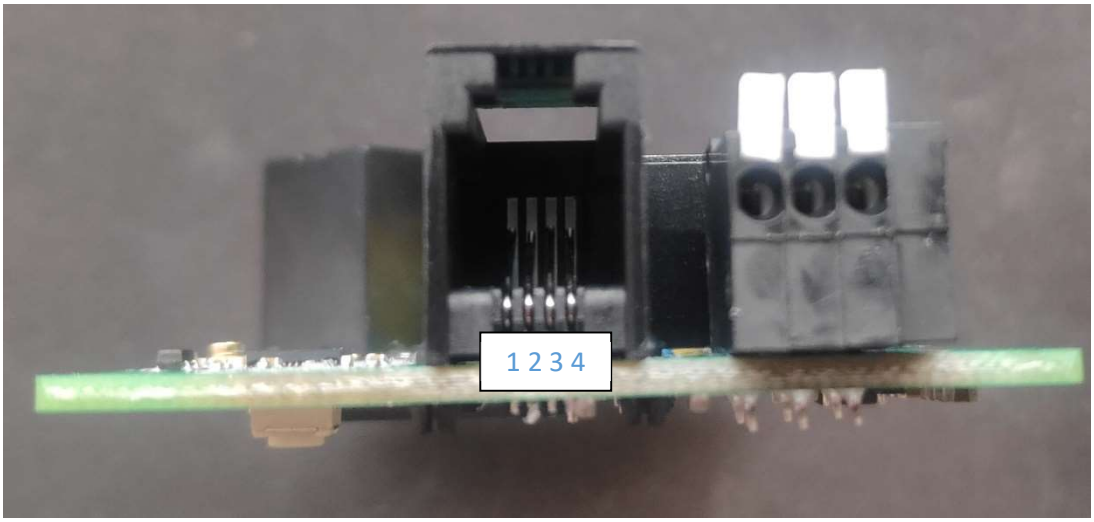
How to get a second GPIO on the SonOff THR320D

First some explanations and background information. The pin out of the rj10-connector



Pinout:

1=GND

2=RX1 (on the PCB silkscreen) → R25/R16 → GPIO26

3=TX0 (on the PCB silkscreen) → R26/R14 → GPIO25

4=VCC (on the PSP silkscreen) → V_{out} of MC9700 ; (enable pin of IC MC9700 → R48/R20→GPIO27)

Values:

R16=open (series to GPIO26)

R25=open (pullup 3,3V GPIO26)

R14=47Ω (series to GPIO25)

R26=1kΩ (pullup to 3,3V GPIO25)

R20=10kΩ (pulldown to GND GPIO27)

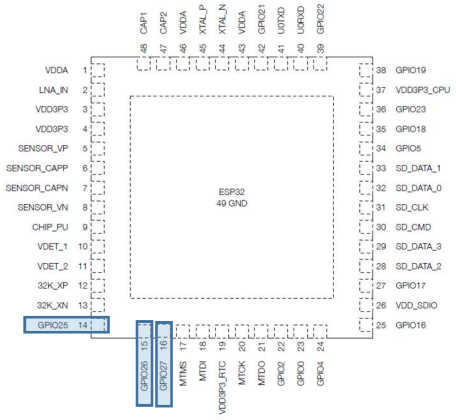
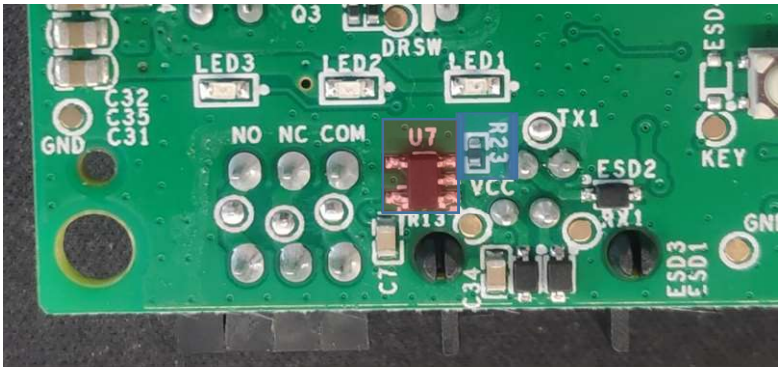


