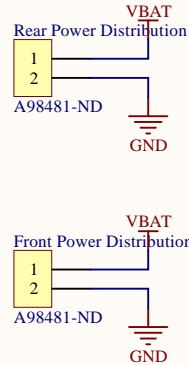
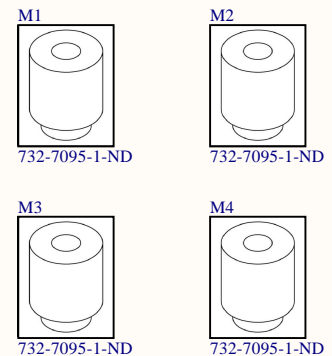
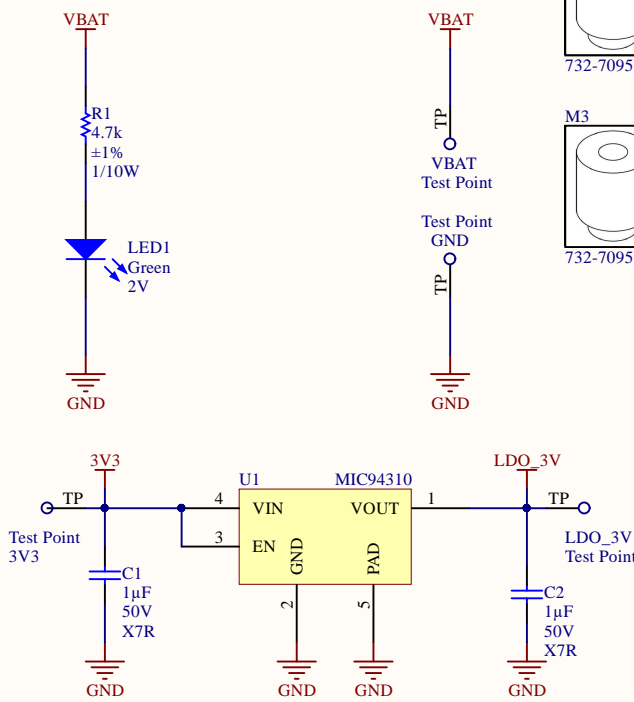


<- 3mA Max.

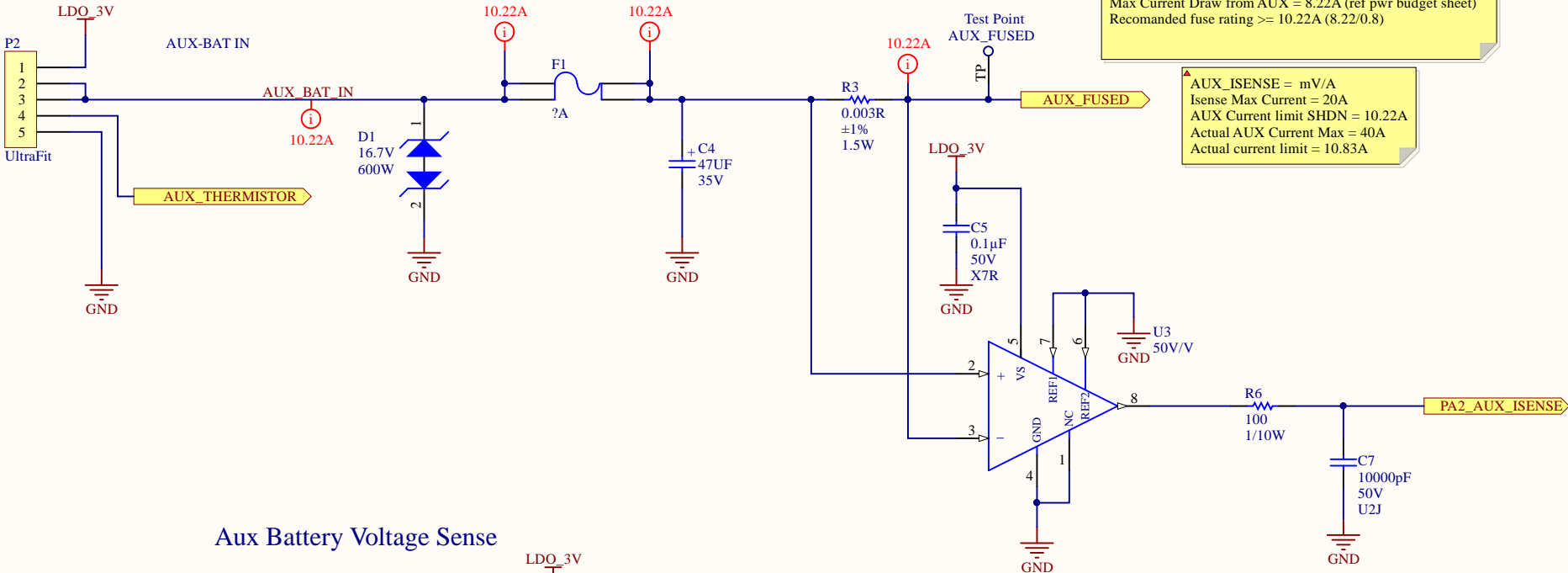


PROJECT	MSXIV_PowerSelection.PrjPcb		
DOCUMENT	Title		
PART NUMBER	VARIANT	[No Variations]	
DRAWN BY	REVISION		
LAST MODIFIED	2020-03-09	SHEET	* OF *

