

1

2

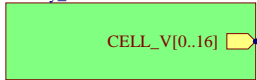
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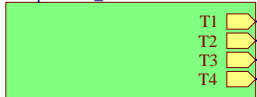
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A

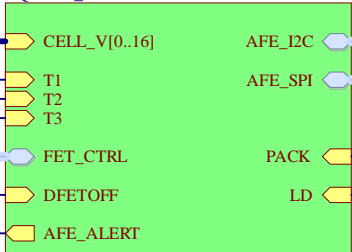
Battery Interface
Battery_Interface.SchDoc



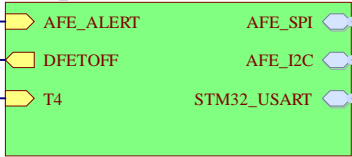
Temperature Sense
Temperature_Sense.SchDoc



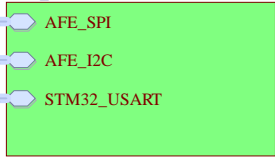
AFE
BQ76952_AFE.SchDoc



STM32 MCU
STM32_MCU.SchDoc

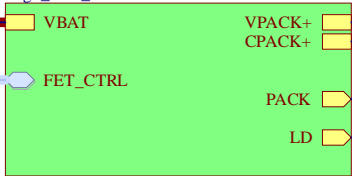


Pack Interface
Pack_Interface.SchDoc



VBAT+

High Side FETs
High_Side_FETs.SchDoc



VPACK+

CPACK+

Mounting Holes



MH1



MH2



MH3



MH4

1

2

3

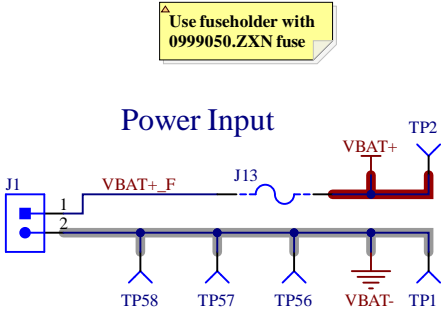
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D

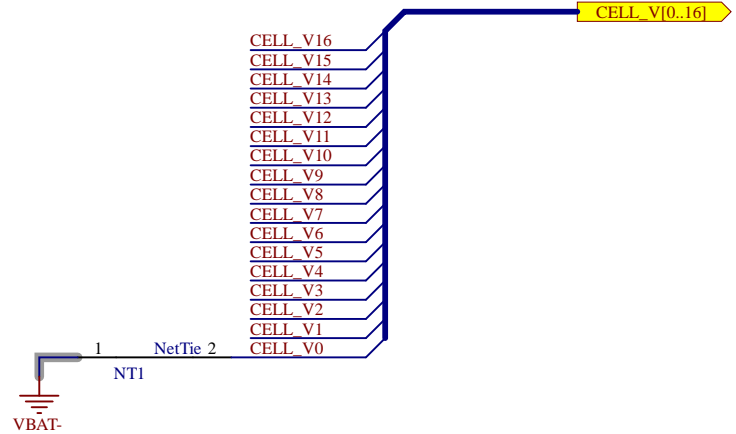
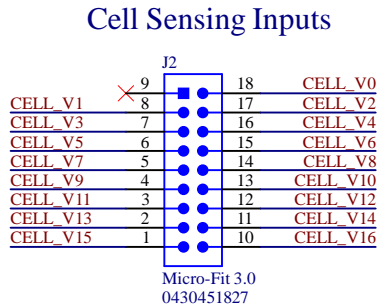
D

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| University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1 | | REV 1.0 |
| PROJECT LTO 16S BMS.PrjPcb, [No Variations] | | |
| DOCUMENT Top.SchDoc | | MODIFIED 2023-08-13 |
| ENGINEER Farris Matar | REVIEWER * | SHEET 1 OF 8 |