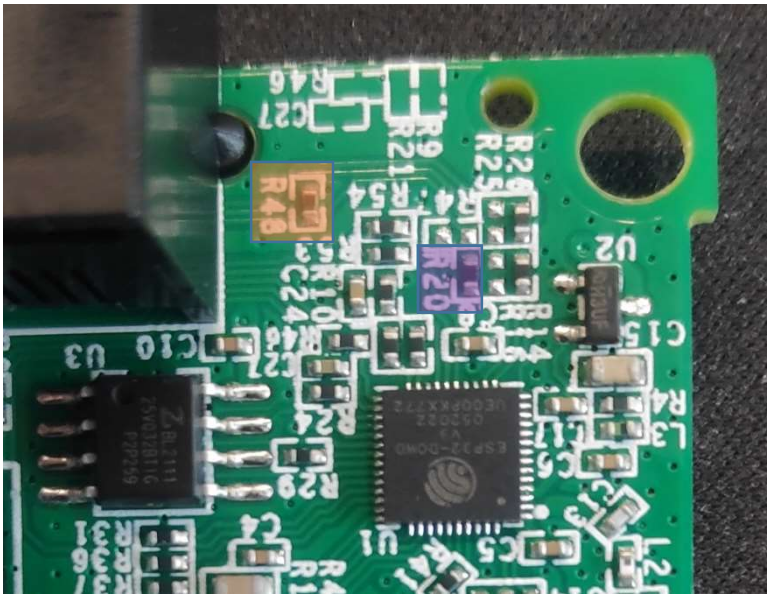
Figure 3: ESP32 Pin Layout (QFN 5*5, Top View)

“Adjustable Fast Response Current-Limited Power-Distribution Switch”

U7 is the MC9700. It’s a current limit switch IC. A resistor (R_{SET}) can set the current. On the SonOff THR320D PCB it’s R23=33kΩ on the backside of the PCB.



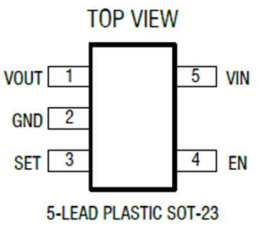
The enable Pin of MC9700 is connected via voltage divider R48/R20 to GPIO27



I_{SET} is the maximum flowing current on the VCC Pin at the RJ10 connector. I_{SET} is calculated by the following simple formula.

$$I_{set}(A) = \frac{6{,}8k\Omega}{33k\Omega} = 0{,}206A \approx 200mA$$

So the maximum flowing current is 200mA on the RJ10 connector.



Current limit threshold Setting

Current limit threshold is programmed with a resistor from SET to ground marked as R_{SET}. It can be estimated by the following equation:

$$I_{SET}(A) = \frac{6.8k\Omega}{R_{SET}(k\Omega)}$$

Such as the following table.

I_{SET}(mA)	R_{SET}(kΩ)
600	11.3
800	8.45
1000	6.8
1500	4.53
2000	3.4

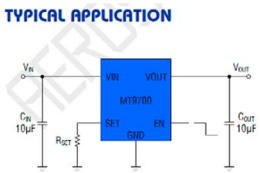
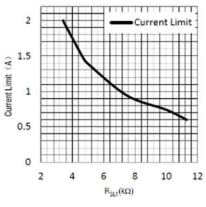


Figure 1. Basic Application Circuit



Long story short ☺

To get the GPIO26 working, there are two options

- a simple jumper on R16 to connect Pin2 of RJ10 (RX1 on silkscreen) directly to GPIO26
- put in a resistors on:
    - R16=47Ω (series to GPIO25)
    - R26=1k Ω (pullup 3,3V GPIO25)

I used the second option and soldered the resistors in place. I didn't have the right size of SMD resistors on hand but the right values. I managed to get them soldered in place.