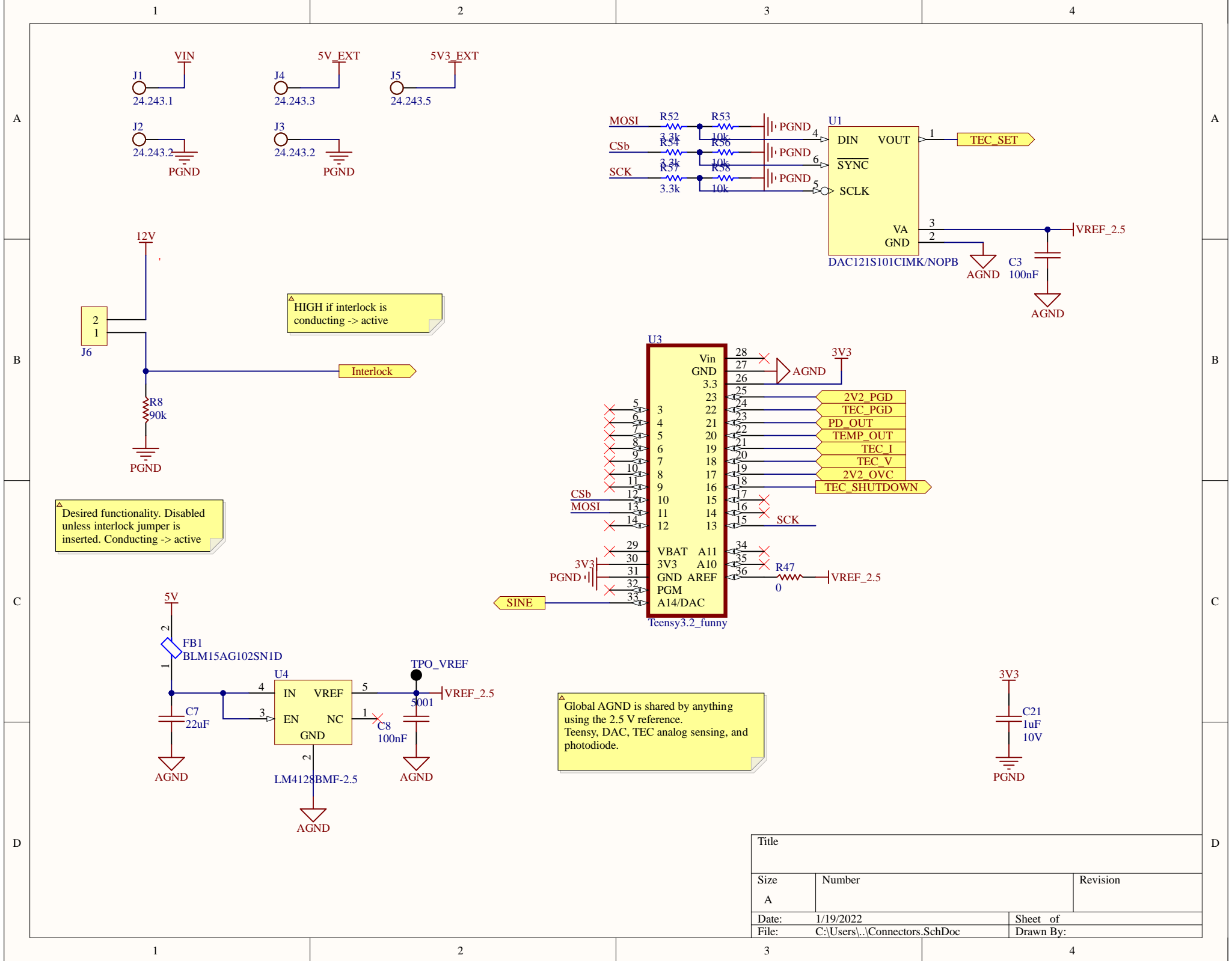
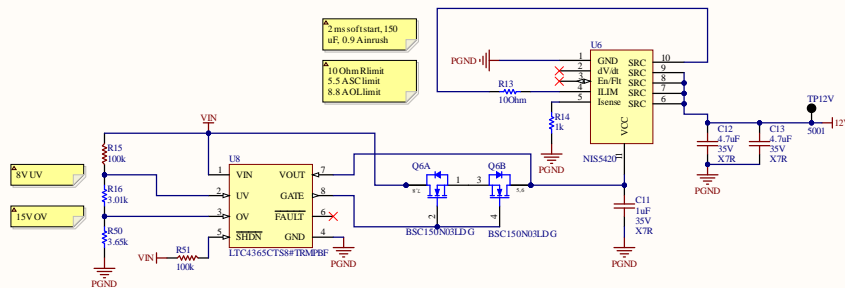


