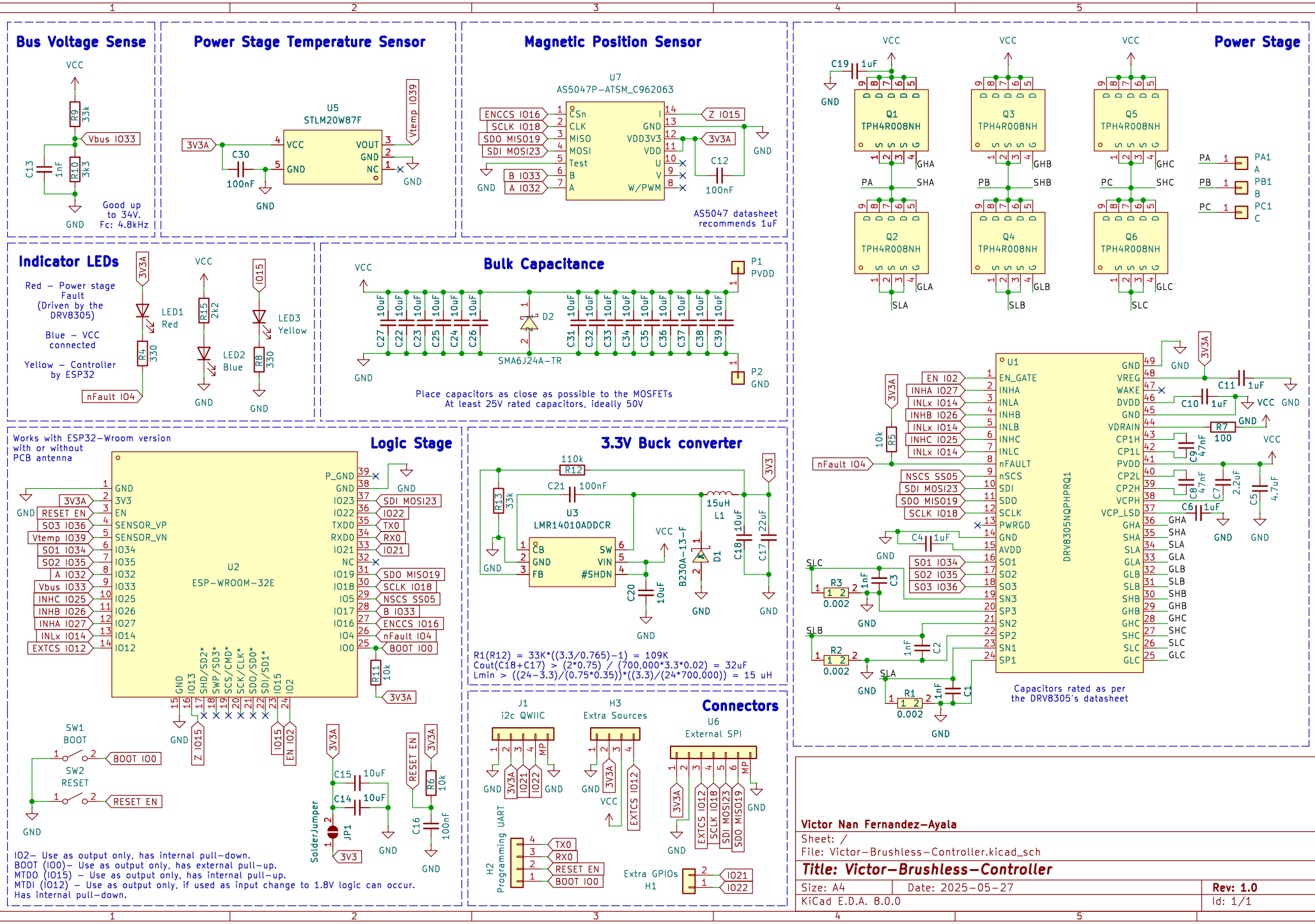
Bus Voltage Sense
VCC
R9 33k
Vbus IO33
C13 1nF
R10 3k3
GND
Good up to 34V.
