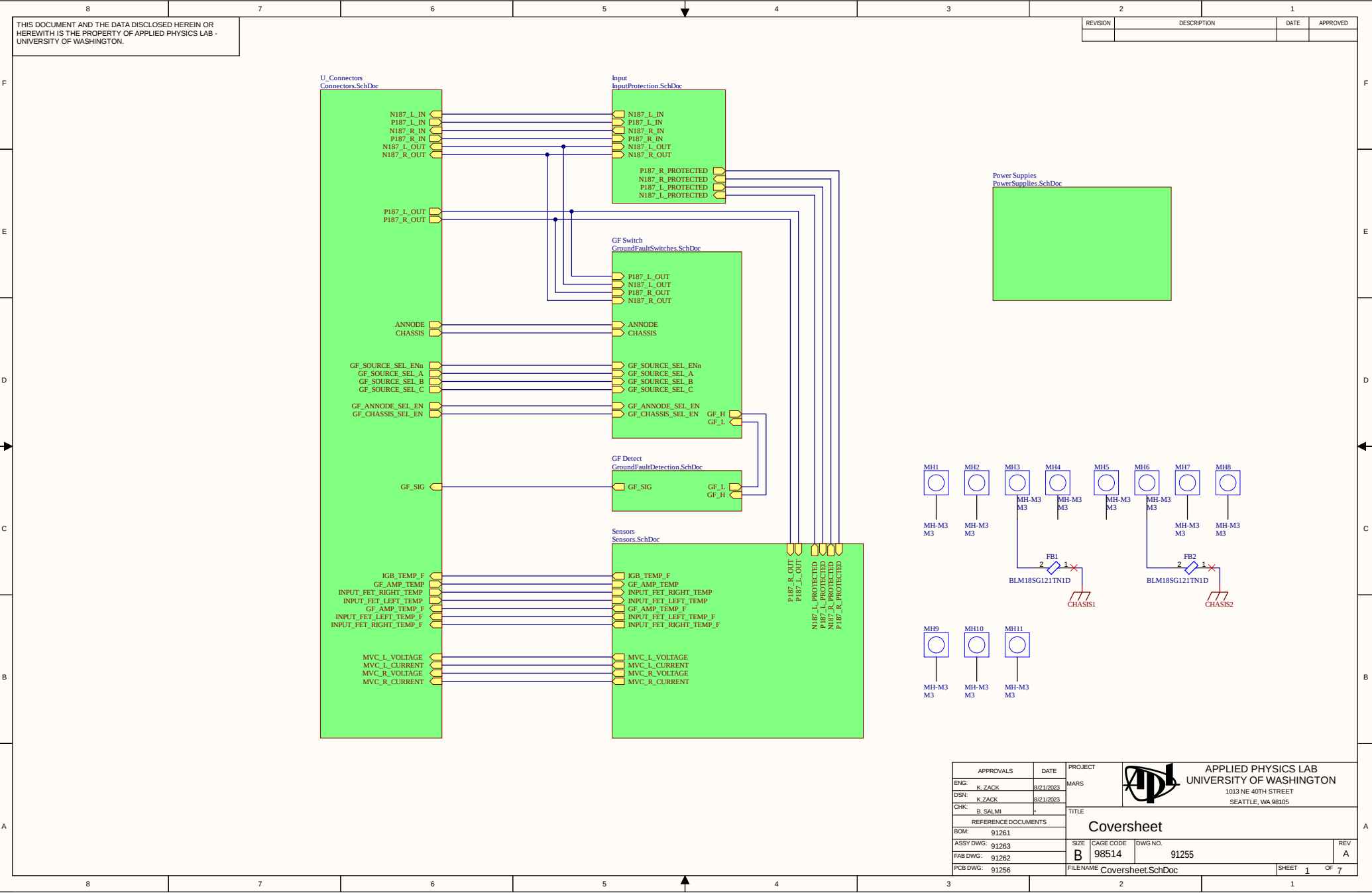