BATTERY INTERFACE

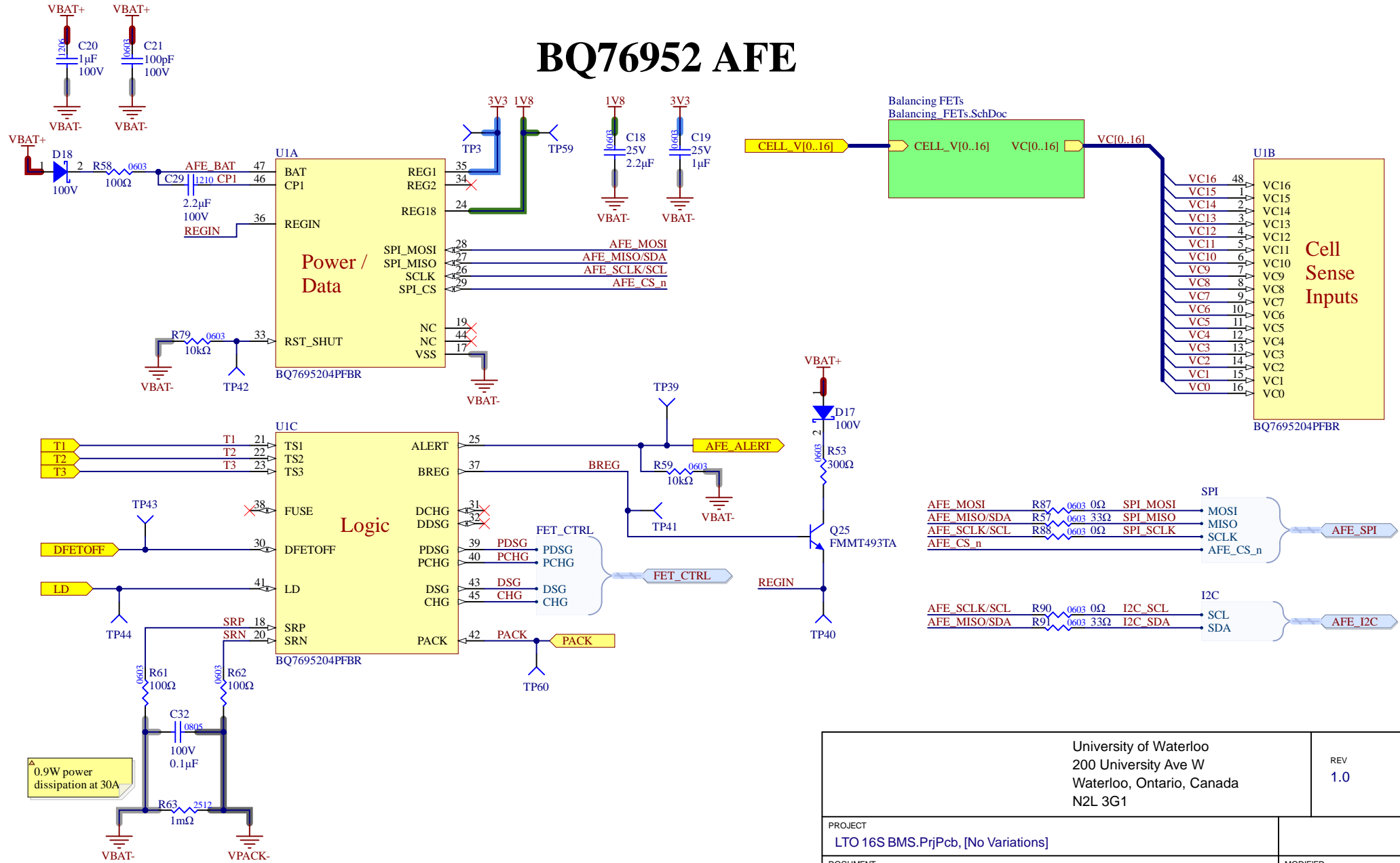


Battery specs:
- 16s1p 20Ah LTO battery
- 1.5V - 2.7V cell voltage range, 2.3V nominal



