

A

B

C

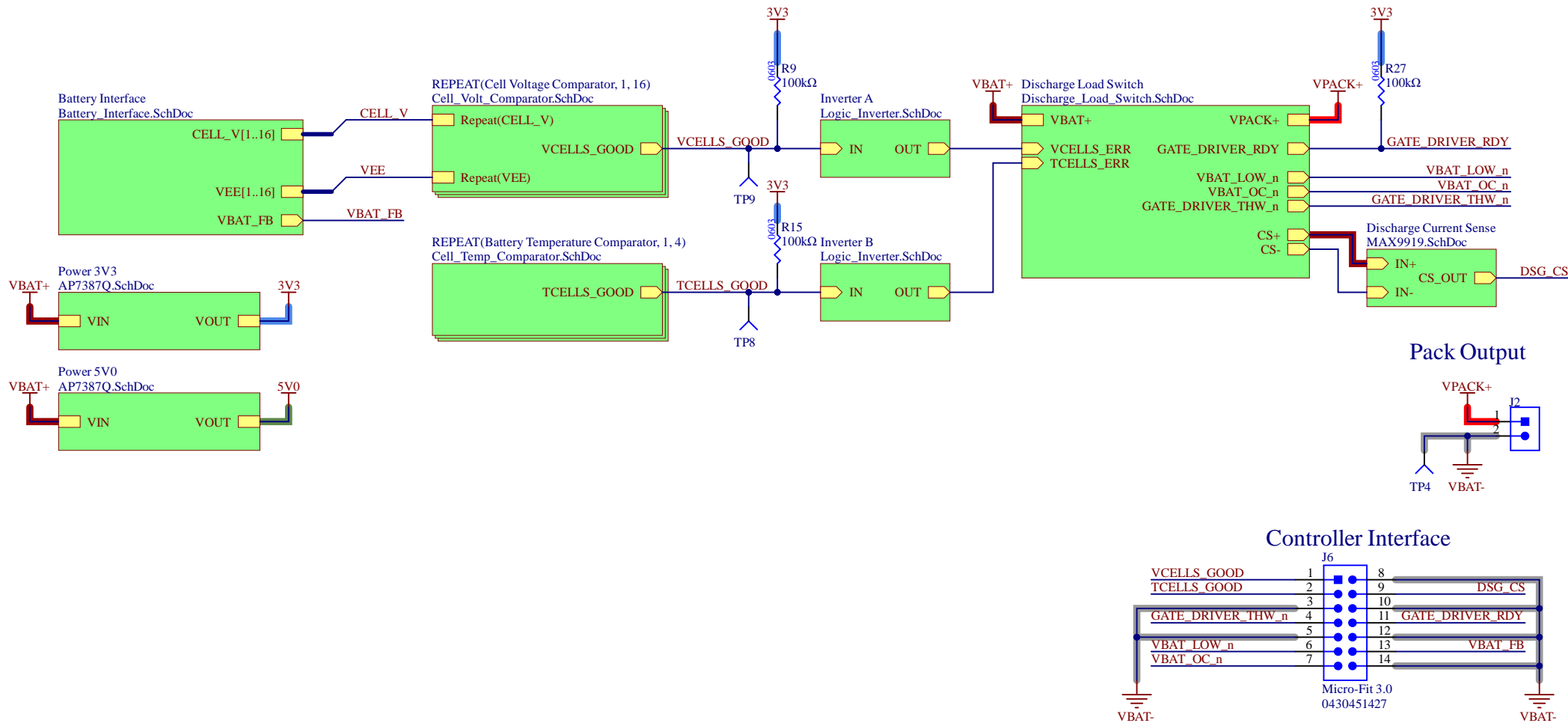
D

A

B

C

D



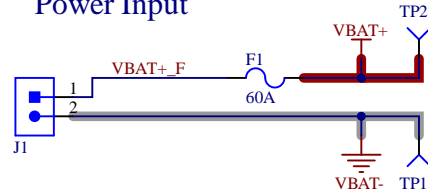
Mounting Holes

MH1 MH2
MH3 MH4

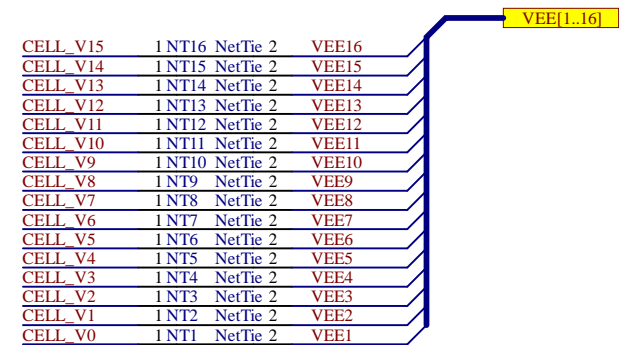
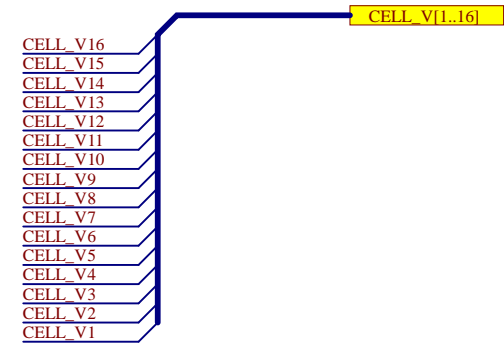
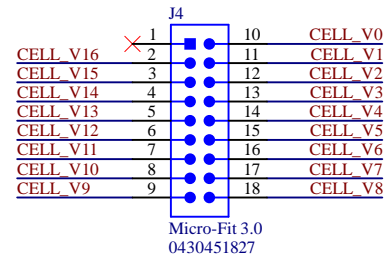
University of Waterloo Robotics Team 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1.0
PROJECT Battery Protector.PrjPcb, [No Variations]		
DOCUMENT Top.SchDoc		MODIFIED 2023-03-13
ENGINEER Farris Matar	REVIEWER *	SHEET 1 OF 8