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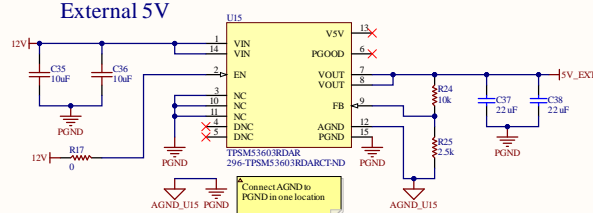


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## Power Input Protection

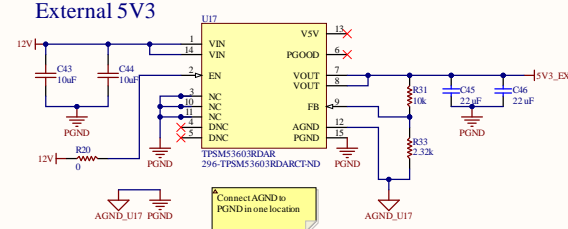


## External 5V

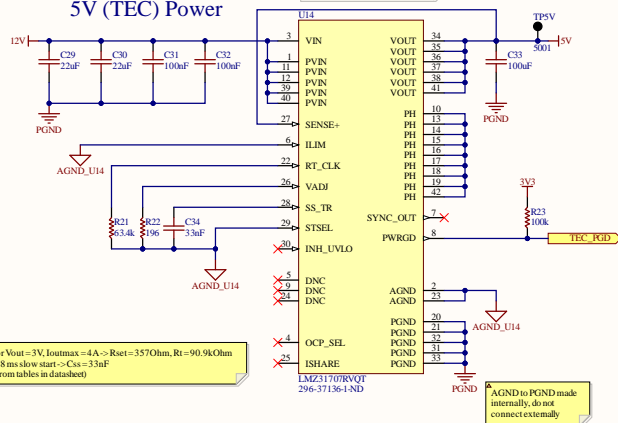


FB Voltage Divider: for R\_FFB, 10kOhm is recommended  
 $R_{FBB} = 10(V_{out} - 1) / I_{kOhm}$   
 $V_{out} = 5V \rightarrow 2.5 kOhm$   
 $V_{out} = 3.3V \rightarrow 2.32 kOhm$   
 $V_{out} = 3.3V \rightarrow 4.35 kOhm$