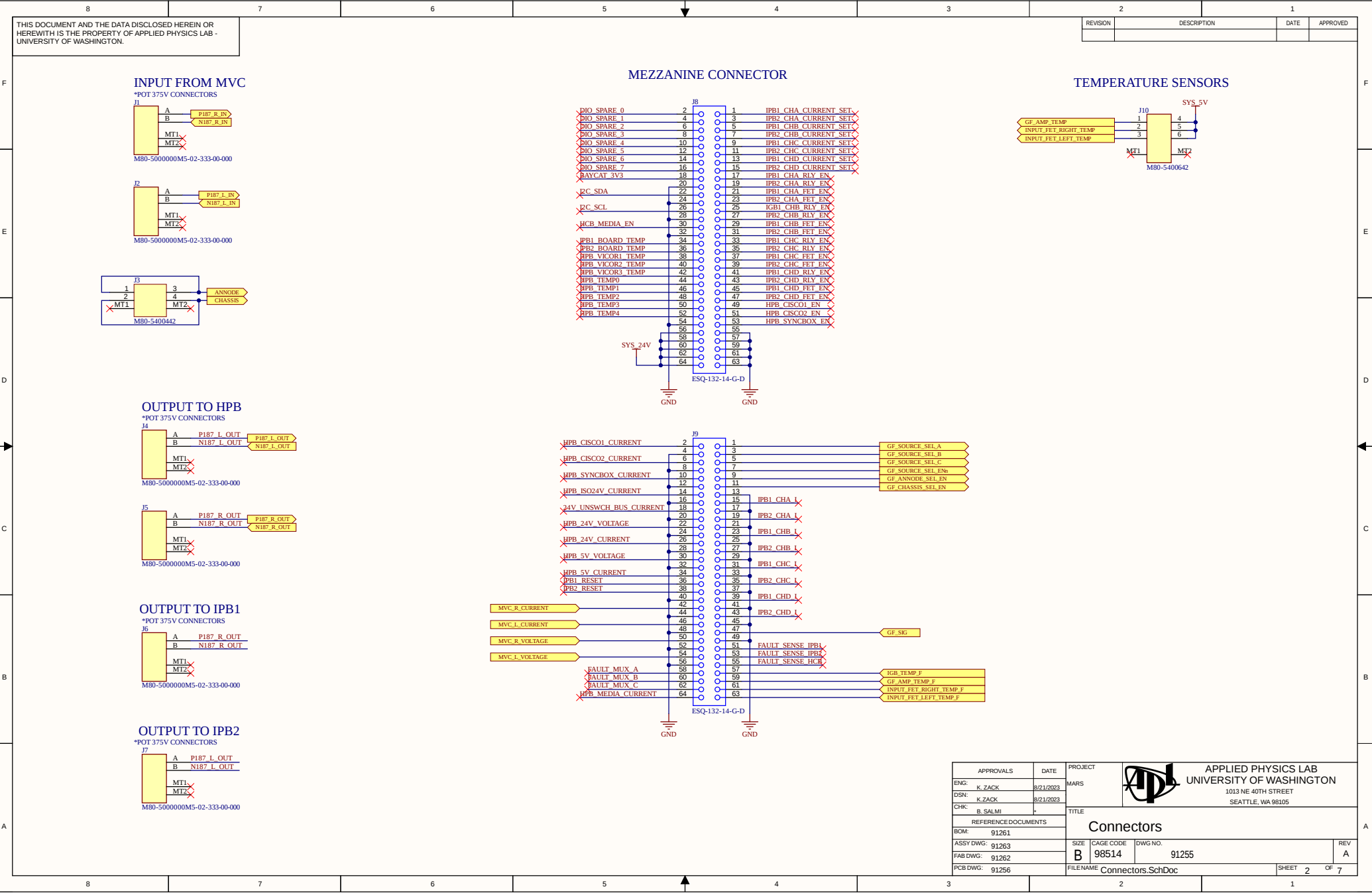






