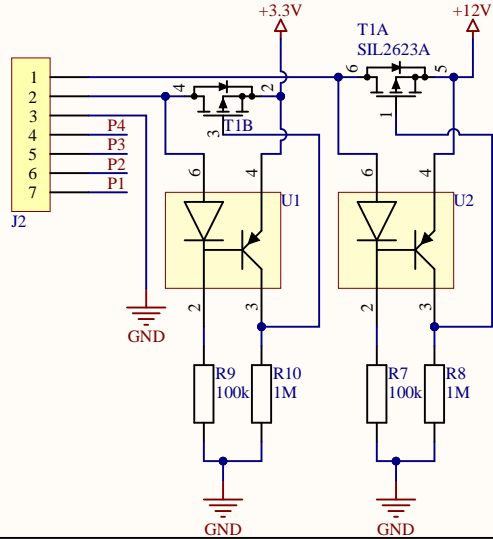
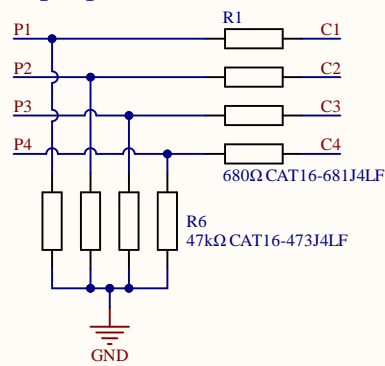


Header PMOD + 12V



Input protection



Gate resistors

$$I_{io} = 8 \text{ [mA]} \text{ (max)}, V = 3.3 \text{ [V]} \Rightarrow R_{g_min} = 412 \text{ [\Omega]}$$

$$t_{imax} = R * Q_{gate} * \ln(V_g / (V_g - V_{gs_pl})) = 412 * 4.5n * \ln(3.3 / (3.3 - 1.9)) = 1.59 \text{ [\mu s]}$$

$$\Rightarrow \text{max_f} = 630 \text{ [kHz]}$$

$$\Rightarrow \text{for } R_g = 680 \text{ [\Omega]}, I_{io} = 4.85 \text{ [mA]}, t = 2.6 \text{ [\mu s]}$$