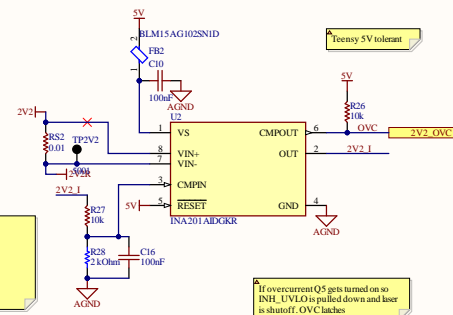
## External 5V3



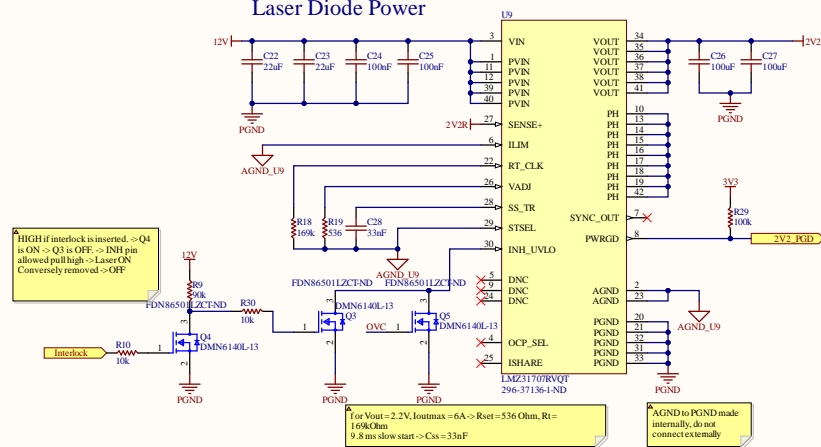
## 5V (TEC) Power



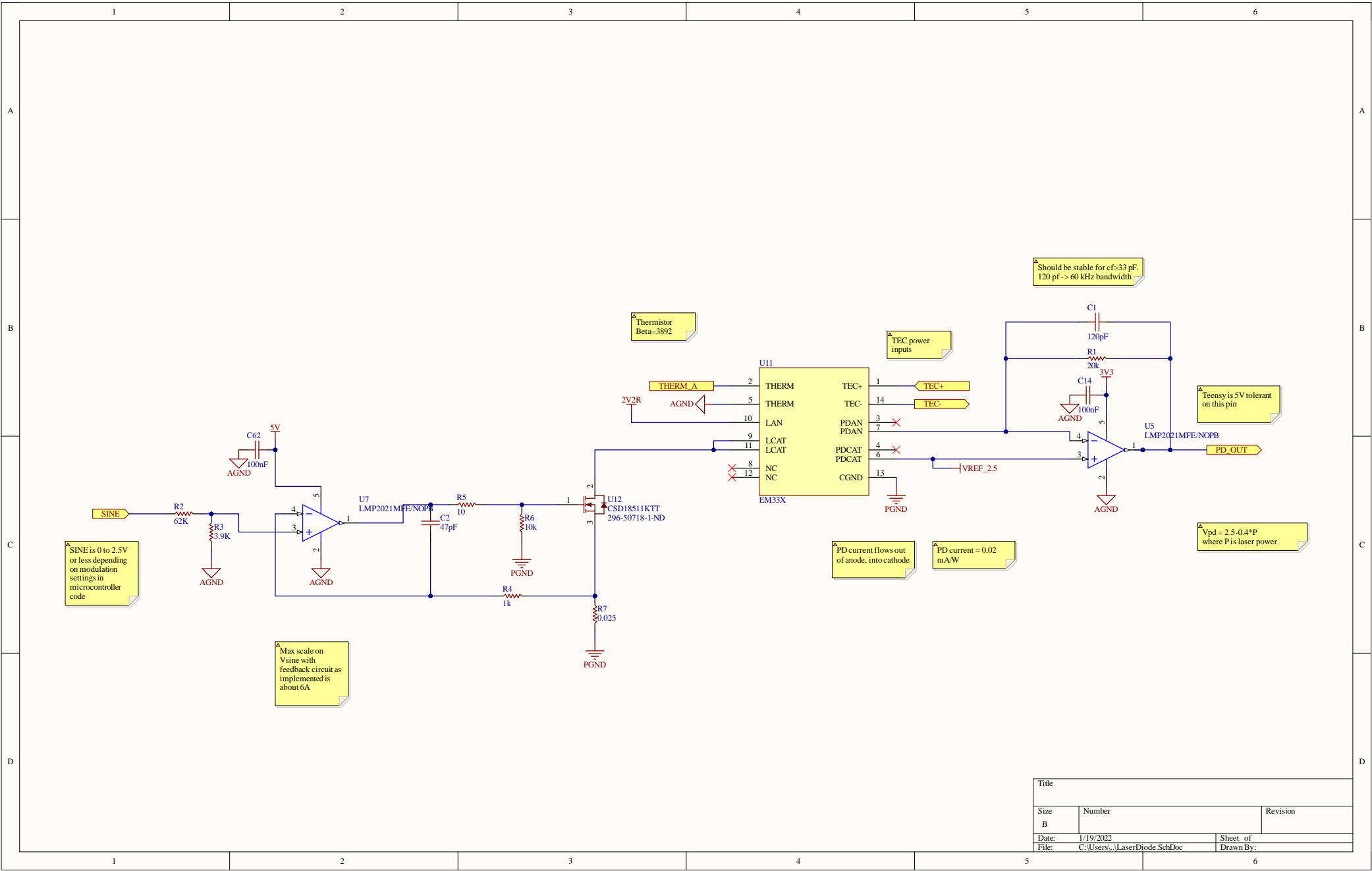
## Laser Diode OVC



## Laser Diode Power

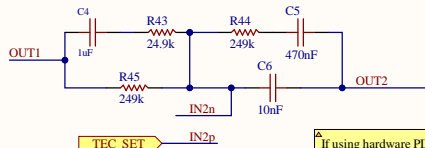
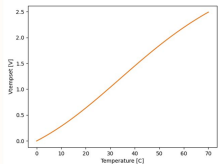
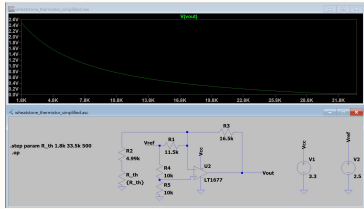


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File:	C:\Users\I\PowerSchDoc	Drawn By:

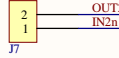


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B		
Date:	1/19/2022	Sheet of
File:	C:\Users\...\LaserDiode.SchDoc	Drawn By:

