

RP2040 Robotic Arm Controller

PROJECT FILES



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PROJECT DETAILS

Project name:

RP2040 Robotic Arm Controller

Project description:

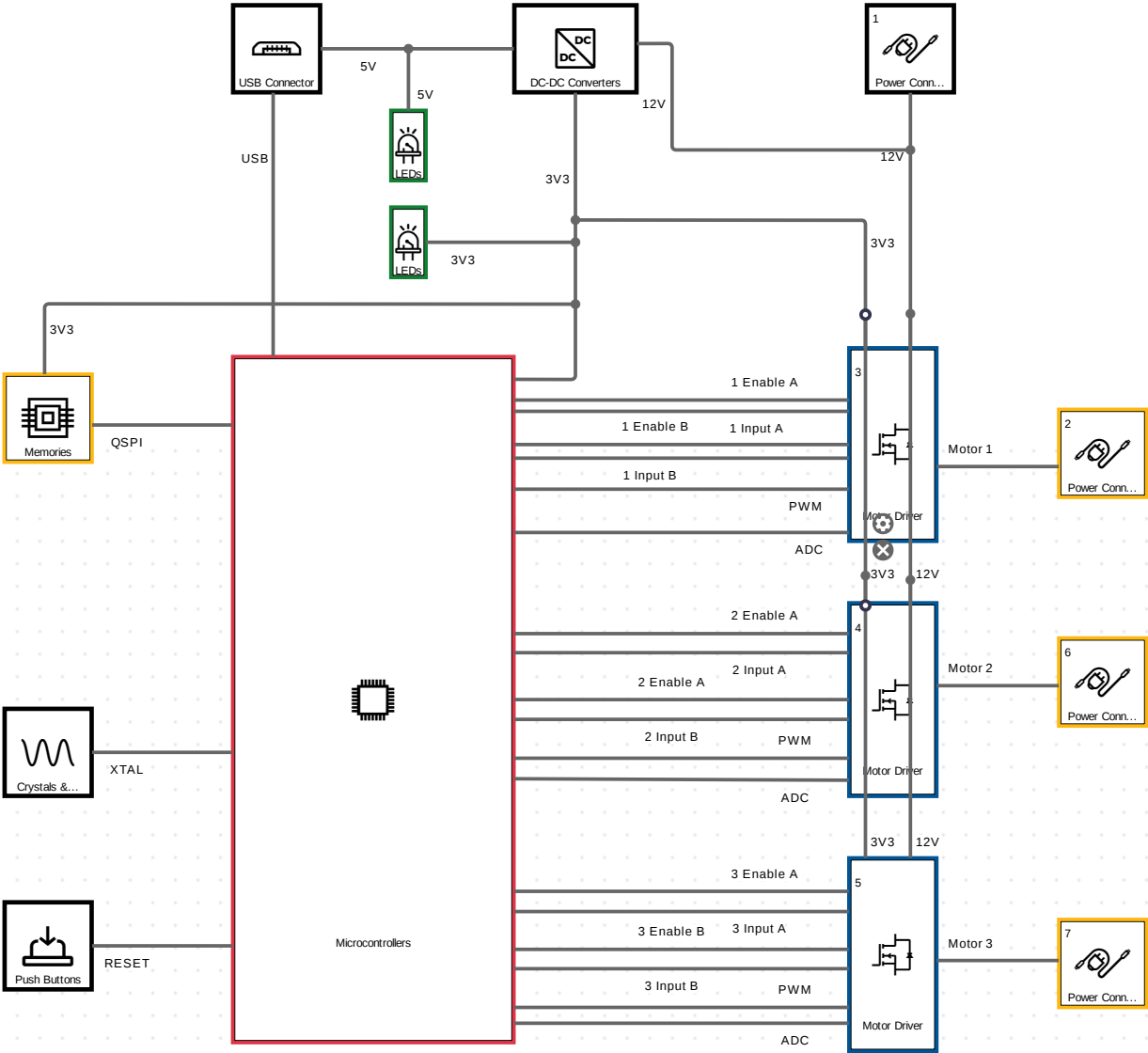
Tinker with the capacity of Raspberry Pi's first MCU, the RP2040 in combination with a dual Half Bridge Motor Driver from STMicroelectronics and control 3 DC Motors powered with 12V

