Wireless Workshop Handbook

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1 PCB Design

Install KiCad. The project files can be found here.

2 Soldering

You can find the interactive Bill of Materials here.

2.1 Passives

Resistors and the photoresistor do not have an orientation, just check you're putting the right values in the right places!

2.2 LEDs

The silk-screened line on the PCB for LED footprints is on **cathode** side (ground). The easiest way to align them is to take them out of the tape aligned – the holes on the tape are *always* on the **cathode** side (Fig. 1).

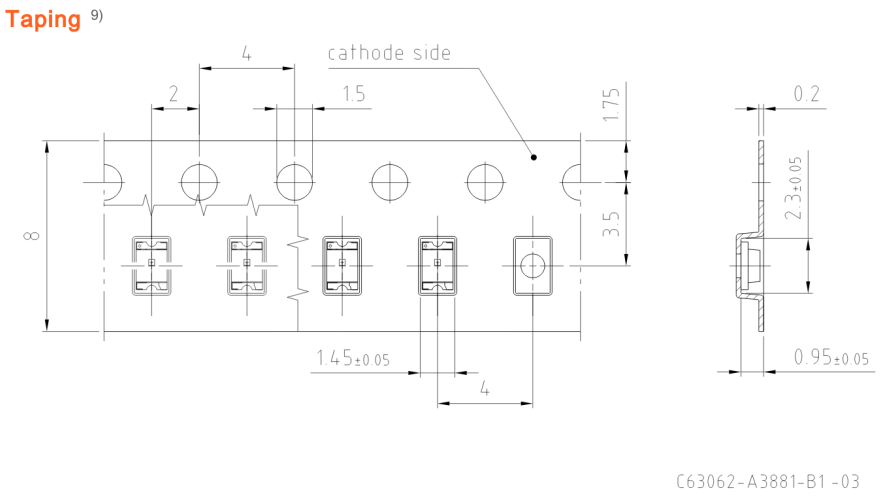

Figure 1: LEDs oriented in tape

2.2.1 For when you inevitably drop one...

Both the green and orange LEDs have both a small dot in the metal and a green arrow that both point to their **cathode**. The red LED is exactly the opposite, its markings point to its **anode**. (Figs. 2 and 3)

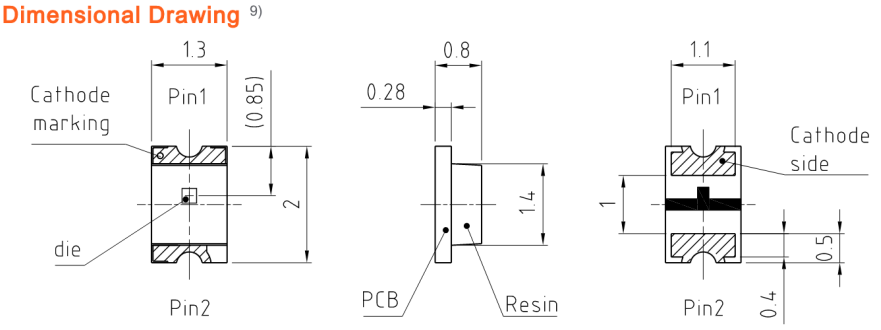

Figure 2: Orange and green LEDs

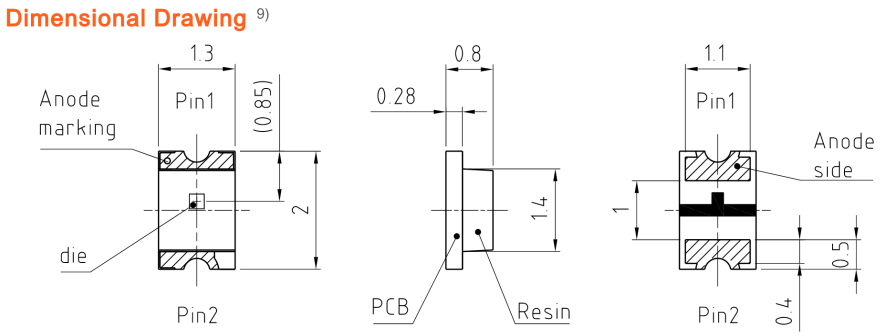

Figure 3: Red LEDs

2.3 ICs

Pin 1 for ICs are denoted with a longer silk-screened line on the PCB. See figures 4 and 5 for the on-chip pin 1 markings.