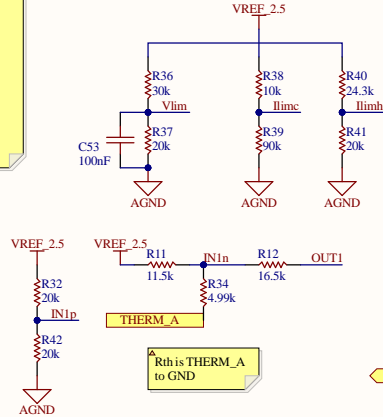
Parameters:  
 $V_{ref} = 2.5 \text{ V}$ ,  $I_{TC\_max} = 4 \text{ A}$ ,  $I_{TH\_max} = 0.5 \text{ A}$ ,  
 $R_{sense} = 0.01 \text{ ohms}$ ,  $V_{T\_max} = 5 \text{ V}$   
 $V_{ILIMC} = (V_{ref}/2) + (25 * I_{TC\_max} * R_s)$   
 $\rightarrow V_{ILIMC} = 2.25 \text{ V}$   
 $V_{ILIMH} = (V_{ref}/2) - (25 * I_{TH\_max} * R_s)$   
 $\rightarrow V_{ILIMH} = 1.125 \text{ V}$   
 $V_{VLIM} = V_{T\_max}/5$   
 $\rightarrow V_{VLIM} = 1 \text{ V}$



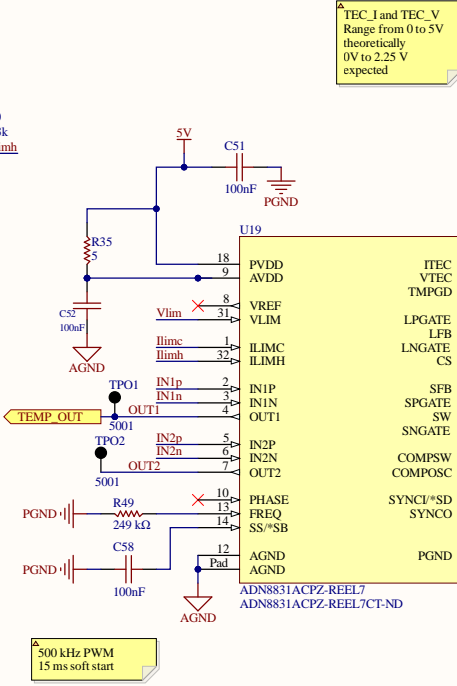
This jumper bypasses hardware PID



If using hardware PID, TEC\_SET voltage corresponds to requested temp. Otherwise TEC\_SET is modified based on software PID