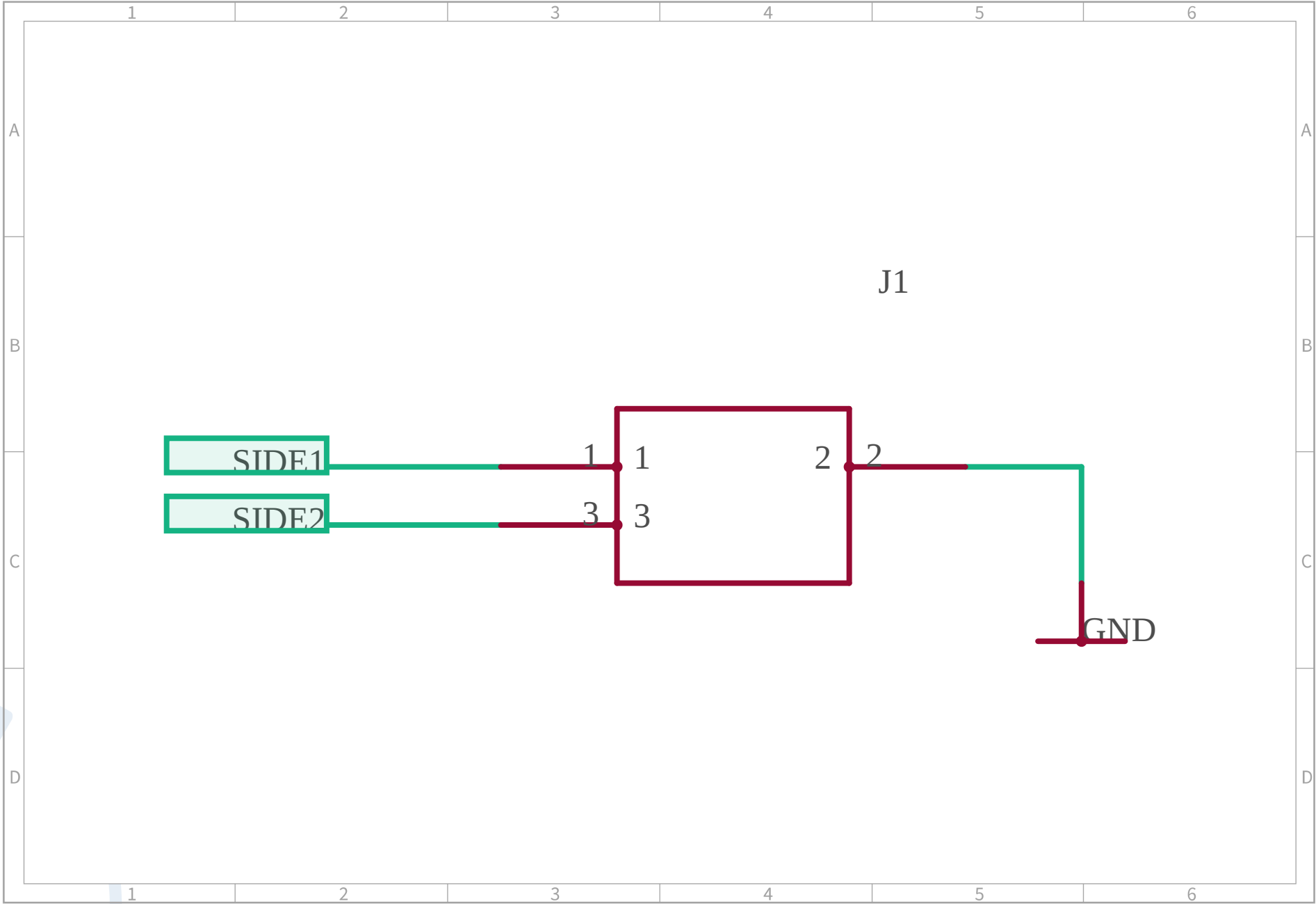
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