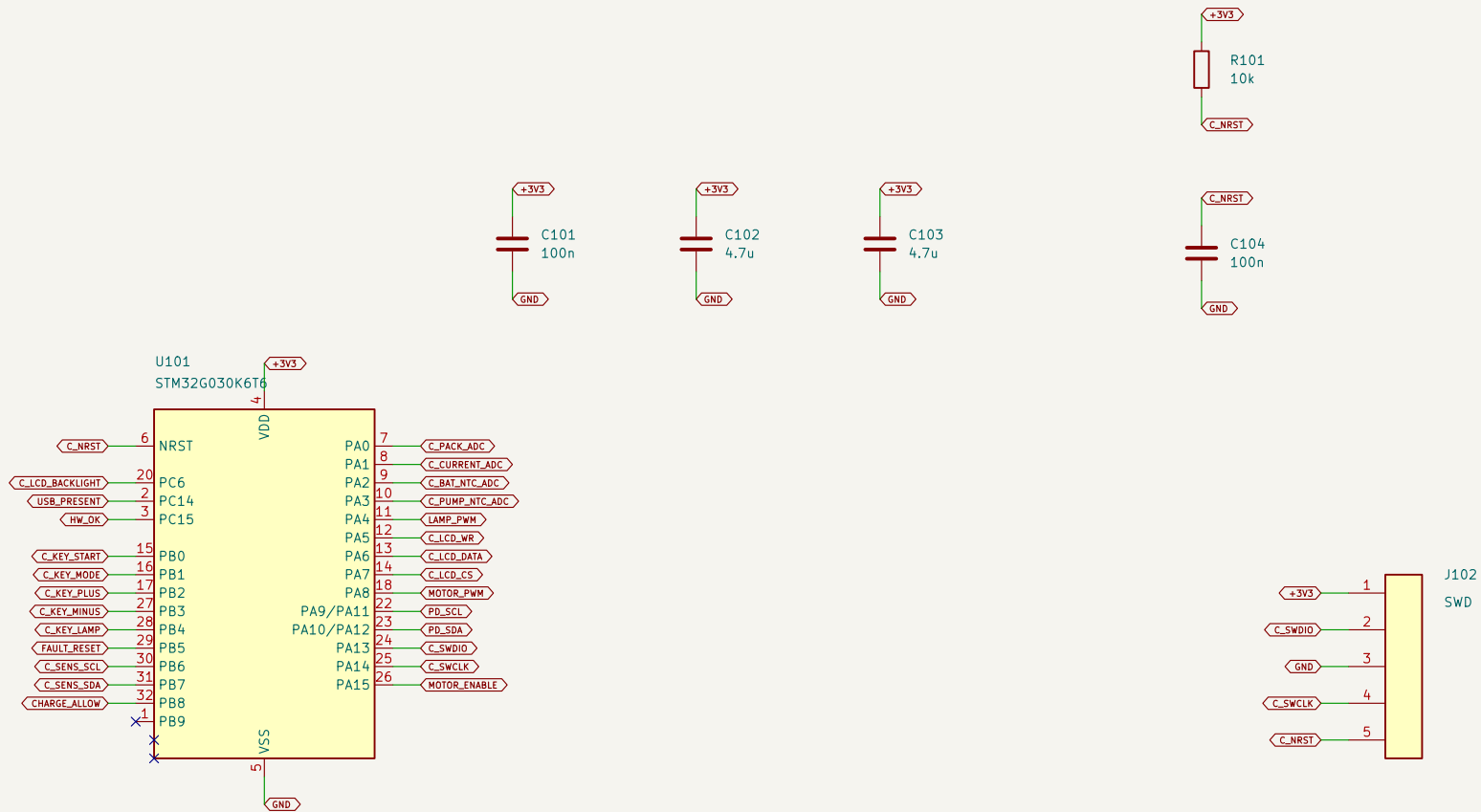


	1	2	3	4	5	6	7	8
ONE PCB: MCU + USB-PD charger + motor power + 3S protection + LCD driver + five keys B_B_MINUS is isolated from GND by protection MOSFETs. Never short them. LCD glass is a custom tooling specification pending supplier confirmation.								
A	controller 1 文件: controller_01.kicad_sch		controller 2 文件: controller_02.kicad_sch		controller 3 文件: controller_03.kicad_sch		controller 4 文件: controller_04.kicad_sch	
B	power 1 文件: power_01.kicad_sch		power 2 文件: power_02.kicad_sch		power 3 文件: power_03.kicad_sch		power 4 文件: power_04.kicad_sch	
C	power 5 文件: power_05.kicad_sch		power 6 文件: power_06.kicad_sch		power 7 文件: power_07.kicad_sch		power 8 文件: power_08.kicad_sch	
D	power 9 文件: power_09.kicad_sch		power 10 文件: power_10.kicad_sch		power 11 文件: power_11.kicad_sch		power 12 文件: power_12.kicad_sch	
E	bms 1 文件: bms_01.kicad_sch		bms 2 文件: bms_02.kicad_sch		bms 3 文件: bms_03.kicad_sch		display_seed 1 文件: display_seed_01.kicad_sch	
F	display_seed 2 文件: display_seed_02.kicad_sch		display_seed 3 文件: display_seed_03.kicad_sch					
							Sheet: /	
							File: airpump.kicad_sch	
							Title: AP-ALL V0.5 Single-board inflator	
							Size: A3	
							Date:	
							Rev: 0.5	
							KiCad E.D.A. 10.0.6	
							Id: 1/23	

MCU / local decoupling / SWD
All functional blocks are on ONE PCB. LCD and keys are on sheets 21–23.
Network labels replace the removed board-to-board harnesses.



