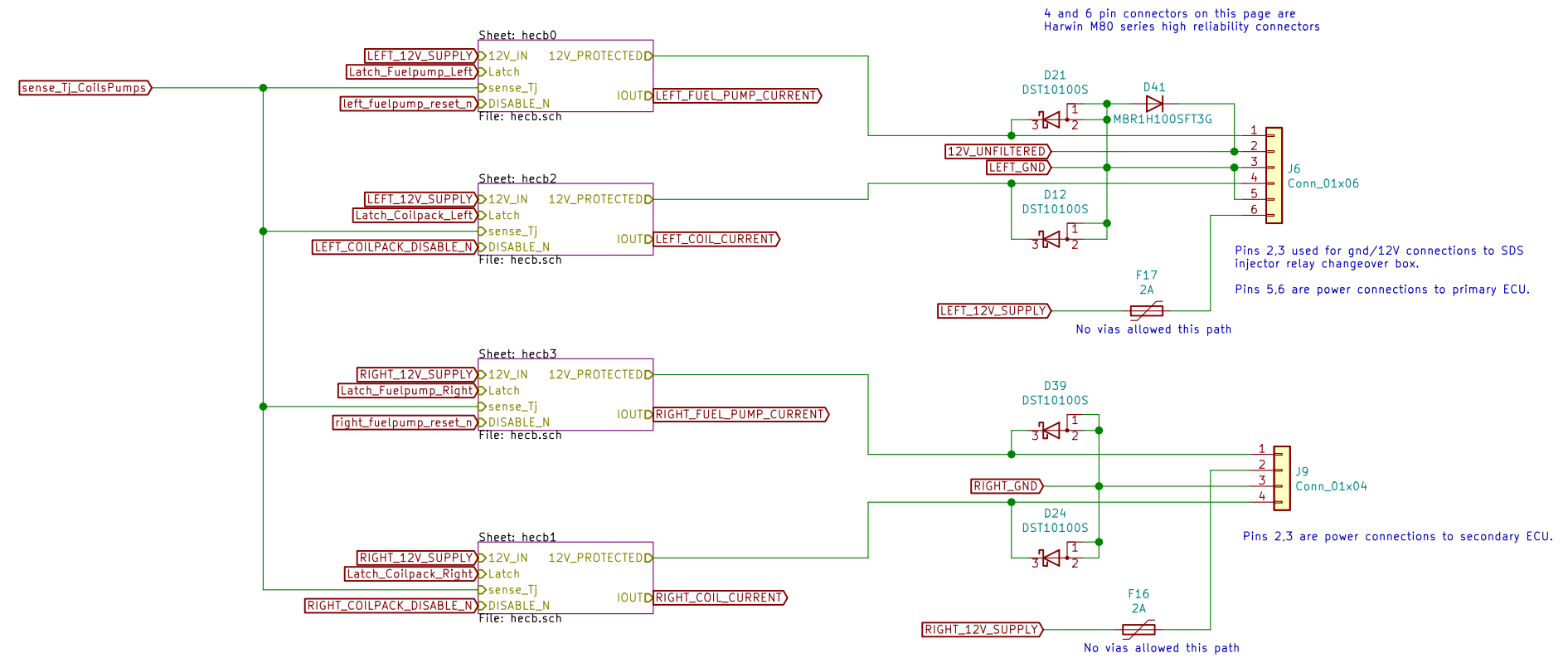
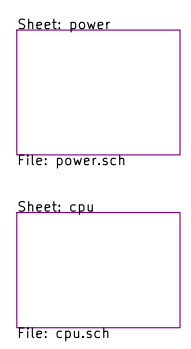
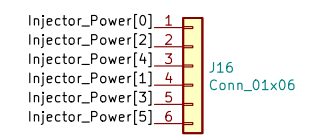


No joins allowed on 18AWG injector wiring. Use only genuine Harwin M80 crimp and/or soldered contacts.



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KiCad E.D.A. kicad 5.1.9-1.fc33		Id: 1/13