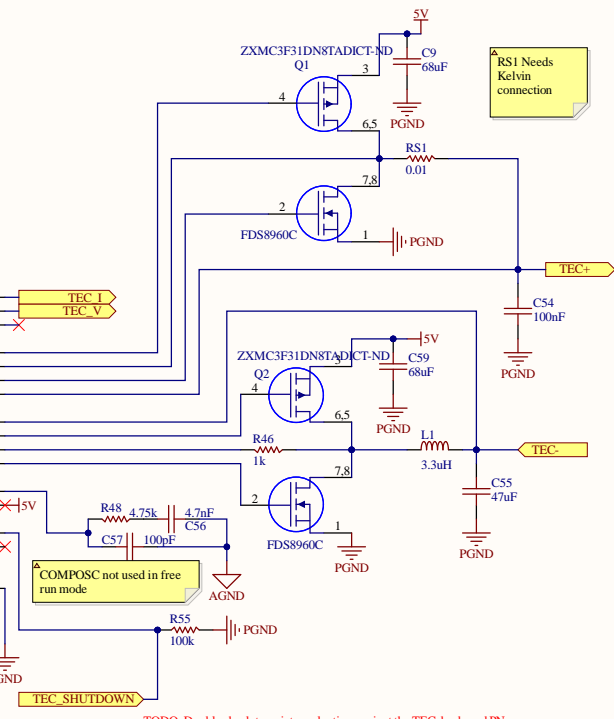


Rth is THERM\_A to GND



500 kHz PWM  
15 ms soft start

TEC\_I and TEC\_V  
Range from 0 to 5V  
theoretically  
0V to 2.25 V  
expected

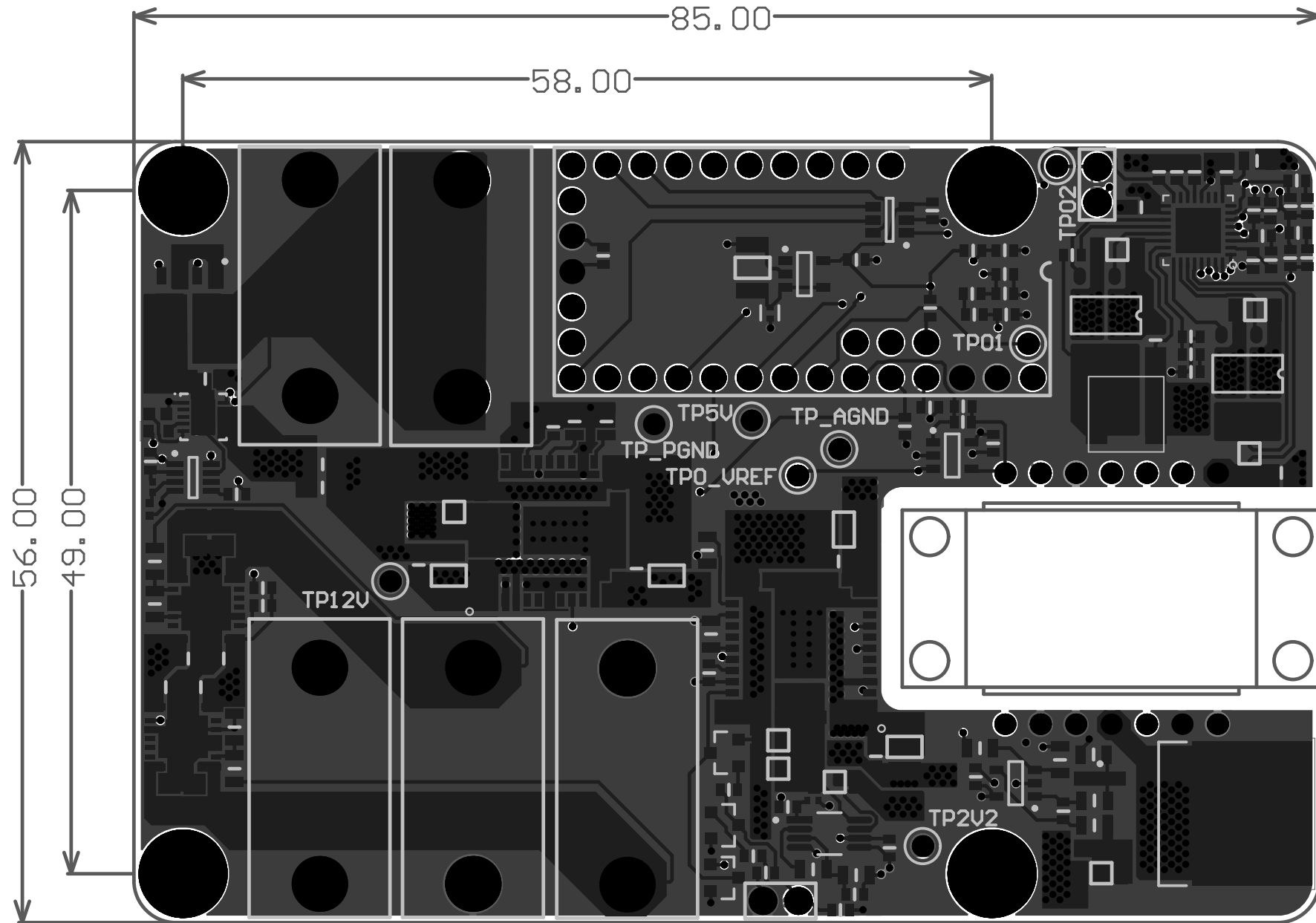


RS1 Needs Kelvin connection

TODO: Double check transistor selection against the TEC dev board PN

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Increase via size? 10 mil?