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hardware@uwmidsun.com

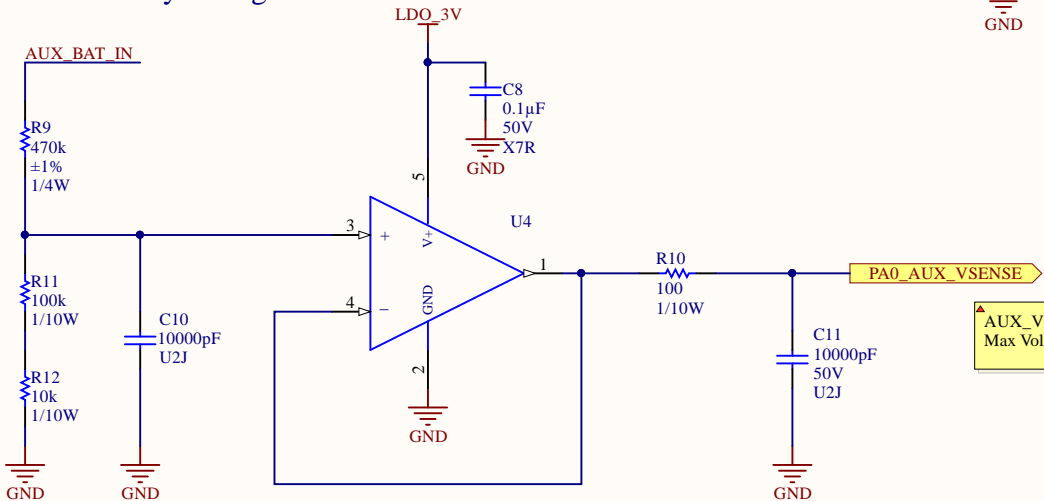


Voltage ref = 1.533V  
Actual volt ref = 1.6238V

Max Current Draw from AUX = 8.22A (ref pwr budget sheet)  
Recomanded fuse rating  $\geq 10.22A$  (8.22/0.8)

AUX\_ISENSE = mV/A  
Isense Max Current = 20A  
AUX Current limit SHDN = 10.22A  
Actual AUX Current Max = 40A  
Actual current limit = 10.83A

Aux Battery Voltage Sense

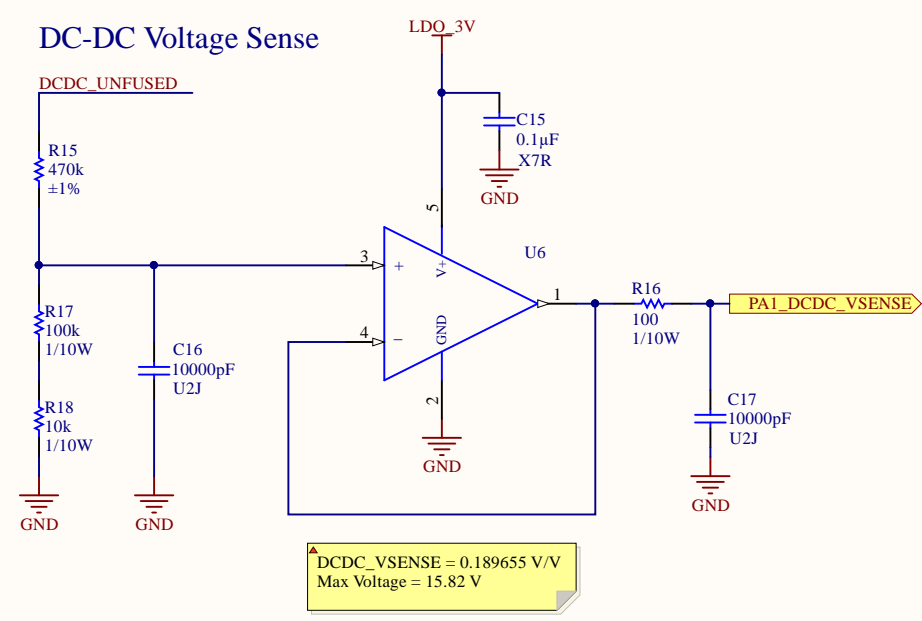
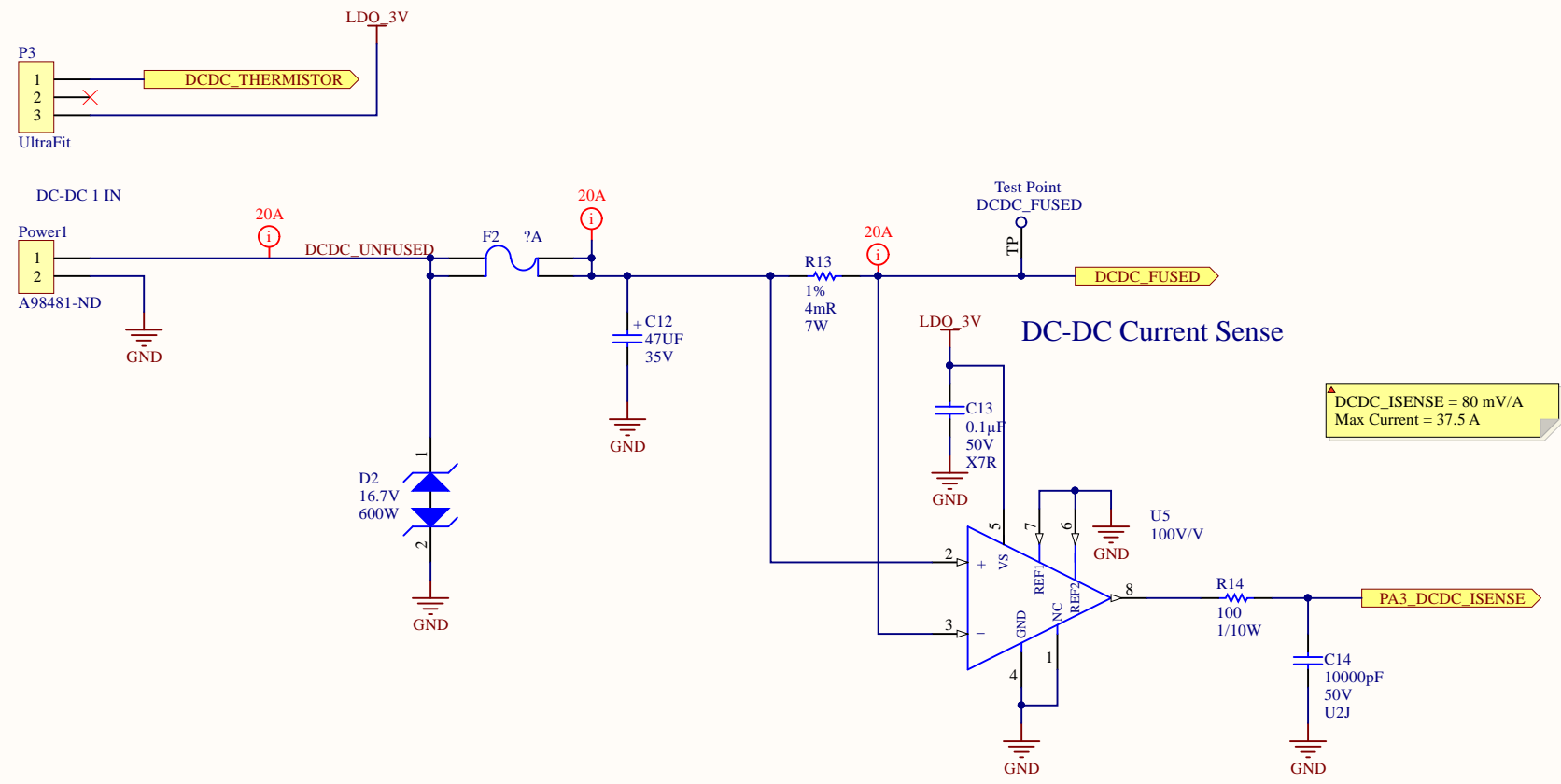