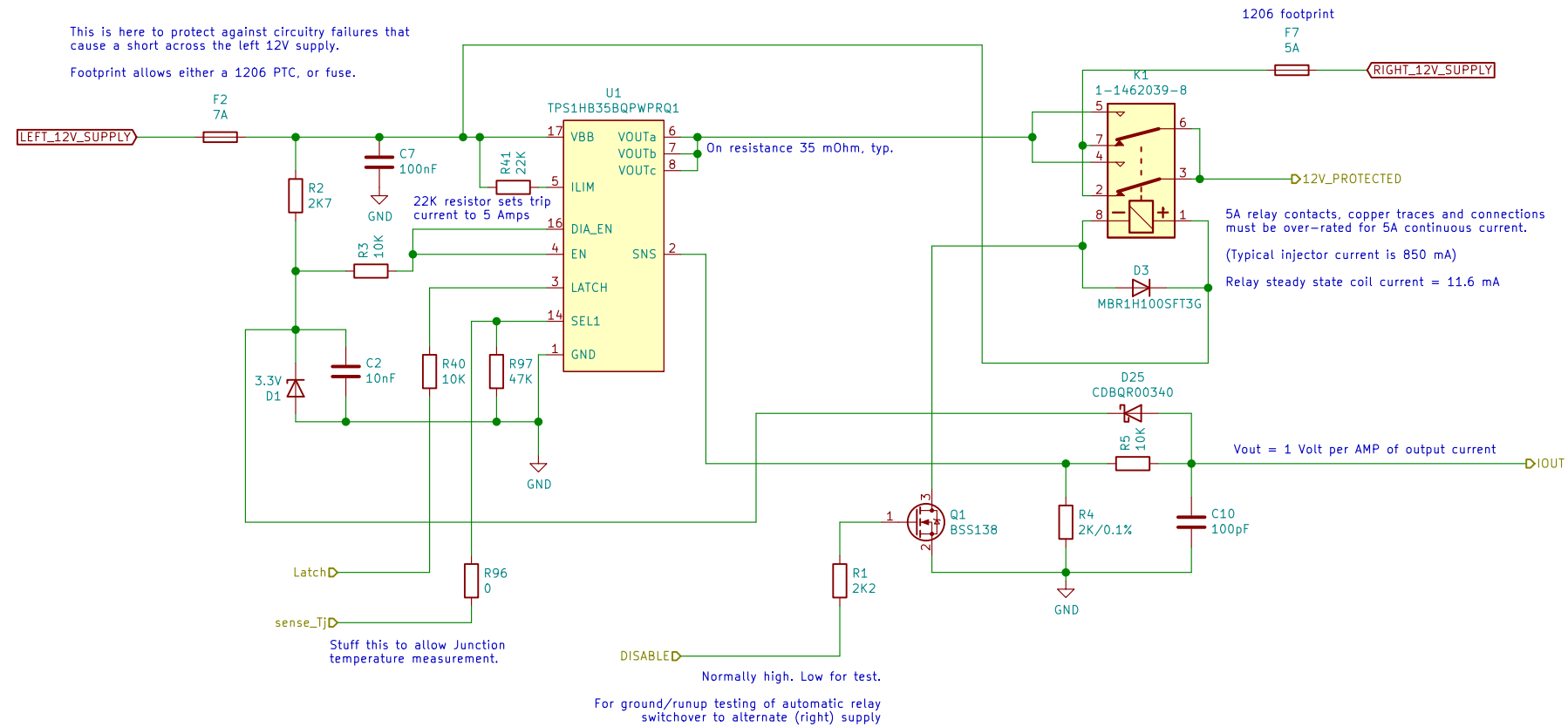
PER-INJECTOR SUPPLY

As long as there's a left supply, we let the TPS1HB35 handle circuit protection. If the left supply fails, the relay opens and we revert to the right supply for injector power, with no monitoring and simple fuse protection.

We don't use the TPS1HB35 output to power the relay, because the automatic retry is of the order of 2 msec, this would keep hammering the relay (3 msec changeover time) in the event of an injector wiring/coil short.

If the TPS1HB35 itself fails, we lose an injector. It is possible to provide an in-flight override to revert injectors to the backup supply and work around the problem. Not sure this is a good idea, decide later. Otherwise – fly the plane and land asap!

Note: the TPS1HB35 is extremely rugged/reliable and self protecting.



Fuses are preferred, a note about PTC's in general...

PTC's derate HARD with temperature. However, in this application, during normal operation the duty cycle of the injectors is fairly low, so we are not dealing with a continuous holding current – unless there is a wiring short in which case all bets are off anyway.

In any case – do not plan on operating the power board in an environment of high ambient temperature if PTC's are used rather than fuses.

