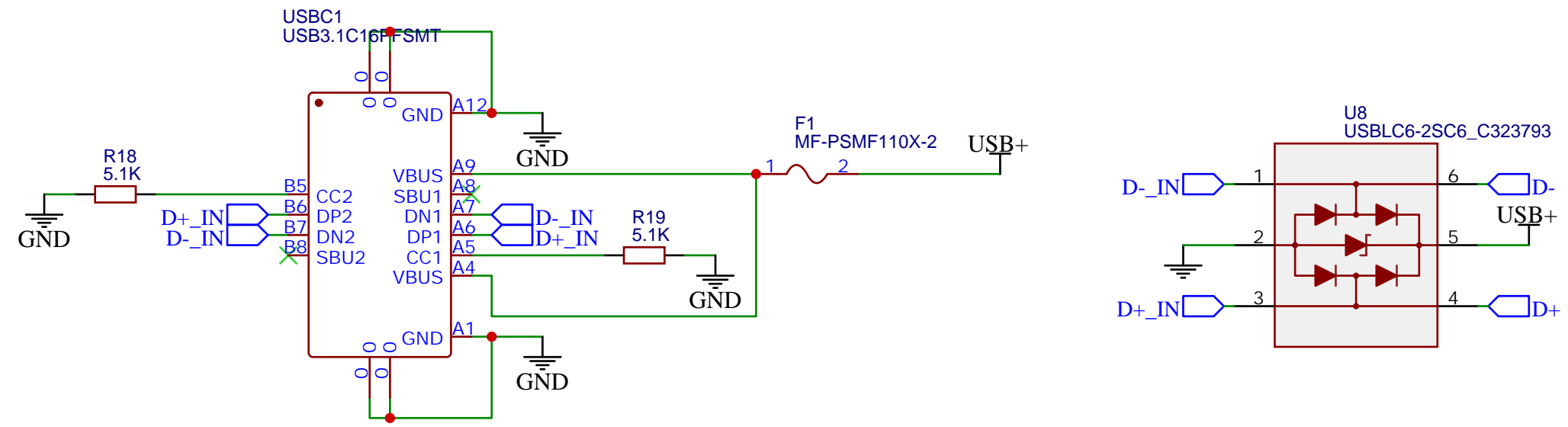
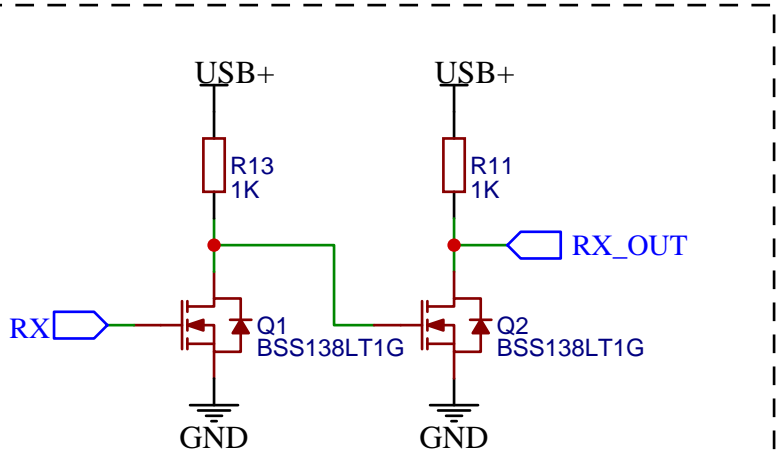
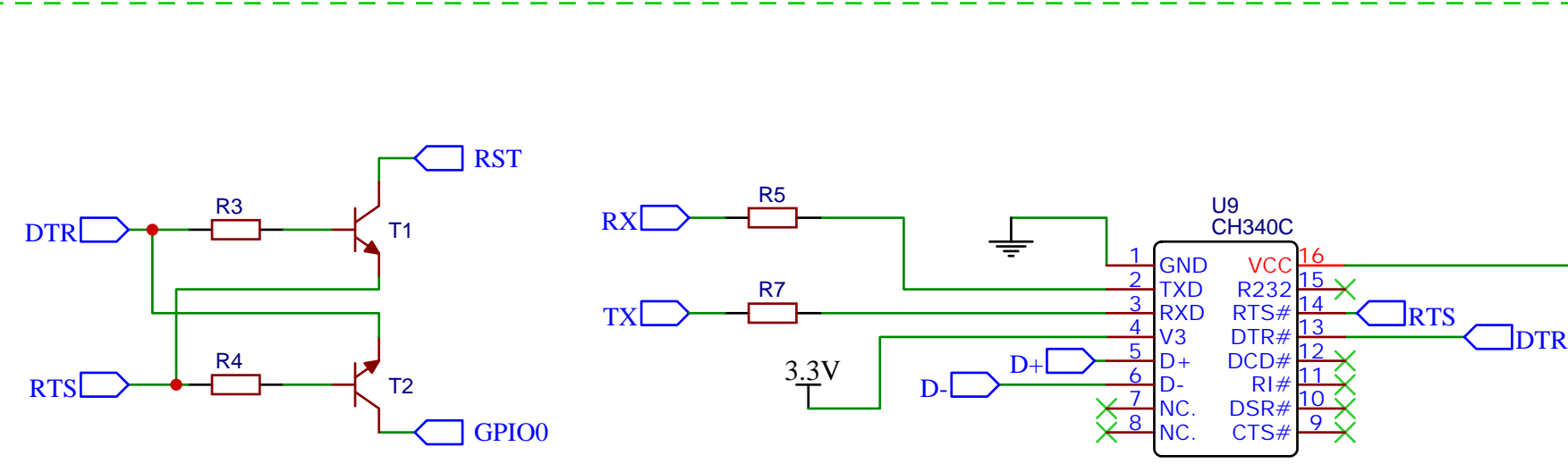