Battery specs:
- 16s1p 20Ah LTO battery
- 1.5V - 2.7V cell voltage range, 2.3V nominal

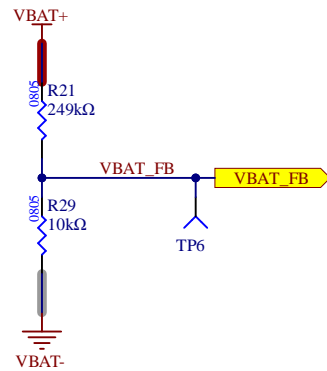
Power Input



Cell Sensing Inputs



Battery Voltage Feedback

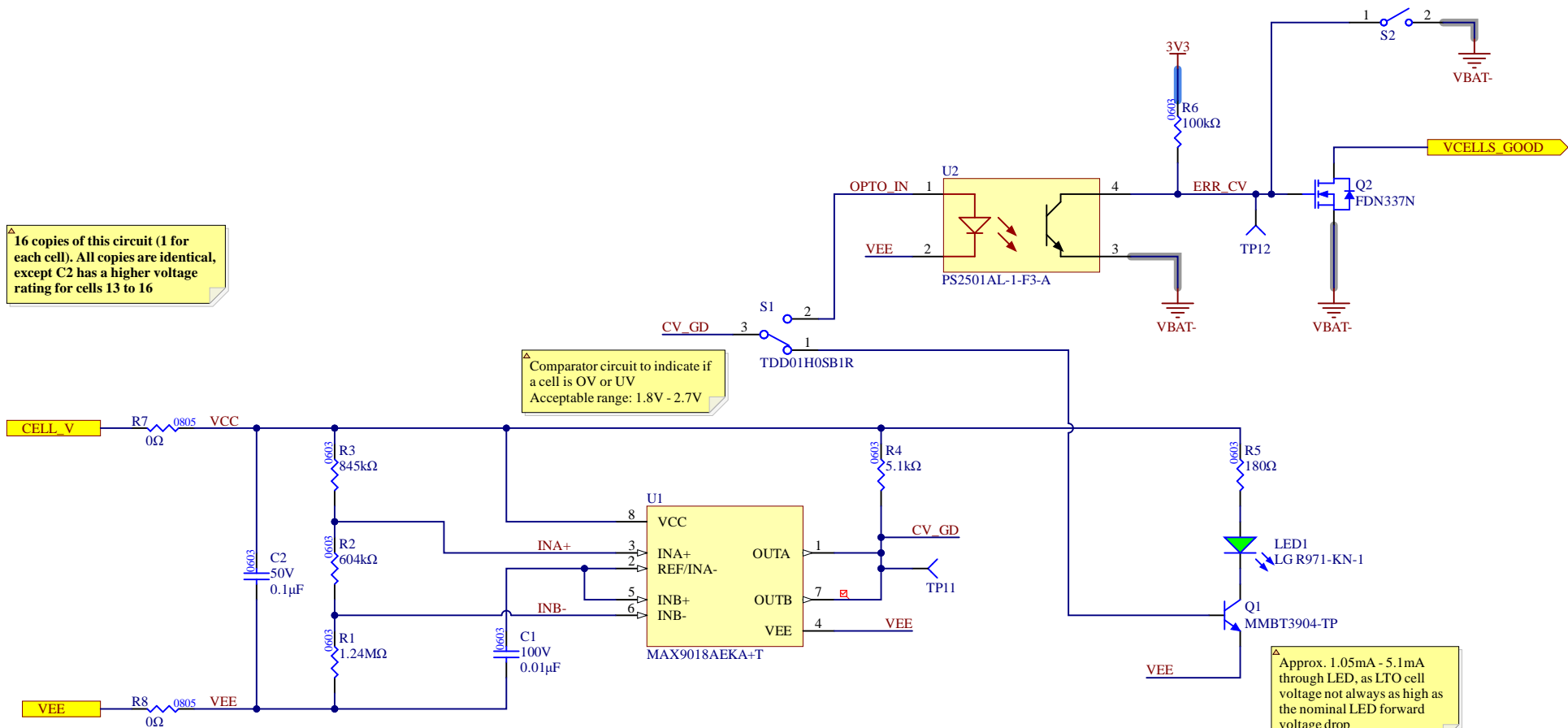


University of Waterloo Robotics Team 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1.0
PROJECT Battery Protector.PrjPcb, [No Variations]		
DOCUMENT Battery_Interface.SchDoc		MODIFIED 2023-03-14
ENGINEER Farris Matar	REVIEWER *	SHEET 2 OF 8