AUX\_VSENSE = 0.189655 V/V  
Max Voltage = 15.82 V

PROJECT	MSXIV_PowerSelection.PrjPcb	
DOCUMENT	Title	
PART NUMBER	VARIANT	[No Variations]
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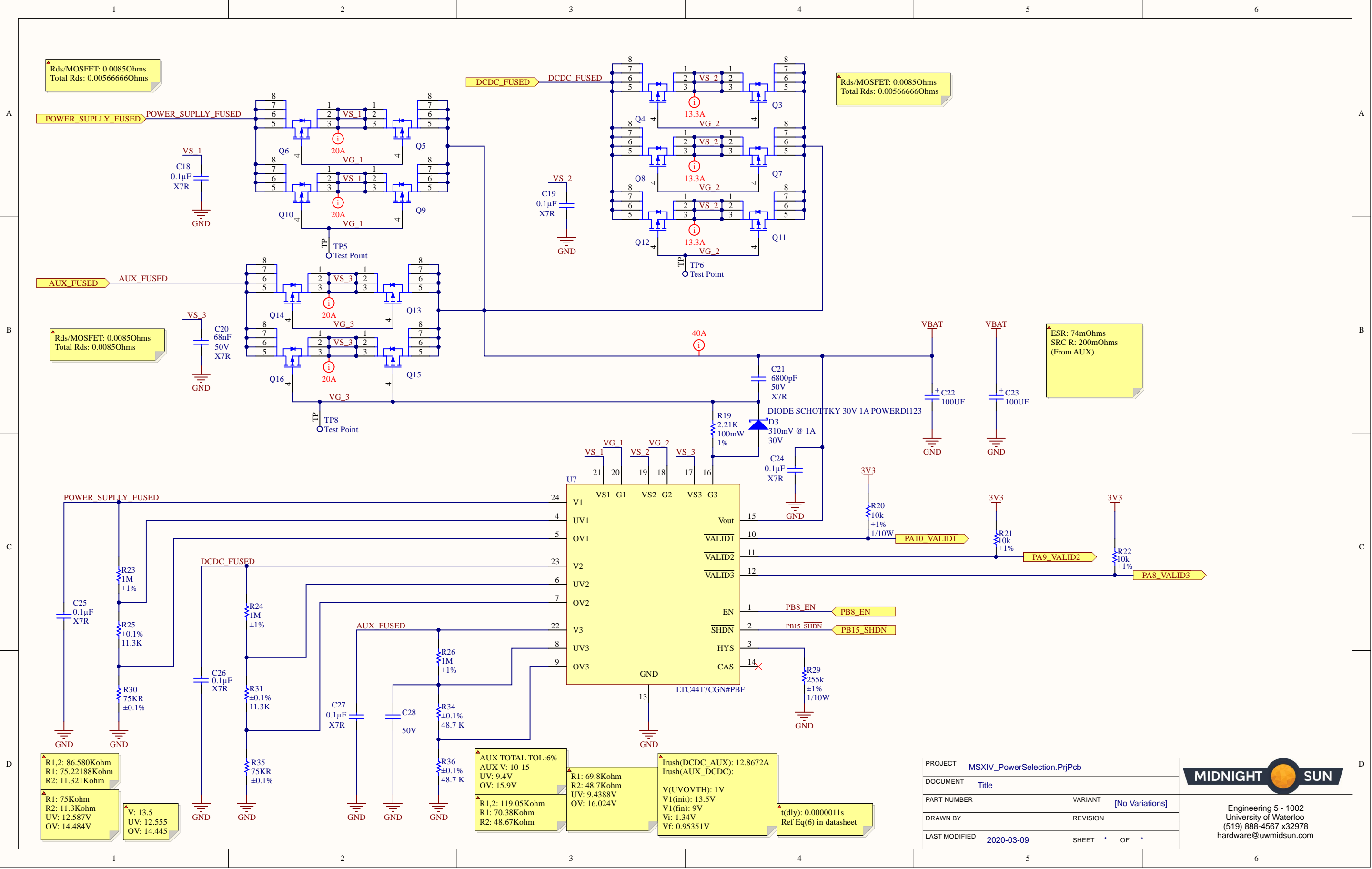


