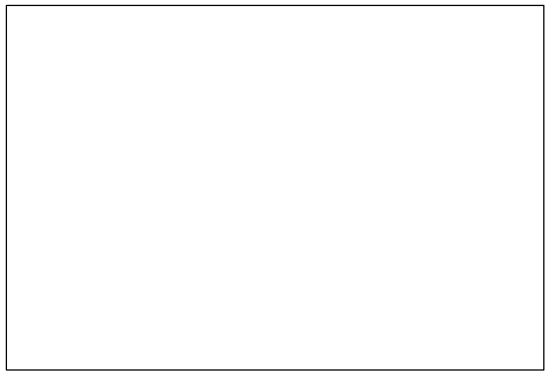
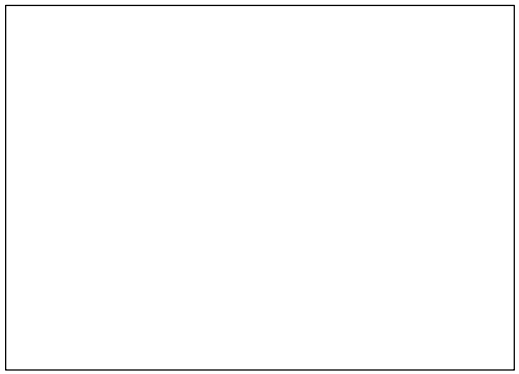
LOAD SWITCHES



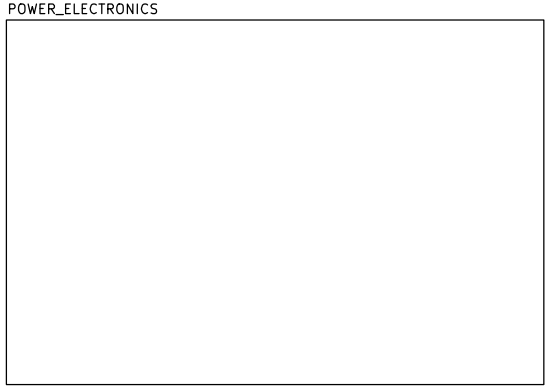
File: PDB_LOAD_SWITCHES.kicad_sch

EXTERNAL CONNECTORS



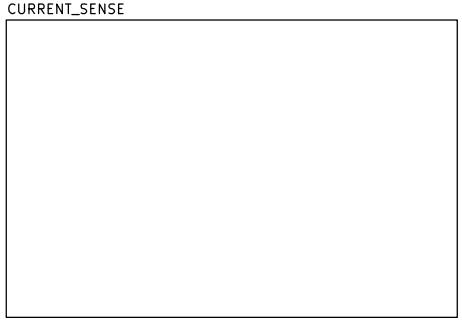
File: PDB_EXT_CONNECTORS.kicad_sch

POWER_ELECTRONICS



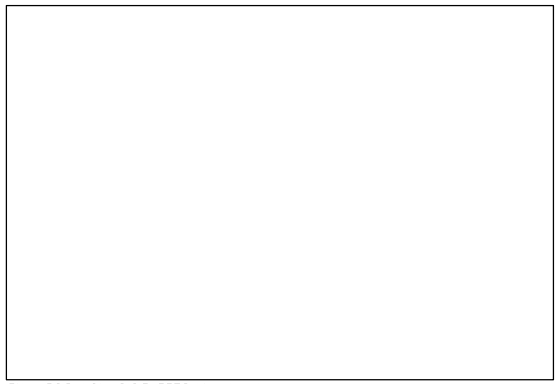
File: PDB_POWER_ELECTRONICS.kicad_sch

CURRENT_SENSE



File: PDB_CURRENT_SENSE.kicad_sch

LOW SIDE FETS



File: PDB_LOW_SIDE_FETS.kicad_sch

Sheet: /
File: POWER DISTRIBUTIONB BOARD.kicad_sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 1/9