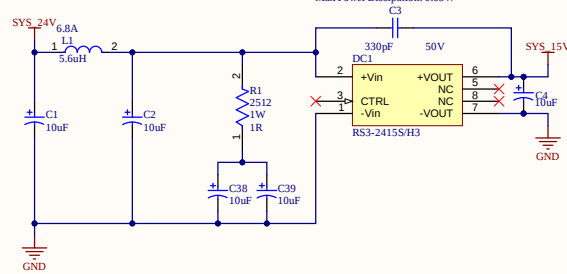
APPROVALS		DATE	PROJECT		APPLIED PHYSICS LAB UNIVERSITY OF WASHINGTON 1013 NE 40TH STREET SEATTLE, WA 98105	
ENG:	K. ZACK	8/21/2023	MARS			
DSN:	K. ZACK	8/21/2023			TITLE Connectors	
CHK:	B. SALMI					
REFERENCE DOCUMENTS			SIZE	CAGE CODE	DWG NO.	REV
BOM:	91261		B	98514	91255	A
ASSY DWG:	91263					
FAB DWG:	91262					
PCB DWG:	91256					
FILENAME Connectors.SchDoc					SHEET 2	OF 7

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REVISION	DESCRIPTION	DATE	APPROVED

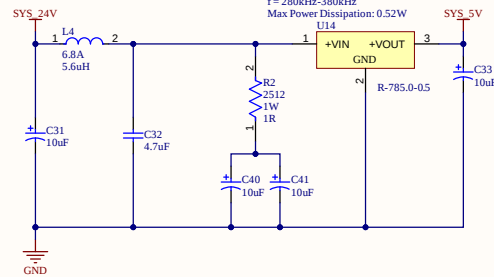
15V POWER SUPPLY

MTBF: 3303x10³hrs
f = 200kHz
Max Power Dissipation: 0.65W

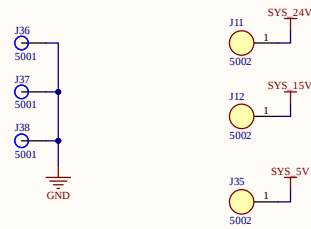


5V POWER SUPPLY

MTBF: 26162x10³hrs
f = 280kHz-380kHz
Max Power Dissipation: 0.52W



POWER TEST POINTS

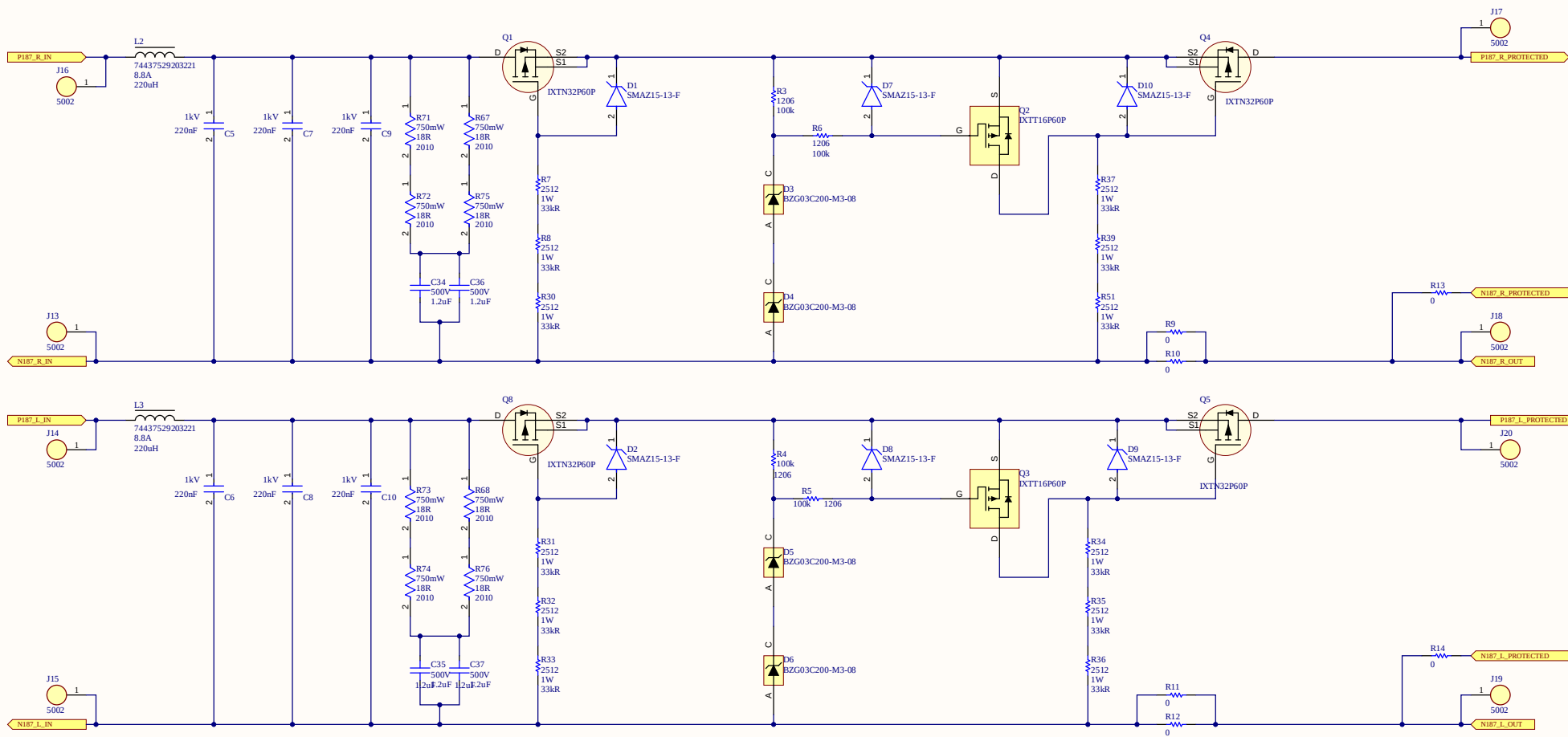


APPROVALS		DATE	PROJECT	 APPLIED PHYSICS LAB UNIVERSITY OF WASHINGTON 1013 NE 40TH STREET SEATTLE, WA 98105										
ENG:	K. ZACK	8/21/2023	MARS											
DSN:	K. ZACK	8/21/2023												
CHK:	B. SALMI													
REFERENCE DOCUMENTS				Power Supplies <table><tr><td>SIZE</td><td>CAGE CODE</td><td>DWG NO.</td><td>REV</td></tr><tr><td>B</td><td>98514</td><td>91255</td><td>A</td></tr></table> FILENAME: PowerSupplies.SchDoc SHEET 3 OF 7			SIZE	CAGE CODE	DWG NO.	REV	B	98514	91255	A
SIZE	CAGE CODE	DWG NO.	REV											
B	98514	91255	A											
BOM:	91261													
ASSY DWG:	91263													
FAB DWG:	91262													
PCB DWG:	91256													

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REVISION	DESCRIPTION	DATE	APPROVED

