ZXSC310EV5 EVALUATION BOARD 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 ZXSC310EV5 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

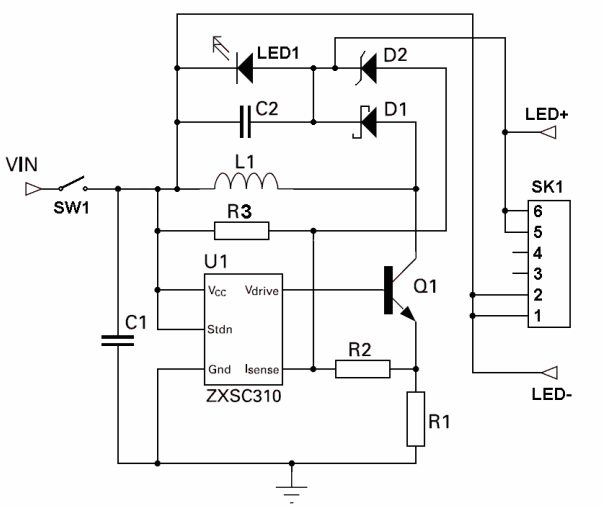
- LED torches
- High Power LED driving

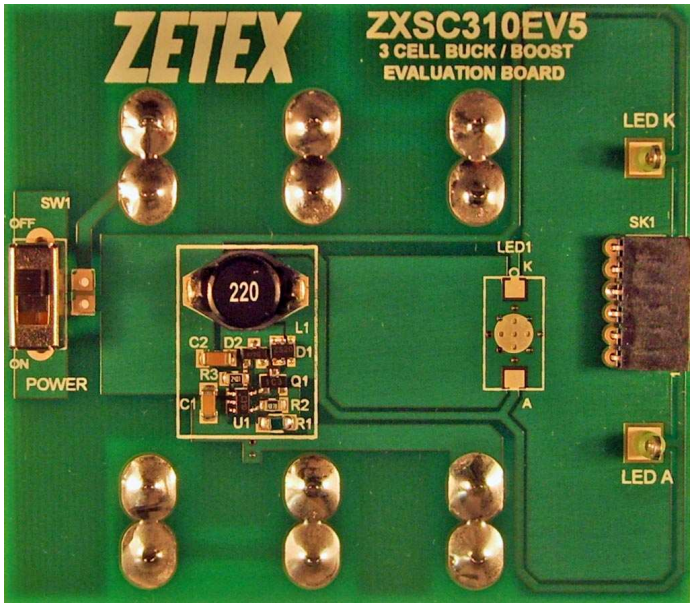
ORDERING INFORMATION

ORDER NUMBER
ZXSC310EV5

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

TYPICAL APPLICATION CIRCUIT





ZXSC310EV5 EVALUATION BOARD

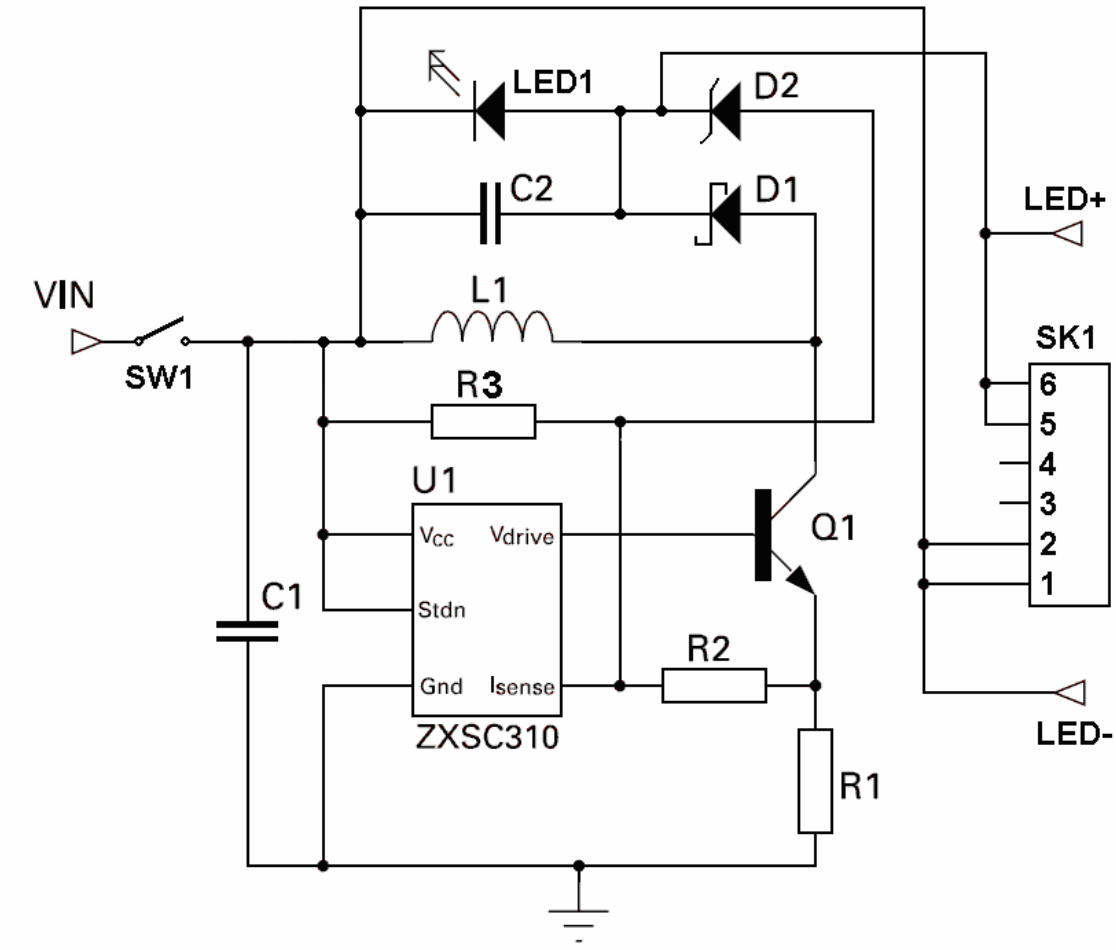
REFERENCE DESIGN

The ZXSC310EV5 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 ZXSC310EV5 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.

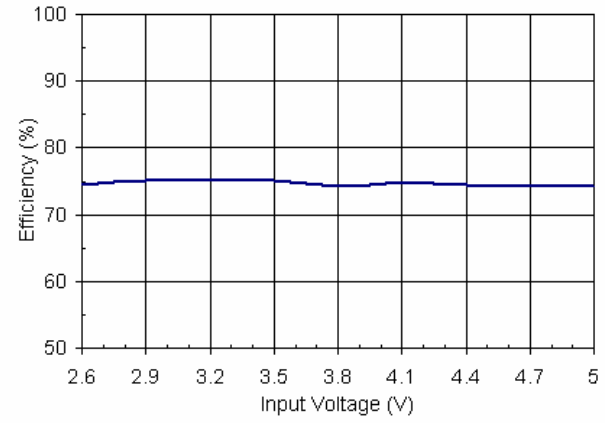
Schematic Diagram



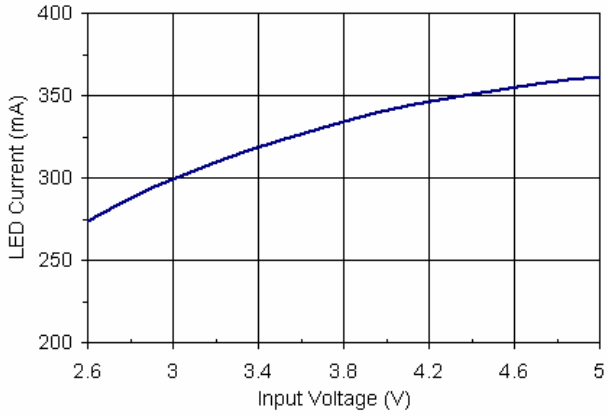
Parts List

Ref	Value	Package	Part Number	Manufacturer	Notes
U1	N/A	SOT23-5	ZXSC310E5	Zetex / Diodes Inc	Boost LED Driver
Q1	N/A	SOT23	ZXTN25012EFH	Zetex / Diodes Inc	Low sat. NPN transistor
D1	40V 2A	SOT23-6	ZHCS2000	Zetex / Diodes Inc	Schottky diode
D2	12V 0.25W	SOT23	BZX84C12	Zetex / Diodes Inc.	Zener diode
LED1	1W 350mA		n/a	generic	Not fitted
L1	22uH 2.5A	N/A	DO3316P-223 NPI31W220MTRF 7456122	Coilcraft NIC Components Wurth	SMT Inductor, ~0.085R
R1	0R018	0805		generic	+/-1% tolerance
R2	4R7	0805		generic	+/-1% tolerance
R3	2k4	0805		generic	+/-1% tolerance
C1,C2	4.7µF 10V	1206	C1206C475K8RAC GRM31CR71A475KA01 NMC1206X7R475K10	Kemet Murata NIC Components	X7R, +/-10% tolerance
SW1	n/a	n/a		generic	Slide switch
SK1	n/a	6 way DIL		generic	6 way connector