Single PCB engineering candidate / not production release

车载便携打气泵 / 主控电路

Sheet: /controller 1/

File: controller_01.kicad_sch

Title: 01 供电、主控与调试

Size: A4

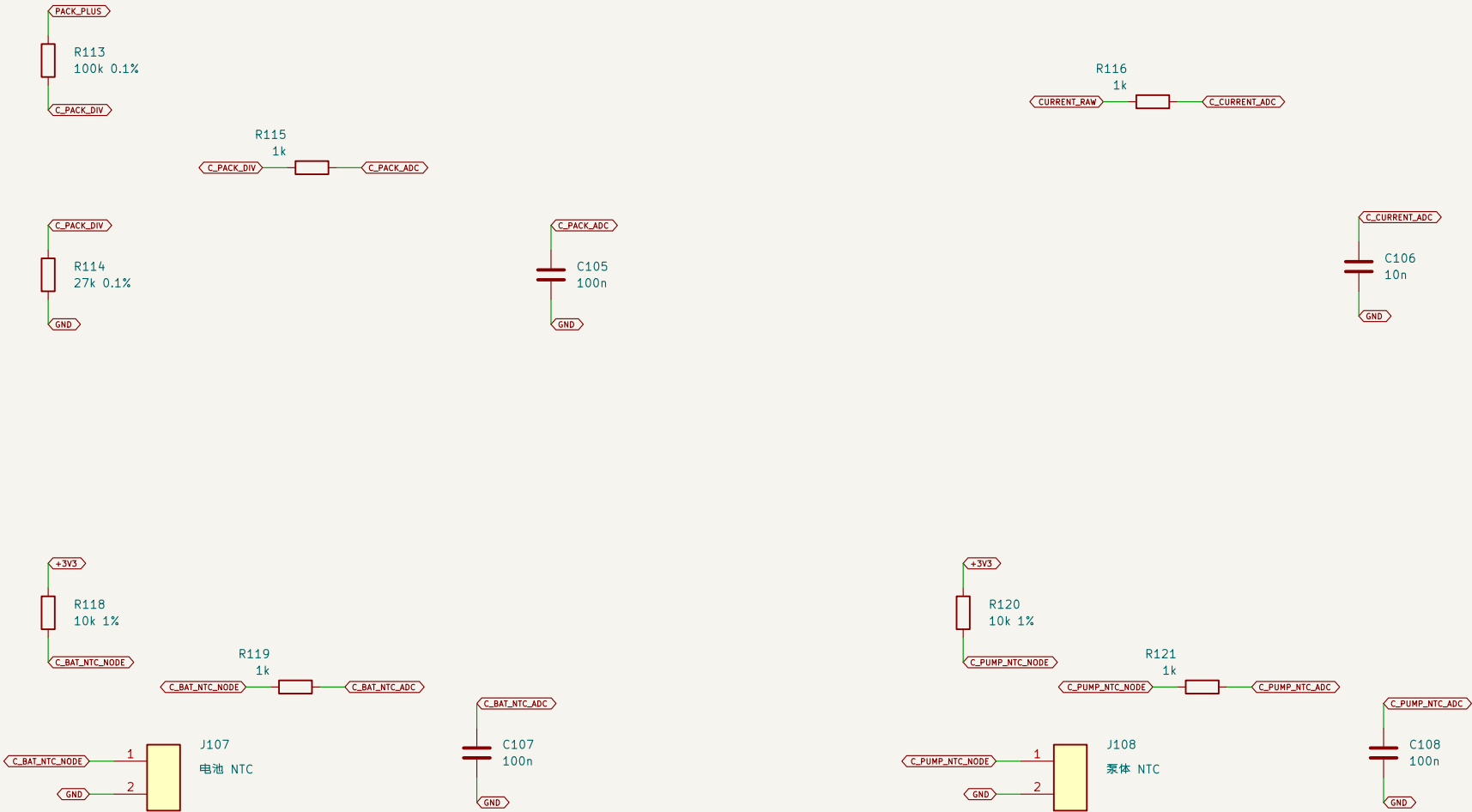
Date: 2026-09-13

Rev: 0.5

KiCad E.D.A. 10.0.6

Id: 2/23

Battery voltage / motor current / NTC acquisition
All functional blocks are on ONE PCB. LCD and keys are on sheets 21–23.
Network labels replace the removed board-to-board harnesses.