INPUT VOLTAGE PROTECTION
REVERSE POLARITY
400V Cutoff

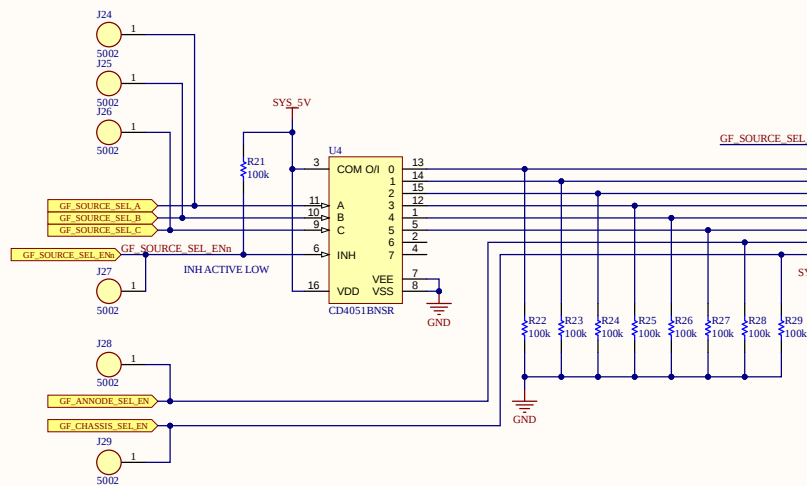


REVISION	DESCRIPTION	DATE	APPROVED

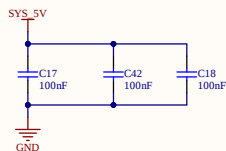
APPROVALS		DATE		PROJECT		 APPLIED PHYSICS LAB UNIVERSITY OF WASHINGTON 1013 NE 40TH STREET SEATTLE, WA 98105	
ENGR. K. ZACK		8/21/2023		MARS			
DSN: K. ZACK		8/21/2023					
CHK: B. SALMI				TITLE			
REFERENCE DOCUMENTS				Ground Fault Detection			
BCM: 91261							
ASSY DWG: 91263				SIZE		REV	
FAB DWG: 91262				CAGE CODE		DWG NO.	
PCB DWG: 91256				B		91255	
FILE NAME				GroundFaultDetection.SchDoc		SHEET 5 OF 7	

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GROUND FAULT SELECTION

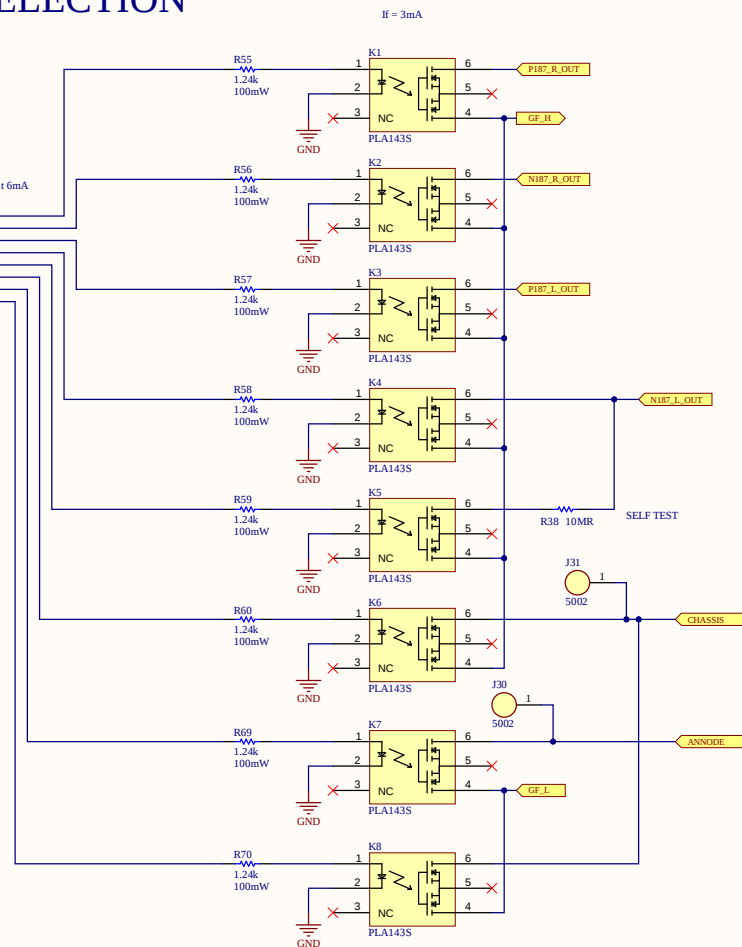


BYPASS CAPS



INPUT STATES				"ON" CHANNEL(S)
INHIBIT	C	B	A	
CD4051B				
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	X	X	X	None