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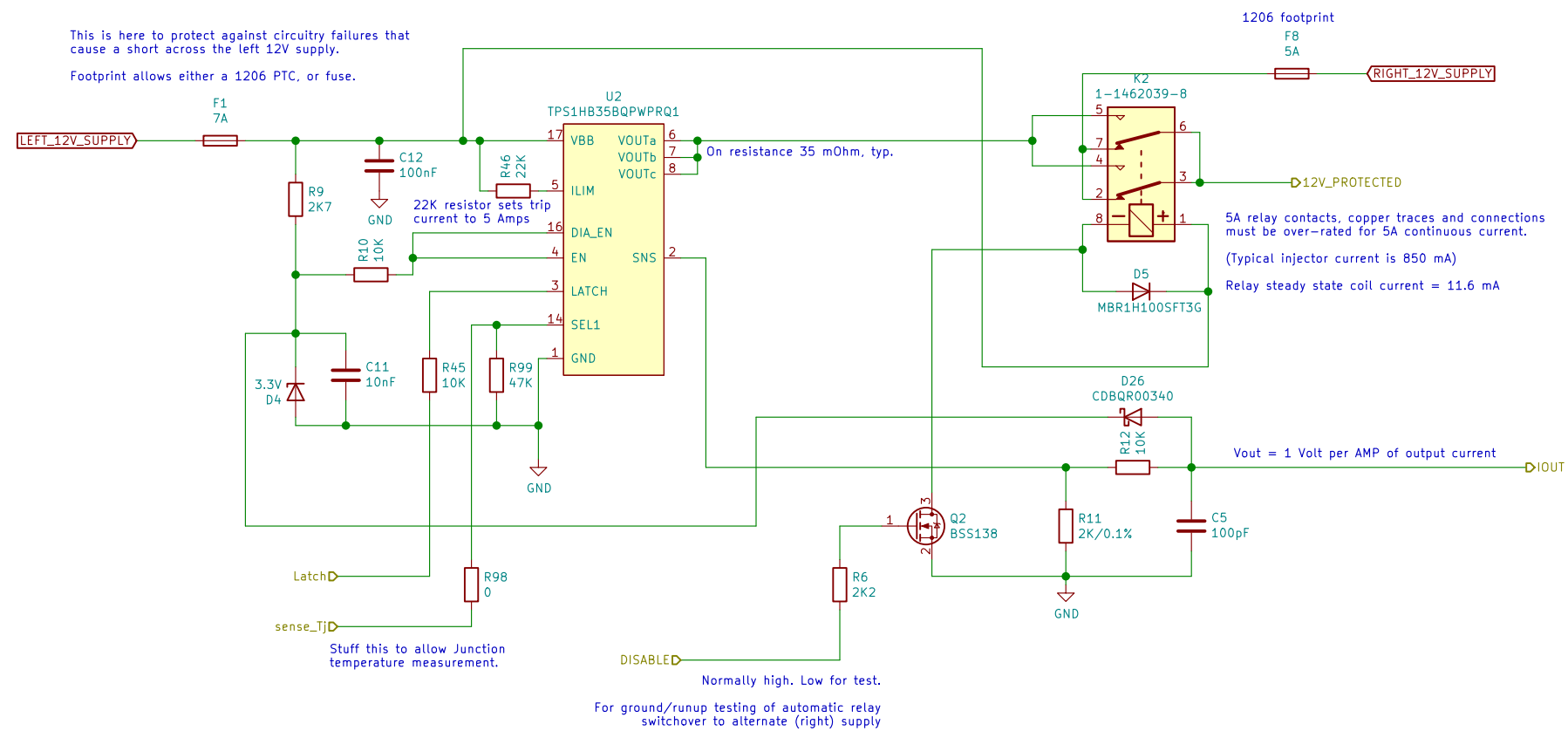
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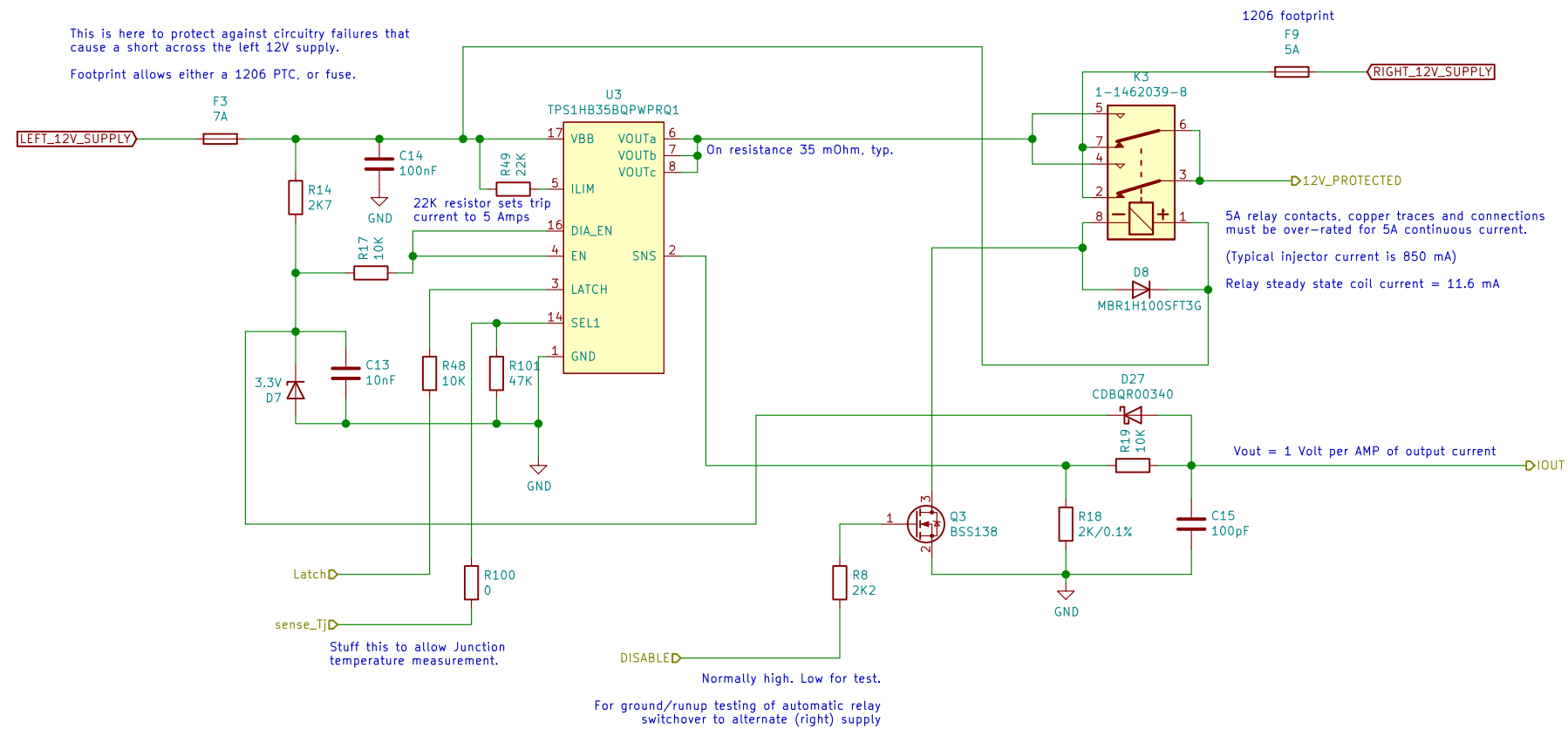
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