I/O

LOGO

J1
USB_C_Receptacle_USB2.0_16P
VBUS A4
CC1 A5
CC2 B5
D− B7
D− A7
D+ A6
D+ B6
SBU1 A8
SBU2 B8
SHIELD
GND A1
S1
R5 5.1k
R6 5.1k
+5V_USB
U2
USBLC6−2SC6
USB_D−
USB_D+

C25
Connector BLDC Motor
Phase_A
Phase_B
Phase_C

C24
Connector ESC
Bat+ 1
Bat− 2
SCL 5
PWM 4
SDA 6
GND 3
V_Bat_raw
I2C1_CL
Duty_in
I2C1_SDA
C28 2.2u/40V
Q5
IRFH8318TRPBF
R23 1M
R24 100k
V_Bat
D5 LED_Small
R25 22k
+3V3
D6 LED_Small
R26 1k

UC

+3V3
C22 4.7u
C20 100n
C21 100n
J_VBAT1
J_VUSB1
C19 100n
C18 1u
C23 100n
V_Bat
R7 5.1k
R8 1k
V_Bat_Div

U1
STM32L412CBU6
NRST 7
PH0 5
PH1 6
PH3 44
J_BOOT1
PC13 2
PC14 3
PC15 4
PB0 18
PB1 19
PB2 20
PB3 39
PB4 40
PB5 41
PB6 42
PB7 43
PB8 45
PB9 46
PB10 21
PB11 22
PB12 25
PB13 26
PB14 27
PB15 28
VBAT 1
VDD 24
VDD 48
VDD 9
VDDA 56
VDDUSB 36
VSS 23
VSSA 8
PA0 10
PA1 11
PA2 12
PA3 13
PA4 14
PA5 15
PA6 16
PA7 17
PA8 29
PA9 30
PA10 31
PA11 32
PA12 33
PA13 34
PA14 37
PA15 38
VV_SENSE_C ADC1_IN5
VISENSE_C ADC1_IN6
VV_SENSE_B ADC1_IN7
VISENSE_B ADC1_IN8
VV_SENSE_A ADC1_IN9
VISENSE_A ADC1_IN10
V_Bat_Div ADC1_IN11
LO_A TIM1_CH_1N
Hi_A TIM1_CH_1
Hi_B TIM1_CH_2
HI_C TIM1_CH_3
USB_D−
USB_D+
SWDIO
SWCLK
RCC_OSC_IN
RCC_OSC_OUT
TIM1_CH_2N
TIM1_CH_3N
LO_B
LO_C
Duty_in
I2C1_CL
I2C1_SDA

Y1
Crystal_GND24_Small
RCC_OSC_OUT
RCC_OSC_IN
C26 12p
C27 12p

Phase A

nMos can handle 100A, pMos 120A

V_Bat
D1 1N5819WS
VB_A
C4 1u
C3 1u
IC3
IR2103STRPBF
VCC VB HIN HO LIN VS COM LO
Hi_A
LO_A
R2 100
nGate_A
Q2
BSC060P03NS3E G
C2 47u
R3 100
pGate_A
Q1
IRFH8318TRPBF
SMBJP6KE22A−TP
D7
Phase_A
R11 5.1k
VV_SENSE_A
R12 1k
+3V3
U3
INA180A3
R1 2mOhm
R4 1k
VISENSE_A
C1 1n

Phase B

V_Bat
D3 1N5819WS
VB_B
C6 1u
C7 1u
IC1
IR2103STRPBF
Hi_B
LO_B
R9 100
nGate_B
Q7
BSC060P03NS3E G
C8 47u
R10 100
pGate_B
Q8
IRFH8318TRPBF
SMBJP6KE22A−TP
D8
Phase_B
R15 5.1k
VV_SENSE_B
R16 1k
+3V3
U4
INA180A3
R13 2mOhm
R14 1k
VISENSE_B
C9 1n

Phase C

V_Bat
D4 1N5819WS
VB_C
C14 1u
C15 1u
IC4
IR2103STRPBF
HI_C
LO_C
R17 100
nGate_C
Q3
BSC060P03NS3E G
C16 47u
R18 100
pGate_C
Q4
IRFH8318TRPBF
SMBJP6KE22A−TP
D9
Phase_C
R21 5.1k
VV_SENSE_C
R22 1k
+3V3
U5
INA180A3
R19 2mOhm
R20 1k
VISENSE_C
C17 1n

Buck Converter

+5V_USB
D2 1N5819WS
V_Bat
IC2
LMR51420XDDCR
VIN EN GND CB SW FB
C5 2.2u / 2xV_bat
C13 100n /2x V_bat
CB
C10 100n / X7R or X5R / 16V
SW
L2 8.2u
OUT_buck
FB
R_FBT1 100k 1%
R_FBB1 22k1 %1
C11 22u/6.6V
C12 22u/6.6V
+3V3
J_3V3

R_FBB = R_FBT/((Vout−0,6)/0,6) = 100k /((3,3−0,6)/0,6) ~ 22.222k

Calculations:
Battery
max 4.2V per Cell
should drive till S4 batteries aka 16,8V

ESC
Max pulsed current: 200A
Max continious current: 100A

H1 MountingHole
H2 MountingHole

Sheet: /
File: ESC.kicad_sch

Title:

Size: A3 | Date: | **Rev:**
KiCad E.D.A. 9.0.0 | Id: 1/1