ESP-M2 is used for its tiny footprint  
GPIO4, GPIO5 and GPIO12 are unused in the design and perfect for any use.

### 3.3V to 5V Level shifting for WS2812

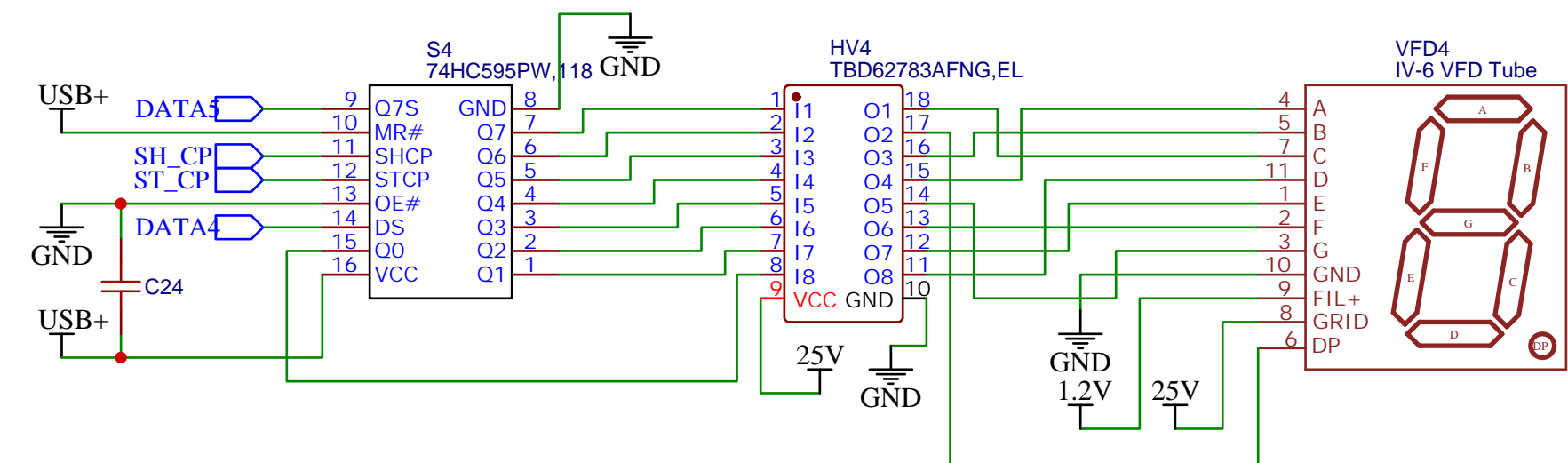
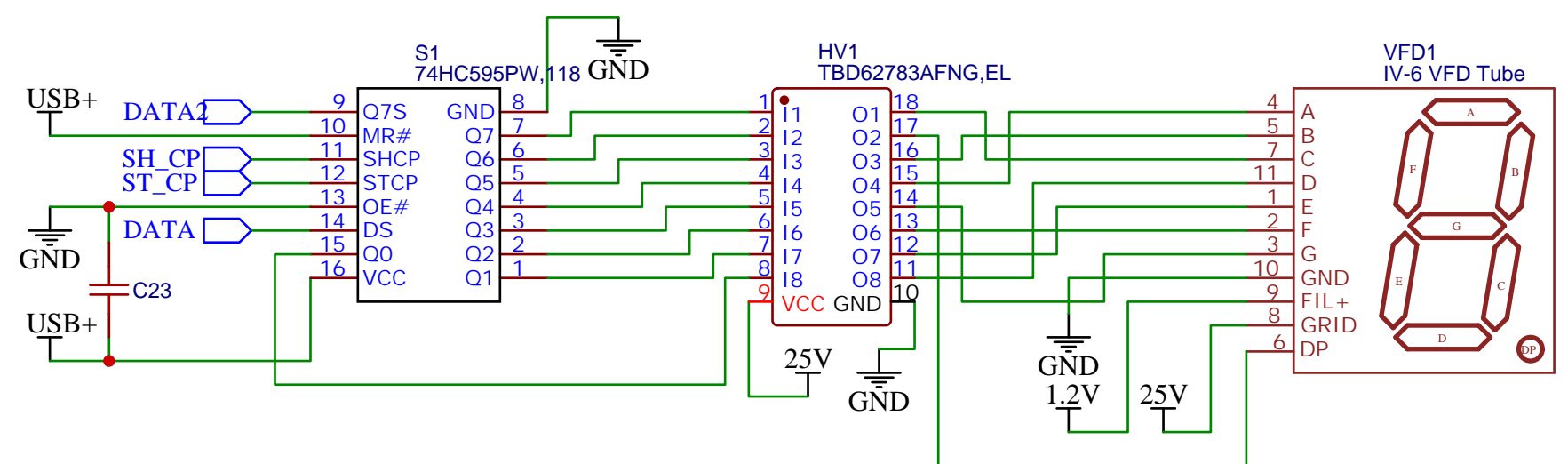