Single PCB engineering candidate / not production release

车载便携打气泵 / 主控电路

Sheet: /controller 2/

File: controller_02.kicad_sch

Title: 02 电压、电流与温度采样

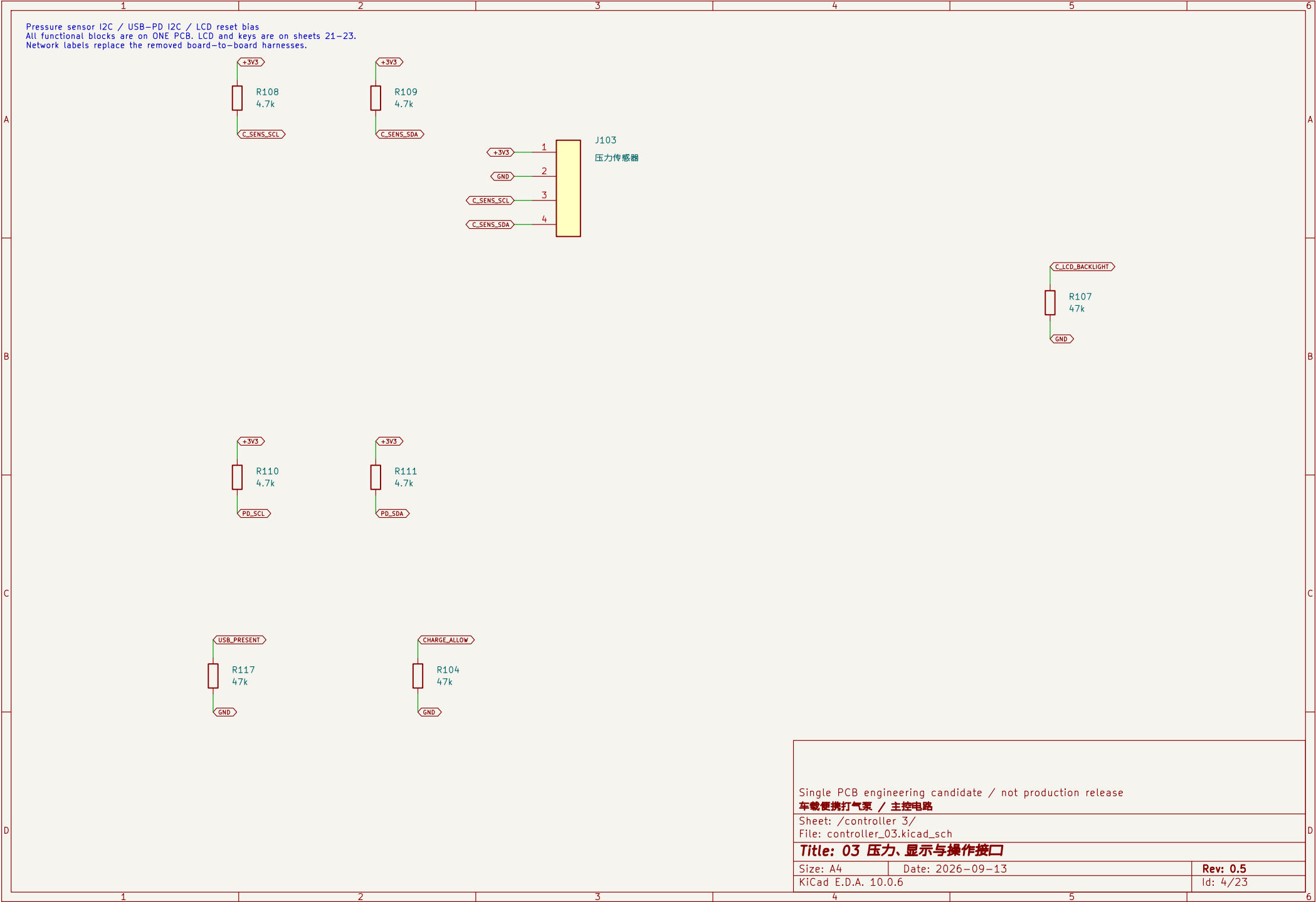
Size: A4

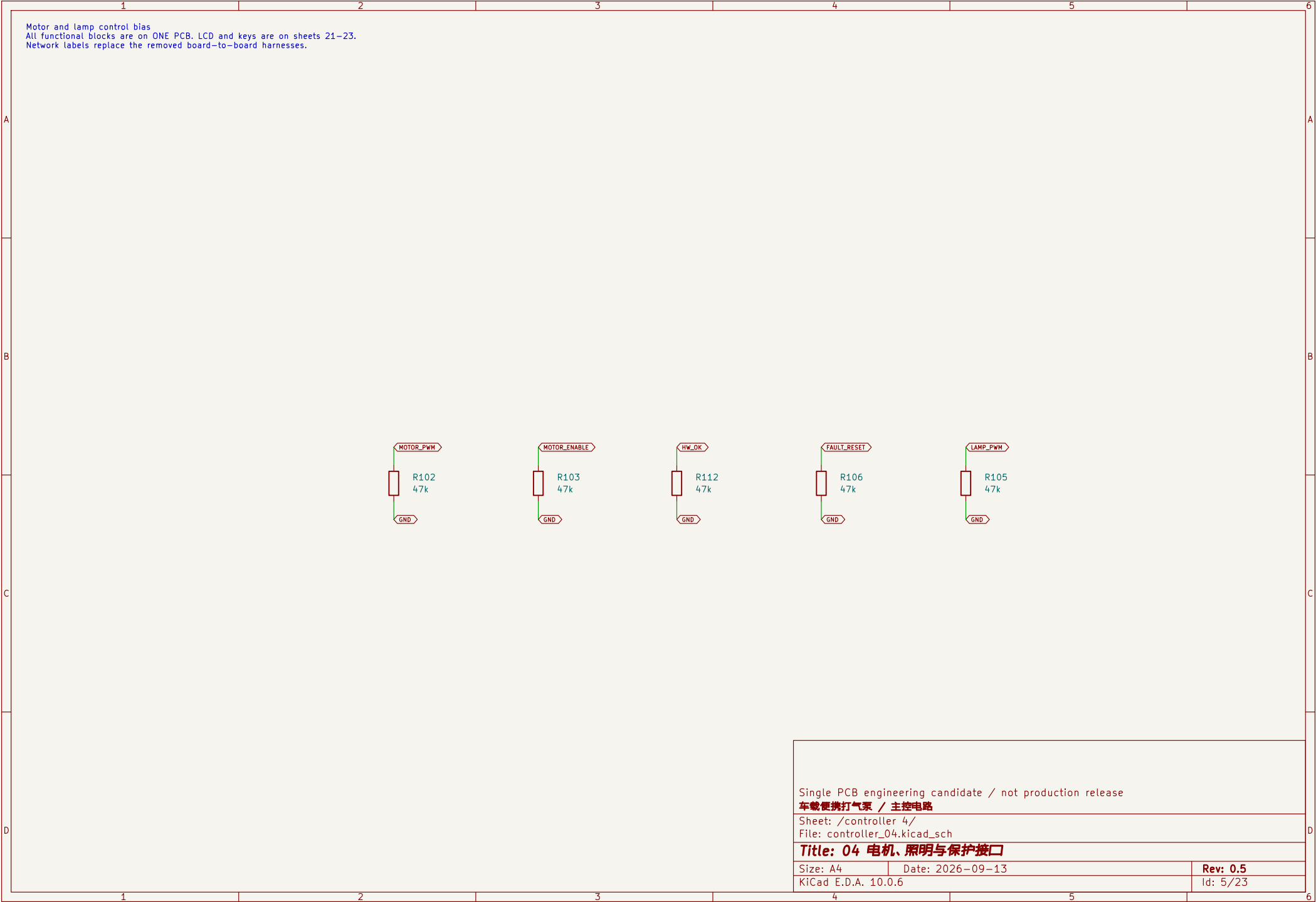
Date: 2026-09-13

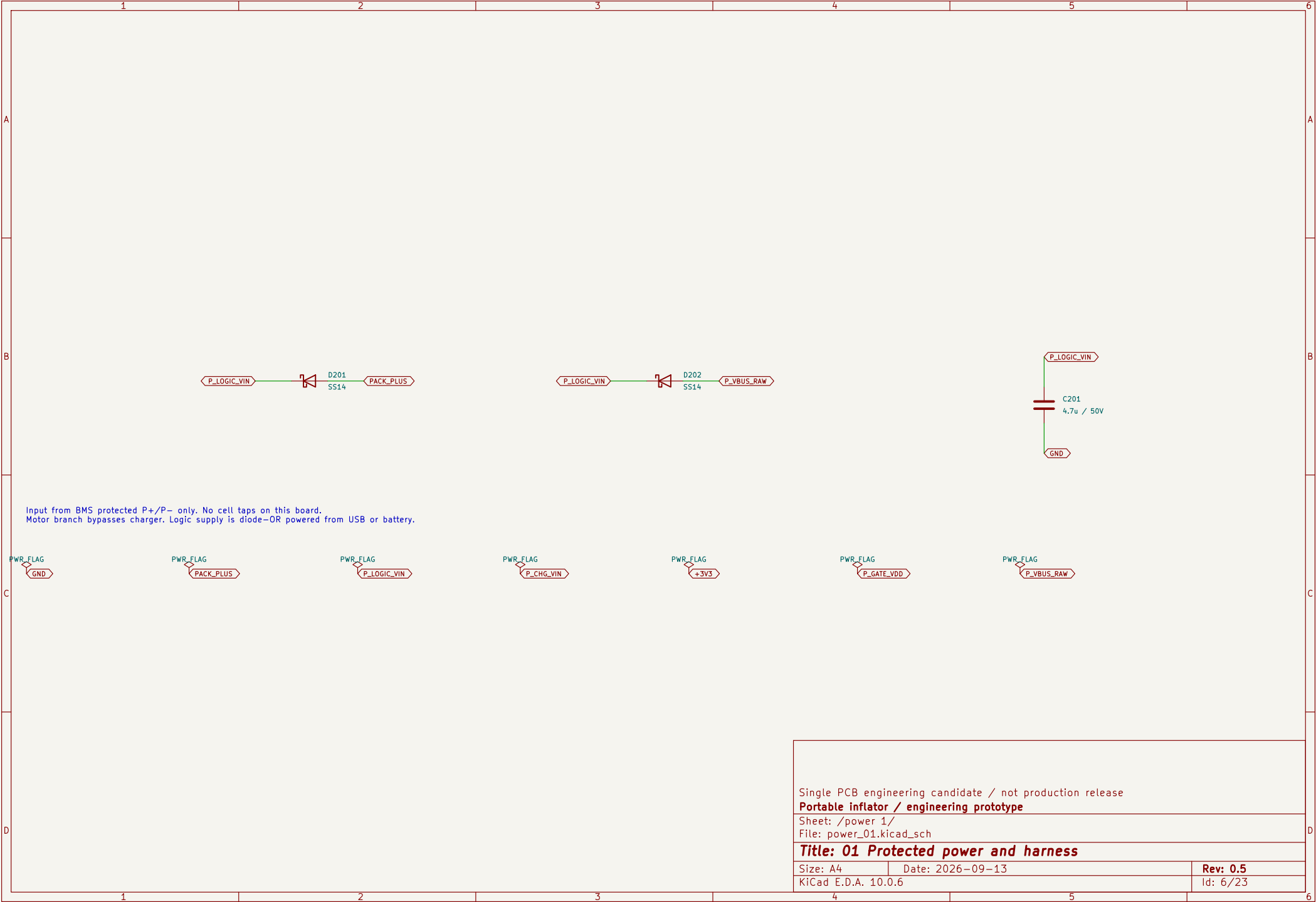
Rev: 0.5

KiCad E.D.A. 10.0.6

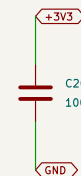
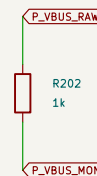
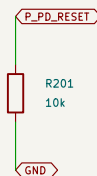
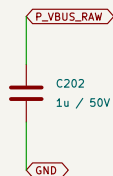
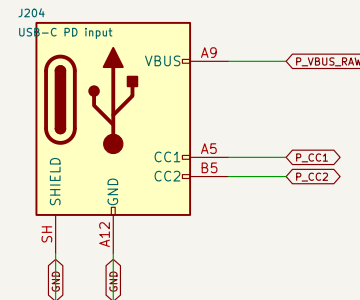
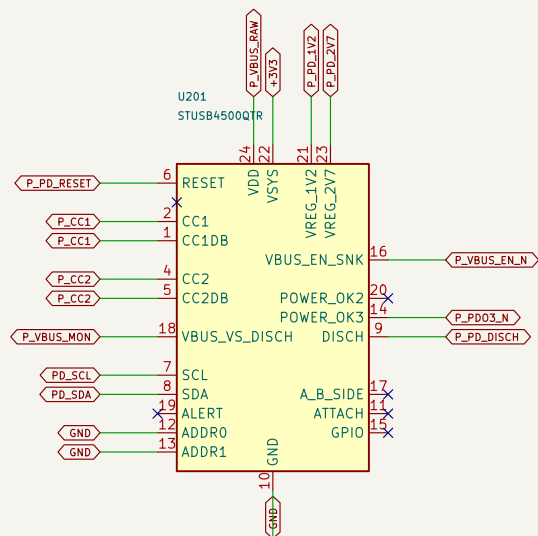
Id: 3/23







Program PDO3 = 20 V / 1.5 A; confirm contract before CHARGE_ALLOW.
Default factory PDO3 is only 20 V / 1 A. I2C address 0x28.



