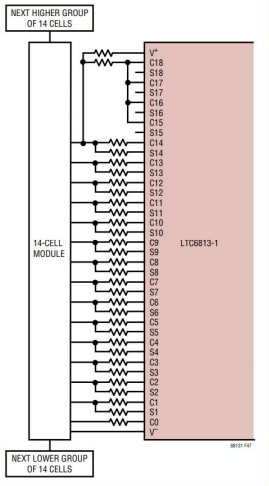
LTC Power Selector

Populate jumper respective to # of cells used
Depopulate non-used jumper as well as balancing interface
Ex: If 14 cells used, populate Cell14_F and depop rest

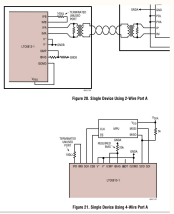
14 Cell Example (Figure 47)



IBIAS: Isolated Interface Current Bias. Tie IBIAS to V⁻ through a resistor divider to set the interface output current level. When the isoSPI interface is enabled, the IBIAS pin voltage is 2V. The IPA/IMA or IPB/IMB output current drive is set to 20 times the current, I_B, sourced from the IBIAS pin.

ICMP: Isolated Interface Comparator Voltage Threshold Set. Tie this pin to the resistor divider between IBIAS and V⁻ to set the voltage threshold of the isoSPI receiver comparators. The comparator thresholds are set to half the voltage on the ICMP pin.

R_M = Transmission Line Characteristic Impedance Z_0
Signal Amplitude $V_A = (20 \cdot I_B) \cdot (R_M/2)$
V_{ITCMP} (Receiver Comparator Threshold) = K • V_A
V_{ICMP} (voltage on ICMP pin) = 2 • V_{ITCMP}
$R_{B2} = V_{ICMP}/I_B$
$R_{B1} = (2/I_B) - R_{B2}$



ISOMD: Serial Interface Mode. Connecting ISOMD to V_{REG} configures pins 53, 54, 61 and 62 of the LTC6813-1 for 2-wire isolated interface (isoSPI) mode. Connecting ISOMD to V⁻ configures the LTC6813-1 for 4-wire SPI mode.
DTEN: Discharge Timer Enable. Connect this pin to V_{REG} to enable the Discharge Timer.

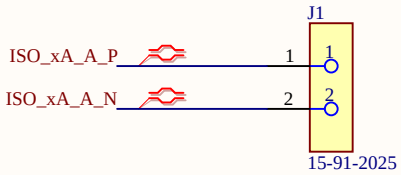
V_{REF2}: Buffered 2nd Reference Voltage for Driving Multiple 10k Thermistors. Bypass with an external 1µF capacitor.
V_{REF1}: ADC Reference Voltage. Bypass with an external 1µF capacitor. No DC loads allowed.

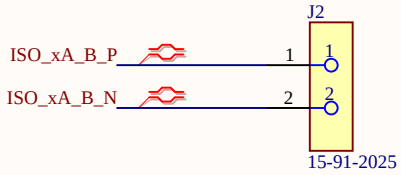
GPIO Header

Thermistor between GPIOx and GND

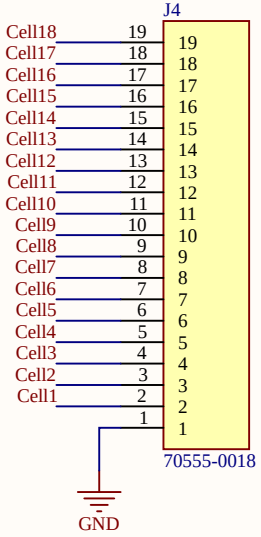
Title	BMS Slave Sheet		
Size: B	Number:	Revision:	
Date: 11/23/2023		Sheet of:	Spartan Racing & SJSU
File: C:\Users\..\bmsSlave_main.SchDoc		Drawn By:	Vincent Pham, Vincent Saw