Output

Flyback diodes

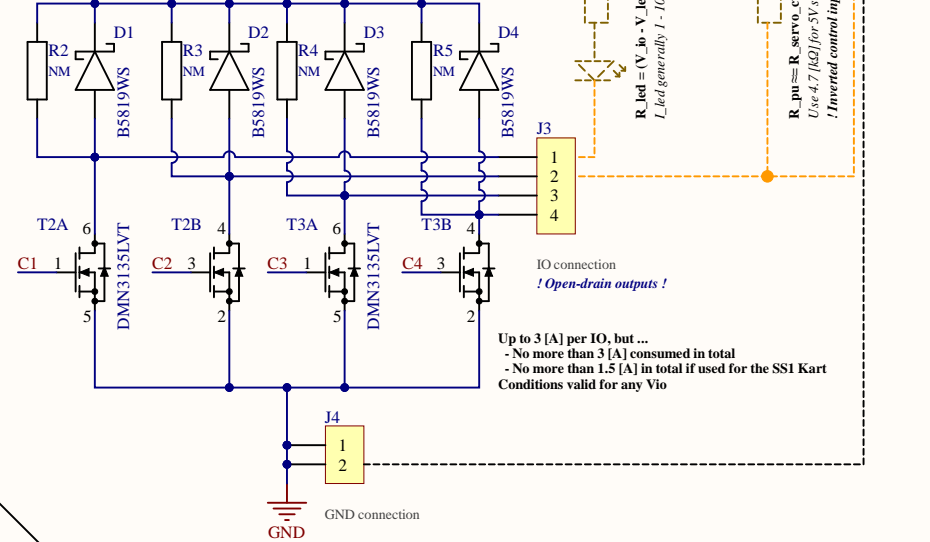
$$E_{gst} = 0.5 * I_{max} * t_{gst}^2$$

$$t_{dissip} = 5 * I_{max} / (R_{d_conduction})$$

$$P_{dissip} = E_{gst} / t_{dissip}$$

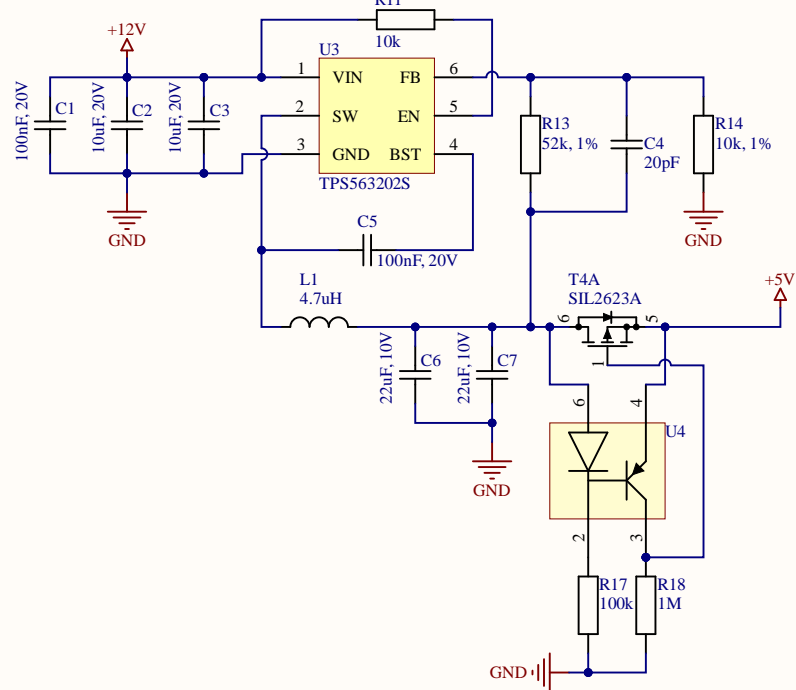
$$\text{OR}$$

$$P_{dissip} = (1/10) * I_{gst}^2 * R_{d_conduction}$$

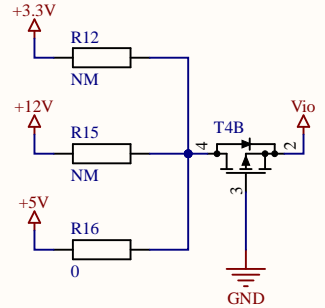


Up to 3 [A] per IO, but ...
- No more than 3 [A] consumed in total
- No more than 1.5 [A] in total if used for the SS1 Kart
Conditions valid for any Vio

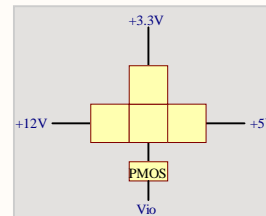
+5V buck



Voltage source



Jumpers position



Wiring outputs

LED, relay, DC motor ...

If needed (e.g. LED), put a resistor in series with the load.
For inductive loads, the circuit is protected with flyback diodes.

Set the Vio jumper and wire the positive side to J1 and the negative one to J3.
Ensure no resistor from R2 to R5 is soldered.
When Cx is '0', the output is left floating and there is no conduction.
When Cx is '1', the transistor is driven and the output conducts.

See the LED example drawn above.

Servo control, push-pull output

Some loads require a well-defined '0' or '1'.
Current design offer the possibility to either close the transistor (output a '0') or left it open (output a 'Z').

For such applications, add a resistor between J1 and the IO on J3 (or solder one on R2 to R5 pads).
Set the Vio jumper to the desired voltage.
Then use the same J3 output to control your circuit.

See the servo example drawn above.

PmodOD2.PrjPcb

OD2.SchDoc

Revision : 1.0

Sheet 1 of 1

Design by : AmA

C:\dev\eb3\10_PCB\07_PMOD_OD2\02_Board\OD2.SchDoc

Hes·so VALAIS WALLIS

Date : 09.10.2023

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