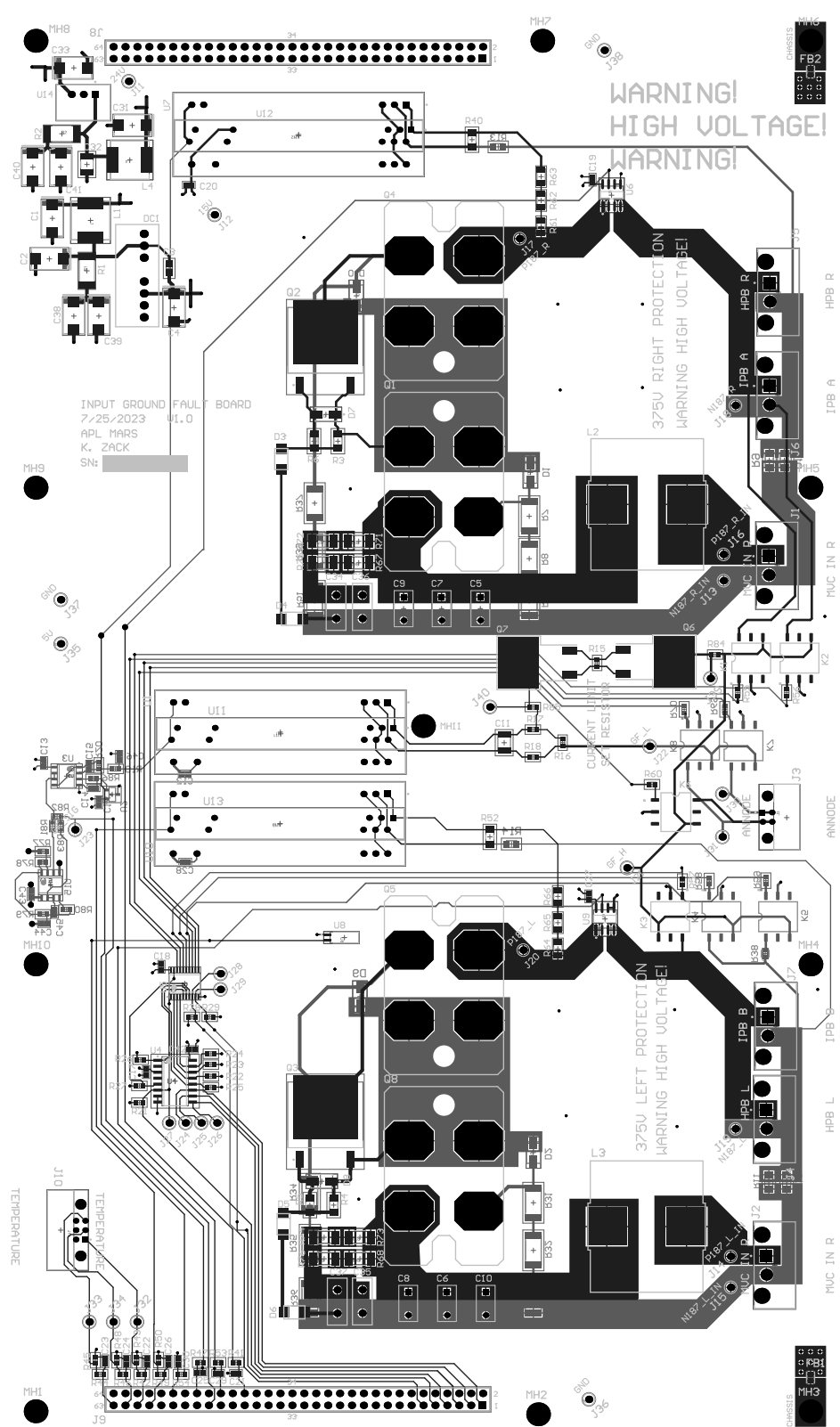
INPUTS			OUTPUT Y
OE1	OE2	A	
L	L	L	L
L	L	H	H
H	X	X	Z
X	H	X	Z



APPROVALS		DATE	PROJECT		APPLIED PHYSICS LAB UNIVERSITY OF WASHINGTON 1013 NE 40TH STREET SEATTLE, WA 98105	
ENG: K. ZACK		8/21/2023	MARS			
DSN: K. ZACK		8/21/2023				
CHK: B. SALMI		*				
REFERENCE DOCUMENTS			TITLE			
BOM: 91261			Ground Fault Switches			
ASSY DWG: 91263			SIZE	CAGE CODE	DWG NO.	REV
FAB DWG: 91262			B	98514	91255	A
PCB DWG: 91256			FILENAME: GroundFaultSwitches_SchDoc			SHEET 6 OF 7

REVISION	DESCRIPTION	DATE	APPROVED

APPROVALS		DATE		APPLIED PHYSICS LAB UNIVERSITY OF WASHINGTON 1013 NE 40TH STREET SEATTLE, WA 98105		
ENG:	K. ZACK	8/21/2003		MARS		
DSN:	K. ZACK	8/21/2003				
CHK:	B. SALMI	*				
TITLE						
REFERENCE DOCUMENTS			Sensors			
BOM: 91261						
ASSY DWG: 91263						
FAB DWG: 91262						
PCB DWG: 91256						
FILE NAME			SIZE	CAGE CODE	DWG NO.	REV
Sensors.SchDoc			B	98514	91255	A
SHEET 7 OF 7						