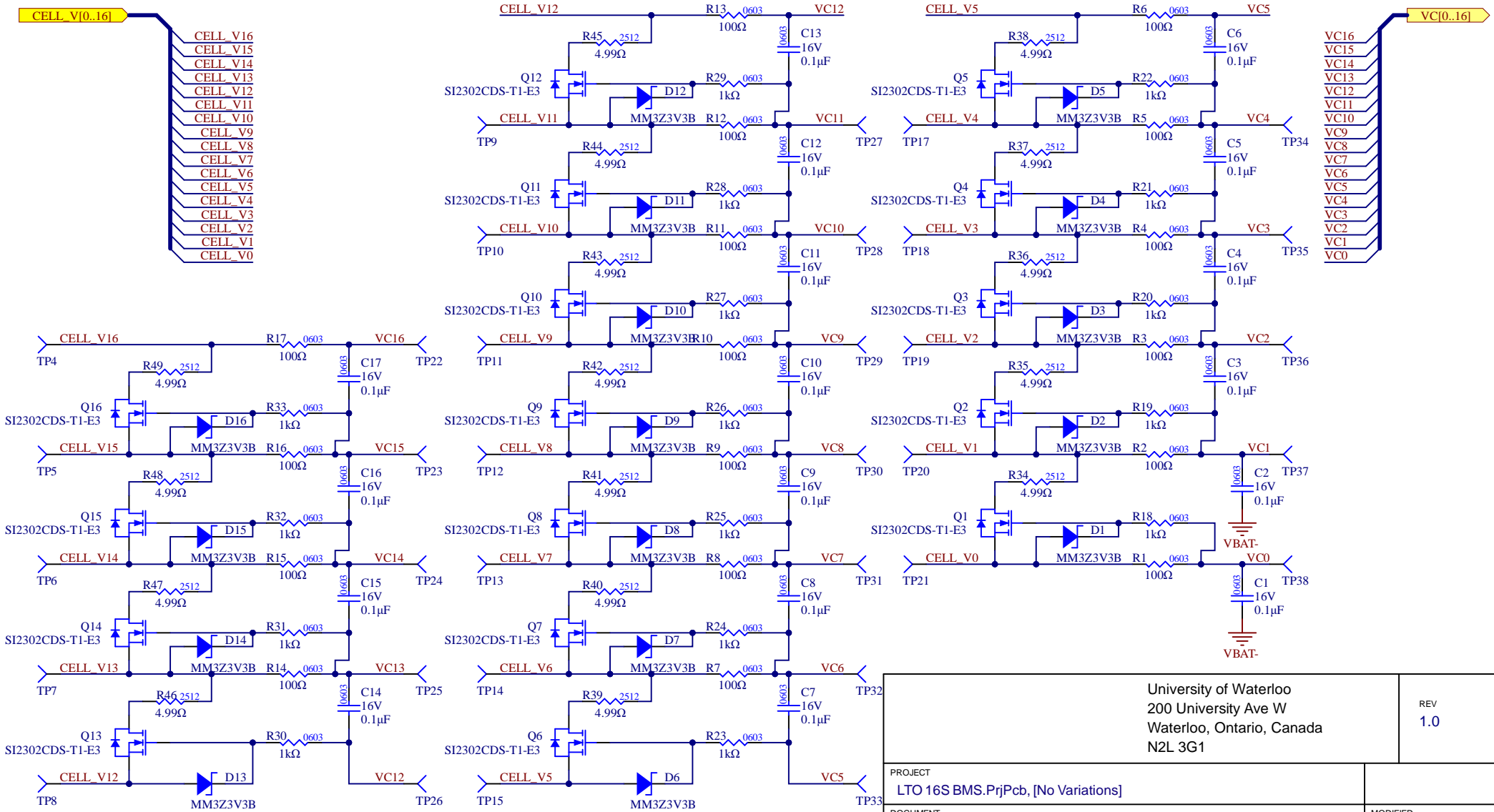
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| DOCUMENT Battery_Interface.SchDoc | | MODIFIED 2023-09-30 |
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BQ76952 AFE