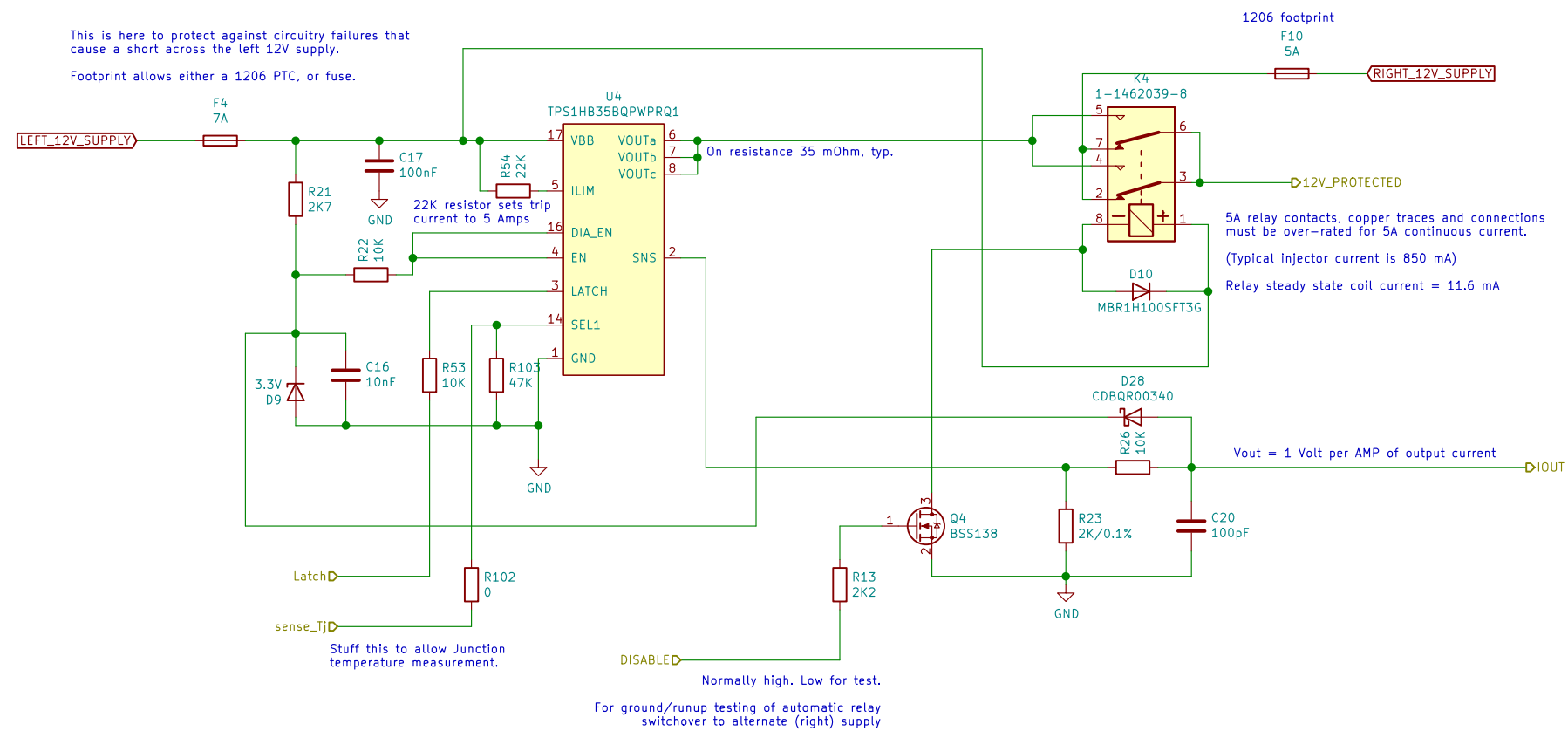
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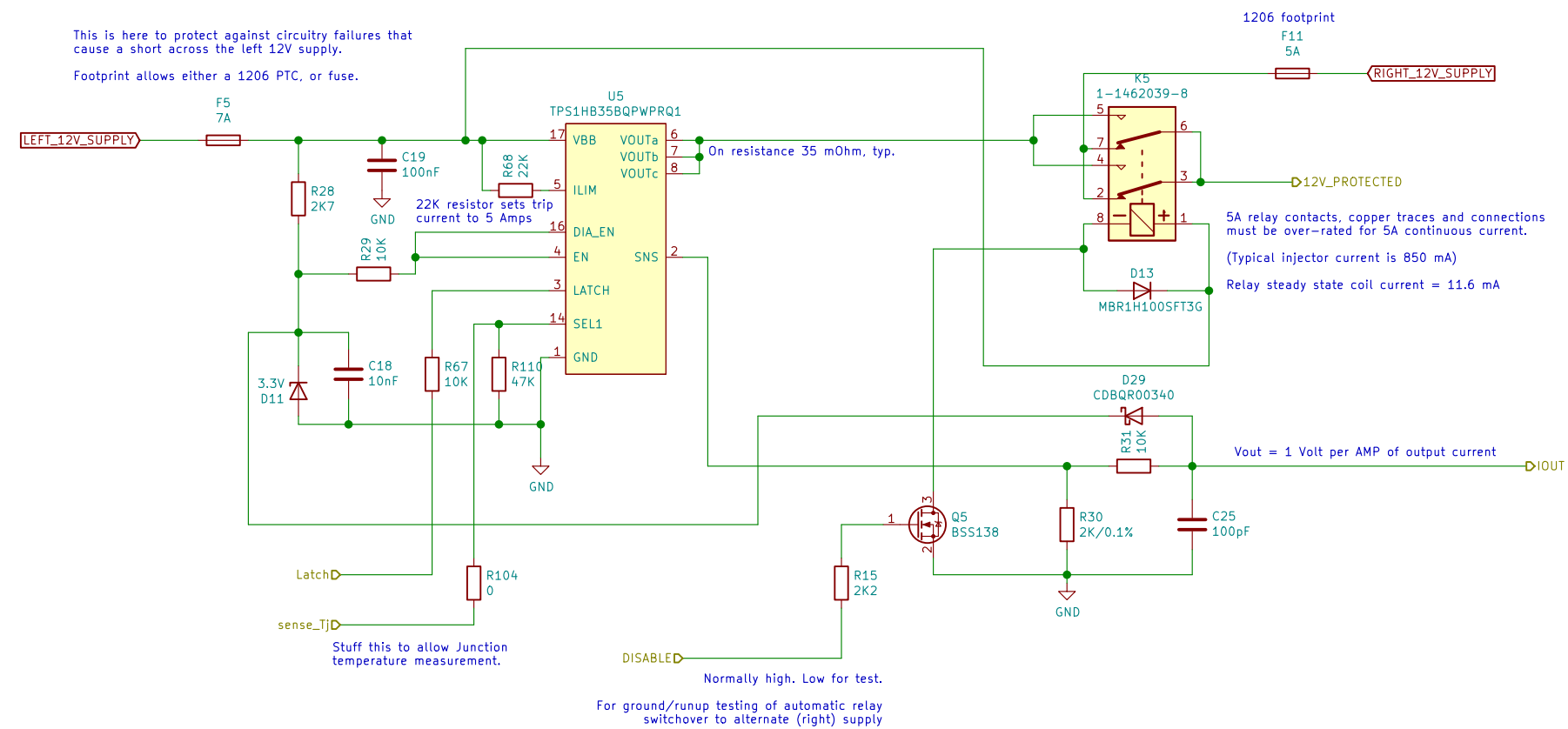
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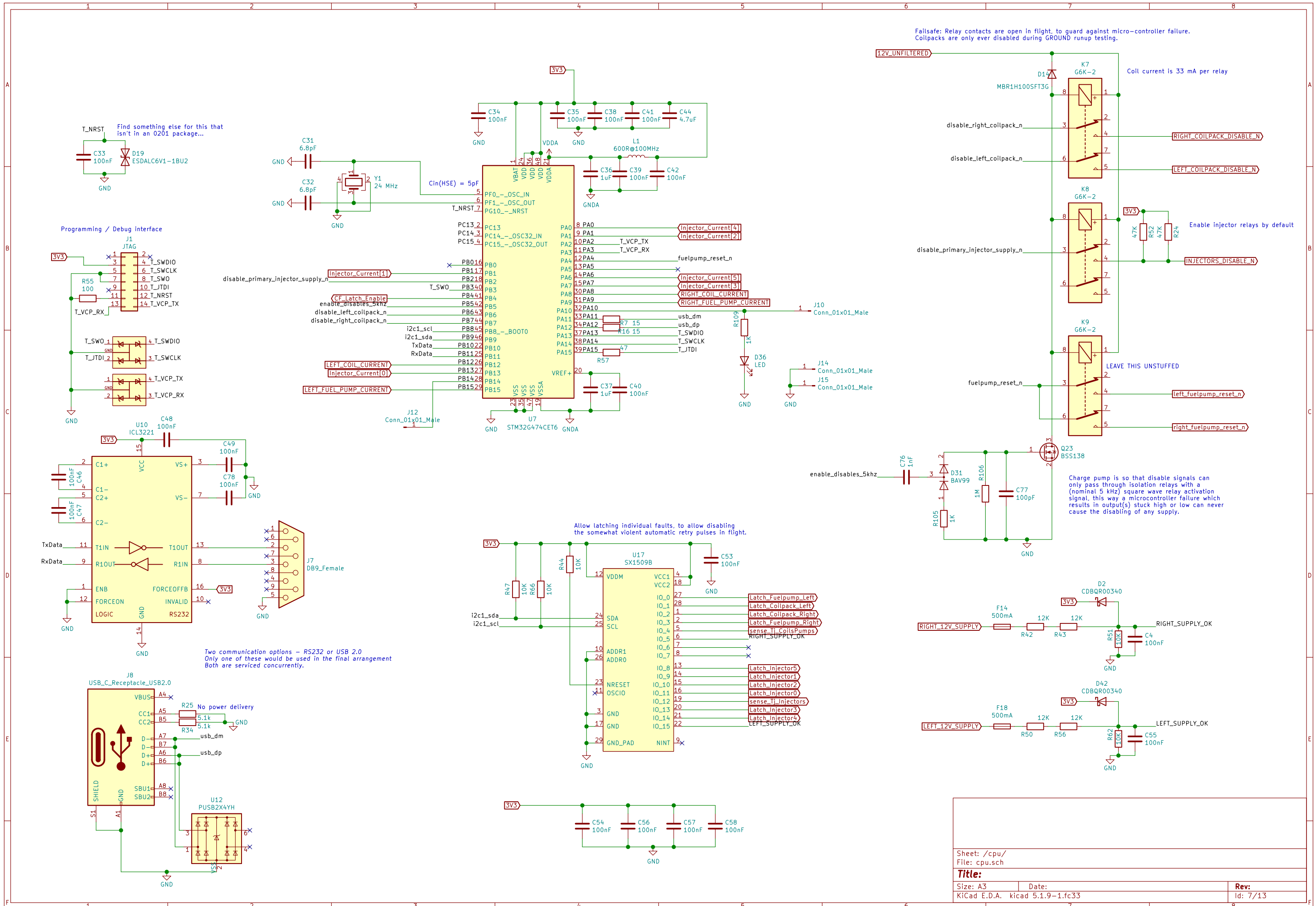