## USB to SERIAL + auto-reset



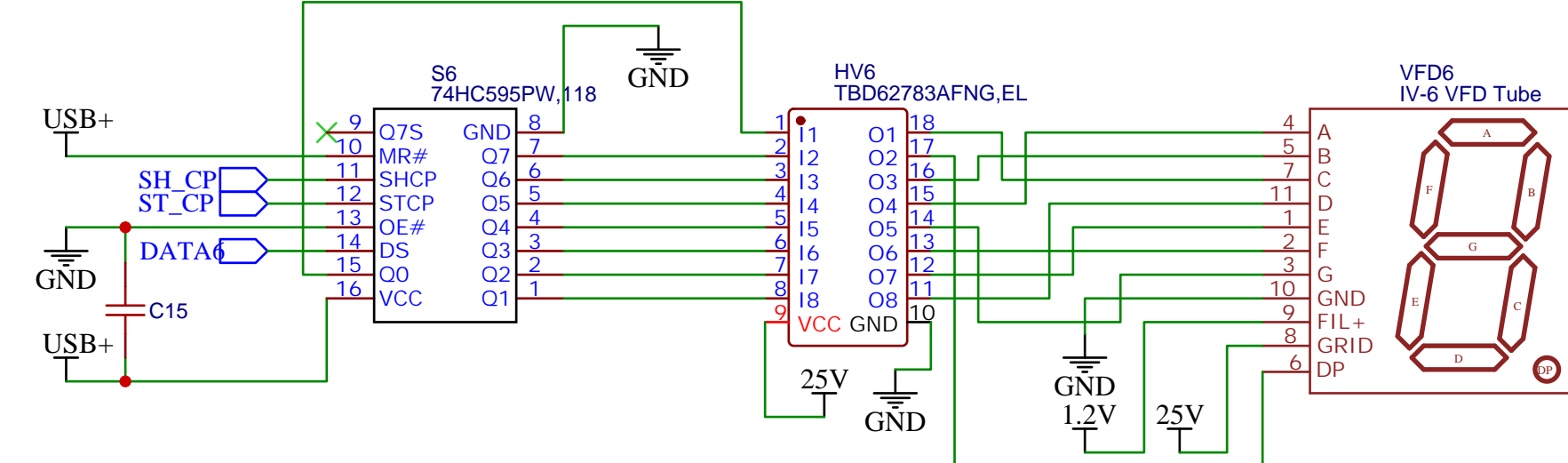
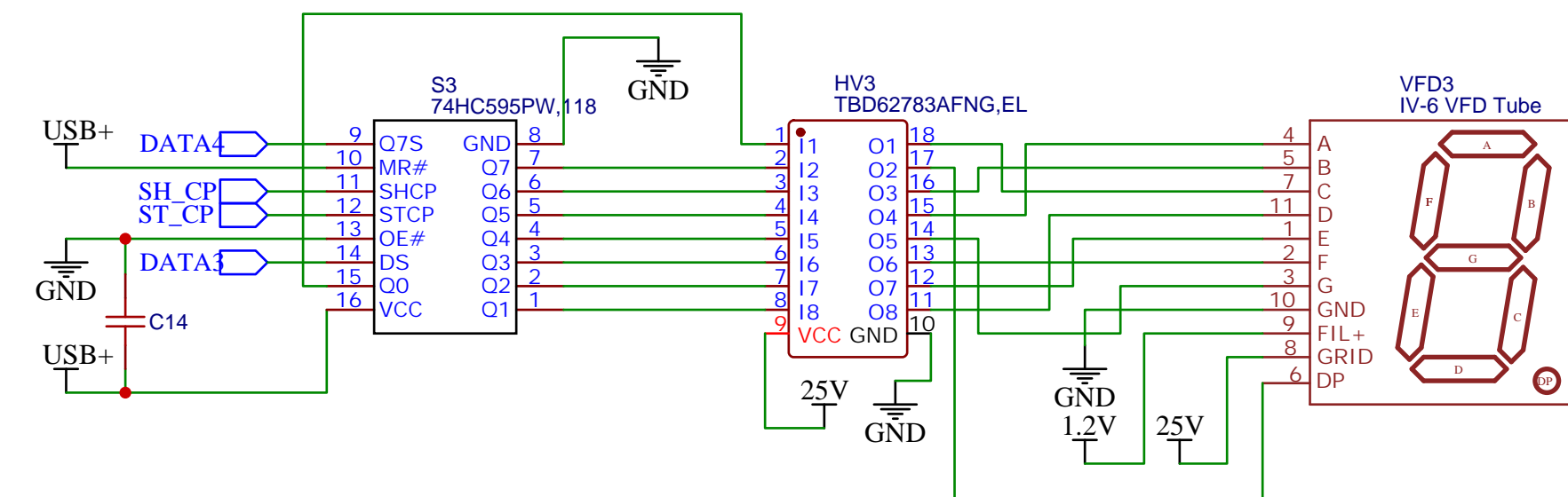