Single PCB engineering candidate / not production release

Portable inflator / engineering prototype

Sheet: /power 2/

File: power_02.kicad_sch

Title: 02 USB-C and PD controller

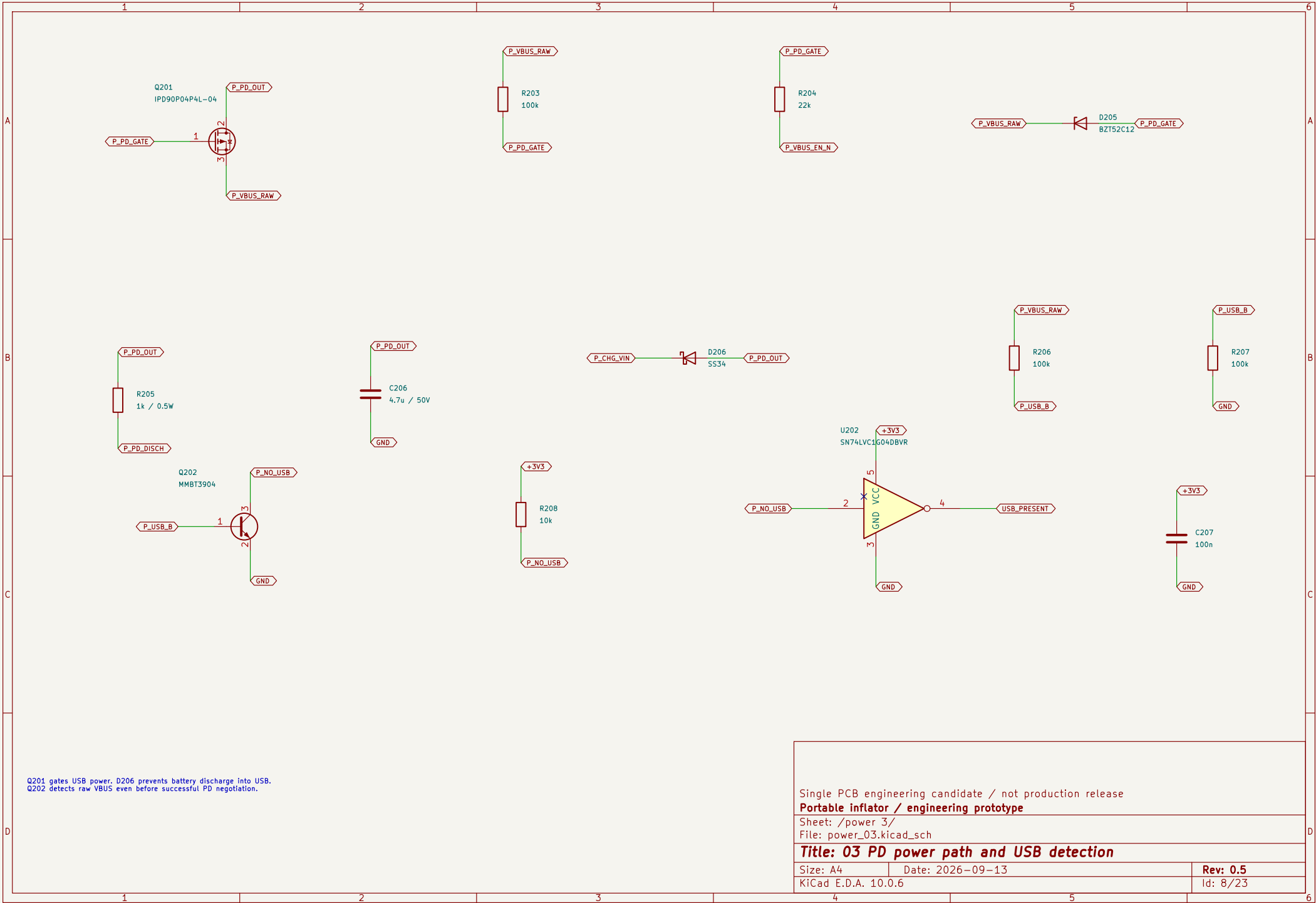
Size: A4

Date: 2026-09-13

Rev: 0.5

KiCad E.D.A. 10.0.6

Id: 7/23



Single PCB engineering candidate / not production release
Portable inflator / engineering prototype
 Sheet: /power 4/
 File: power_04.kicad_sch
Title: 04 Three-cell CC/CV charger
 Size: A4 Date: 2026-09-13 Rev: 0.5
 KiCad E.D.A. 10.0.6 Id: 9/23