Line #	Name	Description	Designator	Quantity	Procurement Instructions	Special Note	Manufacturer 1	Manufacturer Part Number 1	Manufacturer Lifecycle 1	Supplier 1	Supplier Part Number 1	Supplier Unit Price 1	Supplier Subtotal 1
	SIL02	2.54mm Header 1x2	J6, J7	2	Turnkey		TE Connectivity	5-146274-2	Volume Production	Avnet	5-146274-2	0.15964	0.31968
	5001	Test Point, Black, 1-Pin THD, RoHS, Bulk	TP2V2, TP5V, TP12V, TP_AGND, TP_PGND, TP01, TP02, TPO_VREF	8	Turnkey		Keystone Electronics	5001	Volume Production	Mouser	534-5001	0.41	3.28
	100pf	603 Capacitor	C57	1	Turnkey		Kyocera AVX	06033C101KA2A	Volume Production	Newark	92AH6330	0.02	0.02
	10mf	603 Capacitor	C6	1	Turnkey		Kyocera AVX	06035C103KA2A	Volume Production	Newark	88R4176	0.008	0.008
	ADN8831ACPZ-REEL7	A High Efficiency TEC Controller Solution	U19	1	Consignment	No Overage Available!	Analog Devices	ADN8831ACPZ-REEL7	Volume Production	Digi-Key	ADN8831ACPZ-REEL7CT-ND		
	BLM15AG102SN1D	FERRITE BEAD 1 KOHM 0402 1LN	FB1, FB2	2	Turnkey		Murata	BLM15AG102SN1D	Volume Production	Mouser	81-BLM15AG102SN1D	0.1	0.2
	BSC150N03LD G	N-Channel OptiMOS 3 Power-Transistor, 30 V VDS, 20 A ID, -55 to 150 degC, PG-TDSON-8-4, Reel, Green	Q6	1	Turnkey		Infineon	BSC150N03LDG	Volume Production	Mouser	726-BSC150N03LDGATMA	1.04	1.04
	1uf	603 Capacitor	C21	1	Turnkey		KEMET	C0603C105K3PACTU	Volume Production	Newark	36K2618	0.023	0.023
	120pf	603 Capacitor	C1	1	Turnkey		KEMET	C0603C121J5GACTU	Volume Production	Newark	78H7742	0.002	0.002
	33nf	603 Capacitor	C28, C34	2	Turnkey		KEMET	C0603C33K3RACTU	Volume Production	Newark	07X0804	0.006	0.012
	47pf	603 Capacitor	C2	1	Turnkey		KEMET	C0603C470J3GACTU	Volume Production	Newark	78H8528	0.025	0.025
	4.7nf	603 Capacitor	C56	1	Turnkey		KEMET	C0603C472J5GACTU	Volume Production	Newark	05AC7998	0.109	0.109
	470nf	603 Capacitor	C5	1	Turnkey		KEMET	C0603C474K4RACTU	Volume Production	Newark	12AC0600	0.139	0.139
	4.7uf	805 Capacitor	C12, C13	2	Turnkey		KEMET	CD805C475K3PACTU	Volume Production	Newark	36K2755	0.071	0.142
	100uf	1206 Capacitor	C26, C27, C33	3	Turnkey		TDK	C3216X5R1A107M160AC	Volume Production	Newark	12T1945	0.573	1.72
	68uf	1206 Capacitor	C9, C59	2	Turnkey		TDK	C3216X5R1A68M160AC	Volume Production	Arrow Electronics	C3216X5R1A68M160AC	1.27	2.53
	100nf	603 Capacitor	C3, C8, C10, C14, C16, C24, C25, C31, C32, C51, C52, C53, C54, C58, C62	15	Turnkey		Yageo	CC0603KRX7R8BB104	Volume Production	Newark	45R8226	0.031	0.465
	100k	603 Resistor	R15, R23, R29, R51, R55	5	Turnkey		TE Connectivity	CPF0603B100KE1	Volume Production	Arrow Electronics	CPF0603B100KE1	0.6287	3.14
	3.65k		R50	1	Turnkey		Vishay	CRW0604023K65FKED	Volume Production				
	4.99k	603 Resistor	R34	1	Turnkey		Vishay	CRCW06034K99FKEA	Volume Production	RSComponent s	6790490	0.053	2.65
	11.5k	603 Resistor	R11	1	Turnkey		Vishay	CRCW060311K5FKEA	Volume Production				
	20k	603 Resistor	R1, R37	2	Turnkey		Vishay	CRCW060320K0FKEA	Volume Production				
	20k	603 Resistor	R32, R41, R42	3	Turnkey		Vishay	CRCW060320K0FKEA	Volume Production				
	30k	603 Resistor	R36	1	Turnkey		Vishay	CRCW060330K0FKEA	Volume Production				
	249k	603 Resistor	R44, R45	2	Turnkey		Vishay	CRCW0603249KFKEA	Volume Production	Arrow Electronics	CRCW0603249KFKEA	0.005	0.01