HIGH SIDE LOAD SWITCHES 5VDC BUS

File: untitled.kicad_sch

HIGH SIDE LOAD SWITCHES DCDC CONVERTERS

File: PDB_HIGH_SIDE_LOAD_SWITCHES_DCDC.kicad_sch

HIGH SIDE LOAD SWITCHES 12VDC BUS

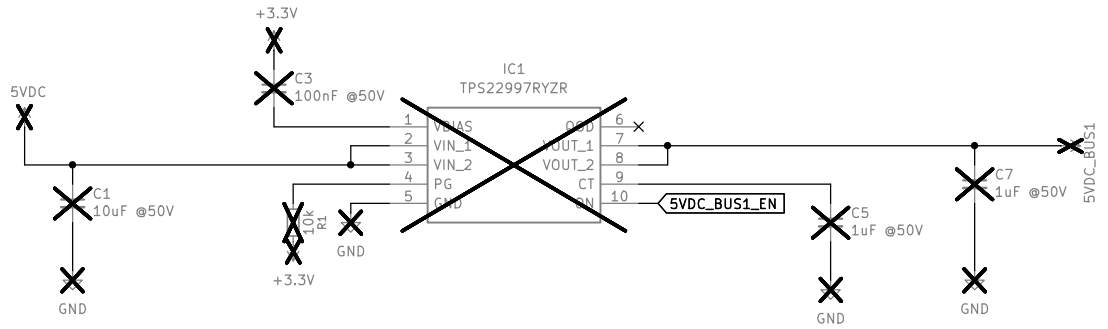
File: PDB_HIGH_SIDE_LOAD_SWITCHES_12VDC_BUS.kicad_sch

Sheet: /LOAD SWITCHES/
File: PDB_LOAD_SWITCHES.kicad_sch

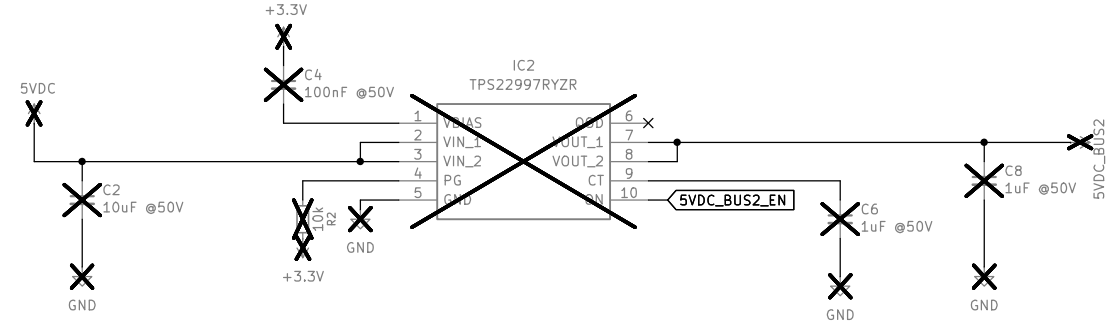
Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 2/9