isoSPI Headers



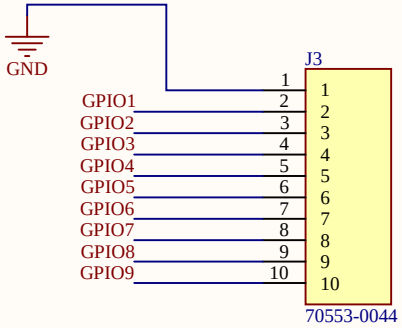


Cell Connector

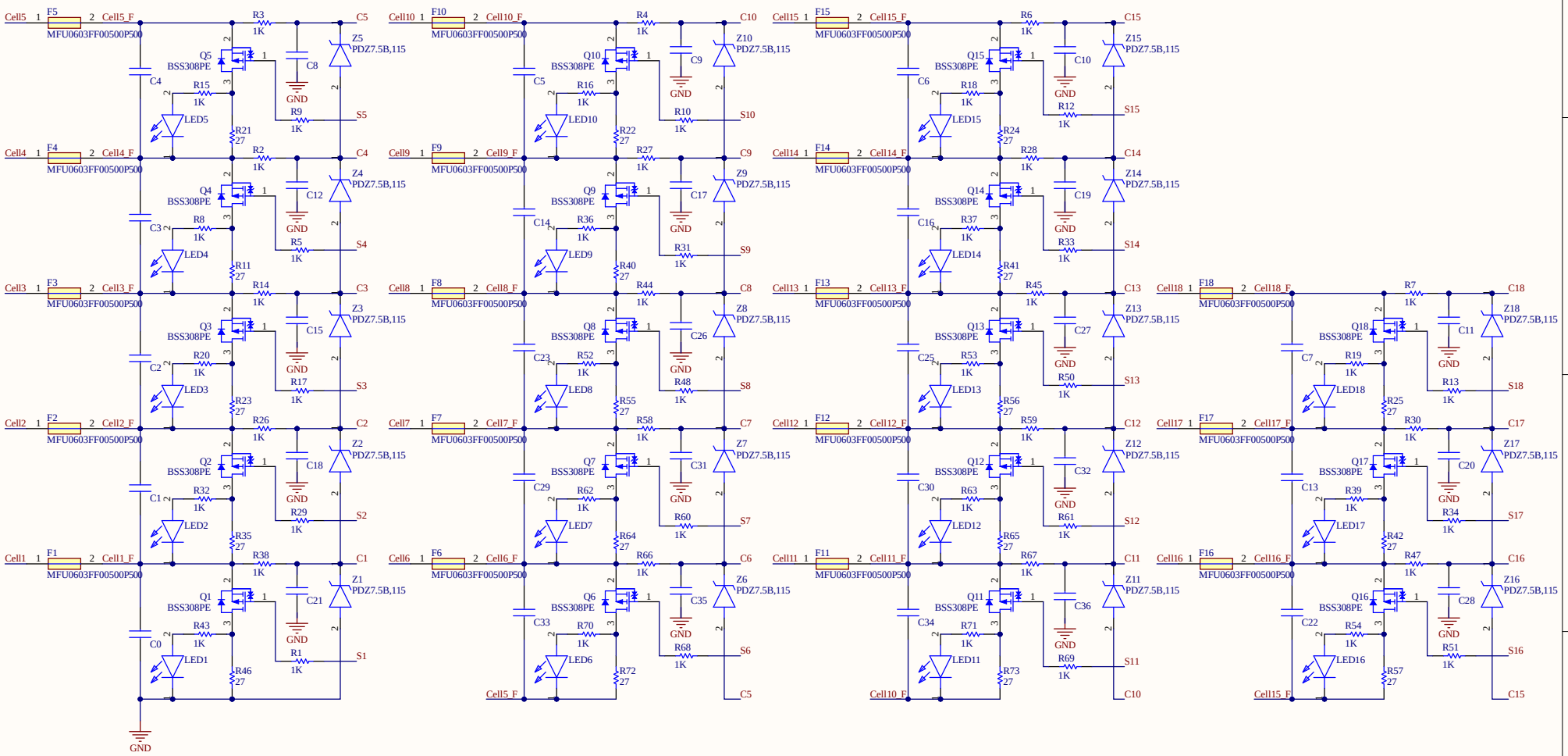


GPIO Header

Thermistor between GPIOx and GND

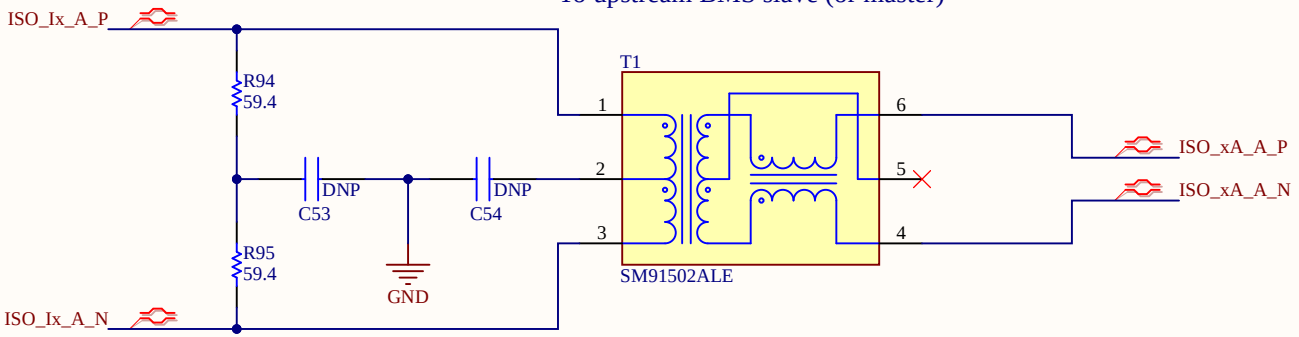


Title		
Size: A	Number:	Revision:
Date: 11/23/2023		Sheet of