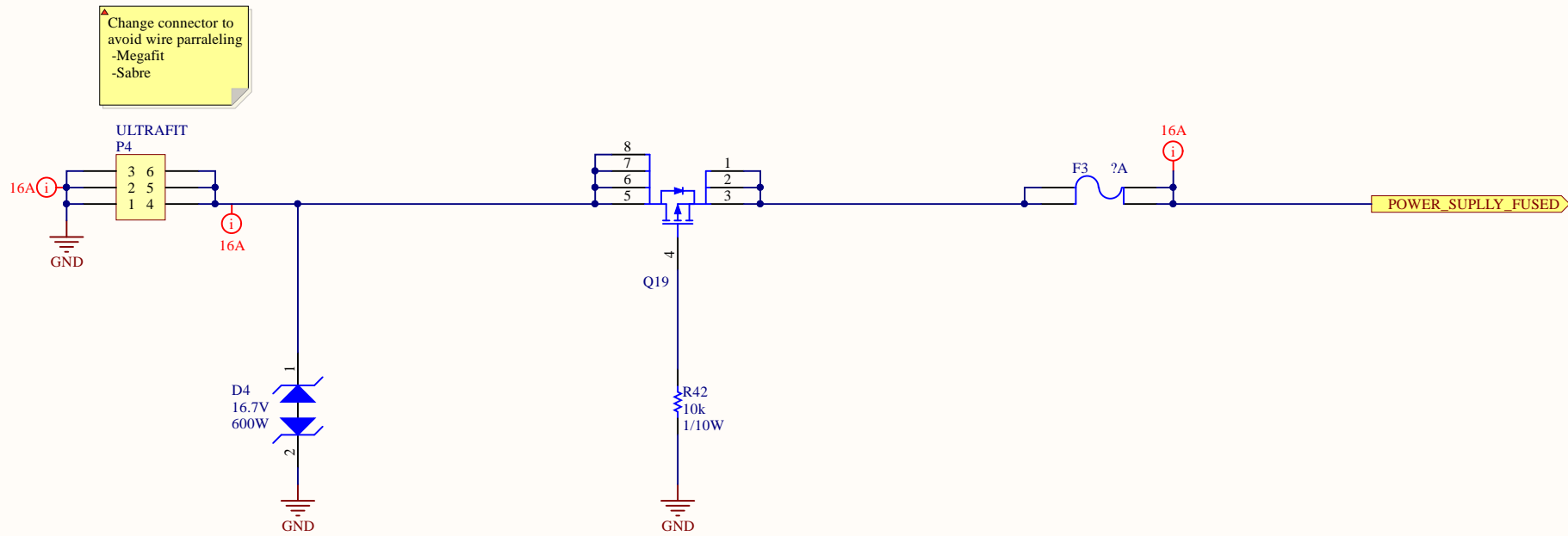
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DOCUMENT	Title	
PART NUMBER	VARIANT	[No Variations]
DRAWN BY	REVISION	
LAST MODIFIED	2020-03-09	SHEET * OF *

MIDNIGHT

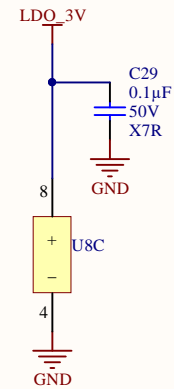
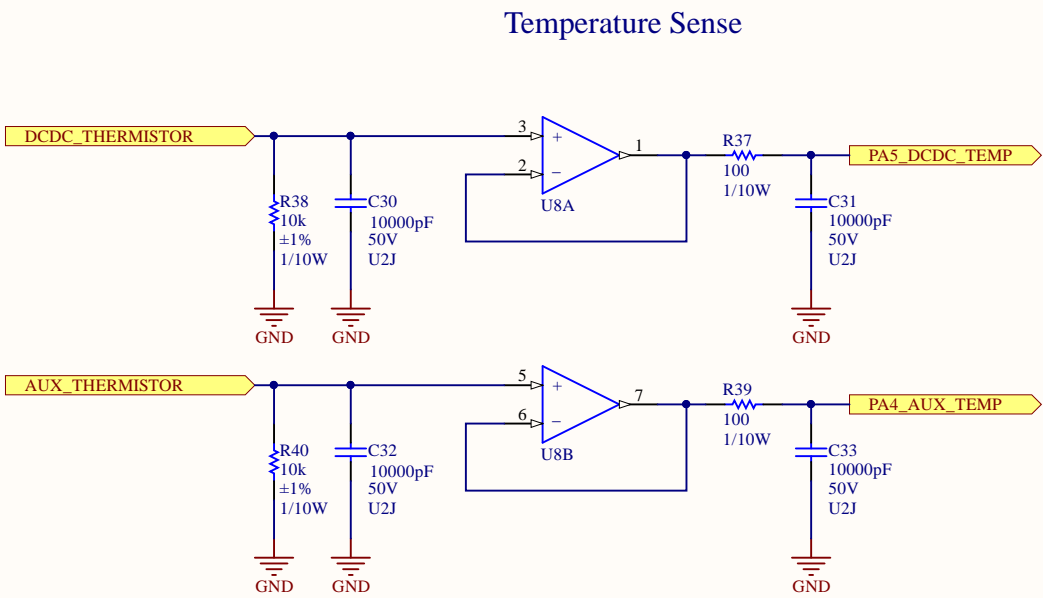
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PROJECT		MSXIV_PowerSelection.PrjPcb		<div><div>MIDNIGHT</div><div>SUN</div></div>
DOCUMENT		Title		
PART NUMBER		VARIANT	[No Variations]	<div>Engineering 5 - 1002 University of Waterloo (519) 888-4567 x32978 hardware@uwmidsun.com</div>
DRAWN BY		REVISION		
LAST MODIFIED	2020-03-09	SHEET	* OF *	



▲ Beaware that there will be two general purpose amp as dedc and aux both uses this design, please make sure does this part belong in main schematic or stays here.

PROJECT		MSXIV_PowerSelection.PrjPcb	
DOCUMENT		Title	
PART NUMBER		VARIANT	[No Variations]
DRAWN BY		REVISION	
LAST MODIFIED		2020-03-09	SHEET * OF *

