How it works 12/20/2021

Q1 is a high side transistor switch that supplies the power to your devices. With the component values shown on the schematic, Q1 turns on when the voltage connected to VDC rises above 5.2V and turns off when it falls below 3.5V. U1 is a dual voltage comparator with U1A used for the upper trip point, U1B for the lower and both connected in an inverting configuration (output goes LOW when VDC exceeds trip points). The power source connected to Q1 (V_P) can be VDC or a separate supply. V_P should be kept below 6.75V.

The U1 outputs (pins 1, 7) are open drain and connected in parallel so that when either trip point is active, Q1 will be turned on. However, Q2 (connected to U1B pin 6) will short U1Bs input to ground until the upper trip point is reached, thus preventing Q1 from turning on as VDC rises past the lower trip point. Once the upper trip is reached, Q2 is turned off thus enabling the lower trip point circuit. Now, as VDC falls, Q1 will remain on until VDC drops below the lower trip point.
U3 and R10 will keep U1s supply voltage from exceeding the maximum of 5.5V.

Upper Trip Point

R1, R2 and R3 determine the Upper trip and is calculated as follows:
Upper Trip = Vref x (R1+R2+R3)/R3, where Vref = 2.5V
For the values on the schematic: 2.5V x 312.1/150 = 5.20V
Removing R1 will yield: 2.5V x 300/150 = 5V
The Upper trip point must be above the Lower and has an upper limit of 10V.

Lower Trip Point

R4, R5 and R6 determine the Lower trip and is calculated as follows:
Lower Trip = Vref x (R4+R5+R6)/R6, where Vref = 2.5V
For the values on the schematic: 2.5V x 349/249 = 3.50V
Replacing R4 with a 50K Ω will yield: 2.5V x 349/249 = 4.00V
The Lower trip point must be below the Upper and has a lower limit of 3.0V.

Q1 switch

Q1 has a maximum V_{CE}(sat) of less than 0.25V when supplying currents of 1A or less. What that means is that the voltage supplied the the ESP/devices will be 0.25V less than V_P. If VDC and V_P are the same and the upper trip set to 5.2V, then the voltage to the ESP/devices will be 5.2-0.25=4.95V max. V_{CE}(sat) drops as the current demand drops and for currents less than 500mA V_{CE}(sat) is only 0.15V

How much current when OFF:

When VDC is at 5V:

U1-	1.2μA
Upper voltage divider-	16 μA
Lower voltage divider-	12 μA
Vref-	139 μA
Total-	168.2 μA

The total current will be proportionally less when VDC is less than 5V.
When VDC is above 5V, the U1 protection circuit (U3, R10) will become active, adding to the total current. This additional current is dependent on VDC and for a VDC of 5.2V, it will be about 294μA. If you can ensure that VDC never rises above 5.5V, then you can eliminate U3 and R10 and thus the additional off time current.