Line #	Name	Description	Designator	Revision ID	Revision Status	Quantity	DNI	Custom column 1	Manufacturer 1	Manufacturer Part Number 1	Manufacturer Lifecycle 1	Supplier 1	Supplier Part Number 1	Supplier Unit Price 1	Supplier Subtotal 1
1	7490230605D4T	1uF Solid MnO2 Tantalum Electrolytic Capacitor, 50 V dc, +/- 20%, T490 Series	C1, C2, C4, C31, C33, C38, C39, C40, C41			8			KEMET	7490230605D4T	Volume Production	Digi-Key	759-1392-1-ND	9.43	18.85
2	Capacitor 330pF 10%, 50V, X7R, 0805	Chip Capacitor, 330pF, 10%, 50V, X7R, 0805 (2012 Metric)	C3			1			Yageo	C080509X7R9B0331	Volume Production	Digi-Key	311-1192-1-ND	0.1	0.1
3	Capacitor 0.22uF, 20%, 1kV, X7R, Radial	Cap Ceramic 0.22uF 1000V X7R 20% Radial 5mm 125°C Bulk	C5, C6, C7, C8, C9, C10			6			Murata	RC0873A224MLU1K03B	Volume Production	Digi-Key	490-8949-ND	2.66	15.96
4	Capacitor 2.2uF 10%, 50V, X7R, 1210	Chip Capacitor, 2.2uF, 10%, 50V, X7R, 1210 (3225 Metric)	C11			1			Yageo	CC120KX7R9B0225	Volume Production	Digi-Key	311-3535-1-ND	0.86	0.86
5	Capacitor 100 nF +/- 10% 50 V 0603	Chip Capacitor, 100 nF, +/- 10%, 50 V, 0603 (1608 Metric)	C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C42, C43, C44, C45, C46			24	[NoParam]	DNI	Kyocera AVX	6803SC104KA72A	Volume Production	Mouser	881-0603SC104KA72A	0.027	0.648
6	Capacitor 4.7uF 10%, 50V, X7R, 1210	Chip Capacitor, 4.7uF, 10%, 50V, X7R, 1210 (3225 Metric)	C34, C35, C36, C37			4			Yageo	CC120KX7R9B0475	Volume Production	Digi-Key	311-2037-1-ND	0.44	0.44
7	Capacitor 1.2uF 20%, 500V X7R	Dipped Radial Lead Multilayer Ceramic Capacitors	C38, C39, C36, C37			4			United Chemi-Con	KT0501B125MPSA0700	New Product				
8	SMA215-13-F	Vz=15V 14.25V+-35.75V Ict=50mA P=1W	D1, D2, D7, D8, D9, D10			6			Diodes	SMA215-13-F	Volume Production	Digi-Key	SMA215-FDCT-ND	0.47	2.82
9	SD502C200-MS-08	Zeiner Diode Single 200V 6W 5000ohm 3000mW 2-Pin SMA T/R	D3, D4, D5, D6			4			Vishay	SD502C200-MS-08	Volume Production	Mouser	78-BD502C200-MS-08	0.54	2.16
10	SS-24US15-HS	SMOC/DC-Converter T2CONQ1NE SPIR3W Reg 2.1 V In 18-36 V Out 15 mA Out: 200	D01			1			Recom	SS-24US15-HS	Volume Production				
11	BLM185C121TMD	Ferrite Beads Multi-Layer 120Ohm 29W 100MHz 5A 0.025Ohm DCR 0603 T/R	FB1, FB2			2			Murata	BLM185C121TMD	Volume Production	Digi-Key	490-3996-1-ND	0.13	0.26
12	M80-500000M5-02-333-00-000	Conn Header R/A 2POS 4MM	J1, J2, J4, J5, J6, J7			6			Harwin	M80-500000M5-02-333-00-000	Volume Production				
13	M80-5400442	HARWIN - M80-5400442 - Wire-To-Board Connector, 2 mm, 4 Contacts, Header, Datamate J-Tek M80 Series, Through Hole, 2 Rows	J3			1			Harwin	M80-5400442	Volume Production	Digi-Key	952-2593-ND	18.97	18.97
14	ESQ-132-14-G-D	Conn Elevated Socket SKT 64 POS 2.54mm Solder ST Top Entry Thru-Hole Tube	J8, J9			2			Samtec	ESQ-132-14-G-D	Volume Production	Mouser	200-ESQ13214G0	15.66	31.32
15	M80-5400442	Conn Header R/A 0PC8 2MM	J10			1			Harwin	M80-5400442	Volume Production	Newark	952-7318	18.96	18.96
16	9002	TEST POINT PC MINI 940D WHITE	J11, J12, J13, J14, J15, J16, J17, J18, J19, J20, J21, J22, J23, J24, J25, J26, J27, J28, J29, J30, J31, J32, J33, J34, J35, J39, J40			27			Keystone Electronics	9002	Volume Production	Digi-Key	36-9002-ND	0.306	8.32
17	9001	TEST POINT PC MINI 940D BLACK	J36, J37, J38			3			Keystone Electronics	9001	Volume Production	Digi-Key	36-9001-ND	0.38	1.14