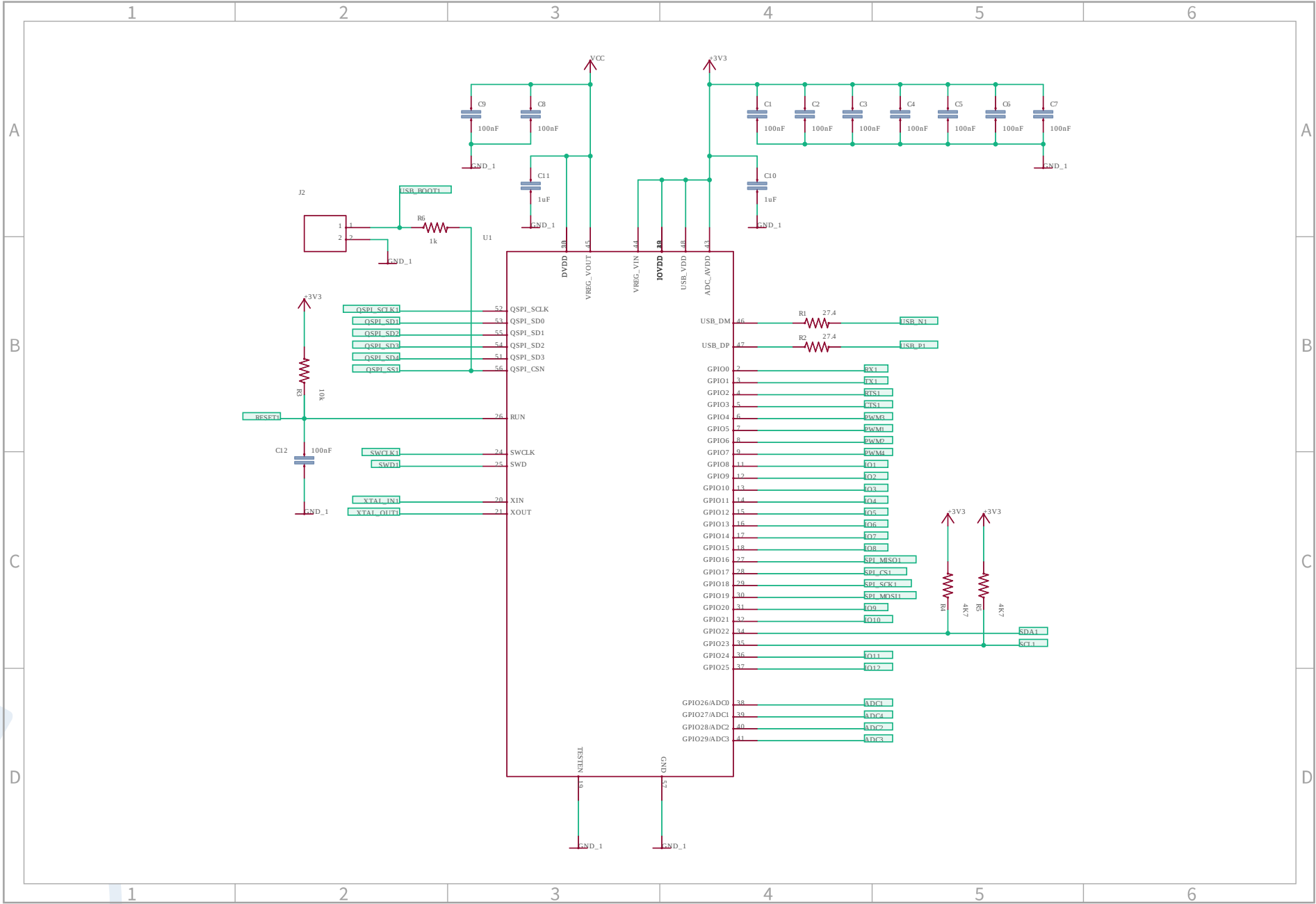
Eagle