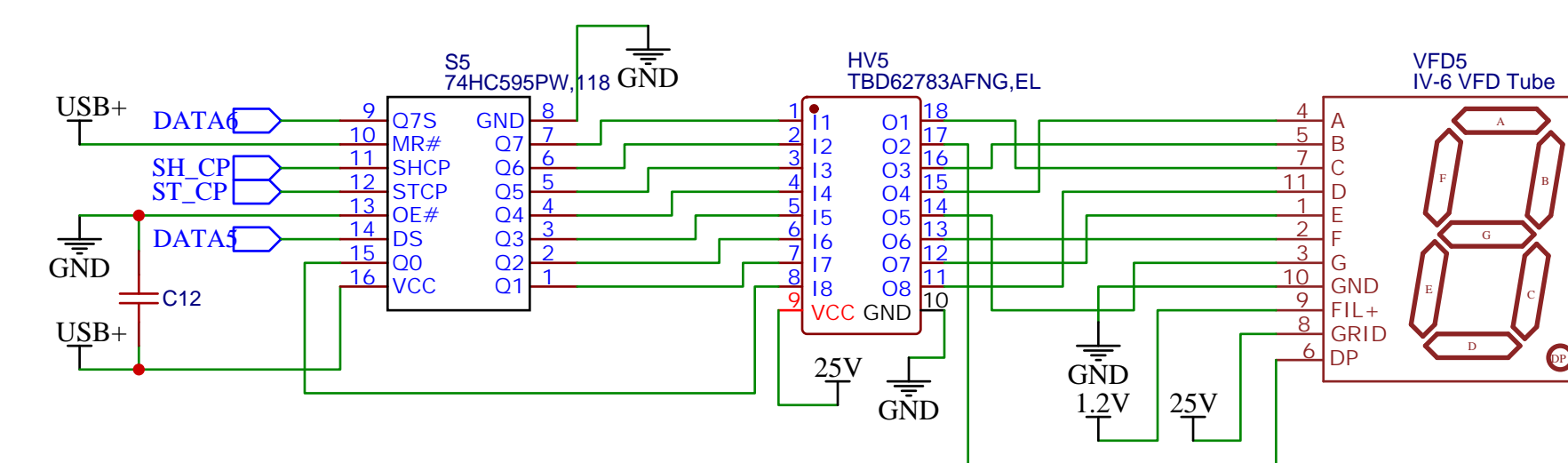
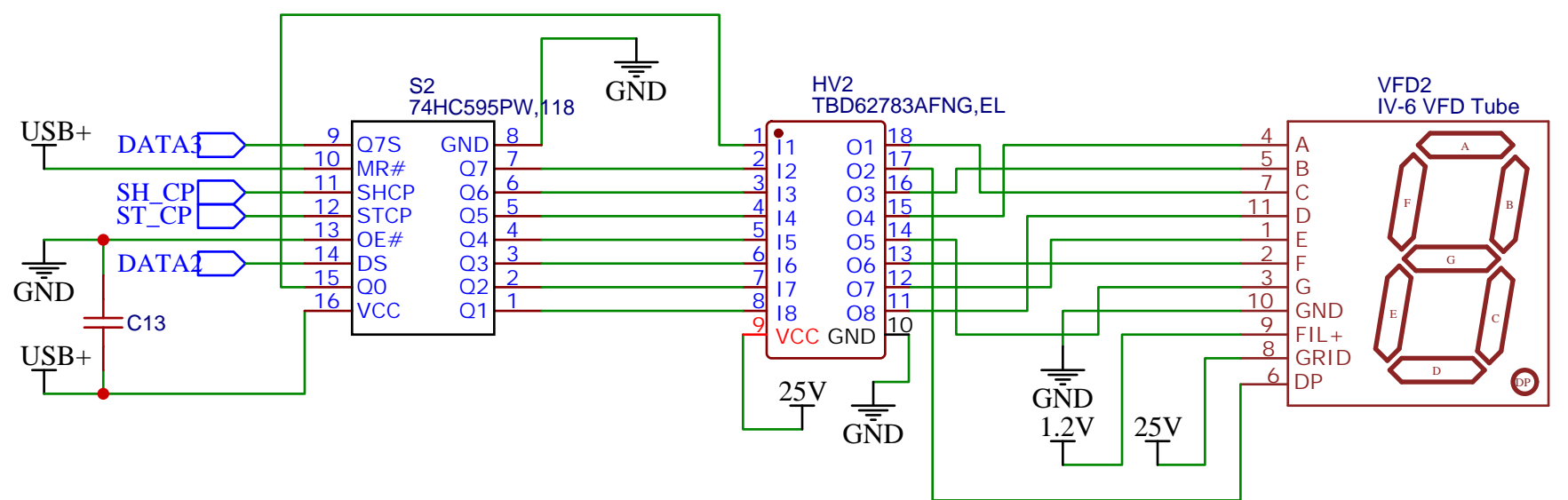
v1.1 note: CH340 powered from 3.3V instead of 5v. Though ESP8266 is 5V tolerant on GPIOs, 3.3V is still better