MIDNIGHT

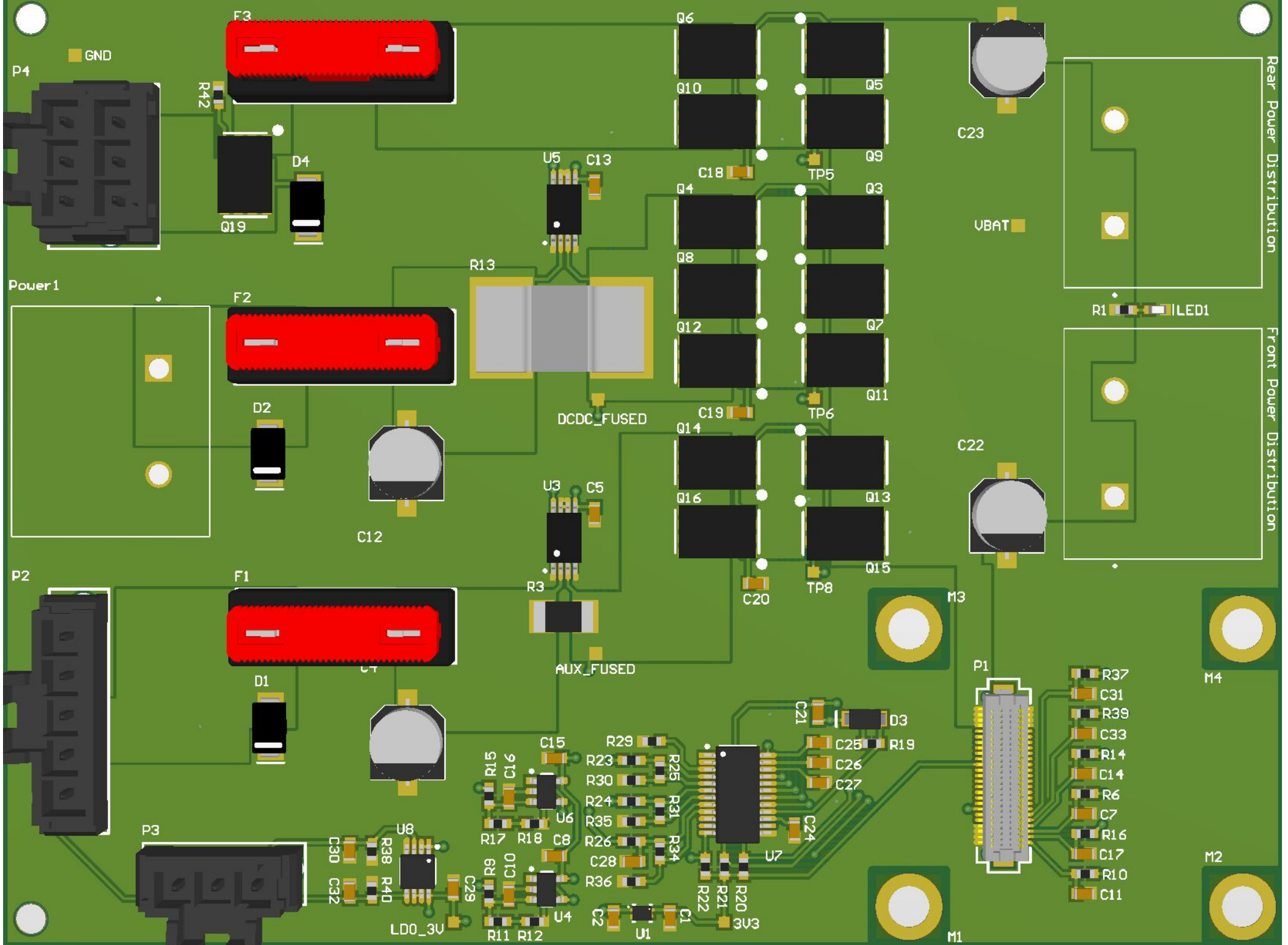
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Bill of Materials	
Project:	MSXIV_PowerSelection.PrjPcb
Revision:	<Parameter ProjectRevision not found
Project Lead:	<Parameter ProjectAuthor not found
Generated On:	2020-03-09 9:23 PM
Production Quantity:	1
Currency	CAD
Total Parts Count:	102