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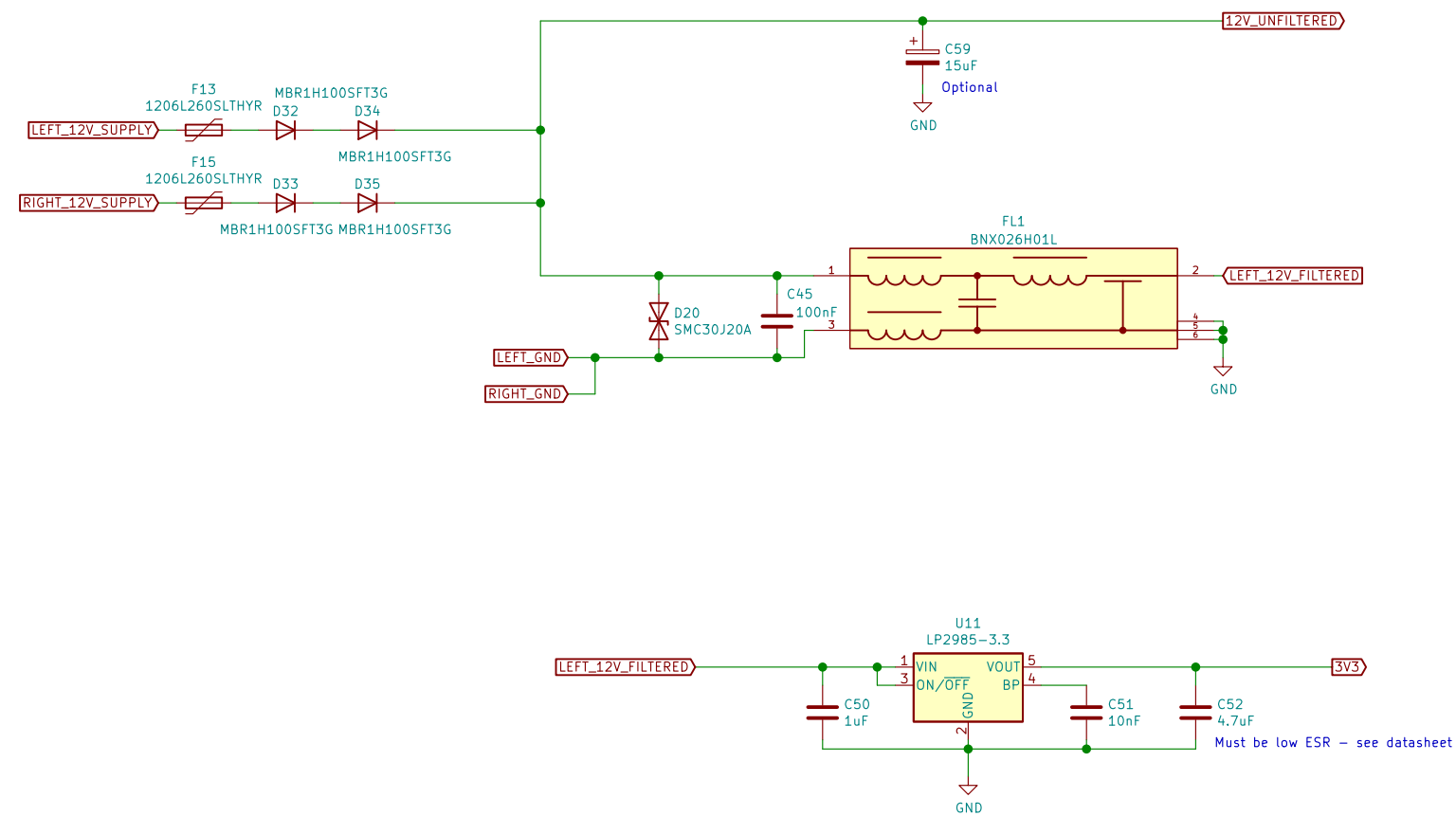
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KiCad E.D.A. kicad 5.1.9-1.fc33	Id: 6/13	