Portable inflator / engineering prototype

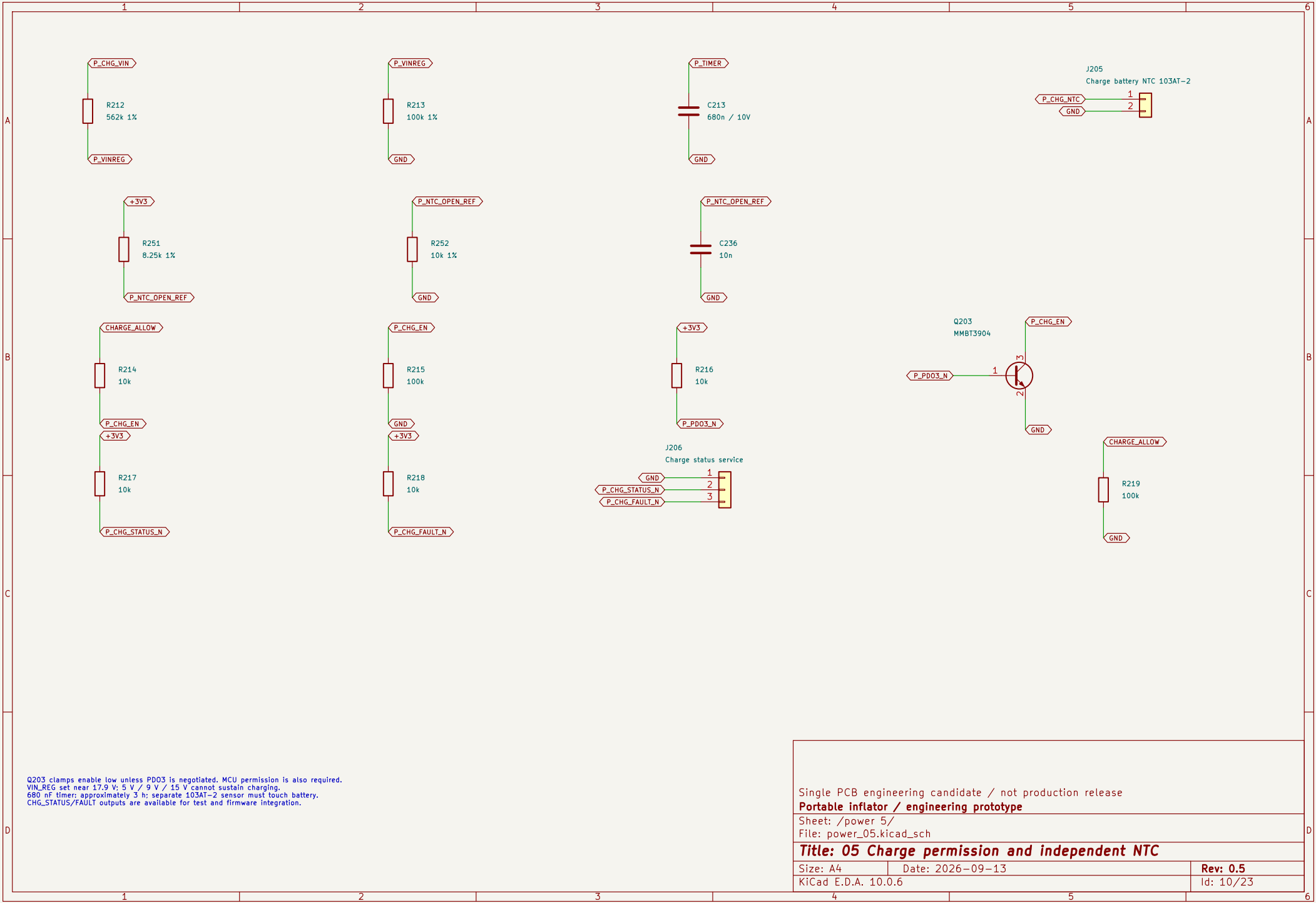
File: power_04.kicad_sch

Title: 04 Three-cell CC/CV charger

Date: 2026-09-13

Rev: 0.5

Id: 9/23



Q203 clamps enable low unless PD03 is negotiated. MCU permission is also required.
VIN_REG set near 17.9 V; 5 V / 9 V / 15 V cannot sustain charging.
680 nF timer; approximately 3 h; separate 103AT-2 sensor must touch battery.
CHG_STATUS/FAULT outputs are available for test and firmware integration.