Fc: 4.8kHz
Power Stage Temperature Sensor
U5
STLM20W87F
3V3A
C30
100nF
VCC
GND
VOUT
GND
NC
Vtemp IO39
Magnetic Position Sensor
U7
AS5047P-ATSM_C962063
ENCCS IO16
SCLK IO18
SDO MISO19
SDI MOSI23
B IO33
A IO32
CSn
CLK
MISO
MOSI
Test
B
A
GND
VDD3V3
VDD
U
V
W/PWM
Z IO15
3V3A
C12
100nF
AS5047 datasheet recommends 1uF
Power Stage
VCC
C19 1uF
Q1 TPH4R008NH
Q2 TPH4R008NH
Q3 TPH4R008NH
Q4 TPH4R008NH
Q5 TPH4R008NH
Q6 TPH4R008NH
GHA
SHA
GLA
SLA
GHB
SHB
GLB
SLB
GHC
SHC
GLC
SLC
PA
PB
PC
PA1
PB1
PC1
Indicator LEDs
Red – Power stage Fault (Driven by the DRV8305)
Blue – VCC connected
Yellow – Controller by ESP32
3V3A
LED1 Red
R4 330
nFault IO4
R15 2k2
LED2 Blue
IO15
LED3 Yellow
R8 330
Bulk Capacitance
P1 PVDD
P2 GND
D2
SMA6J24A-TR
C27 C22 C23 C25 C24 C26
C31 C32 C33 C34 C35 C36 C37 C38 C39
10uF
Place capacitors as close as possible to the MOSFETs
At least 25V rated capacitors, ideally 50V
Works with ESP32-Wroom version with or without PCB antenna
Logic Stage
U2
ESP-WROOM-32E
GND
3V3
EN
SENSOR_VP
SENSOR_VN
IO34
IO35
IO32
IO33
IO25
IO26
IO27
IO14
IO12
P_GND
IO23
IO22
TXD0
RXD0
IO21
NC
IO19
IO18
IO5
IO17
IO16
IO4
IO0
3V3A
RESET EN
SO3 IO36
Vtemp IO39
SO1 IO34
SO2 IO35
A IO32
Vbus IO33
INHC IO25
INHB IO26
INHA IO27
INLx IO14
EXTCS IO12
SDI MOSI23
IO22
TX0
RX0
IO21
SDO MISO19
SCLK IO18
NSCS SS05
B IO33
ENCCS IO16
nFault IO4
BOOT IO0
R11 10k
SHD/SD2*
SWP/SD3*
SCS/CMD*
SCK/CLK*
SDO/SD0*
SDI/SD1*
IO13
IO15
IO2
Z IO15
EN IO2
SW1 BOOT
SW2 RESET
BOOT IO0
RESET EN
C15 10uF
C14 10uF
SolderJumper
JP1
C16 100nF
R6 10k
IO2– Use as output only, has internal pull-down.
BOOT (IO0)– Use as output only, has external pull-up.
MTDO (IO15) – Use as output only, has internal pull-up.
MTDI (IO12) – Use as output only, if used as input change to 1.8V logic can occur.
Has internal pull-down.
3.3V Buck converter
110k
R12
R13 33k
C21 100nF
U3
LMR14010ADDCR
CB
GND
FB
SW
VIN
#SHDN
15uH
L1
D1
B230A-13-F
C18 10uF
C17 22uF
C20 10uF
3V3
R1(R12) = 33K*((3.3/0.765)-1) = 109K
Cout(C18+C17) > (2*0.75) / (700,000*3.3*0.02) = 32uF
Lmin > ((24-3.3)/(0.75*0.35))*((3.3)/(24*700,000)) = 15 uH
Connectors
J1
i2c QWIIC
H3
Extra Sources
U6
External SPI
H2
Programming UART
TX0
RX0
RESET EN
BOOT IO0
Extra GPIOs
H1
IO21
IO22
EXTCS IO12
SCLK IO18
SDI MOSI23
SDO MISO19
U1
DRV8305NQPHPRQ1
EN_GATE
INHA
INLA
INHB
INLB
INHC
INLC
nFAULT
nSCS
SDI
SDO
SCLK
PWRGD
AVDD
SO1
SO2
SO3
SN3
SP3
SN2
SP2
SN1
SP1
VREG
WAKE
DVDD
VDRAIN
CP1H
CP1L
PVDD
CP2L
CP2H
VCPH
VCP_LSD
R5 10k
R7 100
C11 1uF
C10 1uF
C9 47nF
C8 47nF
C7 2.2uF
C6 1uF
C5 4.7uF
C4 1uF
C3 1nF
C2 1nF
C1 1nF
R3 0.002
R2 0.002
R1 0.002
Capacitors rated as per the DRV8305's datasheet
Victor Nan Fernandez-Ayala
Sheet: /
File: Victor-Brushless-Controller.kicad_sch
Title: Victor-Brushless-Controller
Size: A4
Date: 2025-05-27
Rev: 1.0
KiCad E.D.A. 8.0.0
Id: 1/1