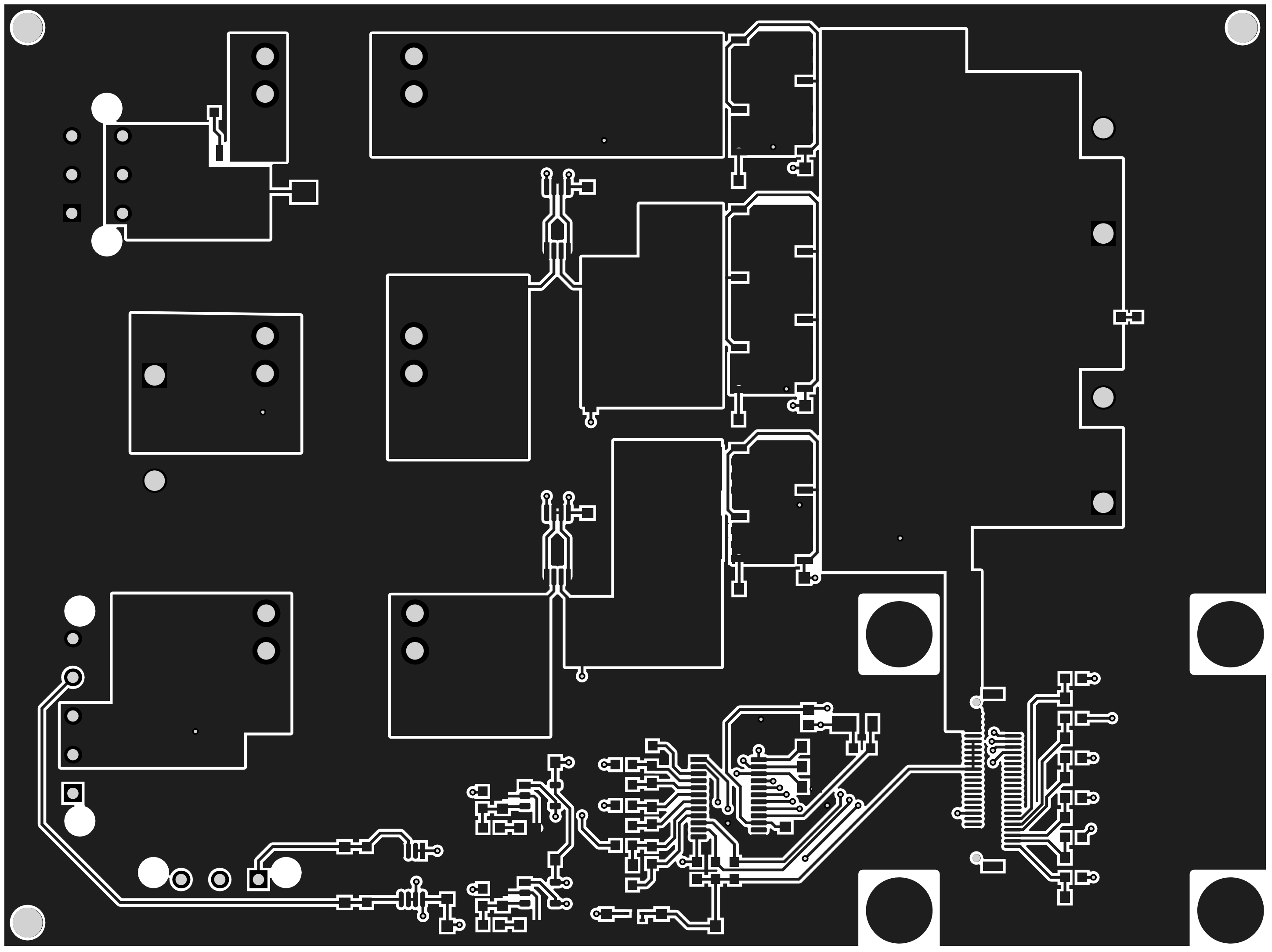
LibRef	Designator	Manufacturer 1	Manufacturer Part Number 1	Supplier 1	Supplier Part Number 1	Supplier Unit Price 1	Quantity	Supplier Subtotal 1
CAP CER 1UF 50V 10% X7R 0603	C1, C2	Taiyo Yuden	UMK107AB7105KA-T	Digi-Key	587-3247-1-ND	0.34007	2	\$ 0.68
CAP ALUM47UF 20% 35V SMD	C4, C12	Panasonic	EEE-1VA470WP	Digi-Key	PCE3961CTND	0.55772	2	\$ 1.12
CAP CER 0.1UF 50V 10% X7R0603	C8, C13, C15, C18, C19, C24, C25, C26, C27	Kyocera AVX	06035C104KA72A	Digi-Key	478-5052-1-ND	0.09522	11	\$ 1.05
CAP CER 10nF 50V 5% X7R 0603	C10, C11, C14, C16, C17, C30, C31, C32, C33	KEMET	C0603C103J5JACTU	Digi-Key	399-13384-1-ND	0.30471	10	\$ 3.05
CAP CER 0.08uF 10% 50V X7R 0603	C20	Murata	GCM188R71H683KA5TD	Digi-Key	490-8027-1-ND	0.24485	1	\$ 0.24
CAP CER 6800pF 50V 10% X7R 0603	C21	Samsung	CL10B682K8BSFNC	Digi-Key	1276-2103-1-ND		1	
CAP ALUM100UF 20% 35V SMD	C22	Panasonic	EEE-1VA101XP	Digi-Key	PCE3951CTND	0.63934	1	\$ 0.64
CAP CER 0.022uF 50V 10% X7R 0603	C28	Murata	GRM188R71H223KA0TD	Digi-Key	490-1517-1-ND		1	
DIODE TVS 15VWM24.4VDCO-214AA(SMB)	D1, D2, D3	Taiwan Semiconductor	SMBJ15CA	Digi-Key	SMBJ15CAFSCTND	0.66655	3	\$ 2.00
DIODE SCHOTTKY 30 1A POWER(D12)	D4	Diodes	DFLS130L-7	Digi-Key	DFLS130LDICTND	0.59853	1	\$ 0.60
FUSE AUTO FUSE HOLDER	F1, F2, F3	Keystone Electronics	3557-2	Digi-Key	36-3557-2-ND	1.4	3	\$ 4.20
CONN BARRIER STRIP 2C19C 0.375"		BUCHANAN-TE CONNECTIVITY	6PCV-02-006	Digi-Key	A98481-ND	2.22	3	\$ 6.65
LED GREEN CLEAR 2V 0603	LED1	Würth Electronics	150060VS75000	Digi-Key	732-4980-1-ND	0.19044	1	\$ 0.19
STANDOFF RND M2.5X0.45 STEEL SMM	M1, M2, M3, M4	Würth Electronics	9774050151R	Digi-Key	732-7095-1-ND	1.48	4	\$ 5.93
CONN 50POS Bergstak Plug 0.02"	P1	Amphenol FCI	10132797-055100LF	Digi-Key	609-5226-1-ND	1.96	1	\$ 1.96
CONN SPOS ULTRA-FIT0.138"	P2	Molex	1722871105	Digi-Key	WM11704-ND	1.41	1	\$ 1.41
CONN 3POS ULTRA-FIT0.138"	P3	Molex	172287-1103	Digi-Key	WM11702-ND	1.12	1	\$ 1.12
CONN 6POS ULTRA-FIT0.138"	P4	Molex	1722991106	Digi-Key	WM11778-ND	1.62	1	\$ 1.62
MOSFET P-CH PW4650V 4.9MOHM	D6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15	ONS Semiconductor	FDW59508L_F086	Digi-Key	DW59508L-F085O5CTND		15	
RES 4.7K OHM1% 1/10W 0603	R1	Yageo Phycomp	RC0603FR-074KL	Digi-Key	311-4.70KHRCFND	0.13603	1	\$ 0.14
RES 5.03 OHM1% 1.5W 2010		Stackpole Electronics	C5NL2010F073L0	Digi-Key	C5NL2010F073L0CCTND	0.88419	1	\$ 0.88
RES 5.10K OHM1% 1/10W 0603	R6, R10, R14, R16, R37, R39	Yageo	RC0603FR-07100RL	Digi-Key	311-100HRCCTND	0.13603	6	\$ 0.82
RES 470K OHM1% 1/4W 0603	R9, R15	Panasonic	ERJ-P43F4703V	Digi-Key	P44078BYCTND	0.19044	2	\$ 0.38
RES 100K OHM5% 1/8W 0603	R11, R17	Yageo	RC0603JR-07100KL	Digi-Key	311-100KRCTND	0.13603	2	\$ 0.27
RES 10K OHM1% 1/10W 0603	R12, R18, R20, R21, R22, R38, R40, R42	Yageo Phycomp	RC0603FR-0710KL	Digi-Key	311-10.0KHRCCTND	0.13603	8	\$ 1.09
R 25.0 004 OHM1% 7W 5931	R13	Yageo	PU5931FKMP70R004L	Digi-Key	YAG4096CTND	2.73	1	\$ 2.73
RES 2.21K OHM1% 1/10W 0603	R19	Yageo	AC0603FR-072K21L	Digi-Key	YAG3586CTND	0.13603	1	\$ 0.14
RES 1M OHM1% 1/10W 0603	R23, R24, R26	Yageo	RC0603FR-071ML	Digi-Key	311-1.00MHRCTND	0.13603	3	\$ 0.41
RES SMD 11.3KOHM0.1% 1/10W 0603	R25, R31	Panasonic	ERA-3AE1132V	Digi-Key	P11.3KDBCTND	0.4625	2	\$ 0.93
RES 255K OHM1% 1/10W 0603	R29	Yageo	RC0603FR-07259KL	Digi-Key	P11.255KHRCCTND	0.13603	1	\$ 0.14
RES SMD 75K OHM0.1% 1/10W 0603	R30, R35	Panasonic	ERA-3AE8753V	Digi-Key	P75KDBCTND	0.4761	2	\$ 0.95
RES SMD 48.7KOHM0.1% 1/10W 0603	R34, R36	Panasonic	ERA-3AE84871V	Digi-Key	P4.87KDBCTND	0.4761	2	\$ 0.95
IC REG LDO 3V 0.2A 4-TDFN	U1	Microchip	MIC943110-PYMT-TR	Digi-Key	576-4761-1-ND	0.38088	1	\$ 0.38
IC CURRENT AMPLIFIER INA240 8-TSSOP	U3	Texas Instruments	INA240A3PWR	Digi-Key	296-45090-1-ND	3.78	1	\$ 3.78
IC OP AMP GEN PURPOSE RR 10MHZ SOT-23-5	U4, U6	Texas Instruments	TLV316QDBVQR1	Digi-Key	296-45323-1-ND	1.27	2	\$ 2.53
IC CURRENT AMPLIFIER INA240 8-TSSOP	U5	Texas Instruments	INA240A3PWR	Digi-Key	296-45090-1-ND	3.78	1	\$ 3.78
COR CONTROLLER SOURCE SELECT24SSO	U7	Analog Devices /Linear	LTC4417CGN#PBF	Digi-Key	LTC4417CGN#PBF-ND	10.66	1	\$ 10.66
IC OP AMP DUAL GP RR 10MHZ 8-VSSOP	U8	Texas Instruments	OPA2917IDGKR	Digi-Key	296-47349-1-ND	3.18	1	\$ 3.18
							Total:	\$ 66.59