Single PCB engineering candidate / not production release

Portable inflator / engineering prototype

Sheet: /power 5/

File: power_05.kicad_sch

Title: 05 Charge permission and independent NTC

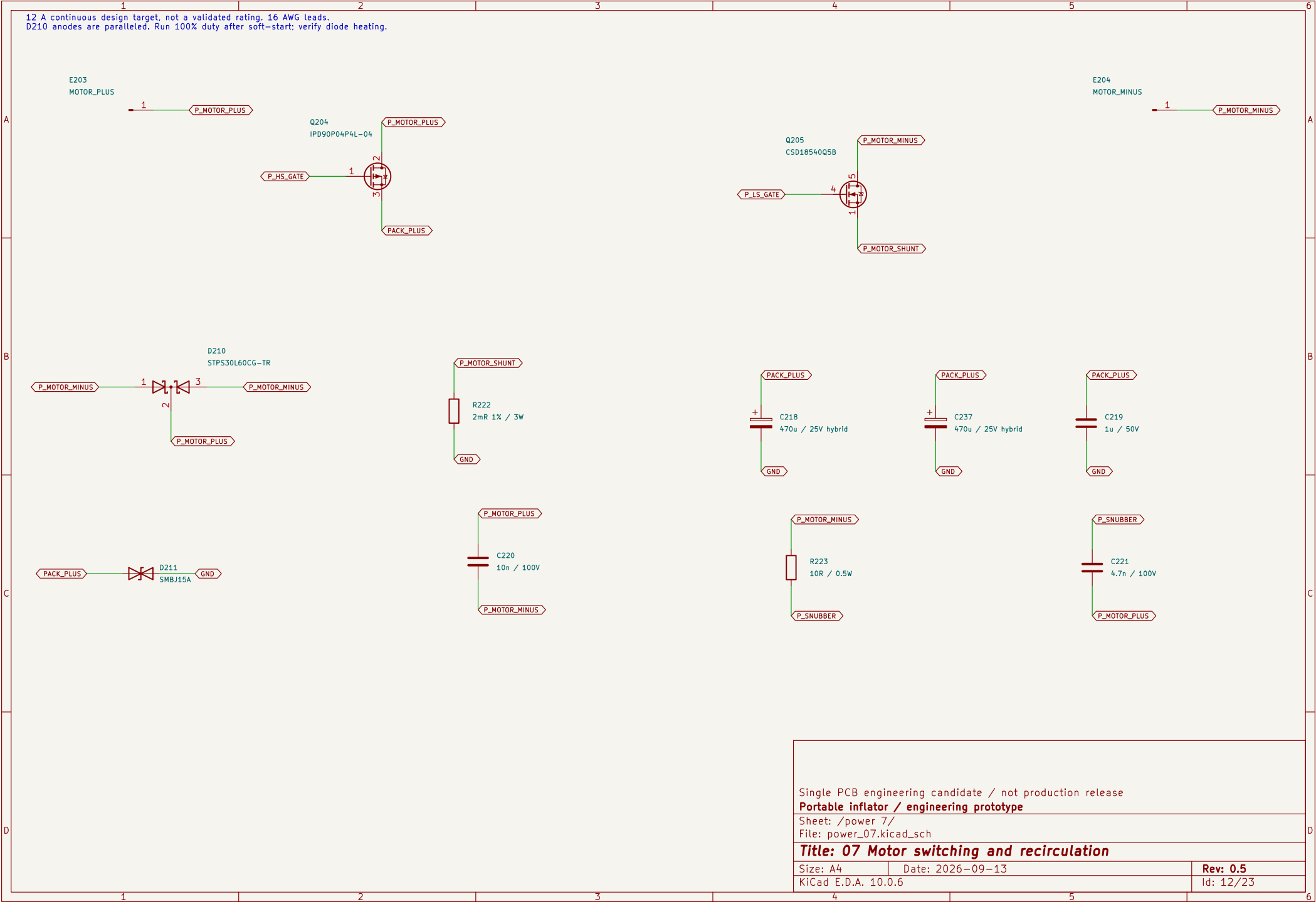
Size: A4

Date: 2026-09-13

Rev: 0.5

KiCad E.D.A. 10.0.6

Id: 10/23



Single PCB engineering candidate / not production release

Portable inflator / engineering prototype

Sheet: /power 7/

File: power_07.kicad_sch

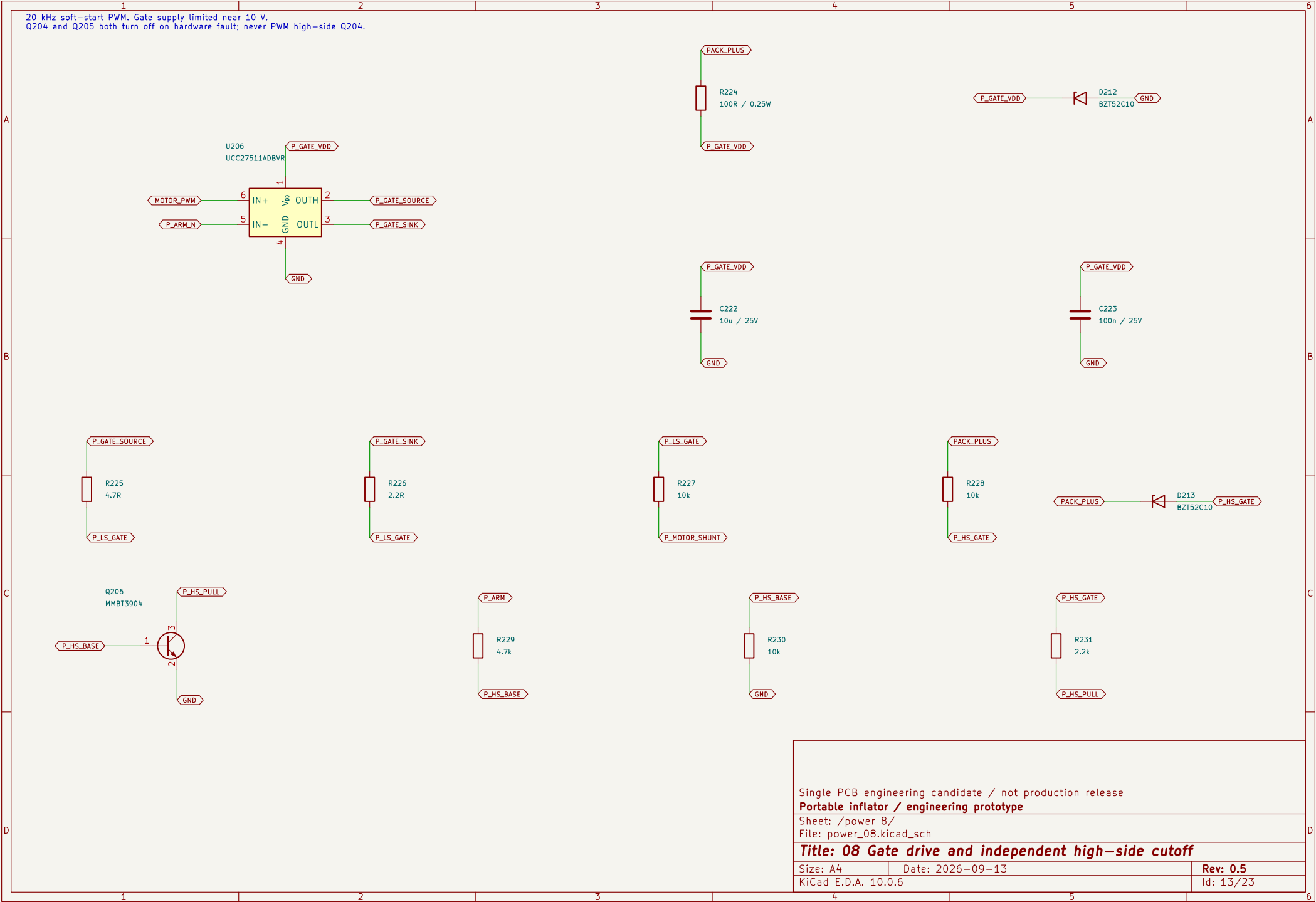
Title: 07 Motor switching and recirculation