18	PA143E	Relay SPST 100V 1.4V DC-10V 1A 60W AC/DC-OUT 6-Pin POP SMD Tube	K1, K2, K3, K4, K5, K6, K7, K8			8			DYS	PA143E	Volume Production	Digi-Key	PA143E-ND	3.34	26.72
19	HLPF323023PR6M0L	Inductor Power Shielded Wirewound 5.6uH 20% 100kHz Powdered Iron 6.8A 0.085Ohm DCR 3232 T/R	L1, L4			2			Vishay Dale	HLPF323023PR6M0L	Volume Production	Digi-Key	641-HLPF323023PR6M02CT-ND	1.41	2.82
20	1443752003221	Fixed Ind 220uH 8.9A 35.45 MOhm	L2, L3			2			Würth Electronics	1443752003221	Volume Production	Digi-Key	730-11717-ND	9.43	18.86
21	MTN32P60P	Mosfet P-ch 820V 32A SOT223B	Q1, Q4, Q5, Q8			4			DYS	MTN32P60P	Volume Production	Digi-Key	MTN32P60P-ND	37.73	150.92
22	MTT1P60P	Single P-channel 600 V 720 Ohm 460 W Power Mosfet - TO-268	Q2, Q3			2			DYS	MTT1P60P	Volume Production	Digi-Key	MTT1P60P-ND	12.63	25.26
23	MTA189N100D2HV	Mosfet N-ch 3200V 1.6A TO268HV	Q6, Q7			2			DYS	MTA189N100D2HV	Volume Production	Digi-Key	MTA189N100D2HV-ND	4.58	9.16
24	Resistor 100 1% 2512 2 W	Res Thick Film 2512 1 Ohm 1% 1W 100ppm/C Molded SMD SMD	R1, R2			3			Vishay Dale	CRW05120000FKEG	Volume Production	Digi-Key	641-0004FCT-ND	0.38	0.75
25	Resistor 100k +/-1% 1206 250 mW	Chip Resistor, 100kOhm, +/- 1%, 0.25 W, -55 to 155 degC, 1206 (3216 Metric)	R3, R4, R5, R6			4			Yageo	RC1206FR-07100K	Not Recommended for New Design	Digi-Key	311-100KRCT-ND	0.096	0.38
26	Resistor 33k 5% 2512 1W	Res Thick Film 2512 33k Ohm 5% 1W 500ppm/C Molded SMD SMD Blister T/R	R7, R8, R30, R31, R32, R33, R34, R35, R36, R37, R38, R51			12			Vishay Dale	CRW251233K0NEG	Volume Production	Digi-Key	641-39K1CT-ND	0.211	2.53
27	Resistor 0R +/- 1% 1206 250 mW	Chip Resistor, 0 Ohm, +/- 1%, 0.25 W, -55 to 155 degC, 1206 (3216 Metric)	R9, R10, R11, R12			4			Yageo	RC1206SR-070R	Volume Production	Digi-Key	311-010RCT-ND	0.1	0.4
28	Resistor 0R +/- 1% 0805 125 mW	Chip Resistor, 0 Ohm, +/- 1%, 125 mW, -55 to 155 degC, 0805 (2012 Metric)	R13, R14			2			Vishay	CRW080500000000EA	Volume Production	Newark	526-8722	0.006	0.012
29	Resistor 2k 43+/-1% 0603 100 mW	Chip Resistor, 2.43k Ohm, +/- 1%, 0.1 W, -55 to 155 degC, 0603 (1608 Metric)	R15, R16			2			Panasonic	ERL3KX7243V	Volume Production	Digi-Key	P2-30KCT-ND	0.1	0.2
30	Resistor 47k5 +/-1% 0603 100 mW	Chip Resistor, 47.5k Ohm, +/- 1%, 0.1 W, -55 to 155 degC, 0603 (1608 Metric)	R17, R18, R19, R20, R79, R80, R88			7			Panasonic	ERL3KX4752V	Volume Production	Digi-Key	P2-30KCT-ND	0.043	0.43
31	Resistor 150k +/-1% 0603 100 mW	Chip Resistor, 150k Ohm, +/- 1%, 0.1 W, -55 to 155 degC, 0603 (1608 Metric)	R21, R22, R23, R24, R25, R26, R27, R28, R29			9			Yageo	RC0603FR-07100K	Volume Production	Digi-Key	311-100KRCT-ND	0.038	0.38
32	CRW060310M0PK1EA	Res Thick Film 0603 10M Ohm 1% 0.1W (1/10W) 100ppm/C Pad SMD Automotive T/R	R30			1			Vishay	CRW060310M0PK1EA	Volume Production	Digi-Key	641-100MCT-ND	0.1	0.1
33	Resistor 10k +/- 1% 1206 250 mW	Chip Resistor, 10k Ohm, +/- 1%, 0.25 W, -55 to 155 degC, 1206 (3216 Metric)	R40, R62			2			Yageo	RC1206FR-0710K	Volume Production	Digi-Key	311-10.0KRCT-ND	0.1	0.2
34	Resistor 530k +/-1% 0603 100 mW	Chip Resistor, 531k Ohm, +/- 1%, 0.1 W, -55 to 155 degC, 0603 (1608 Metric)	R41, R42, R44, R46, R47, R48, R53, R54			8			Panasonic	ERL3KX530V	Volume Production	Digi-Key	P3-11KCT-ND	0.043	0.43