8 PA0	Injector_Current[4]
9 PA1	Injector_Current[2]
10 PA2	T_VCP_TX
11 PA3	T_VCP_RX
12 PA4	fuelpump_reset_n
13 PA5	
14 PA6	Injector_Current[5]
15 PA7	Injector_Current[3]
30 PA8	RIGHT_COIL_CURRENT
31 PA9	RIGHT_FUEL_PUMP_CURRENT
32 PA10	
33 PA11	usb_dm
34 PA12	usb_dp
37 PA13	T_SWCLK
38 PA14	T_SWCLK
39 PA15	T_JTDI
PB0	
PB1	
PB2	
PB3	
PB4	
PB5	
PB6	
PB7	
PB8	
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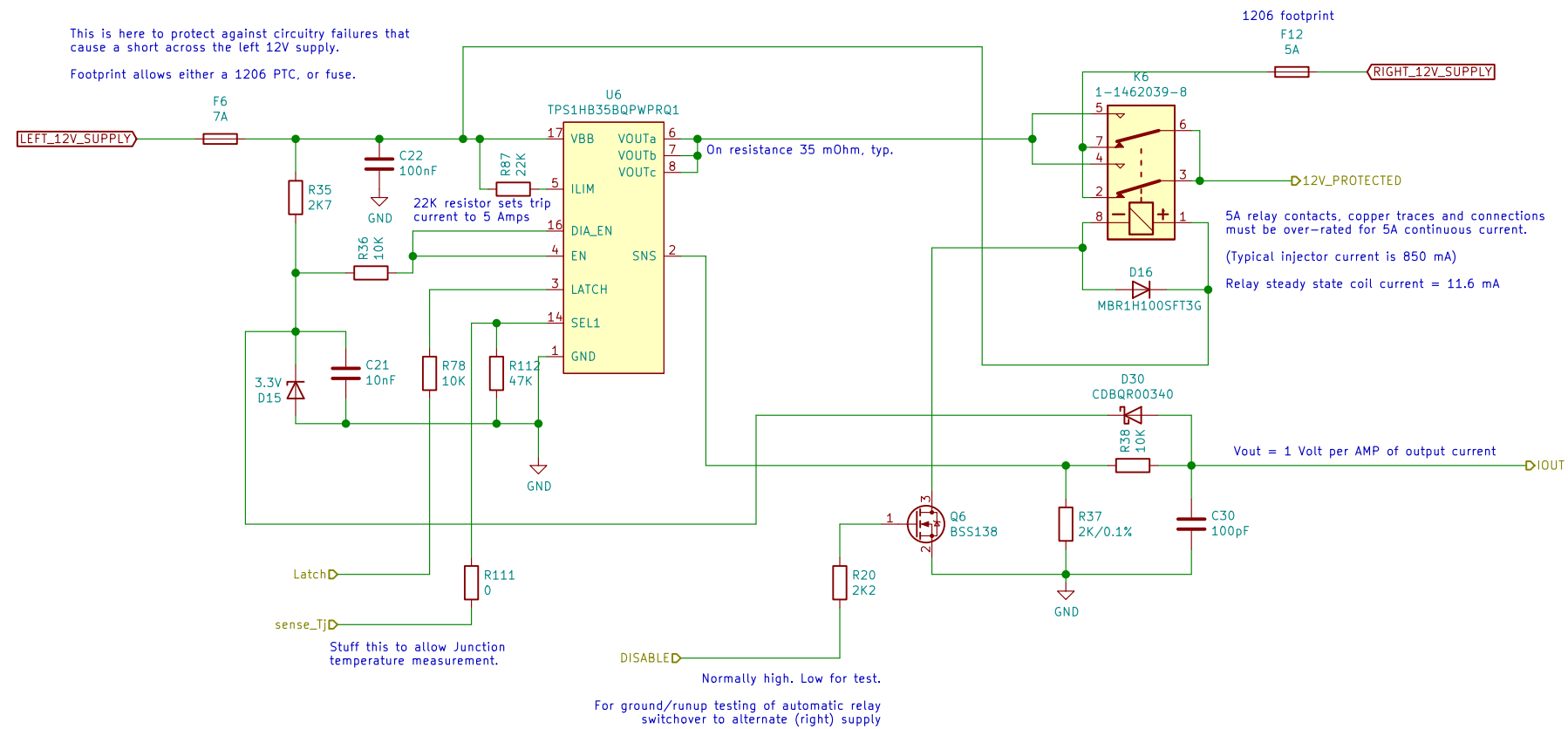
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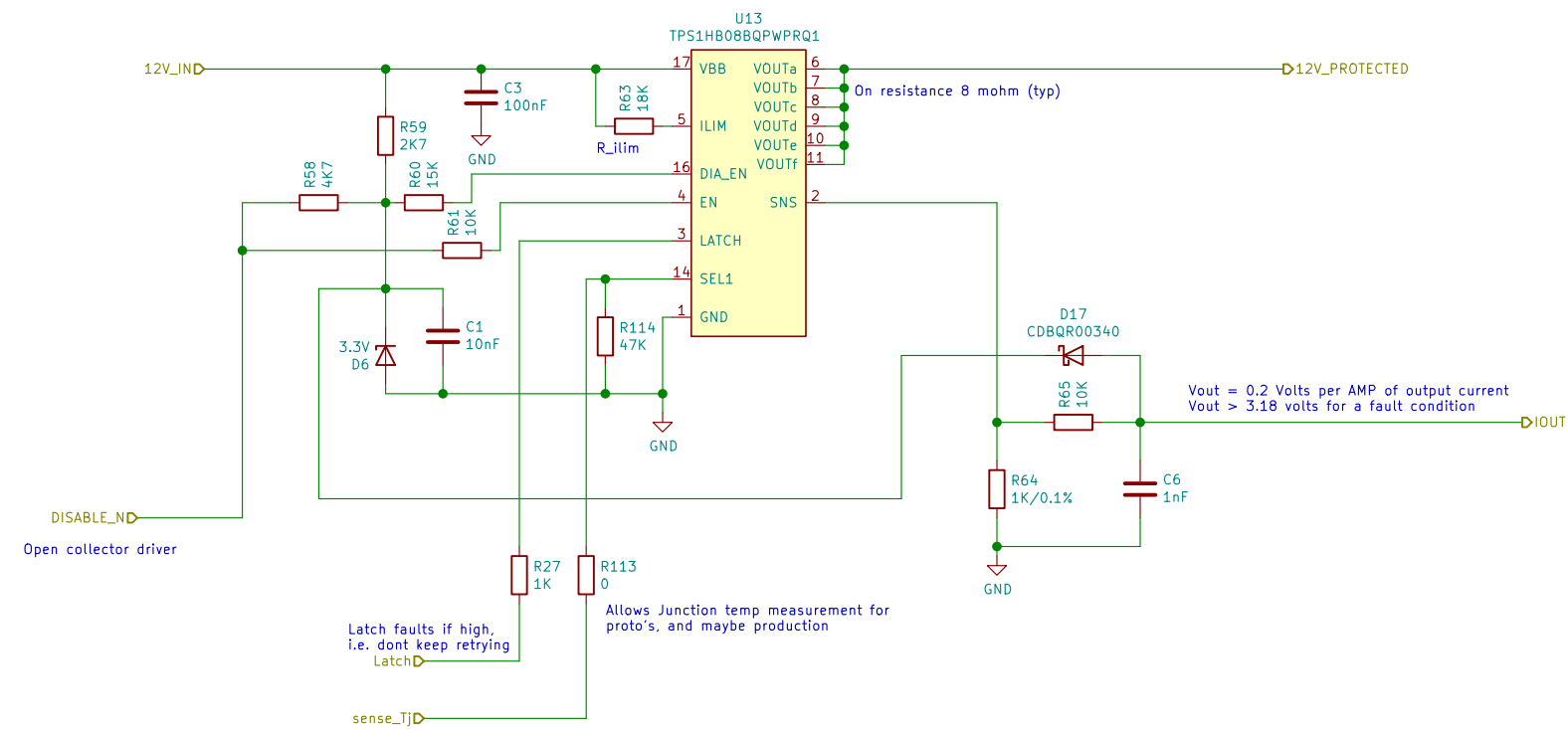
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COILPACK/FUELPUMP SUPPLY



