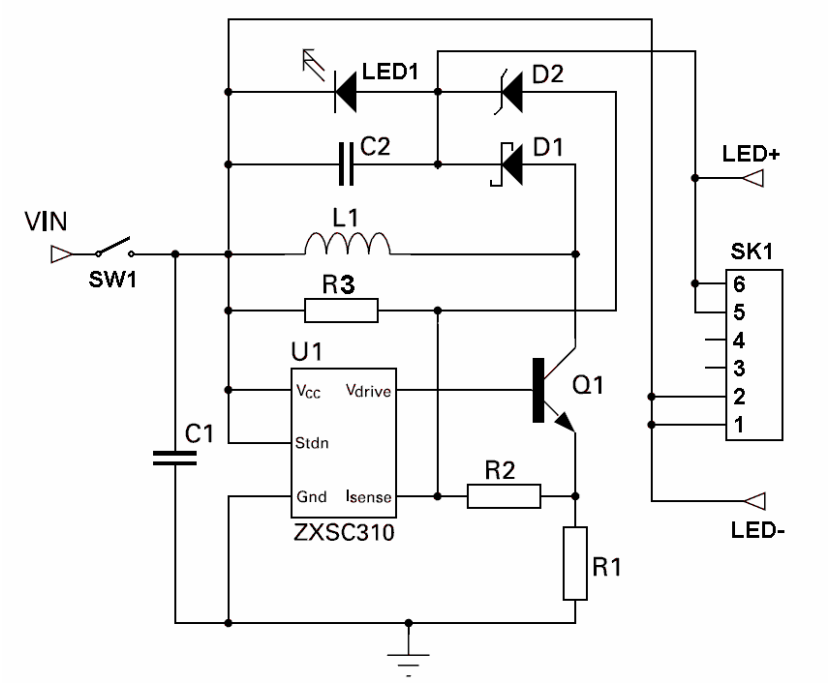
REFERENCE DESIGN

The ZXSC310EV3 is configured to the reference design below. The use of buck-boost topology enables the input voltage to range from below to above the LED voltage. The target application is a 1W white LED being driven from a 3 NiCd/NiMH or alkaline battery input, for torches and high powered LED driving. R1,R2 and R3 form an input voltage feed-forward network, which lowers the effective Isense threshold when input voltage goes high. This provides flatter response of LED current against input voltage. Zener diode D3 causes Isense to be held high (above 20mV) when the output is over voltage. This acts as open circuit protection.

The supply voltage for ZXSC310EV3 is: VIN=2.6V ~ 5V.
For other reference designs or further applications information please refer to the ZXSC310 datasheet.

WARNING: Exposed battery connections exist on the front and back of the board. Do not cause the batteries to short-circuit by placing it on a conductive surface or allowing other conductive materials to come into contact with it.