VFD + shift registers

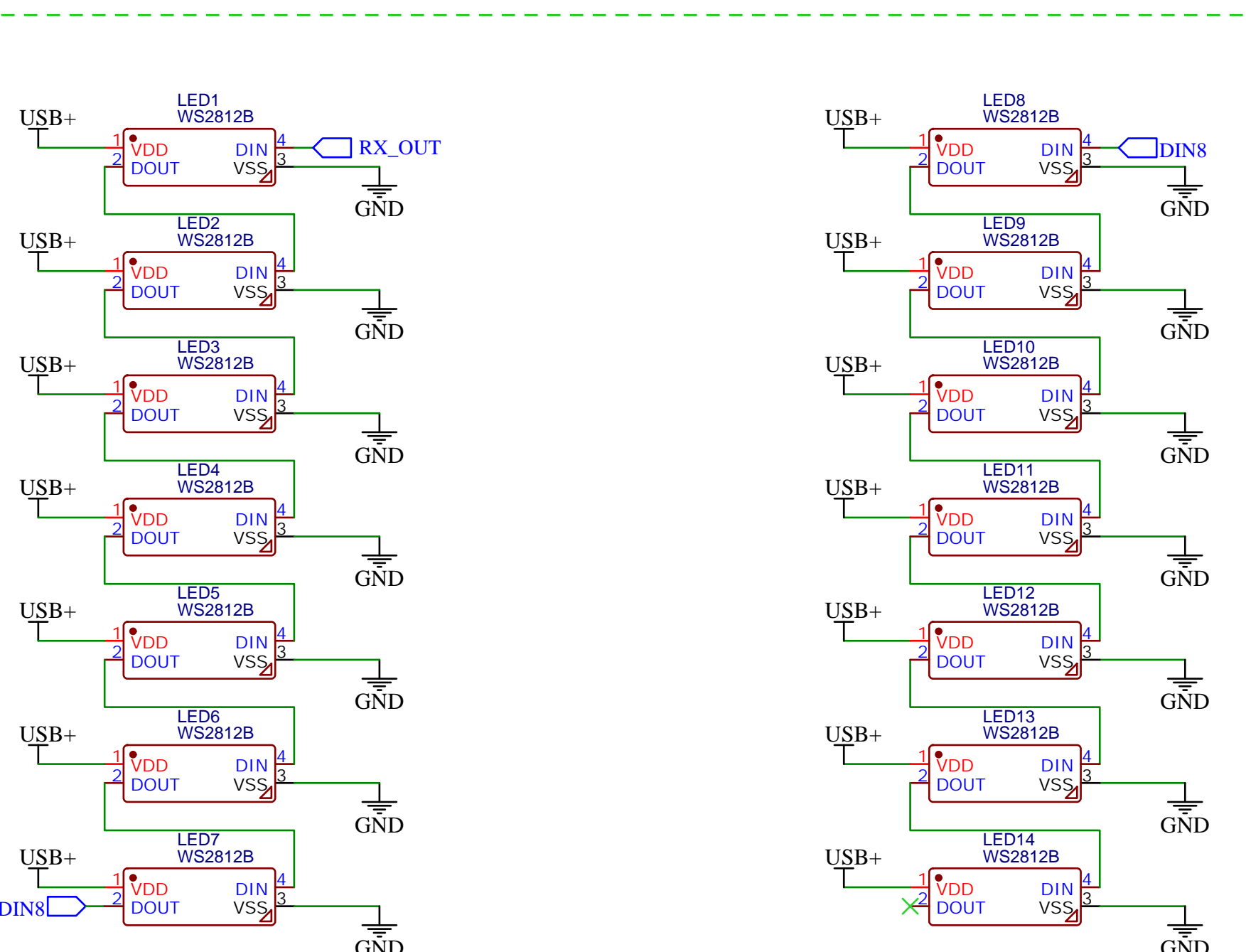


74HCT595PW is required in this design, do not use 74HC595PW!!!

The VFD pin holes on the PCB are misleading (looks flipped) so pay attention to GRID and FILAMENT positions. Double and TRIPLE check before soldering all pins. I suggest to start with the grid pin. (!!!!)