R_illim considerations.

Kcl = 350 for this device. (Min 245 Max 437.5). 18K resistor sets trip current to around 19 Amps.

For the fuel pumps, we need the trip current high enough to NOT trip out during pump start, when starting current can typically step to 13 Amps, then ramp down to the nominal 4.5A operating current.

For the coilpacks, peak current of around 7 Amps may occur at the end of the dwell time, but because of the rate of change of current (0 to 7 Amps in 3.5 msec), the TPS1HB08 can trip if the current limit is not high enough. A 22K R_illim was experimentally found to be inadequate, and 18K seems solid.

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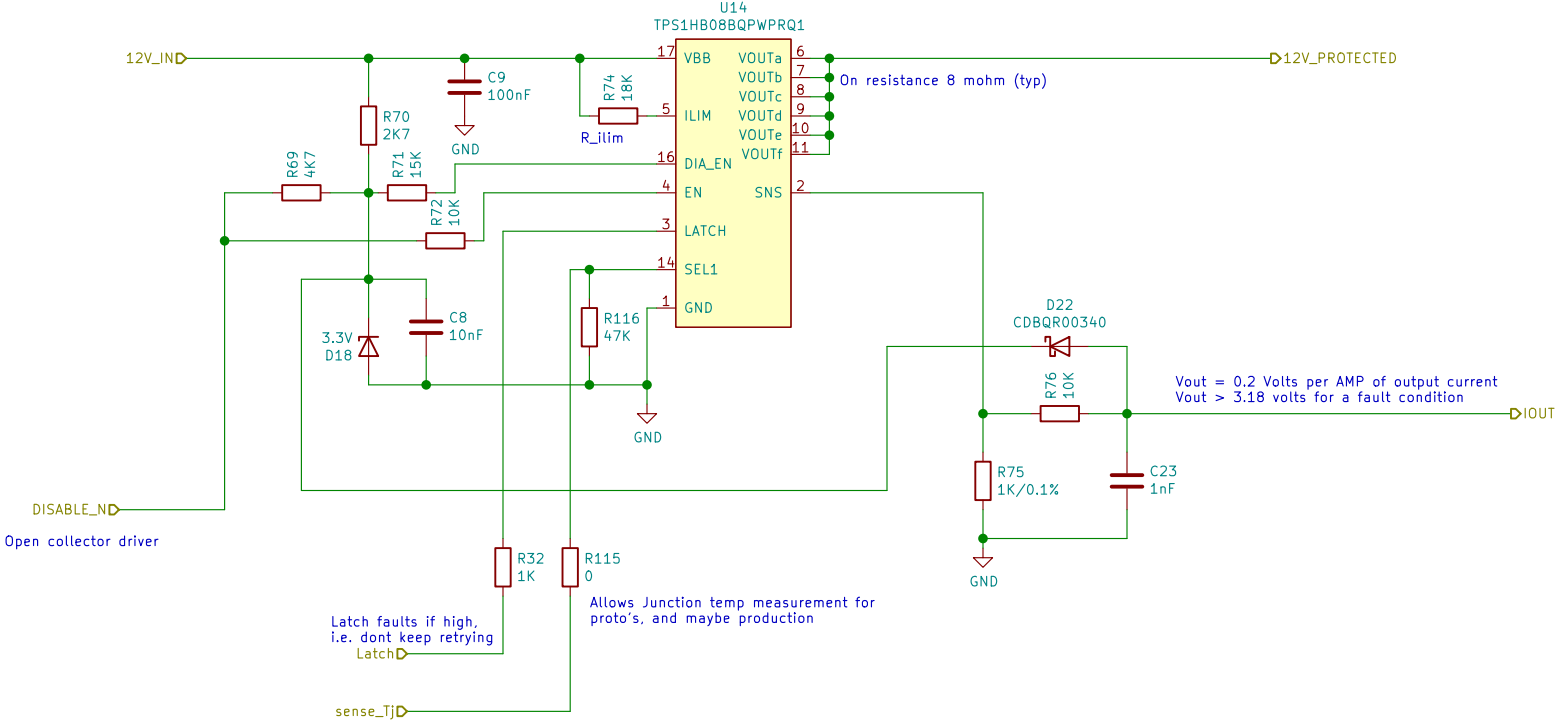
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COILPACK/FUELPUMP SUPPLY



R_{ilim} considerations.