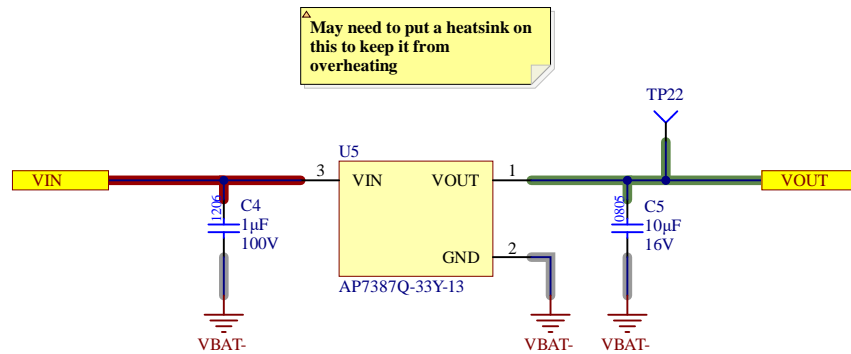
16 copies of this circuit (1 for each cell). All copies are identical, except C2 has a higher voltage rating for cells 13 to 16

Comparator circuit to indicate if a cell is OV or UV
Acceptable range: 1.8V - 2.7V

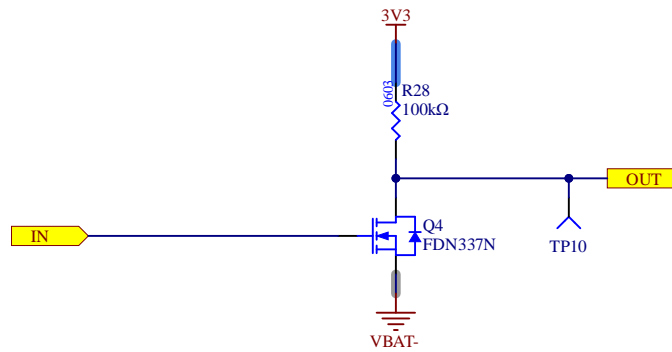
Approx. 1.05mA - 5.1mA through LED, as LTO cell voltage not always as high as the nominal LED forward voltage drop



University of Waterloo Robotics Team 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1.0
PROJECT Battery Protector.PrjPcb, [No Variations]		
DOCUMENT Cell_Volt_Comparator.SchDoc		MODIFIED 2023-03-14
ENGINEER Farris Matar	REVIEWER *	SHEET 4 OF 8

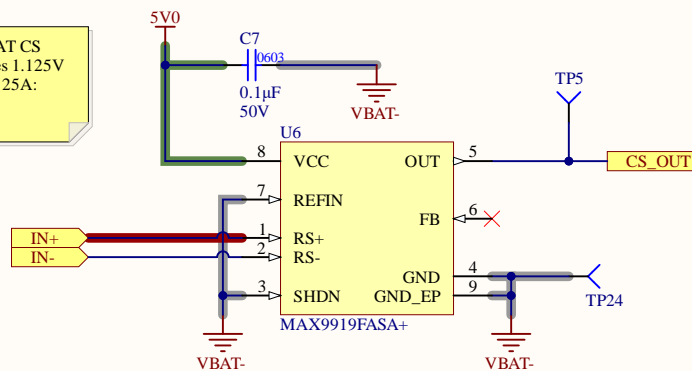


University of Waterloo Robotics Team 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1.0
PROJECT Battery Protector.PrjPcb, [No Variations]		
DOCUMENT AP7387Q.SchDoc		MODIFIED 2023-03-06
ENGINEER Farris Matar	REVIEWER *	SHEET 5 OF 8



University of Waterloo Robotics Team 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1.0
PROJECT Battery Protector.PrjPcb, [No Variations]		
DOCUMENT Logic_Inverter.SchDoc		MODIFIED 2023-02-09
ENGINEER Farris Matar	REVIEWER *	SHEET 6 OF 8

Δ 45V/V gain from VBAT CS
 - At 25A, OUT reaches 1.125V
 - Power dissipation at 25A:
 0.625W



University of Waterloo Robotics Team 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1.0
PROJECT Battery Protector.PrjPcb, [No Variations]		
DOCUMENT MAX9919.SchDoc		MODIFIED 2023-03-14
ENGINEER Farris Matar	REVIEWER *	SHEET 8 OF 8