Schematic Diagram

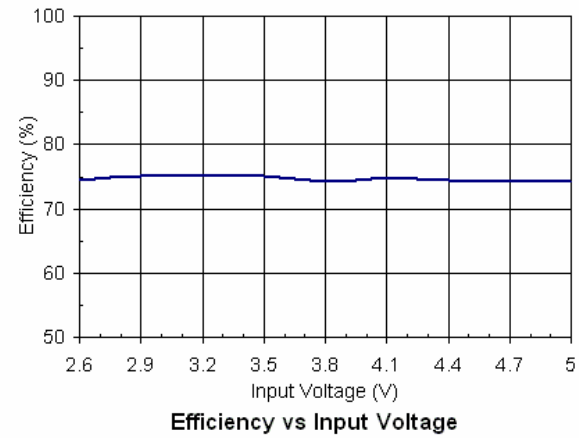


Parts List

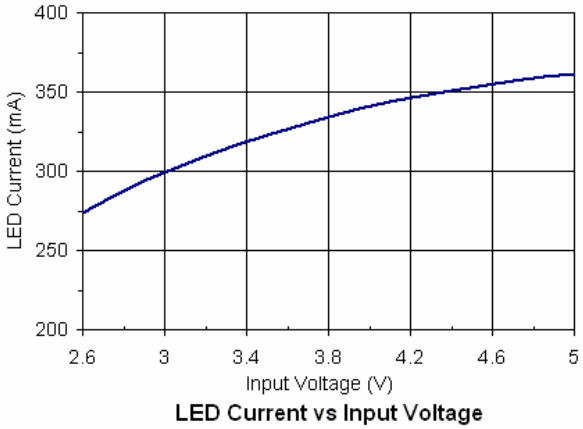
Ref	Value	Package	Part Number	Manufacturer	Notes
U1	N/A	SOT23-5	ZXSC310E5	Zetex	Boost LED Driver
Q1	N/A	SOT23	ZXTN25012EFH	Zetex	Low sat NPN transistor
D1	40V / 2A	SOT23-6	ZHCS2000	Zetex	Schottky diode
D2	12V/0.25W	SOT23	BZX84C12	Generic	Zener diode
L1	22uH / 2.5A	N/A	NPI31W220MTRF	NIC Components	SMT Inductor
R1	18mΩ	0805		Generic	1% tolerance
R2	4.7Ω	0805		Generic	1% tolerance
R3	2.4kΩ	0805		Generic	1% tolerance
C1,C2	4.7µF / 10V	1206	GRM31CR71A475KA01L NMC1206X7R475K10TRLPF	Murata NIC Components	X7R
SW1	n/a	n/a			Slide switch
SK1	n/a	6 way	5535676-5	Tyco	