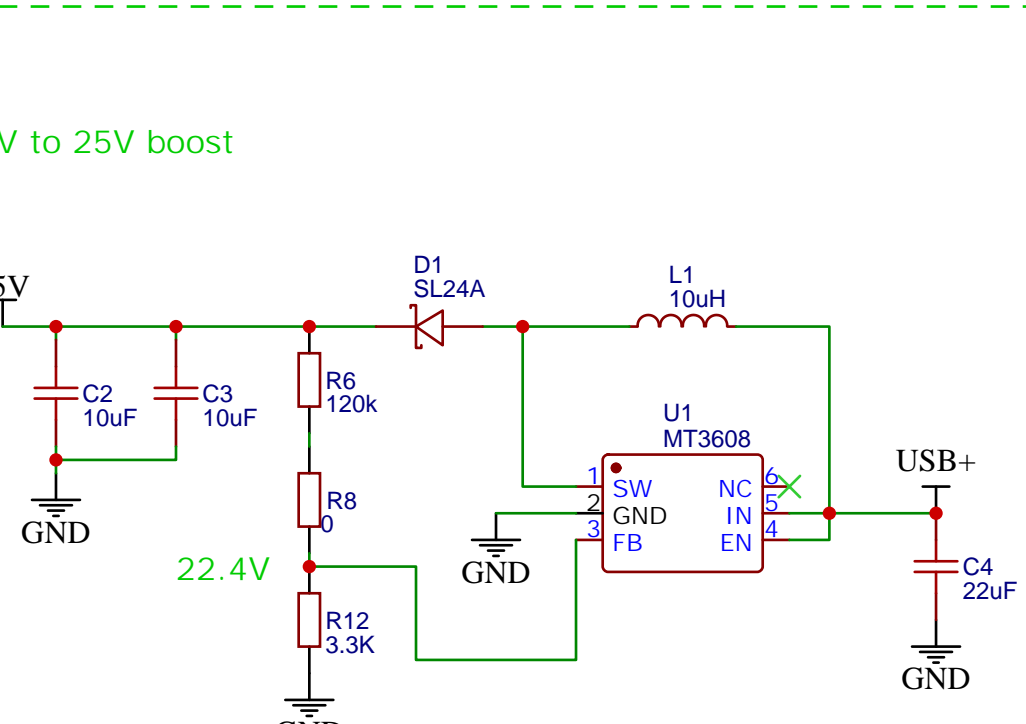


Colon leds



Powered from 3.3V for lower brightness + no level shifter required. Out of spec but tested on several different chips  
Depending on exact chip used, you will have to adjust colors in the sketch  
WS2812B are almost too bright. WS2812C (lcsc C114587) recommended for lower max brightness.

