

Build a solar powered light

Solar garden lights are everywhere, and they are cheap, but they are also usually poor quality. This kit lets you build your own using a high quality chip and other components.

The heart of this kit is the tiny ZXLD383 LED driver IC from Zetex. It is designed to connect to a single cell battery, LED, and solar panel, with just a single small inductor for stepping up the voltage. The circuit layout can be seen in the diagram.

Because the IC is too small to use on its own, we mount it on a small IC carrier PCB, which allows for much easier access to the IC's pins, as well as holding the rest of the components.

The carrier PCB has two sides, one is designed for ICs with a 0.95mm lead spacing. This is the side we need. The other side is unused, except for soldering the through-hole components. The IC is soldered into place in the middle six solder pads, and the other pads are bridged, as represented by the red bars in the diagram. This gives extra through-hole pads to work with.

There's not much to assembly, the tricky part is getting the IC in place without bridging any pins that you shouldn't. You will need a good desk magnifier and a fine tipped (0.5mm or smaller) temperature controlled soldering iron for this task. Set it at around 220°C and you should be fine.

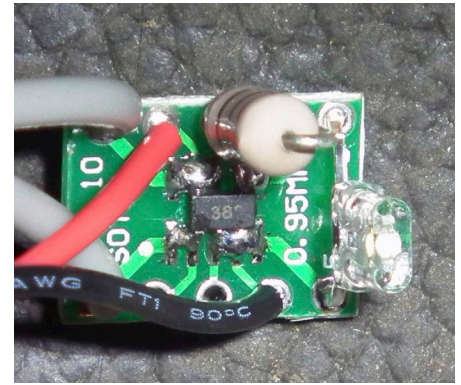
Once the IC is in place and all five pins soldered, then bridge the rest of the solder pads as shown in the diagram. Pin 3 in the IC is not connected

internally, so you can bridge the Gnd pin to it without issue.

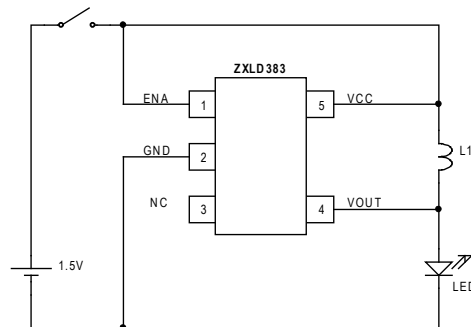
Now mount the inductor and LED, positioning them however you like, but keep the inductor leads short if you can. Now attach the battery holder and solar panel and you are done.

You should be able to connect the battery and, with the solar panel facing down to block light to it, the LED should light. Turn the solar panel over to get some light and the LED should go out. If all is well, then you are done, just fit the PCB, battery holder and solar panel into the case of your choice, but make sure it is fully weatherproof.

Note that the layout shown here is for the simplest circuit design, other

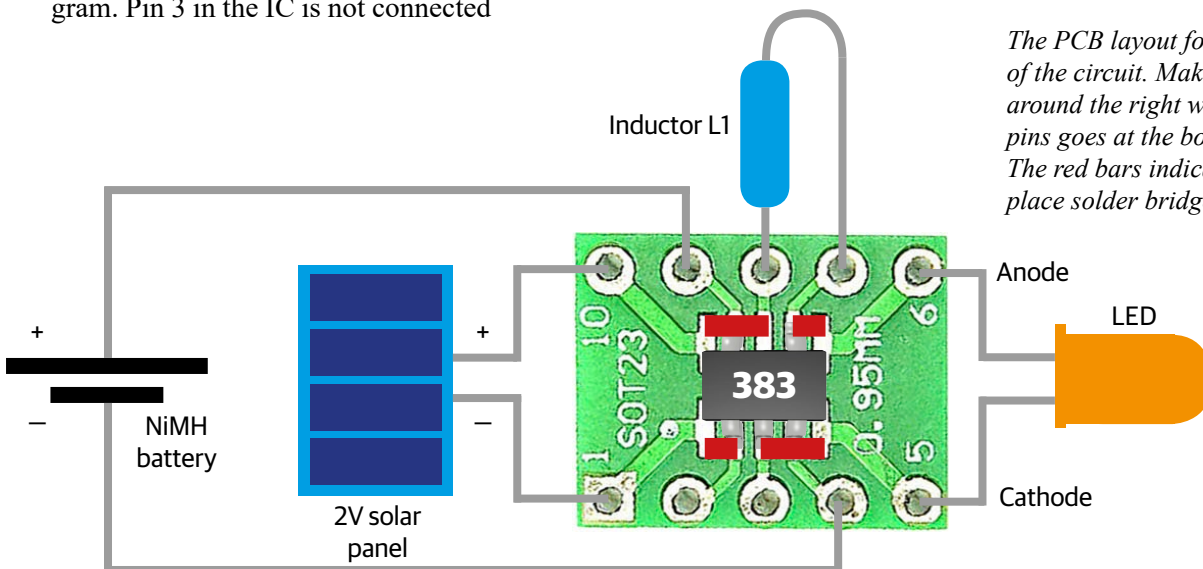


options are possible. For example, you might want to run an animating RGB LED. For this option you will need to build the low output ripple version, which requires two extra components, a Schottky diode and a small capacitor (supplied in the kit). The PCB layout would also be different but will be simple enough to do using the carrier PCB supplied. See the datasheet at www.ledsales.com.au/pdf/ZXLD383.pdf for more information on alternative circuit ideas.



L (uH)	I _{LED(peak)} (mA)	I _{LED(avg)} (mA)
47	45	8.5
22	100	17.3
10	210	34
6.8	330	50
4.7	415	63

The basic layout schematic, and expected LED currents for various inductor. We supply a 10uH device in the kit, which will also give a reasonable current if used in low ripple mode.



The PCB layout for the simple version of the circuit. Make sure you get the IC around the right way, the side with three pins goes at the bottom in this layout. The red bars indicate where you need to place solder bridges.