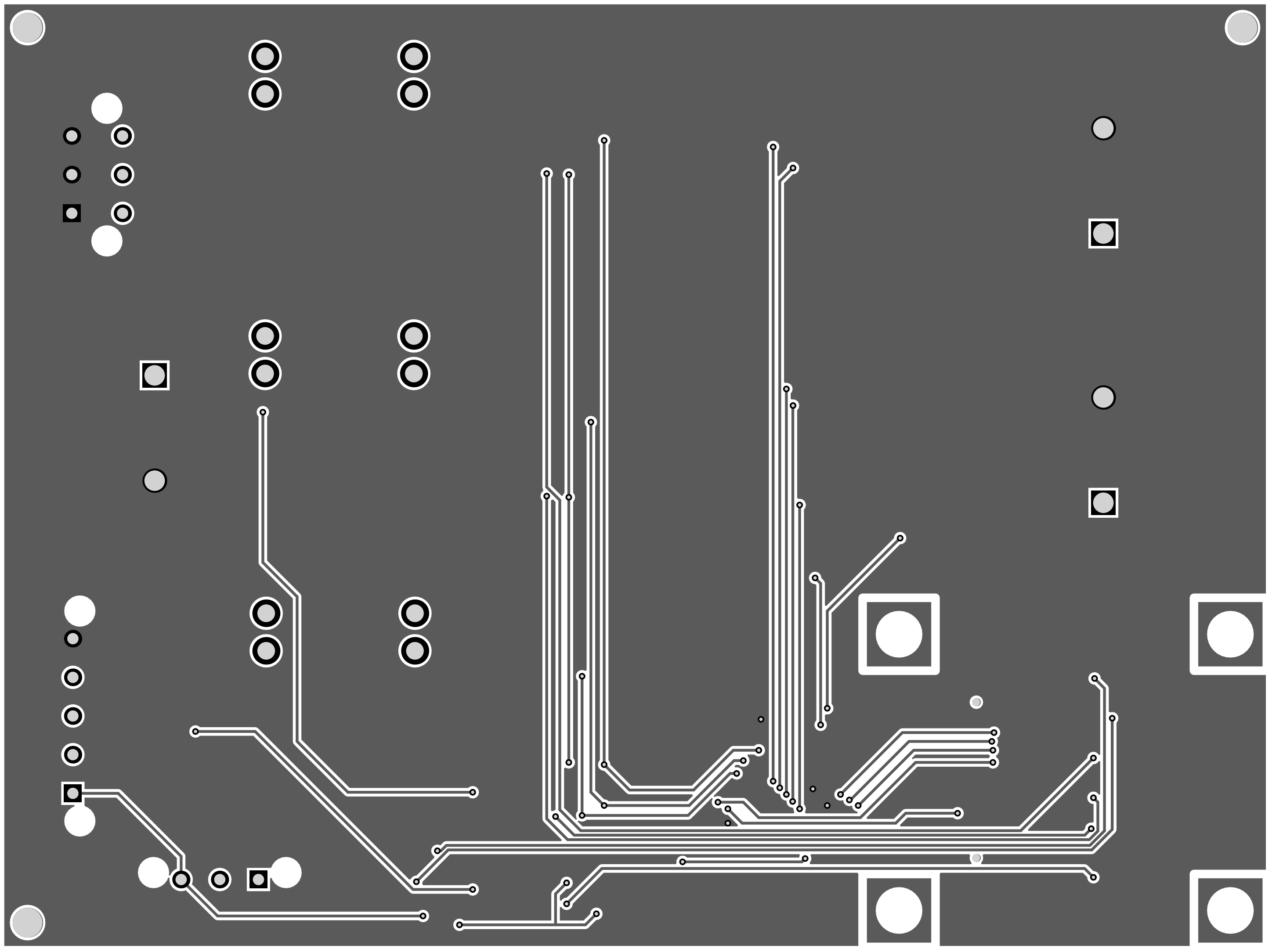


Rear Power Distribution

Front Power Distribution







## Design Rules Verification Report

Filename : D:\Josh9\Documents\Midnight Sun\hardware\MSXIV\_PowerSelection\Power Sel