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| DOCUMENT BQ76952_AFE.SchDoc | | MODIFIED 2023-09-06 |
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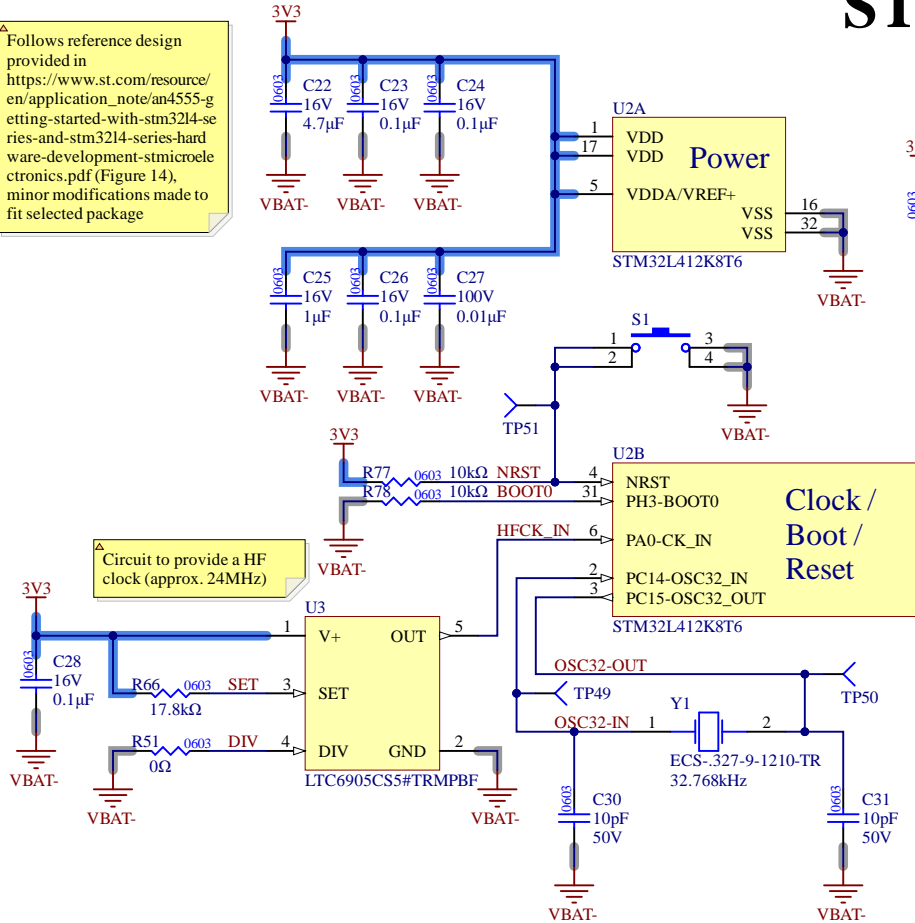
BALANCING FETS