	CSD18511KTT	40-V, N-channel NoxET™ power MOSFET, single D2PAK, 2.6 mOhm	U12	1	Consignment		Texas Instruments	CSD18510KTT	Volume Production	Digi-Key	296-50718-1-ND		
	0.01	1206 Resistor	RS1, RS2	2	Turnkey		Riedon	CSR1206-0R01F1		Digi-Key	696-1374-1-ND	0.59	1.18
	DAC121S101CIMK/NOPB	12-Bit Micro Power, RRO Digital-to-Analog Converter, 6-pin Tiny SOT23, Pb-Free	U1	1	Consignment		TI National Semiconductor	DAC121S101CIMK/NOPB	Volume Production	Mouser	926-DAC121S101CIMKNO	2.94	2.94
	Teensy3.2_1umny	5W Cooled 9XX Multimode Lasers in 14-Pin Package	U3	1	DNP		SparkFun	DEV-13736		Digi-Key	1568-1231-ND	21.88	21.88
	EM33X	805 Resistor	U11	1	DNP		Gaoh and Housgo	EM33X	Manual Solution				
	3.9k		R3	1	Turnkey		Panasonic	ERA6AEB392V	Volume Production	Newark	08N2170	0.05	0.05
	1k		R14	1	Turnkey		Panasonic	ERA-3AEB102V	Volume Production	Mouser	667-ERA-3AEB102V	0.31	0.31
	1k	603 Resistor	R46	1	Turnkey		Panasonic	ERA-3AEB103V	Volume Production	RSComponent s	0566890	0.508	2.54
	10k	603 Resistor	R10, R26, R30	3	Turnkey		Panasonic	ERA-3AEB103V	Volume Production	RSComponent s	0566890	0.508	2.54
	10k	603 Resistor	R38	1	Turnkey		Panasonic	ERA-3AEB103V	Volume Production	RSComponent s	0566890	0.508	2.54
	63.4k	805 Resistor	R21	1	Turnkey		Panasonic	ERA-6AEB6342V		Arrow Electronics	ERA-6AEB6342V	0.2779	0.2779
	16.5k	603 Resistor	R12	1	Turnkey		Panasonic	ERJ3EXF1652V	Volume Production	Newark	65T8349	0.005	0.005
	10k		RS3, RS6, RS8	3	Turnkey		Panasonic	ERJ-2GEJ103X	Volume Production				
	2 kOhm		R28	1	Turnkey		Panasonic	ERJ-3EKF2001V	Volume Production	Digi-Key	P2.00KHTR-ND	0.00546	27.3
	24.3k	603 Resistor	R40	1	Turnkey		Panasonic	ERJ-3EF2432V	Volume Production	Allied Electronics	70265735	0.016	0.016
	24.9k	603 Resistor	R43	1	Turnkey		Panasonic	ERJ-3EF2492V	Volume Production	Allied Electronics	70265738	0.016	0.016
	169k	805 Resistor	R18	1	Turnkey		Panasonic	ERJ-6ENF1693V	Volume Production	Newark	51W9910	0.003	0.003
	0.025	1206 Resistor	R7	1	Turnkey		Panasonic	ERJ-8CWF025V		Mouser	667-ERJ-8CWF025V	0.57	0.57
	DMN6140L-13	MOSFET N-CH 60V 1.6A SOT23	Q3, Q4, Q5	3	Consignment		ON Semiconductor / Fairchild	FDN86501LZ		Mouser	512-FDN86501LZ	1.85	5.55
	22uf	1210 Capacitor	C7, C22, C23, C29, C30	5	Turnkey		Murata	GRM32ER61E226KE15L	Not Recommended for New Design	Mouser	81-GRM32ER61E226KE15	0.8	4
	1uf	805 Capacitor	C11	1	Turnkey		Murata	GRM216R61E105KA12D	Not Recommended for New Design	Arrow Electronics	GRM216R61E105KA12D	0.3514	0.3514
	22 uf		C37, C38, C45, C46	4	Turnkey		Murata	GRM219R61A226MEA00	Not Recommended for New Design	Digi-Key	490-9951-1-ND	0.5	2.2
	47uf	805 Capacitor	C55	1	Turnkey		Murata	GRT12BR60A76MET13L	Volume Production	Newark	64AJ4452	0.232	0.232
	INA201AIDGKR	IC CURRENT MONITOR 3.5% 8VSSOP	U2	1	Consignment		Texas Instruments	INA201AIDGKR	Volume Production	Mouser	595-INA201AIDGKR	2.91	2.91
	LM4128BMT-2.5	Precision Micropower Series Voltage Reference, 5-pin SOT-23	U4	1	Consignment		TI National Semiconductor	LM4128BD1MF2.5/NOPB	Volume Production	Digi-Key	296-LM4128BDQ1MF2.5/NOPBCT-ND	3.12	3.12
	LMP2021MFE/NOPB	Zero Drift, Low Noise, EMI Hardened Amplifier, 5-pin SOT-23, Pb-Free	U5, U7	2	Turnkey		TI National Semiconductor	LMP2021MFE/NOPB	Volume Production	Digi-Key	LMP2021MFE/NOPBCT-ND	3.71	7.42