5VDC BUS 1

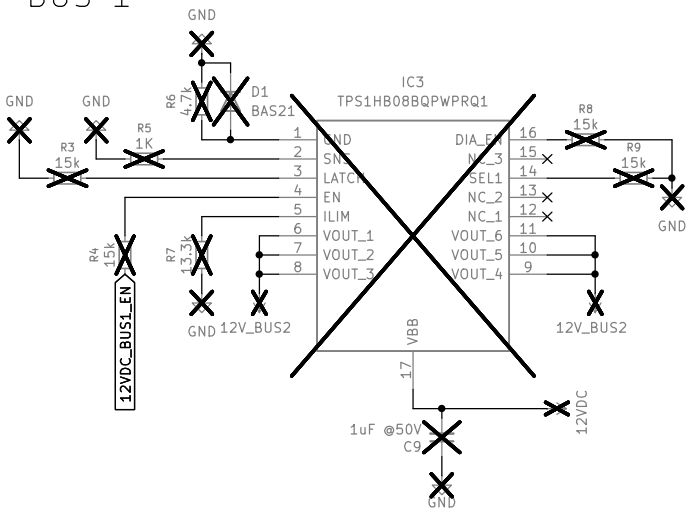


5VDC BUS 2

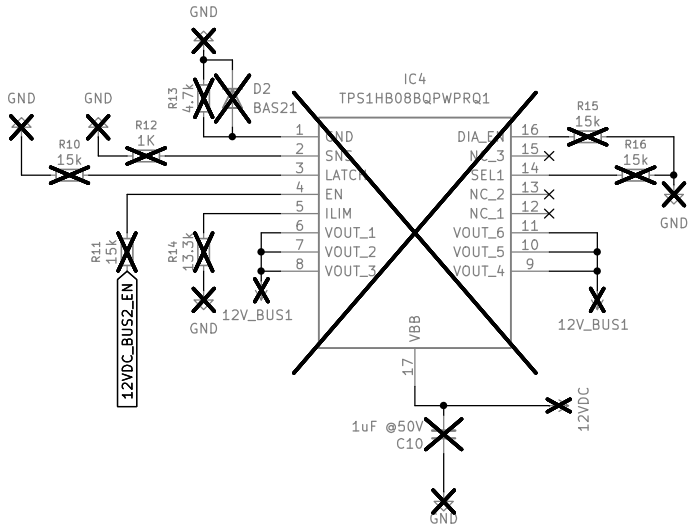


Sheet: /LOAD SWITCHES/HIGH SIDE LOAD SWITCHES 5VDC BUS/		
File: untitled.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 3/9

BUS 1



BUS 2



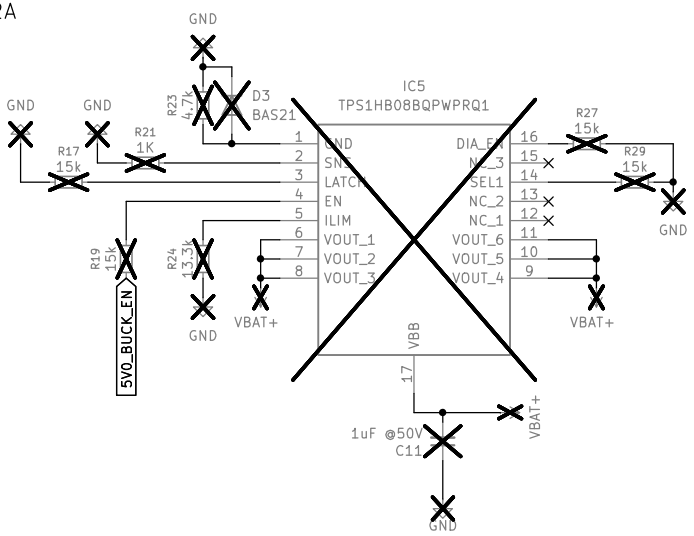
Sheet: /LOAD SWITCHES/HIGH SIDE LOAD SWITCHES 12VDC BUS/
File: PDB_HIGH_SIDE_LOAD_SWITCHES_12VDC_BUS.kicad_sch

Title:

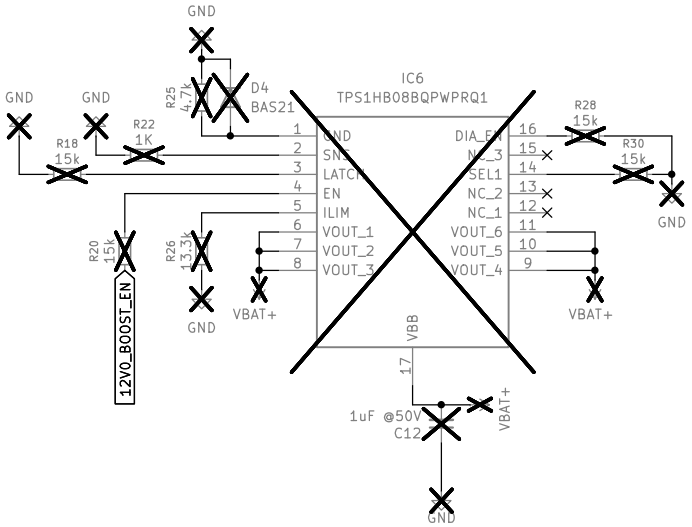
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 4/9