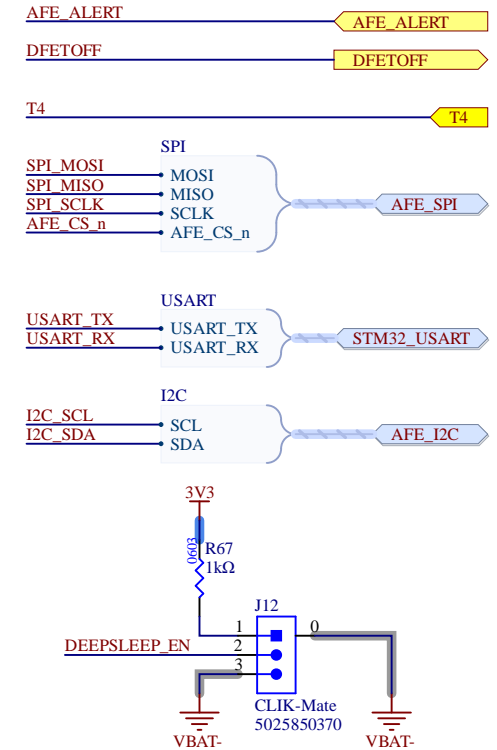
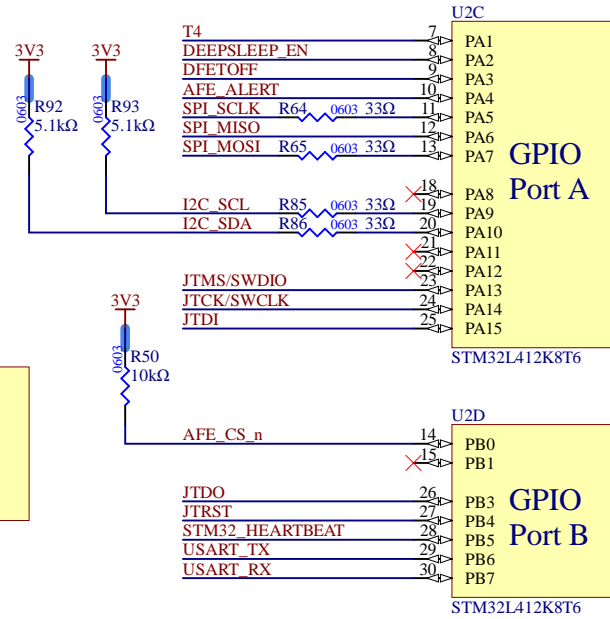
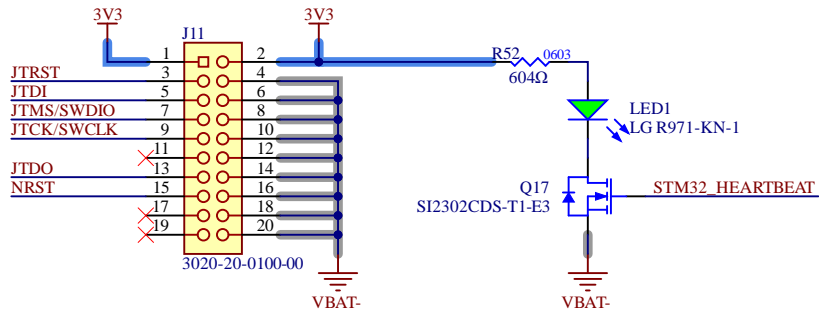
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| PROJECT LTO 16S BMS.PrjPcb, [No Variations] | | |
| DOCUMENT Balancing_FETs.SchDoc | | MODIFIED 2023-09-16 |
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STM32 MCU

Follows reference design provided in
https://www.st.com/resource/en/application_note/an4555-getting-started-with-stm32l4-series-and-stm32l4-series-hard-ware-development-stmicroelectronics.pdf (Figure 14),
 minor modifications made to fit selected package



Debug / Programming Connector

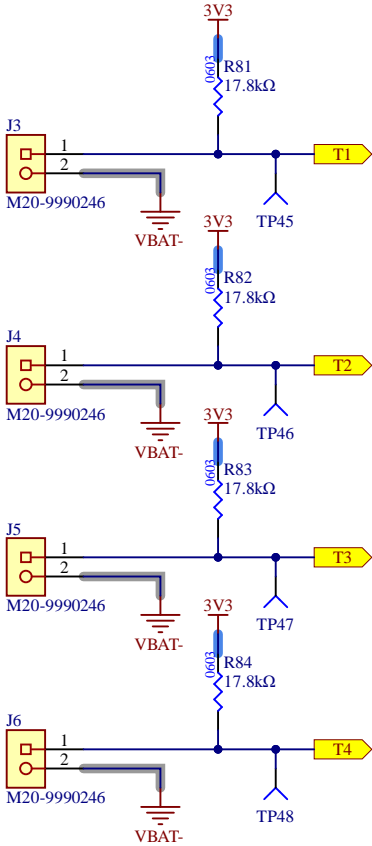


Connector to connect to a toggle switch that will trigger STM32 to put AFE in DEEPSLEEP (very low current consumption) and also put STM32 in SHUTDOWN mode until switch is flipped to wake it back up