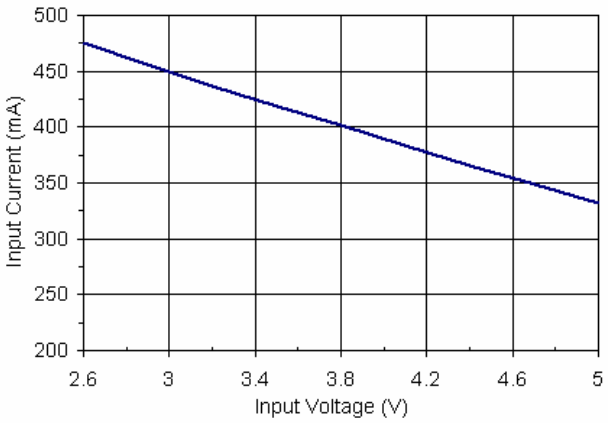
Performance Graphs



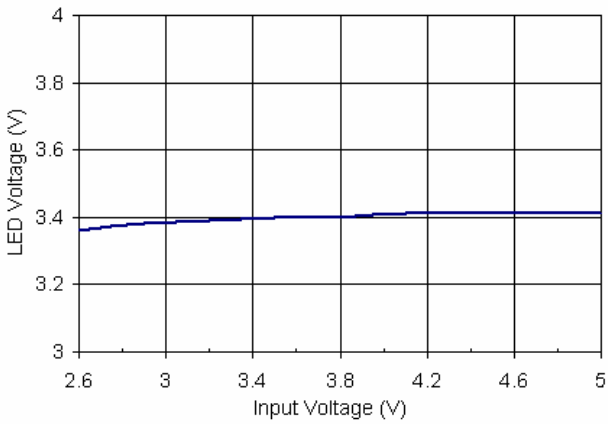
Efficiency vs Input Voltage



LED Current vs Input Voltage



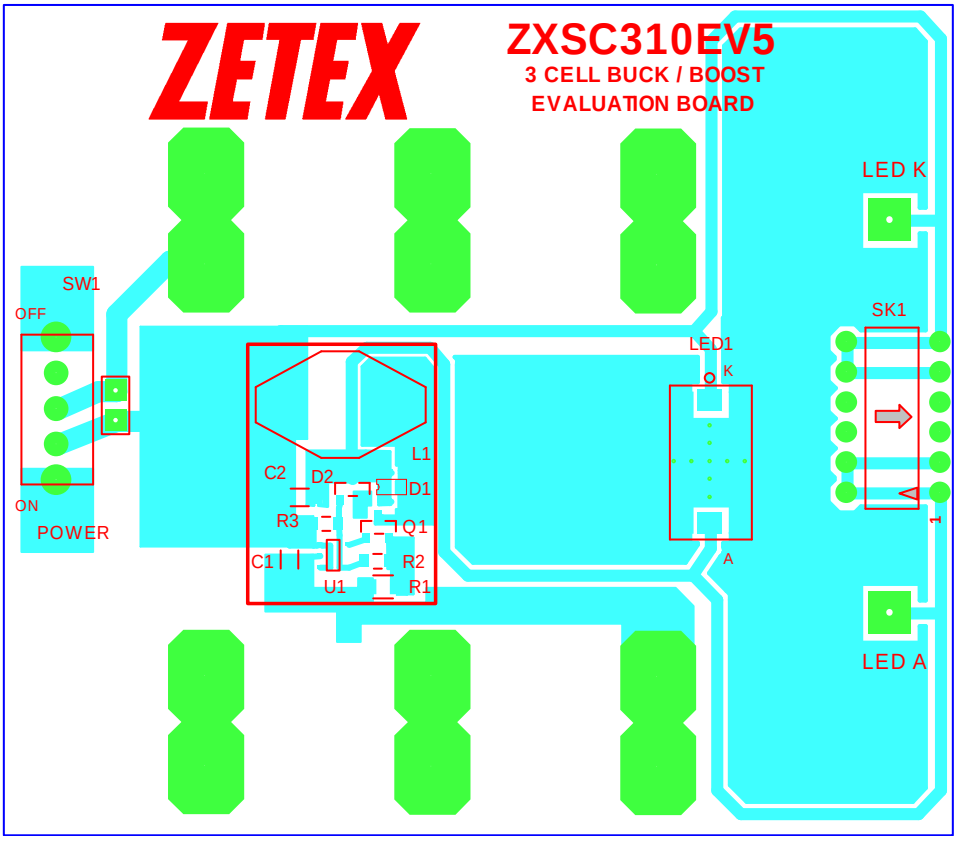
Input Current vs Input Voltage



LED Voltage vs Input Voltage

ZXSC310EV5 OPERATION

Connection diagram



ZXSC310EV5 Set-up and Test

<u>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.</u>

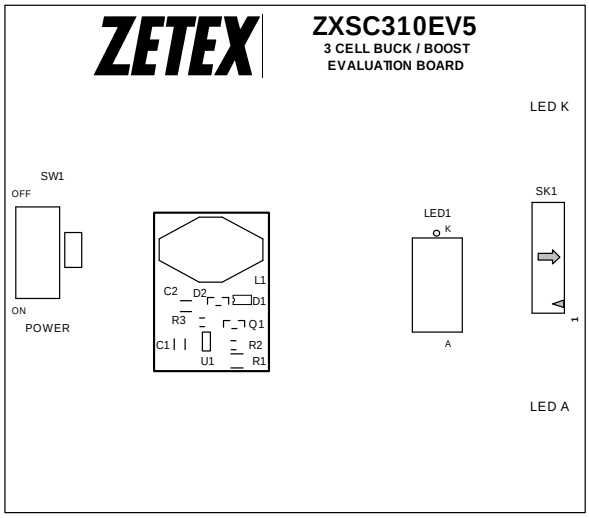
1. Ensure that the 'POWER' switch is set to 'OFF'
2. Insert three 'AA' size alkaline or NiCd/NiMH batteries as depicted on the rear of the board, or connect a supply to the battery clips. (positive to BAT1 + and negative to BAT3 -)