5V0 BUCK CONVERTER

CURRENT_LIM=12A

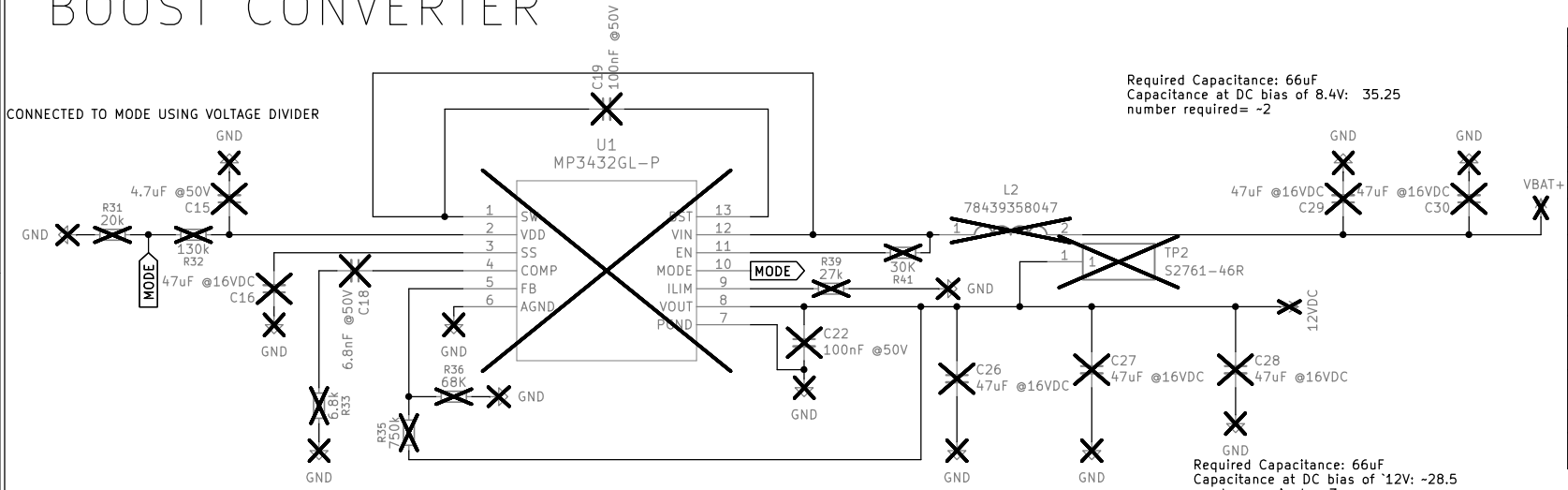


12V0 BUCK CONVERTER



Sheet: /LOAD SWITCHES/HIGH SIDE LOAD SWITCHES DCDC CONVERTERS/		
File: PDB_HIGH_SIDE_LOAD_SWITCHES_DCDC.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 5/9