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| DOCUMENT STM32_MCU.SchDoc | | MODIFIED 2023-09-16 |
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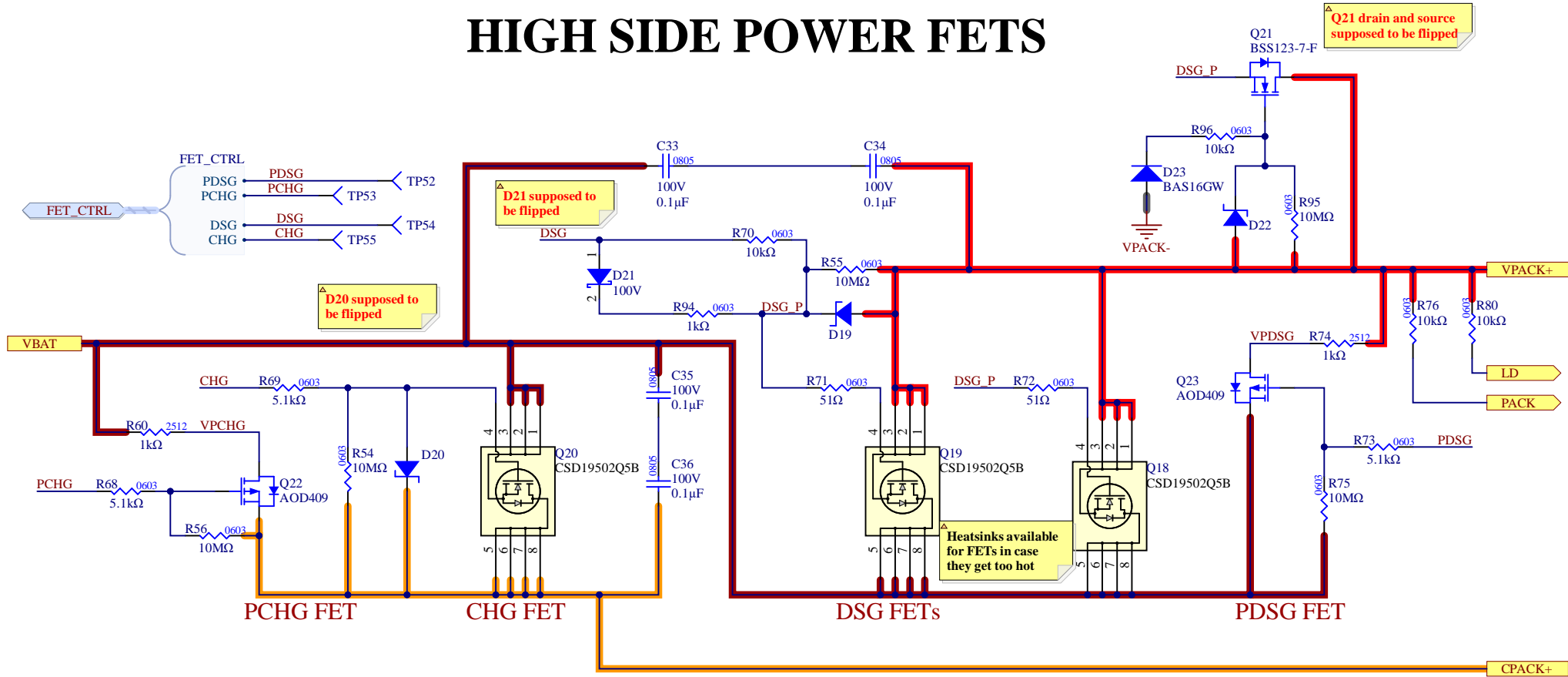
TEMPERATURE SENSING

103-AT thermistors to be connected here, will use 18k internal pull-up on AFE inputs