PERFORMANCE

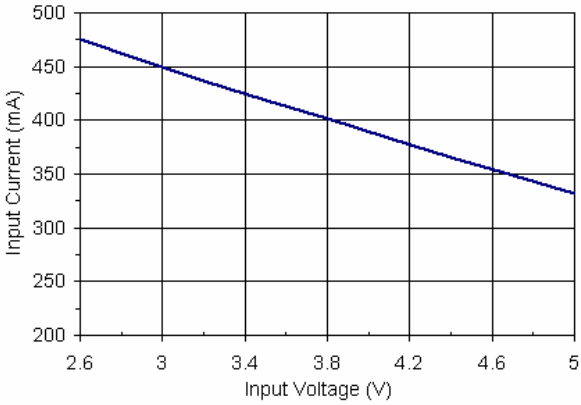
Graphs



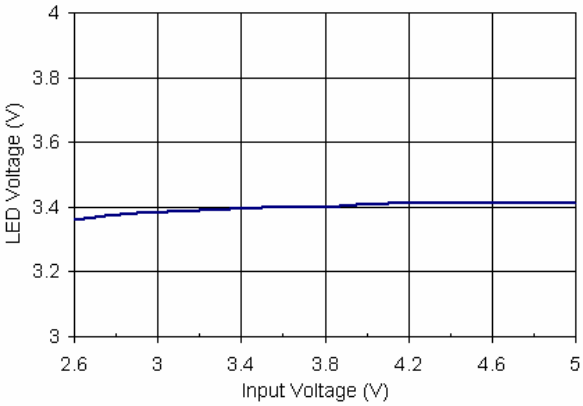
Efficiency vs Input Voltage



LED Current vs Input Voltage



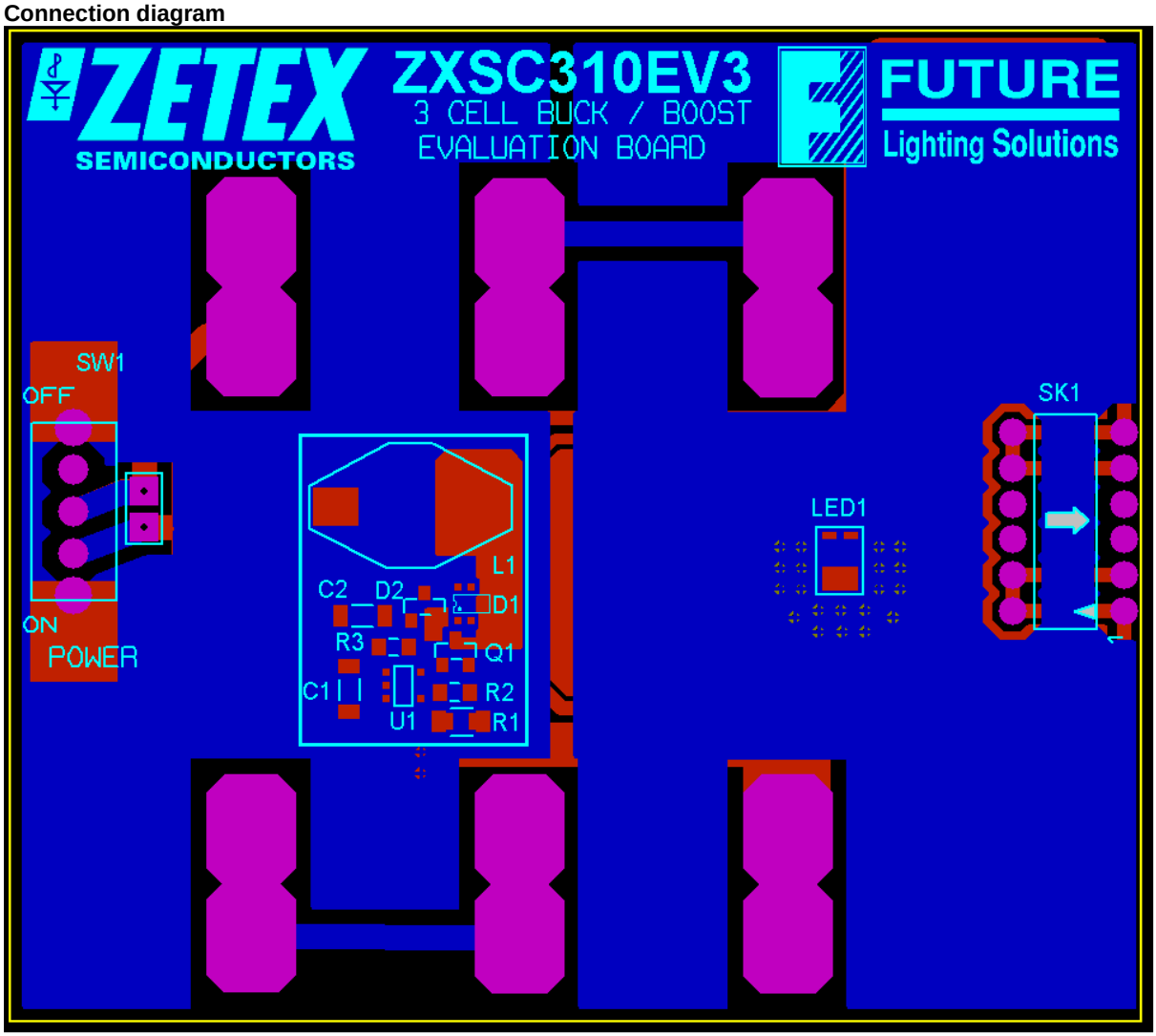
Input Current vs Input Voltage



LED Voltage vs Input Voltage

ZXSC310EV3 OPERATION

Connection diagram



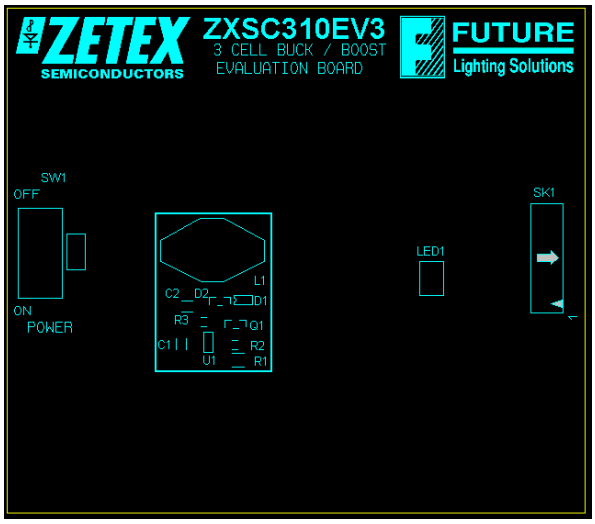
ZXSC310EV3 Set-up and Test

WARNING: Exposed battery connections exist on the front and back of the board. Do not cause the batteries to short-circuit by placing it on a conductive surface or allowing other conductive materials to come into contact with it.