BOOST CONVERTER

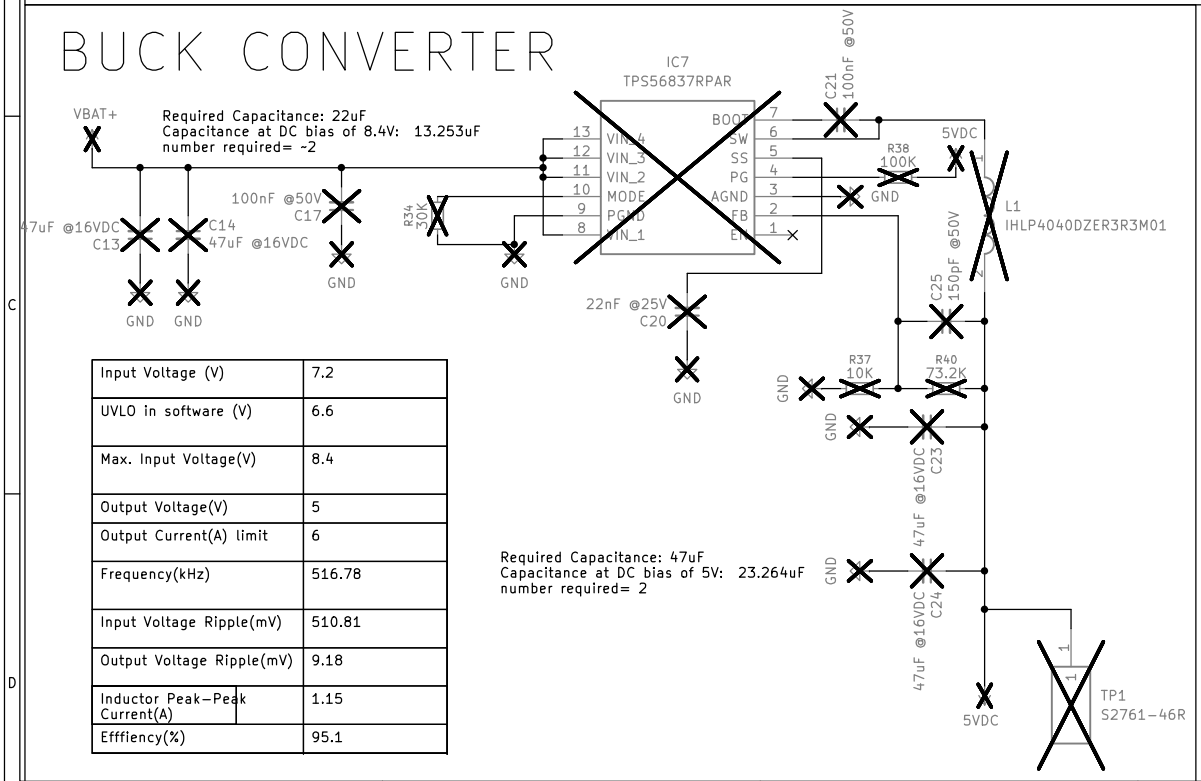


Required Capacitance: 66uF
Capacitance at DC bias of 8.4V: 35.25
number required= ~2

Required Capacitance: 66uF
Capacitance at DC bias of `12V: ~28.5
number required= ~3
USED: 22202 tdk

Input Voltage (V)	7.2
Min. Input Voltage(V)	6
Max. Input Voltage(V)	8.4
Output Voltage(V)	12
Output Current(A)	2.5
Frequency(kHz)	600
Input Voltage Ripple(mV)	3.46
Output Voltage Ripple(mV)	31.36
Inductor Peak-Peak Current(A)	1.02
Effffiency(%)	97.9

BUCK CONVERTER



Required Capacitance: 22uF
Capacitance at DC bias of 8.4V: 13.253uF
number required= ~2

Required Capacitance: 47uF
Capacitance at DC bias of 5V: 23.264uF
number required= 2

Input Voltage (V)	7.2
UVLO in software (V)	6.6
Max. Input Voltage(V)	8.4
Output Voltage(V)	5
Output Current(A) limit	6
Frequency(kHz)	516.78
Input Voltage Ripple(mV)	510.81
Output Voltage Ripple(mV)	9.18
Inductor Peak-Peak Current(A)	1.15
Effffiency(%)	95.1