File: C:\Users\..\bmsSlave_conn.SchDoc		Drawn By:

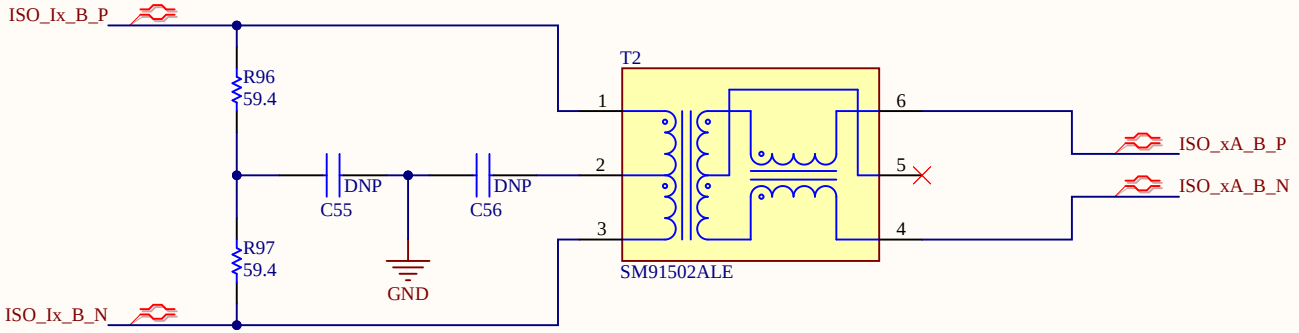


Title: Slave Balancing		
Size: B	Number:	Revision:
Date: 11/23/2023		Sheet of
File: C:\Users\..\bmsSlave_cells.SchDoc		Drawn By: Vincent Pham, Vincent Saw

To upstream BMS slave (or master)