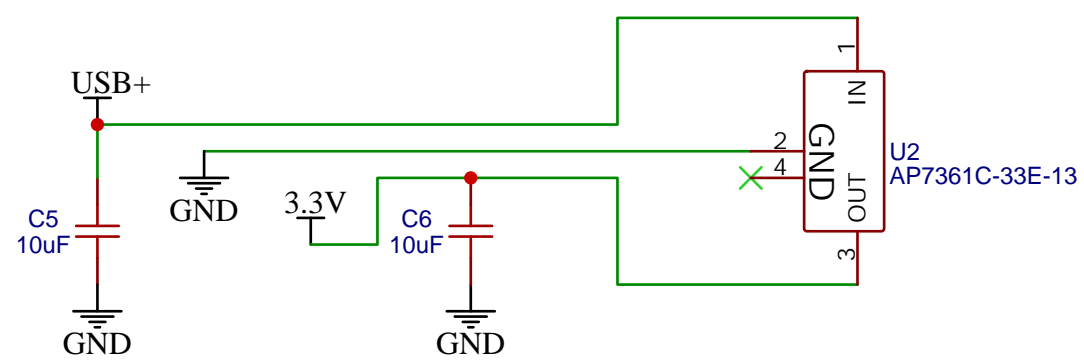
3.3V, 25V, 1.2V voltages



Absolute max voltage is 28V but it's good to stay below 25V

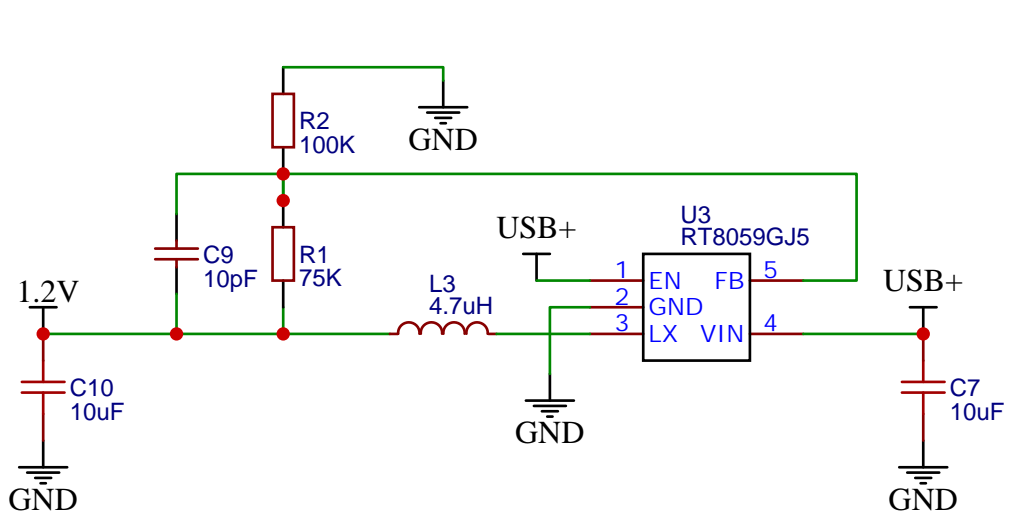
21-23V should work fine with reasonable brightness and low MT3608 temperature

It is easy to fry the MT3608 (I did) while adjusting it so go nice and slow. Good to have some spares just in case.



Also fits: AP2114HA-3-3TRG1 (C460314), SPX3940AM3-L-3-3/TR (C48252), LM39100S-3.3 (C126055)

5V to 1.0V step-down



180K R2 + 100K R1 can be used to set voltage to 0.9V

0.9V = dimmer numbers but lowest current hand best lifetime

1V = middleground, good brightness, reasonable current consumption

1.2V = very bright, high current, MT3608 overheats