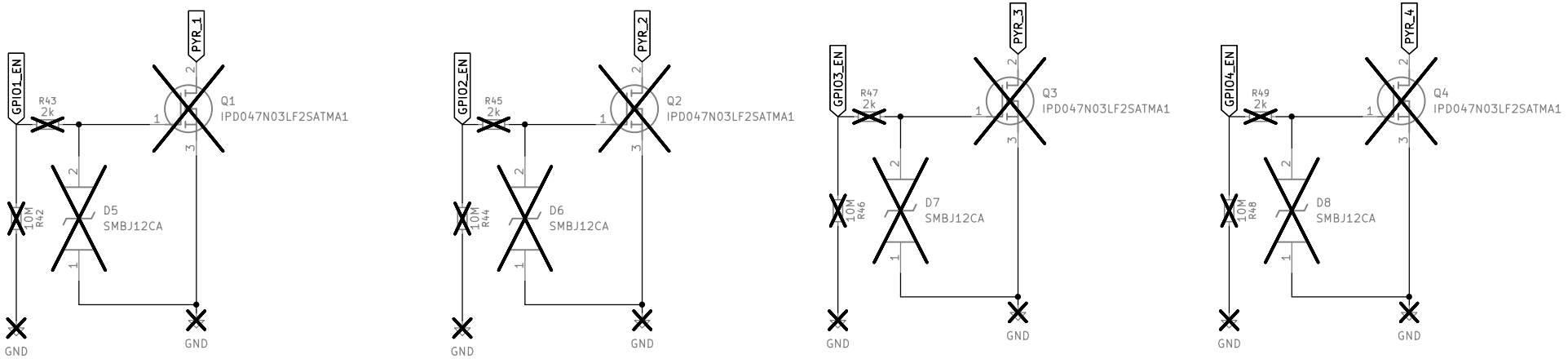
Sheet: /POWER_ELECTRONICS/
File: PDB_POWER_ELECTRONICS.kicad_sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 7/9

ARMING MOSFET/LOAD SWITCHES

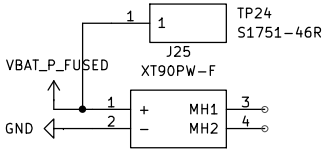
N CHANNEL MOSFETS ENHANCMENT



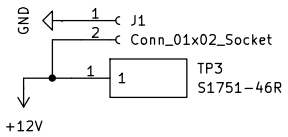
Sheet: /LOW SIDE FETS/ File: PDB_LOW_SIDE_FETS.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 8/9

(PORT SIDE)

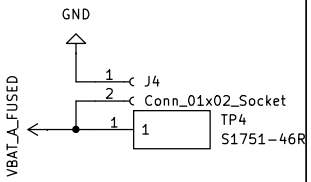
TIB PORT SIDE



12V0 OUT

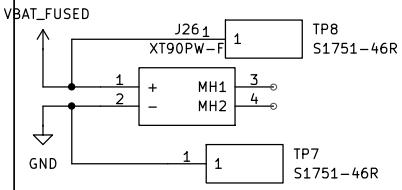


VBAT ACOUSTICS

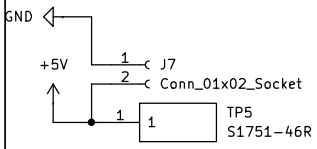


(STARBOARD SIDE)