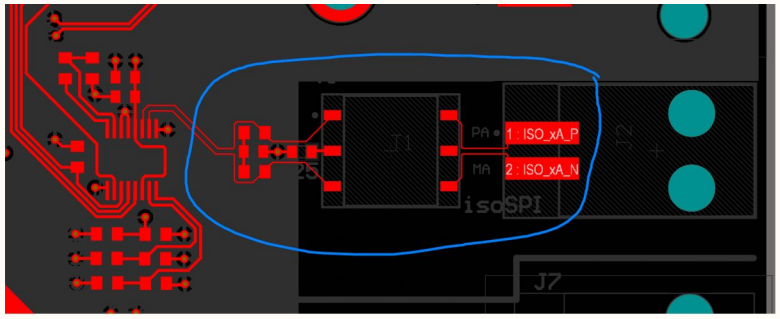


To downstream BMS slave

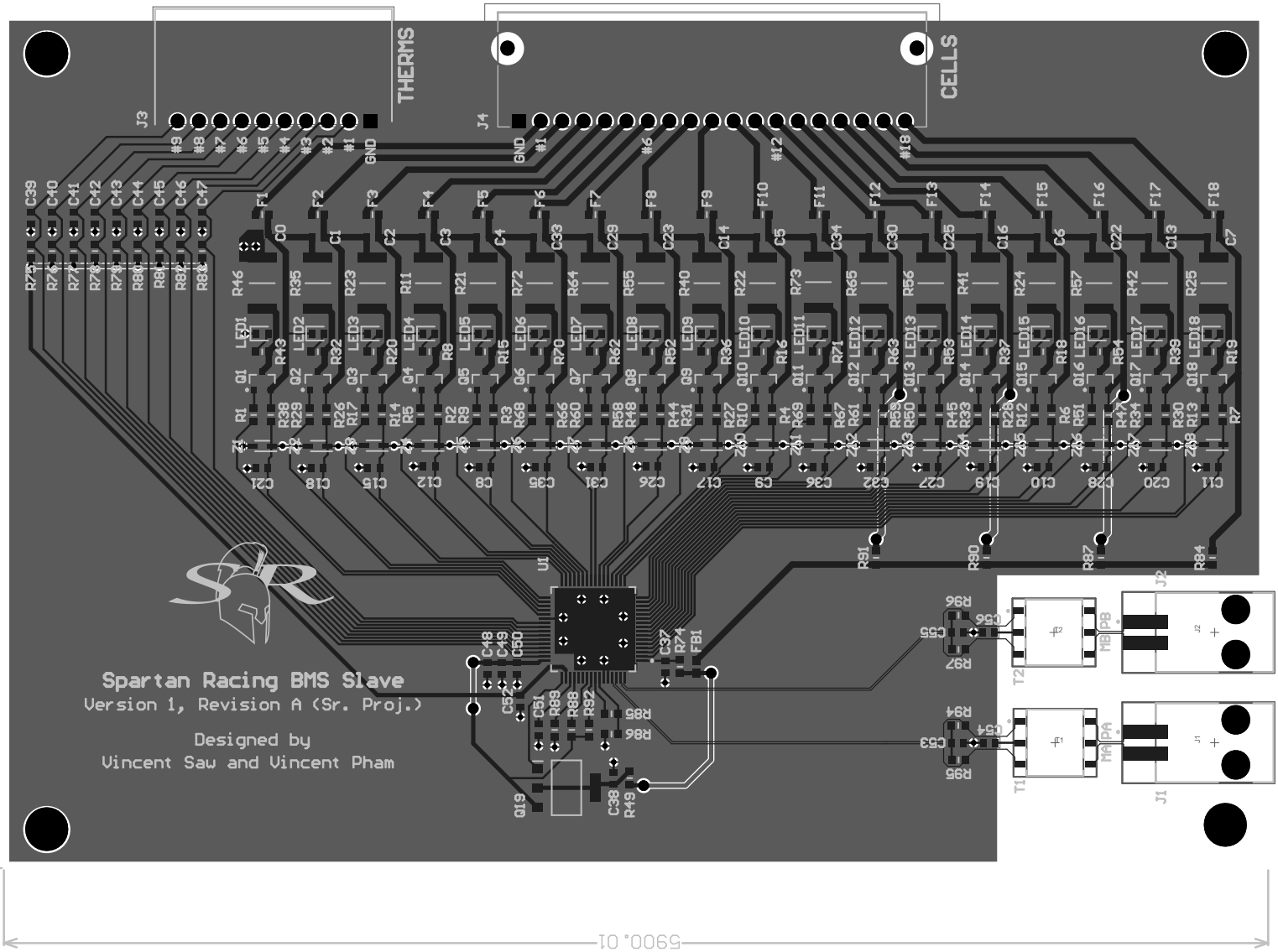


FOLLOW DATASHEET LAYOUT GUIDELINES!