35	Resistor 7k 15 +/-1% 0603 100 mW	Chip Resistor, 7.15k Ohm, +/- 1%, 0.1 W, -55 to 155 degC, 0603 (1608 Metric)	R43, R45, R48, R50			4			Panasonic	ERL3KX715V	Volume Production	Digi-Key	P7-15KCT-ND	0.1	0.4
36	Resistor 1k 24 +/-1% 0603 100 mW	Chip Resistor, 1.24k Ohm, +/- 1%, 0.1 W, -55 to 155 degC, 0603 (1608 Metric)	R55, R56, R57, R58, R59, R60, R69, R70			8			Panasonic	ERL3KX124V	Volume Production	Digi-Key	P1-24KCT-ND	0.043	0.43
37	Resistor 330k +/-0.1% 1206 250mW	Res Thin Film 1206 330k Ohm 0.1% 1/4W +/-50ppm/C Molded SMD SMD Punched Carrier T/R	R61, R62, R63, R64, R65, R66			6			Panasonic	ER99A6334V	Volume Production	Newark	127-2078	0.138	0.896
38	Resistor 10k 5% 2010 750mW	Res Thick Film 2010 10 Ohm 5% 1/4W +/-100ppm/C Molded SMD SMD Plastic T/R	R67, R68, R71, R72, R73, R74, R75, R76			8			Blackstone Electronics	RMPT2010T10R0	Volume Production	Digi-Key	786-RMPT2010T10R0CT-ND	0.103	0.82
39	Resistor 10k +/- 1% 0603 100 mW	Chip Resistor, 10k Ohm, +/- 1%, 0.1 W, -55 to 155 degC, 0603 (1608 Metric)	R77			1			Yageo	RC0603FR-0710K	Volume Production	Digi-Key	311-10.0KRCT-ND	0.1	0.1
40	Resistor 30k1 +/-1% 0603 100 mW	Chip Resistor, 30.1k Ohm, +/- 1%, 0.1 W, -55 to 155 degC, 0603 (1608 Metric)	R78			1			Panasonic	ERL3KX302V	Volume Production	Digi-Key	P30-10KCT-ND	0.1	0.1
41	Jumpor 0603	Jumpor 0603	R81, R82, R83			3	[NoParam]		Bourns	CR0603-1-000LF	Volume Production	Digi-Key	CR0603-1-000LCT-ND	0.013	0.13
42	Resistor 0R +/- 1% 0603 100 mW	Chip Resistor, 0 Ohm, 0.1 W, -55 to 155 degC, 0603 (1608 Metric)	R84, R85			2			Yageo	RC0603SR-070R	Volume Production	Digi-Key	311-0.02RCT-ND	0.038	0.18
43	AD2020N	SP Amp Isolated Amp Single 16.5 Volt 14-Pin PDIP	U1, U7, U10			3			Analog Devices	AD2020N	Volume Production	Digi-Key	856-AD2020N-ND	132.3	396.9
44	REF3012AIDBT	1.25V 50ppm/Degrees C, 50uA In SOT23-3 Series (Bandgap) Voltage Reference 3-SOT-23 -40 to 125	U2			1			Renesas Electronics America Inc	1S60002DH012Z-17A	Manual Solution	DigiKey	1S60002DH012Z-17ACT-ND	4.18	4.18
45	OPA2141AID	Outl. 10MHz, Single Supply, Low Noise, JFET Precision Amplifier 8-SOIC -40 to 125	U3, U16			2	[NoParam]	DNI	Texas Instruments	OPA2141AID	Volume Production	Digi-Key	296-27890-5-ND	4.22	8.44
46	CD4051BNSR	1 Circuit IC Switch 8:1 240 Ohm 16-SO	U4			1			Texas Instruments	CD4051BNSR	Volume Production	Mouser	595-CD4051BNSR	0.03	0.03
47	SN74HC541PW	Buffer/Line Driver 8-CH Non-Inverting 3-ST CMOS 20-Pin TSSOP Tube	U5			1			Texas Instruments	SN74HC541PW	Not Recommended for New Design	Digi-Key	296-26482-5-ND	1.25	1.25
48	TMC31101A4BQCR	Precision isolated bidirectional current sensor with Vsupply ratiometric reference 8-SOIC -40 to 125	U6, U9			2			Texas Instruments	TMC31101A4BQCR	Volume Production	Digi-Key	296-TMC31101A4BQCRCT-ND	4.22	8.44
49	AD590KF	SENSOR ANALOG -55C-150C 2P1ATP / Two-Terminal IC Temperature Transducer	U8			1			Analog Devices	AD590KF	Volume Production	Digi-Key	AD590KF-ND	55.09	55.09
50	AD2020K	Amplifier Isolation Amplifier 15V +/-10%, 24Pin +/-5V 1.33Ohm SP -40degC	U11, U12, U13			3			Analog Devices	AD2020K	Volume Production	Digi-Key	856-AD2020K-ND	131.39	394.17
51	B-785-0-0.5	0.5A DC/DC Converter 1N4001NE SPI3Reg V In 6.5-32 V Out 5.6 mA Out: 500	U14			1			Recom	B-785-0-0.5	Volume Production	Digi-Key	945-1037-ND	8.24	8.24