	LMZ31707RVQT	Non-Isolated DC/DC Converters 7A Power Module w/ 2.95V-17V Input	U9, U14	2	Consignment	No Overage Available!	Texas Instruments	LMZ31707RVQT	Volume Production	Digi-Key	296-37136-1-ND		
	LTC4365CTS84TRMPBF	UV, OV and Reverse Supply Protection Controller, 2.5 to 34 V Vin, 8-pin SOT23 (TS8-8), 0 to 70 degC, Pb-Free, Mini Tape and Reel	U8	1	Turnkey		Analog Devices / Linear Technology	LTC4365CTS84TRMPBF	Volume Production	Mouser	584-C4365CTS84TRMPBF	4.52	4.52
	NIS5420		U6	1	Consignment		ON Semiconductor	NIS5420MT6TXG	Volume Production	Arrow Electronics	NIS5420MT6TXG	0.9963	0.9963
	3.01k		R16	1	Turnkey		Yageo	RC0402FR-073K01L	Volume Production	Mouser	603-RC0402FR-073K01L	0.01	0.1
	3.3k		RS2, RS4, RS7	3	Turnkey		Yageo	RC0402FR-073K3L	Volume Production	Mouser	603-RC0402FR-073K3L	0.014	0.14
	100hm	Chip Resistor, 10 Ohm, +/- 1%, 0.1 W, -55 to 155 degC, 0603 (1608 Metric), RoHS, Tape and Reel	R13	1	Turnkey		Yageo	RC0603FR-0710RL	Volume Production	Mouser	603-RC0603FR-0710RL	0.1	0.1
	90k	603 Resistor	R8, R9, R39	3	Turnkey		Yageo	RC0603FR-07390KL	Volume Production	Mouser	603-RC0603FR-07390KL	0.024	0.24
	0	603 Resistor	R47	1	Turnkey		Yageo	RC0603JR-070RL	Volume Production	Mouser	603-RC0603JR-070RL	0.1	0.1
	0	603 Resistor	R17, R20	2	Turnkey		Yageo	RC0603JR-070RP	Volume Production	Digi-Key	YAG1307CT-ND	0.1	0.2
	10k	805 Resistor	R6, R24, R27, R31	4	Turnkey		Yageo	RC0805FR-0710KL	Volume Production	Newark	85K1799	0.006	0.024
	5.5k	805 Resistor	R19	1	Turnkey		Yageo	RC0805FR-07536RL	Volume Production	Digi-Key	311-536KCT-ND	0.1	0.1
	1k	805 Resistor	R4	1	Turnkey		Susumu	RG2012P-102-B-15	Volume Production	Mouser	754-RG2012P-102-B-15	0.37	0.37
	5	805 Resistor	R35	1	Turnkey		Cyntec	RLT1220-F-SR00-FNH		Digi-Key	2037-BLT1220-F-SR00-FNHCT-ND	0.52	0.52
	10	805 Resistor	R5	1	Turnkey		Stackpole Electronics	RNCF0805AKT10R0	Volume Production	Arrow Electronics	RNCF0805AKT10R0	0.9082	0.9082
	19k	805 Resistor	R22	1	Turnkey		TE Connectivity	RP73PF2A1968BTFD	Volume Production				
	62k	805 Resistor	R2	1	Turnkey		Susumu	RR1220P-623-D	Volume Production	Digi-Key	RR1220P-623-D	0.1	0.1
	2.32k	805 Resistor	R33	1	Turnkey		Susumu	RR1220P-2321-D-M	Volume Production	Mouser	754-RR1220P-2321-D-M	0.1	0.1
	4.75k	603 Resistor	R48	1	Turnkey		Yageo	RT0603BRD074K75L	Volume Production	Mouser	603-RT0603BRD074K75L	0.32	0.32
	3.3uH	Bourns SRP0520 3.3uH 4.8A Inductor	L1	1	Turnkey		Bourns	SRP0520-3R3K	Volume Production	Arrow Electronics	SRP0520-3R3K	0.5721	0.5721
	249 kH	603 Resistor	R49	1	Turnkey		Vishay Dale	TNPW0603249KBEEA		Avnet	05R2341	0.143	0.143
	TPSM53603RDAR	36-V, 3-A step-down power module in small 5.5 x 5 x 4-mm Enhanced HotRod™ QFN with simple footprint	U15, U17	2	Consignment	No Overage Available!	Texas Instruments	TPSM53603RDAR	Volume Production	Digi-Key	296-TPSM53603RDARCT-ND		
	1uf	603 Capacitor	C4	1	Turnkey		Taiyo Yuden	UMK107B105KA-T	Volume Production	Digi-Key	587-2400-1-ND	0.18	0.18
	2.5k	805 Resistor	R25	1	Turnkey		VPG Foil Resistors	Y16292K5000019R	Volume Production	Digi-Key	Y1629-2.50KACT-ND	8.38	8.38
	10uf	603 Capacitor	C35, C36, C43, C44	4	Turnkey		Murata	Z8B18AR1E106ME01L	Volume Production	Newark	03AC4785	0.167	0.668
	FDS8960C	MOSFET pair	Q1, Q2	2	Consignment		Diodes	ZXMC3F1DN8TA		Mouser	522-ZXMC3F1DN8TA	0.78	1.56