3. Set the PSU to 4.5V (if used).
4. Connect a suitable Lumileds™ Luxeon® 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.

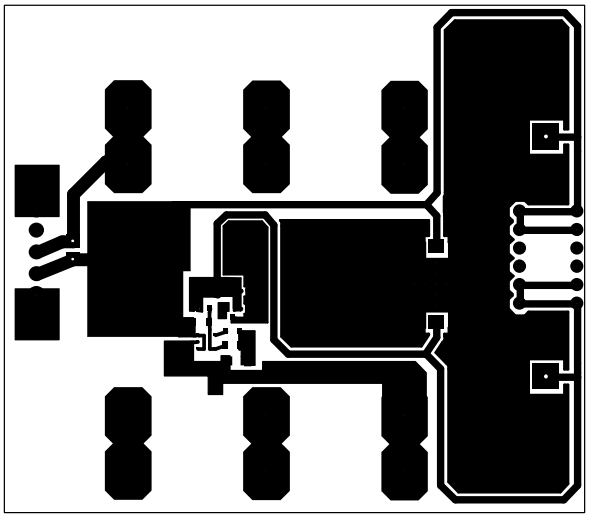
Layout considerations

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.

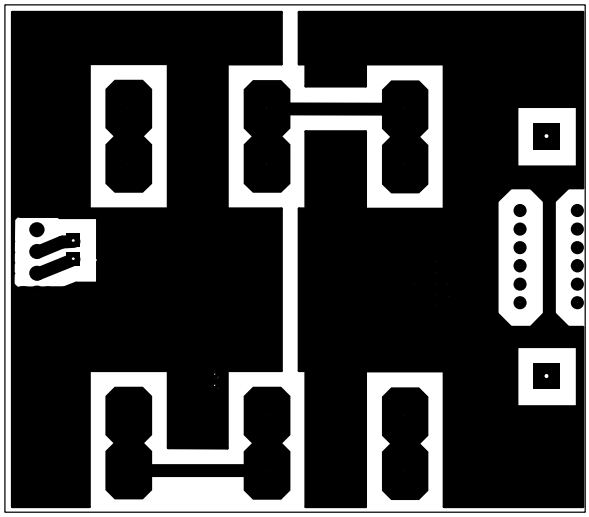
Below (contained within the box), is the recommended layout of the ZXSC310 driver circuitry.



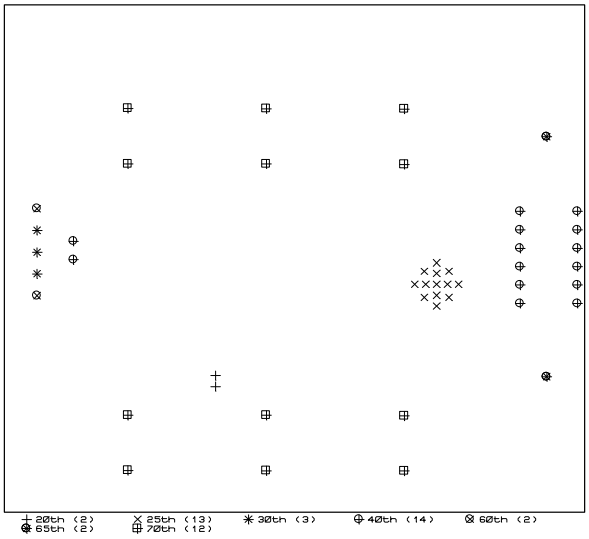
Top Silk



Top Copper



Bottom Copper



Drill File

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"Not recommended for new designs"	Device is still in production to support existing designs and production
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