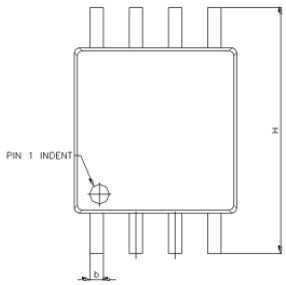

Figure 4: Pin 1 mark on SPI Flash

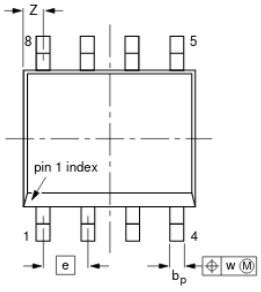

Figure 5: Pin 1 mark on LM75B temperature sensor

2.4 Header Pins

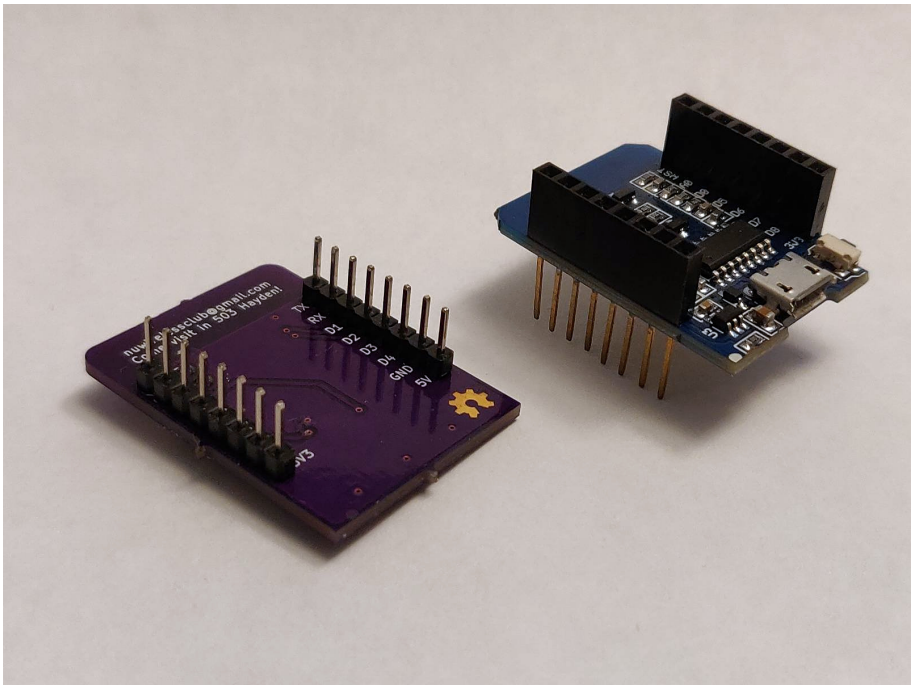

Figure 6: Install the header pins as shown.

3 Embedded Systems Programming

First, get the firmware binary here. To flash, use `esptool`: assuming `pip` is using Python 3,

```
 pip install esptool
# erase anything that's already on there
$ esptool.py erase_flash
# upload firmware £ esptool.py --baud 460800 write_flash \
 --flash_size=detect 0 workshop.bin
```

There is in a shell script to automate the flash erasing/writing process here. Assuming the firmware was flashed successfully, pressing the reset button should blink the board LED five times.
To actually connect (not necessary to confirm flash is successful, assuming the LEDs flash) and get a Python REPL, using `picocom` for example,

```
$ picocom /dev/ttyUSB0 -b115200
...
Type [C-a] [C-h] to see available commands
Terminal ready
>>> import os
>>> os.listdir()
['boot.py', 'inet.py', 'led.py', 'light.py', 'temp.py']
>>>
```