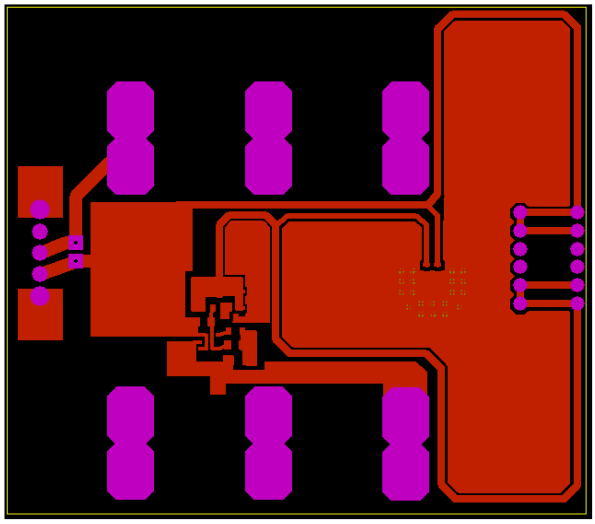
1. Ensure that the 'POWER' switch is set to 'OFF'
2. Insert three 'AA' size alkaline or NiCd/NiMH batteries as depicted on the rear of the board, or connect a power supply to the battery clips. (positive to BAT1 + and negative to BAT3 -)
3. Set the PSU to 4.5V (if used).
4. Connect a suitable Lumileds™ Luxeon® emitter board to connector SK1. (The LED must be capable of handling 350mA)
5. Turn on the PSU (if used).
6. Turn the 'POWER' switch to 'ON'
7. The LED should illuminate, and the LED current should be regulated at 350mA +/-10%.
8. The input current should measure between 300mA ~ 400mA - **THIS IS A FUNCTIONAL BOARD.**

Layout considerations
PCB tracks should be kept as short as possible to minimise ground bounce, and the ground pin of the device should be soldered directly to the ground plane. It is particularly important to mount the inductor and the input/output capacitors close to the device to minimise parasitic resistance and inductance, which will degrade the efficiency. The FB pin is a high impedance input, so PCB track lengths to this should also be kept as short as possible to reduce noise pickup. Excess capacitance from the FB pin to ground should be avoided.

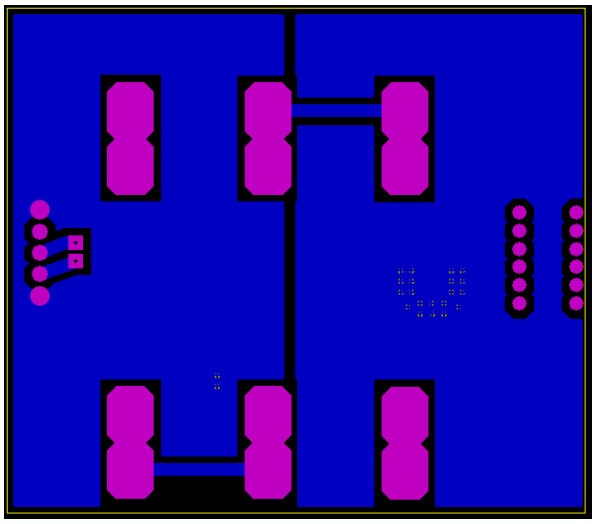
Below (contained within the box), is the recommended layout of the ZXSC310 driver circuitry.



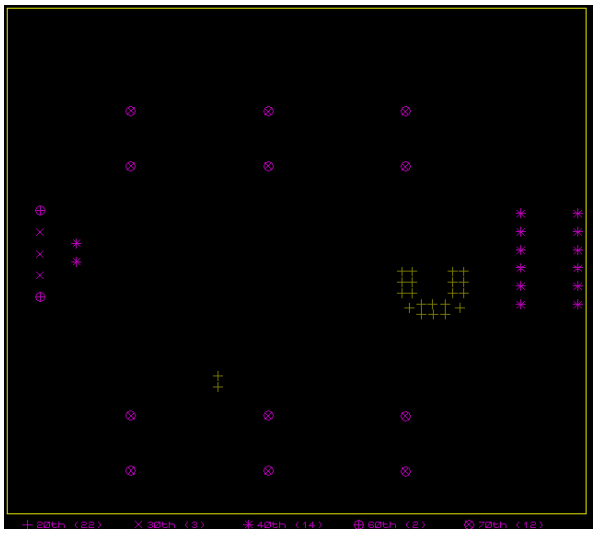
Top Silk



Top Copper



Bottom Copper



Drill File

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