KEEP AREA UNDERNEATH TRANSFORMER EMPTY



Title		
Size: A	Number	Revision
Date: 11/23/2023		Sheet of
File: C:\Users\..\bmsSlave_isospi.SchDoc		Drawn By: Vincent Pham, Vincent Saw


THERMS
CELLS
J3
J4
Spartan Racing BMS Slave
Version 1, Revision A (Sr. Proj.)
Designed by
Vincent Saw and Vincent Pham
4000.00
5900.01

Line #	Name	Description	Designator	Quantity	Manufacturer 1	Manufacturer Part Number 1	Manufacturer Lifecycle 1	Supplier 1	Supplier Part Number 1	Supplier Unit Price 1	Supplier Subtotal 1
	885382207009	Multilayer Ceramic Chip Capacitor WCAP-CSST Series 0805 10000pF X7R0805103K100DFC T1S000	C0, C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C53, C54, C55, C56	40							
	Capacitor	Capacitor	C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47	11							
	Capacitor	Capacitor	C48, C49, C50, C51, C52	5							
	MFU0603FF00500P500	Fuse	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, F13, F14, F15, F16, F17, F18	18							
	BLM18PG330SN1D	Ferrite Bead	FB1	1							
	15-91-2025	CONN HEADER SMD R/A 2POS 2.54MM	J1, J2	2	Molex	15-91-2025	Volume Production	Avnet	0015912025	3.18	6.36
	70553-0044	Connector	J3	1							
	70555-0018	Connector	J4	1							
	LS_L29K-G1H2-1	LED	LED1, LED2, LED3, LED4, LED5, LED6, LED7, LED8, LED9, LED10, LED11, LED12, LED13, LED14, LED15, LED16, LED17, LED18	18							
	BSS308PE	P-Channel OptiMOS P3 Small-Signal-Transistor, -30 V VDS, -2 A ID, -55 to 150 degC, PG-SOT23, Reel, Green	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18	18	Infineon	BSS308PE	Volume Production	Mouser	726-BSS308PEH6327XTS	0.319	5.74
	NSV1C201MZ4T1G	Transistor	Q19	1							
	Resistor	Resistor	R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R12, R13, R14, R15, R16, R17, R18, R19, R20, R26, R27, R28, R29, R30, R31, R32, R33, R34, R36, R37, R38, R39, R43, R44, R45, R47, R48, R50, R51, R52, R53, R54, R58, R59, R60, R61, R62, R63, R66, R67, R68, R69, R70, R71	54							
	Resistor	Resistor	R11, R21, R22, R23, R24, R25, R35, R40, R41, R42, R46, R55, R56, R57, R64, R65, R72, R73	18							
	Resistor	Resistor	R49, R74	2							
	Resistor	Resistor	R75, R76, R77, R78, R79, R80, R81, R82, R83	9							
	Resistor	Resistor	R84, R87, R88, R89, R90, R91	6							
	Resistor	Resistor	R85	1							
	Resistor	Resistor	R86	1							
	Resistor	Resistor	R92	1							
	Resistor	Resistor	R94, R95, R96, R97	4							
	SM91502ALE	BMS XFORMER 1-CH 1000V AECQ +125	T1, T2	2	Bourns	SM91502ALE	Volume Production	Newark	95AC3538	2.81	5.62
	LTC6813HLWE-1#3ZZPBF	18 CHANNEL MULTICELL BATTERY STA	U1	1	Analog Devices / Linear Technology	LTC6813HLWE-1#3ZZPBF					
	PDZ7.5B,115	Zener Diode	Z1, Z2, Z3, Z4, Z5, Z6, Z7, Z8, Z9, Z10, Z11, Z12, Z13, Z14, Z15, Z16, Z17, Z18	18							