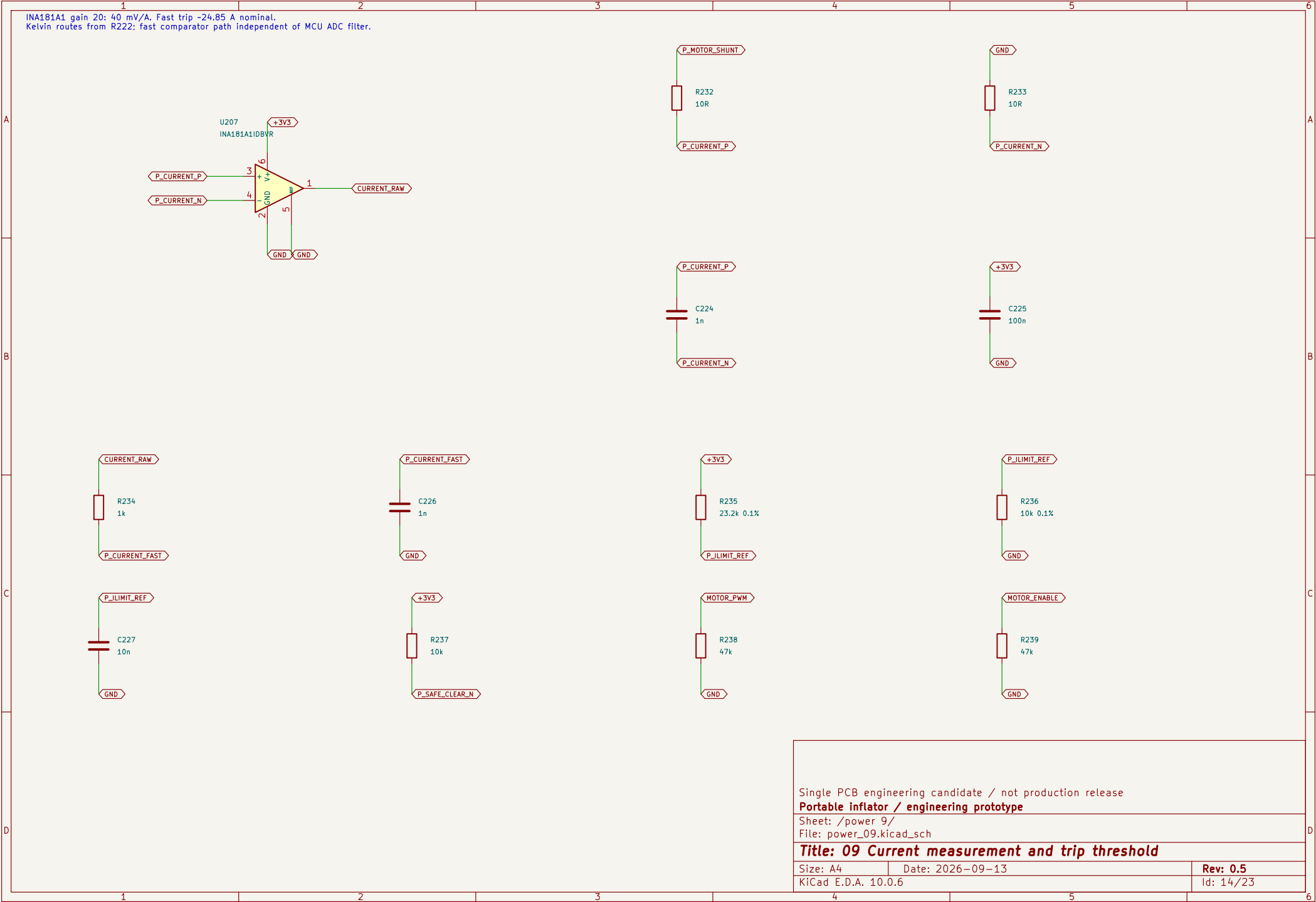
Size: A4 Date: 2026-09-13

KiCad E.D.A. 10.0.6

Rev: 0.5

Id: 12/23



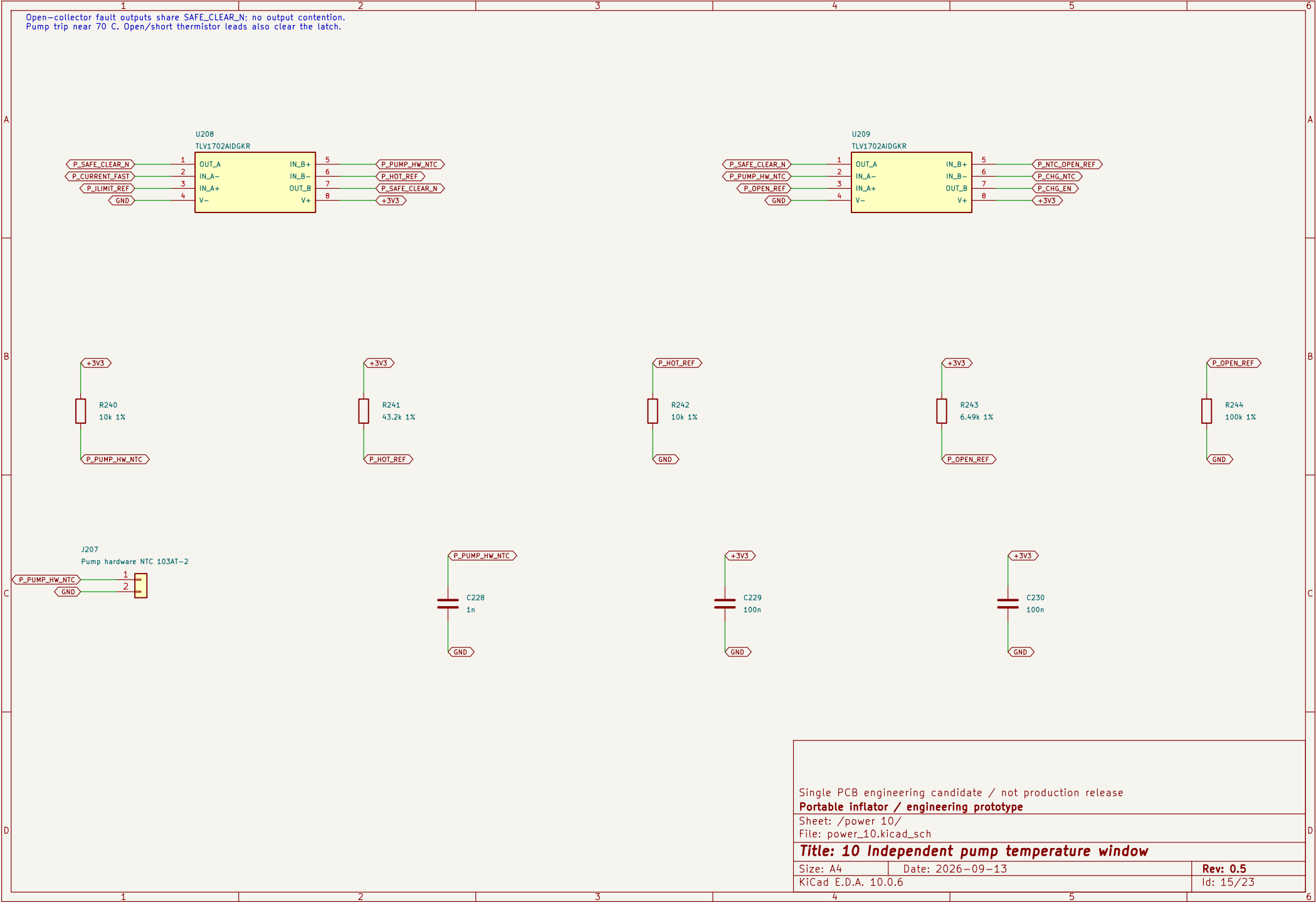


Single PCB engineering candidate / not production release
Portable inflator / engineering prototype

Sheet: /power 9/
File: power_09.kicad_sch

Title: 09 Current measurement and trip threshold

Size: A4	Date: 2026-09-13	Rev: 0.5
KiCad E.D.A. 10.0.6		Id: 14/23



Single PCB engineering candidate / not production release

Portable inflator / engineering prototype

Sheet: /power 10/

File: power_10.kicad_sch

Title: 10 Independent pump temperature window

Size: A4

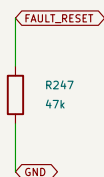
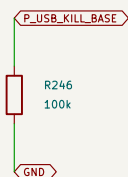
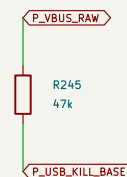
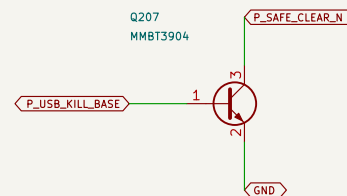
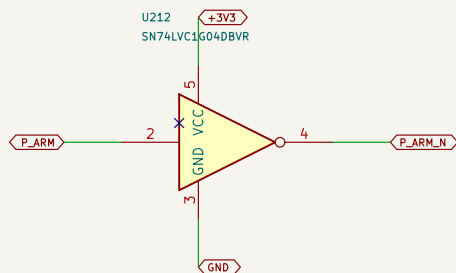
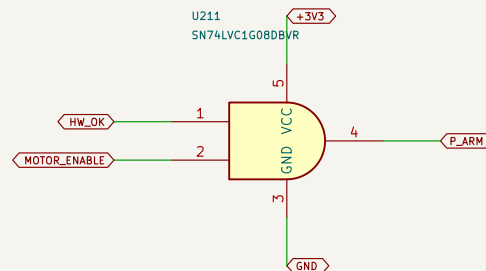
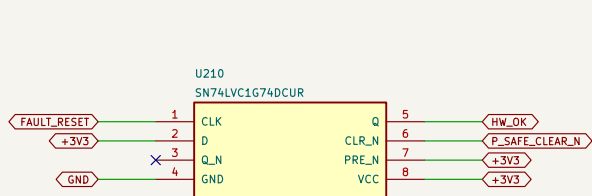
Date: 2026-09-13

Rev: 0.5

KiCad E.D.A. 10.0.6

Id: 15/23

Only FAULT_RESET rising edge can arm HW_OK after ALL fault sources clear.
Q207 kills on raw VBUS. A lost control cable defaults motor outputs off.