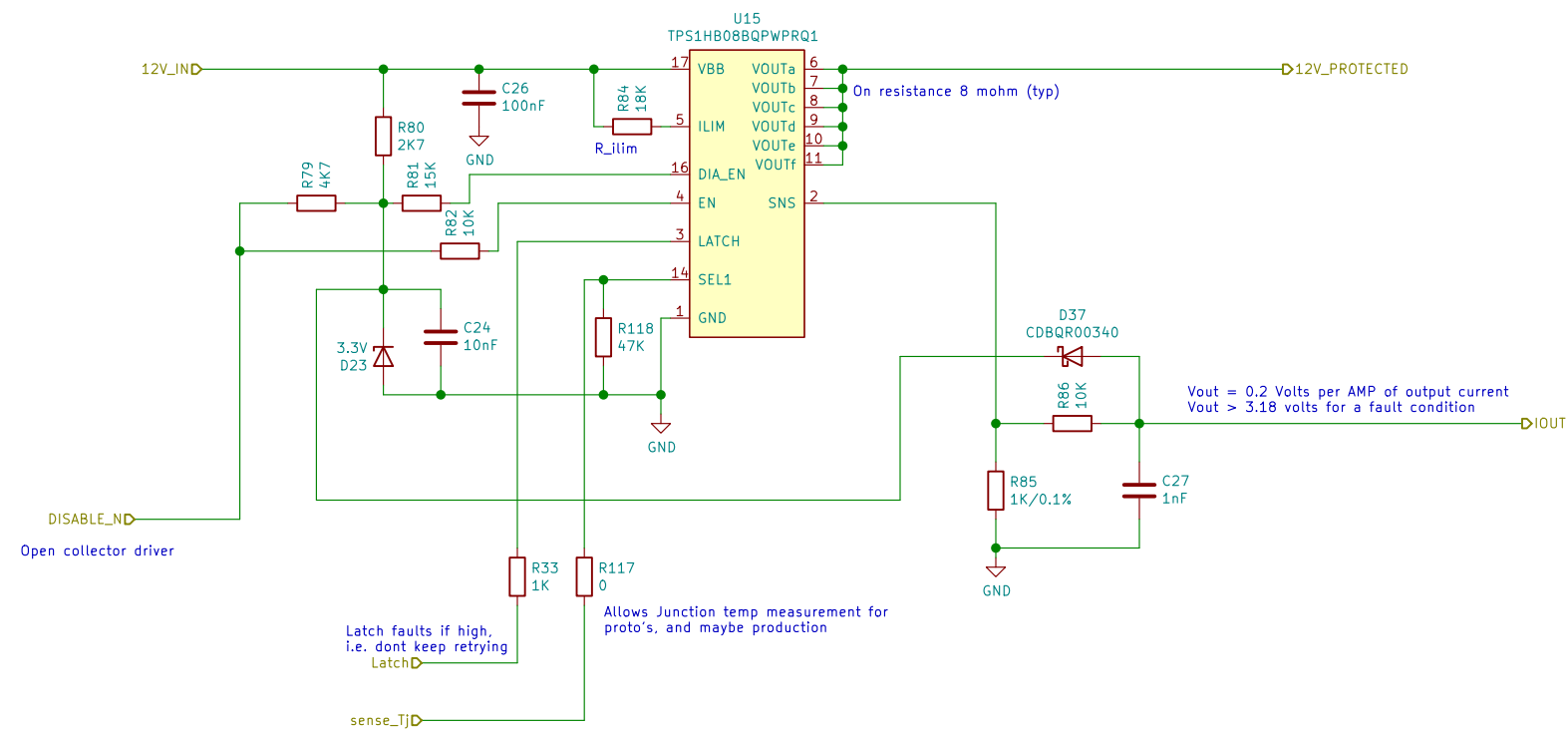
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KiCad E.D.A. kicad 5.1.9-1.fc33		Id: 11/13

COILPACK/FUELPUMP SUPPLY



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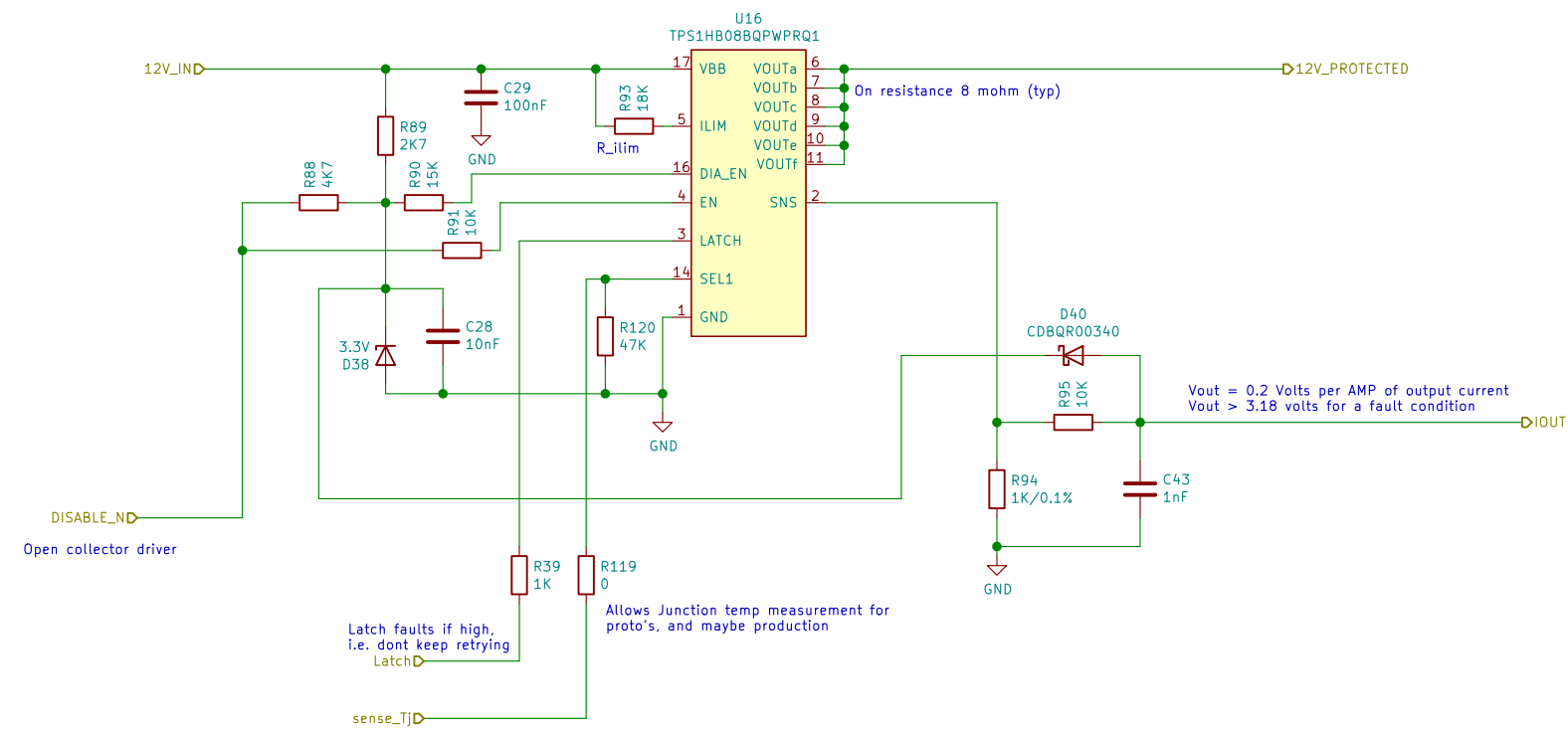
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Id: 12/13

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