TIB STARBOARD SIDE

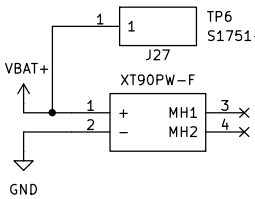


5V0 OUT

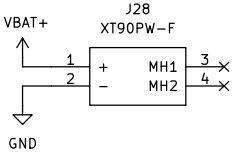


STERN

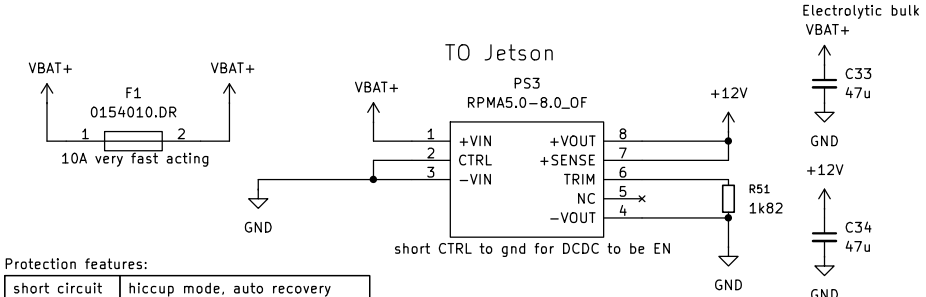
BAT1 CONN



BAT1 CONN

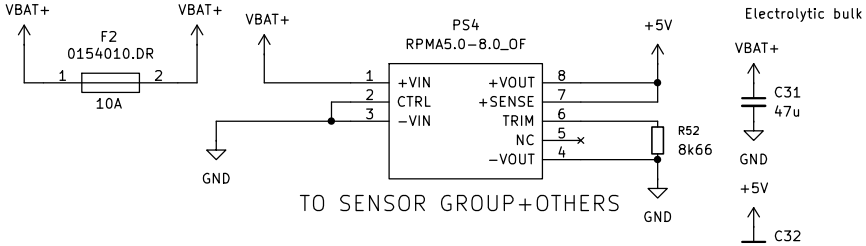


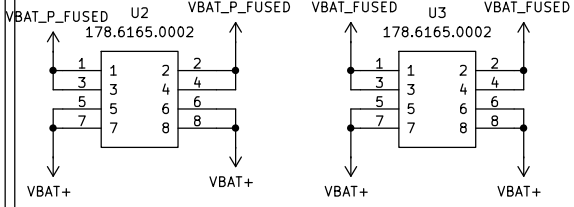
BOW(ISOLATED GROUND)



Protection features:

short circuit protection	hiccup mode, auto recovery after fault removed
over-voltage	110%-150% of nominal Vout
Overload protection	150% typ (typ=6A)





In rush current calcs
over current protection: 14A @hiccup mode (fuse should blow at 10A)
Maximum Capacitative Load: 1200uF
Output current max= 6A, peak voltage=17.0V
Energy required =1/2*C*V^2=0.5*(1200e-06)*17= 1.734J

Mounting Holes: M3

H1 MountingHole
H2 MountingHole
H3 MountingHole
H4 MountingHole

Sheet: /EXTERNAL CONNECTORS/
File: PDB_EXT_CONNECTORS.kicad_sch

Title:

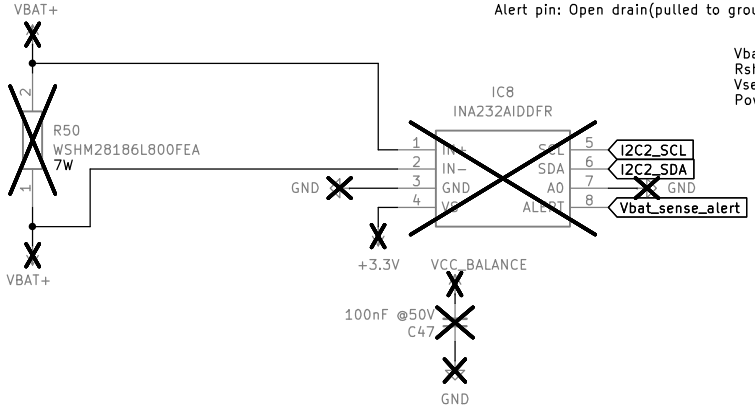
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 9/9

CURRENT SENSE_ VBAT

!Device Address!
AO connected to VS:1000000
AO connected to GND:1000001

Alert pin: Open drain(pulled to ground) output, effective when limits exceeded or conversion ready

Vbat current sense:
Rshunt< Vsenese/I max
Vsense= ±81.92 mV (ADCRANGE = 0), Imax=12[Ilim of all load switches], Rshunt=6.827mohm
Power= 6.8e−03*12^2=0.9792



Sheet: /CURRENT_SENSE/		
File: PDB_CURRENT_SENSE.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 10/9