Single PCB engineering candidate / not production release

Portable inflator / engineering prototype

Sheet: /power 11/

File: power_11.kicad_sch

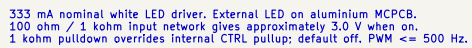
Title: 11 Latched hardware stop

Size: A4 Date: 2026-09-13

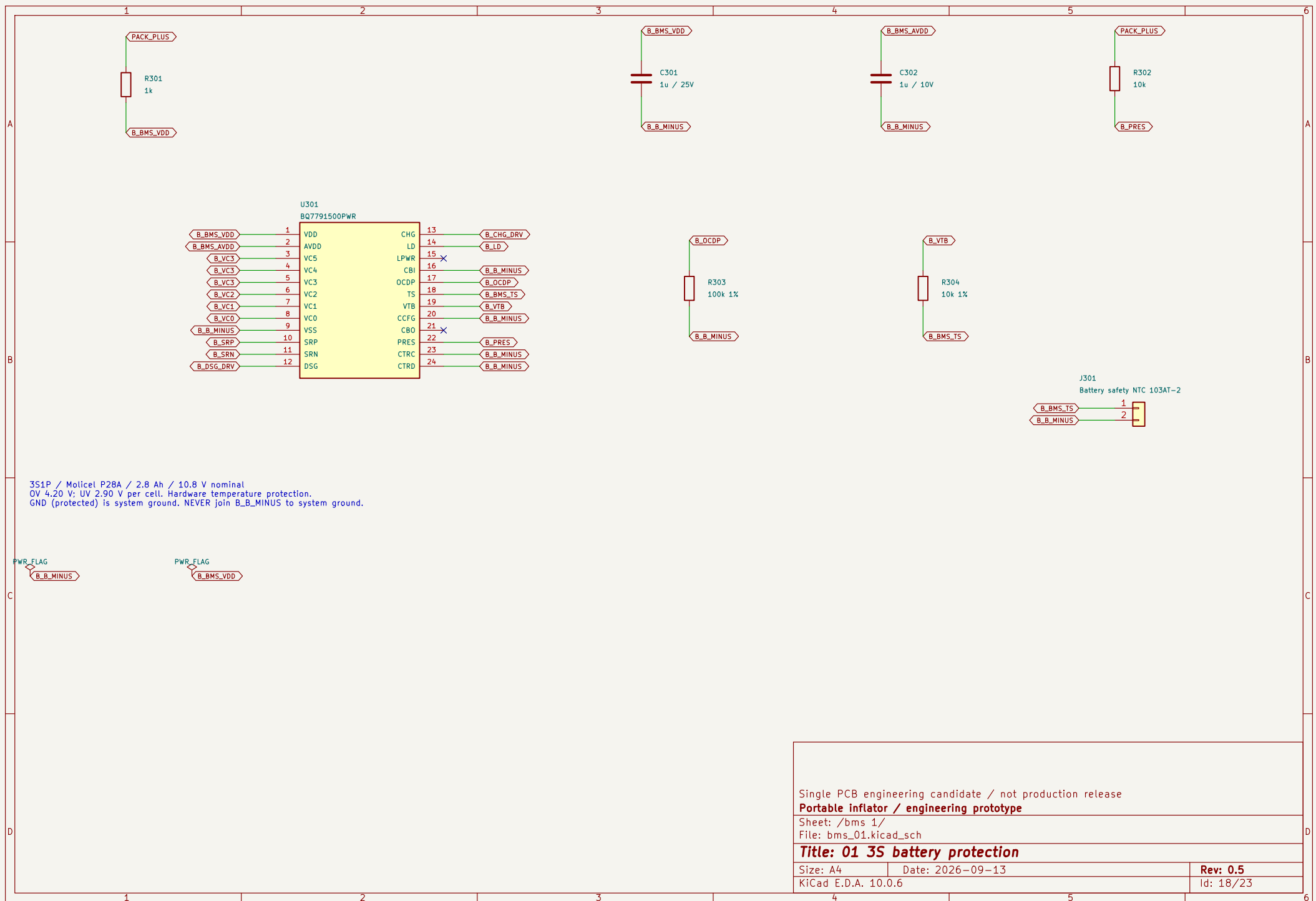
KiCad E.D.A. 10.0.6

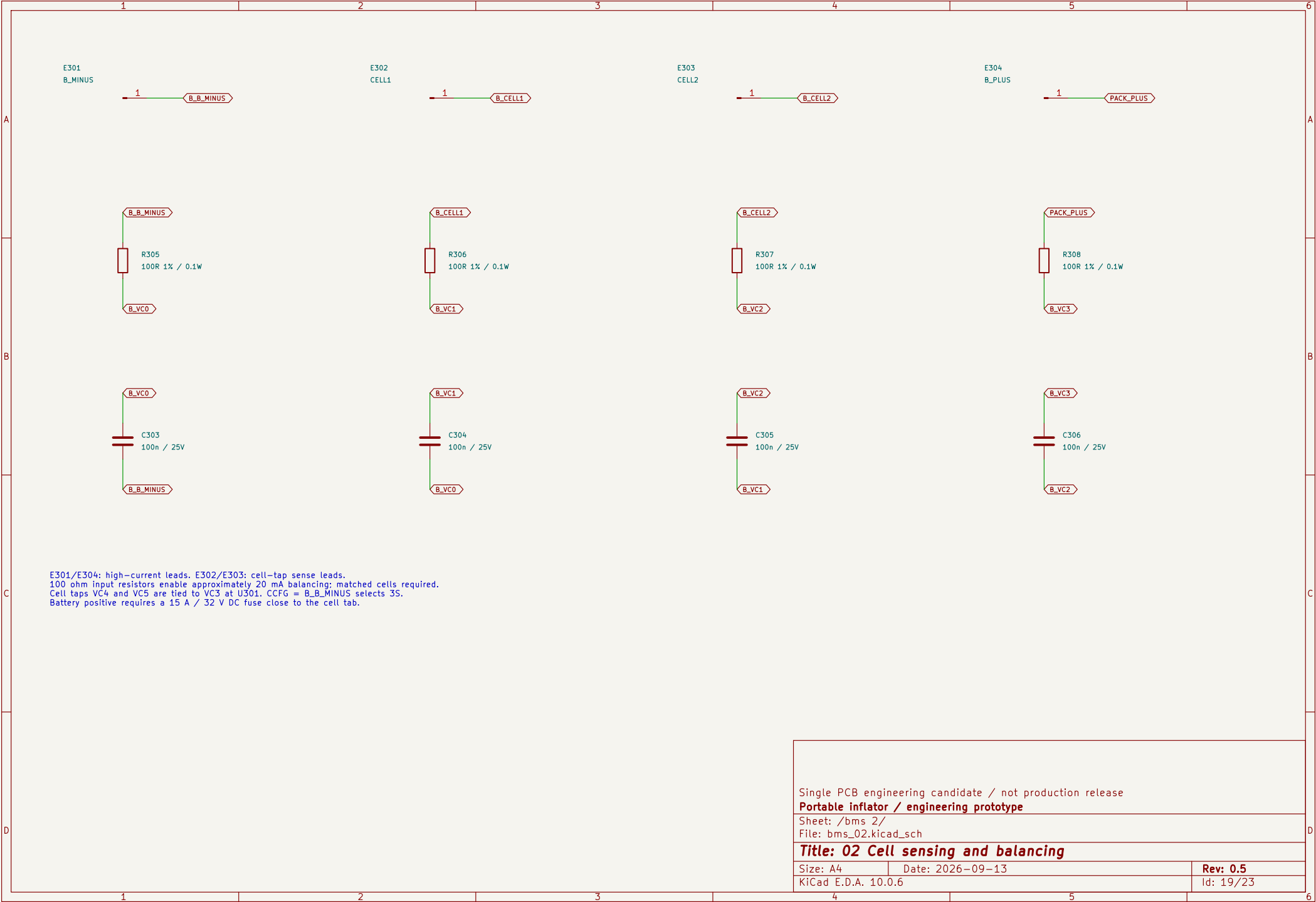
Rev: 0.5

Id: 16/23



Id: 17/23





R309: nominal OCD 20 A / 180 ms; SCD 40 A / 960 us. Not a constant-current limiter.
Q301/Q302 share drains; gate clamps protect against PACK- movement.

Q301
CSD18540Q5B

B_DSG_GATE

B_BMS_DRAIN

B_SHUNT_B

Q302
CSD18540Q5B

B_CHG_GATE

B_BMS_DRAIN

GND

B_B_MINUS

R309
3mR 1% / 3W

B_SHUNT_B

B_LD

R315
470k

GND

B_DSG_DRV

R310
4.53k

B_DSG_GATE

B_SHUNT_B

R311
1M

B_SHUNT_B

R317
100R

B_SRN

B_B_MINUS

R316
100R

B_SRN

B_CHG_DRV

R312
1M

B_CHG_LIMIT

B_CHG_GATE

D301
1N4148W

B_CHG_LIMIT

B_CHG_GATE

R313
1M

B_CHG_GATE

R314
3.3M

GND

B_SRN

C307
100n

B_B_MINUS

B_SRN

C308
100n

B_B_MINUS

B_SRN

C309
100n

B_SRN

B_CHG_GATE

D302
BZT52C15

GND

B_DSG_GATE

D303
BZT52C15

B_SHUNT_B

Single PCB engineering candidate / not production release
Portable inflator / engineering prototype
Sheet: /bms 3/
File: bms_03.kicad_sch
Title: 03 Protection MOSFETs and current sense
Size: A4 Date: 2026-09-13 Rev: 0.5
KiCad E.D.A. 10.0.6 Id: 20/23

Sheet: /bms_3/		
File: bms_03.kicad_sch		
Title: 03 Protection MOSFETs and current sense		
Size: A4	Date: 2026-09-13	Rev: 0.5
KiCad E.D.A. 10.0.6		Id: 20/23