Warnings 0  
Rule Violations 184

Warnings	
Total	0

Rule Violations	
Clearance Constraint (Gap=0.254mm) (All),(All)	0
Short-Circuit Constraint (Allowed=No) (All),(All)	0
Un-Routed Net Constraint ( (All) )	0
Modified Polygon (Allow modified: No), (Allow shelved: No)	0
Width Constraint (Min=0.254mm) (Max=0.254mm) (Preferred=0.254mm) (All)	0
Power Plane Connect Rule(Relief Connect )(Expansion=0.508mm) (Conductor Width=0.254mm) (Air Gap=0.254mm)	0
Power Plane Connect Rule(Direct Connect )(Expansion=0.508mm) (Conductor Width=0.254mm) (Air Gap=0.254mm)	0
Hole Size Constraint (Min=0.025mm) (Max=2.54mm) (All)	7
Hole To Hole Clearance (Gap=0.254mm) (All),(All)	0
Minimum Solder Mask Sliver (Gap=0.254mm) (All),(All)	12
Silk To Solder Mask (Clearance=0.254mm) (IsPad),(All)	164
Silk to Silk (Clearance=0.254mm) (All),(All)	1
Net Antennae (Tolerance=0mm) (All)	0
Height Constraint (Min=0mm) (Max=25.4mm) (Preferred=12.7mm) (All)	0
Total	184

Hole Size Constraint (Min=0.025mm) (Max=2.54mm) (All)	
Hole Size Constraint: (2.7mm > 2.54mm) Pad Free-(112.5mm,83.5mm) on Multi-Layer Actual Hole Size = 2.7mm	
Hole Size Constraint: (2.7mm > 2.54mm) Pad Free-(2.5mm,2.5mm) on Multi-Layer Actual Hole Size = 2.7mm	
Hole Size Constraint: (2.7mm > 2.54mm) Pad Free-(2.5mm,83.5mm) on Multi-Layer Actual Hole Size = 2.7mm	
Hole Size Constraint: (3.7mm > 2.54mm) Pad M1-(81.4mm,3.6mm) on Multi-Layer Actual Hole Size = 3.7mm	
Hole Size Constraint: (3.7mm > 2.54mm) Pad M2-(111.4mm,3.6mm) on Multi-Layer Actual Hole Size = 3.7mm	
Hole Size Constraint: (3.7mm > 2.54mm) Pad M3-(81.4mm,28.6mm) on Multi-Layer Actual Hole Size = 3.7mm	
Hole Size Constraint: (3.7mm > 2.54mm) Pad M4-(111.4mm,28.6mm) on Multi-Layer Actual Hole Size = 3.7mm	

Minimum Solder Mask Sliver (Gap=0.254mm) (All),(All)	
Minimum Solder Mask Sliver Constraint: (0.105mm < 0.254mm) Between Pad P1-(88.4mm,22.45mm) on Multi-Layer And Pad P1-(89.9mm,23.2mm) on Top	
Minimum Solder Mask Sliver Constraint: (0.105mm < 0.254mm) Between Pad P1-(88.4mm,8.35mm) on Multi-Layer And Pad P1-(89.9mm,7.6mm) on Top	
Minimum Solder Mask Sliver Constraint: (0.147mm < 0.254mm) Between Pad U1-1(56.735mm,3.325mm) on Top Layer And Pad	
Minimum Solder Mask Sliver Constraint: (0.012mm < 0.254mm) Between Pad U1-1(56.735mm,3.325mm) on Top Layer And Pad U1-5(57.45mm,3.025mm)	
Minimum Solder Mask Sliver Constraint: (0.012mm < 0.254mm) Between Pad U1-2(56.735mm,2.725mm) on Top Layer And Pad U1-5(57.45mm,3.025mm)	
Minimum Solder Mask Sliver Constraint: (0.147mm < 0.254mm) Between Pad U1-3(58.175mm,2.725mm) on Top Layer And Pad	
Minimum Solder Mask Sliver Constraint: (0.022mm < 0.254mm) Between Pad U1-3(58.175mm,2.725mm) on Top Layer And Pad U1-5(57.45mm,3.025mm)	
Minimum Solder Mask Sliver Constraint: (0.022mm < 0.254mm) Between Pad U1-4(58.175mm,3.325mm) on Top Layer And Pad U1-5(57.45mm,3.025mm)	
Minimum Solder Mask Sliver Constraint: (0.147mm < 0.254mm) Between Pad U4-1(47.525mm,6.15mm) on Top Layer And Pad U4-2(47.525mm,5.2mm) or	
Minimum Solder Mask Sliver Constraint: (0.147mm < 0.254mm) Between Pad U4-2(47.525mm,5.2mm) on Top Layer And Pad U4-3(47.525mm,4.25mm) or	
Minimum Solder Mask Sliver Constraint: (0.147mm < 0.254mm) Between Pad U6-1(47.525mm,14.95mm) on Top Layer And Pad U6-2(47.525mm,14mm)	
Minimum Solder Mask Sliver Constraint: (0.147mm < 0.254mm) Between Pad U6-2(47.525mm,14mm) on Top Layer And Pad U6-3(47.525mm,13.05mm)	

Silk To Solder Mask (Clearance=0.254mm) (IsPad) (All)

[illegible]

Silk To Solder Mask (Clearance=0.254mm) (IsPad),(All)

[illegible]



**Silk To Solder Mask (Clearance=0.254mm) (IsPad),(All)**

Silk To Solder Mask Clearance Constraint: (0.225mm < 0.254mm) Between Pad U8-1(38.275mm,9mm) on Top Layer And Track
Silk To Solder Mask Clearance Constraint: (0.248mm < 0.254mm) Between Pad U8-2(37.625mm,9mm) on Top Layer And Track
Silk To Solder Mask Clearance Constraint: (0.248mm < 0.254mm) Between Pad U8-3(36.975mm,9mm) on Top Layer And Track
Silk To Solder Mask Clearance Constraint: (0.248mm < 0.254mm) Between Pad U8-4(36.325mm,9mm) on Top Layer And Track
Silk To Solder Mask Clearance Constraint: (0.248mm < 0.254mm) Between Pad U8-5(36.325mm,4.6mm) on Top Layer And Track
Silk To Solder Mask Clearance Constraint: (0.248mm < 0.254mm) Between Pad U8-6(36.975mm,4.6mm) on Top Layer And Track
Silk To Solder Mask Clearance Constraint: (0.248mm < 0.254mm) Between Pad U8-7(37.625mm,4.6mm) on Top Layer And Track
Silk To Solder Mask Clearance Constraint: (0.248mm < 0.254mm) Between Pad U8-8(38.275mm,4.6mm) on Top Layer And Track

**Silk to Silk (Clearance=0.254mm) (All),(All)**

Silk To Silk Clearance Constraint: (Collision < 0.254mm) Between Text "C4" (32.233mm,24.79mm) on Top Overlay And Track
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