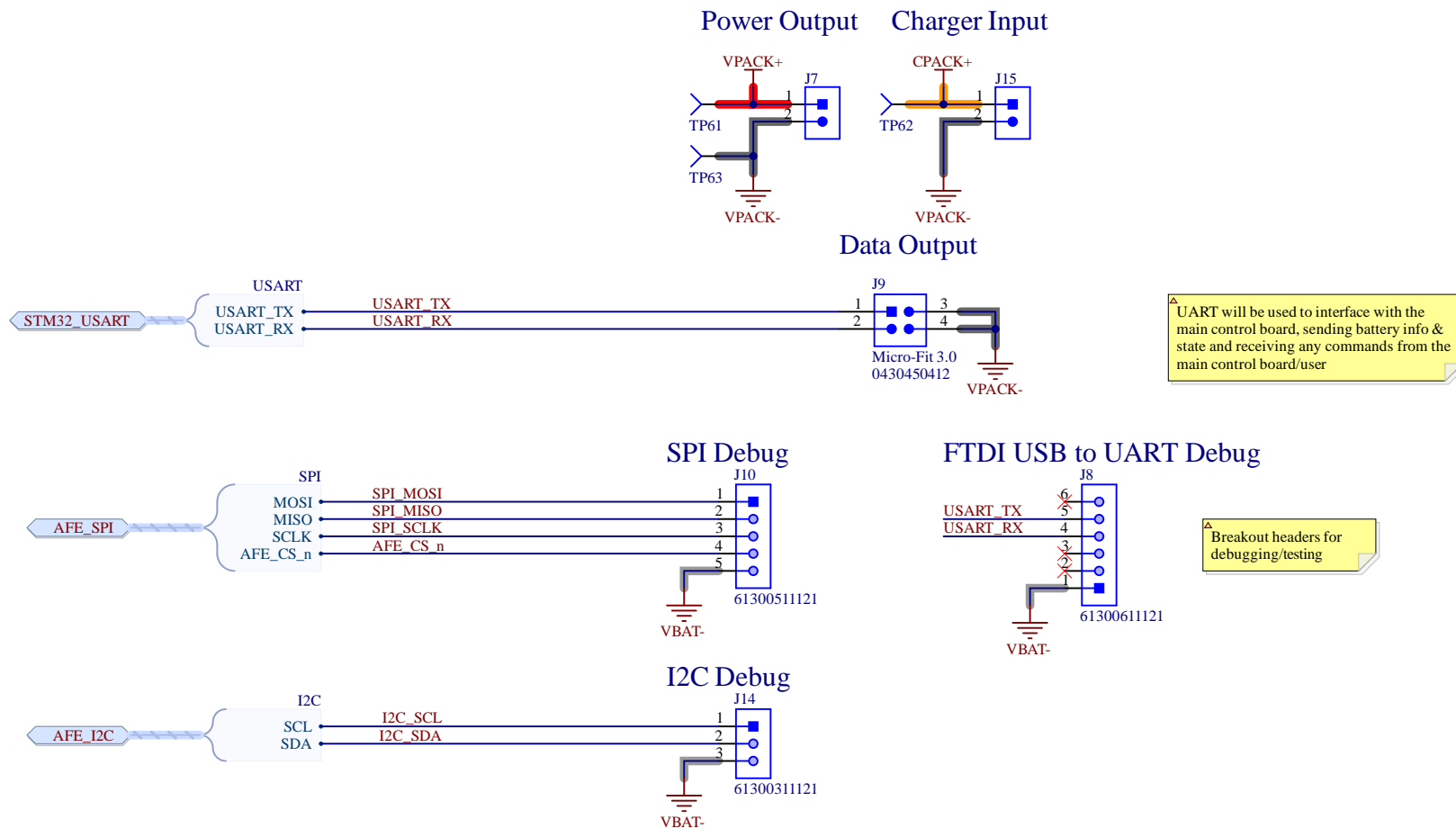
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| University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1 | | REV 1.0 |
| PROJECT LTO 16S BMS.PrjPcb, [No Variations] | | |
| DOCUMENT Temperature_Sense.SchDoc | | MODIFIED 2023-08-13 |
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HIGH SIDE POWER FETS



Parallel FETs configured based on TI app note:
https://www.ti.com/lit/an/slua952/slua952.pdf?ts=1690753454146&ref_url=https%253A%252F%252Fwww.google.com%252F

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| PROJECT LTO 16S BMS.PrjPcb, [No Variations] | | |
| DOCUMENT High_Side_FETs.SchDoc | | MODIFIED 2024-07-13 |
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| University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1 | | REV 1.0 |
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| DOCUMENT Pack_Interface.SchDoc | | MODIFIED 2023-09-30 |
| ENGINEER Farris Matar | REVIEWER * | SHEET 8 OF 8 |