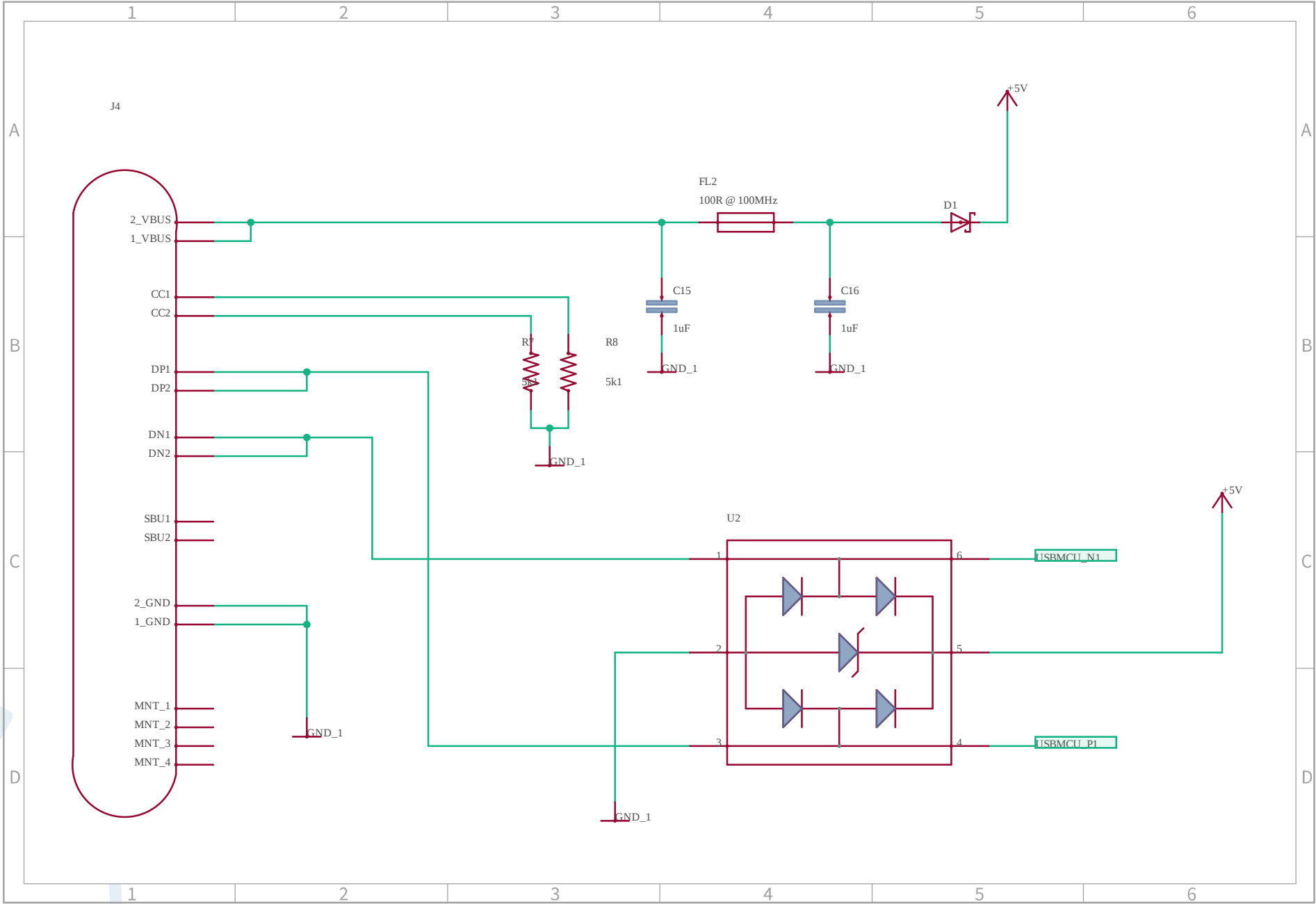
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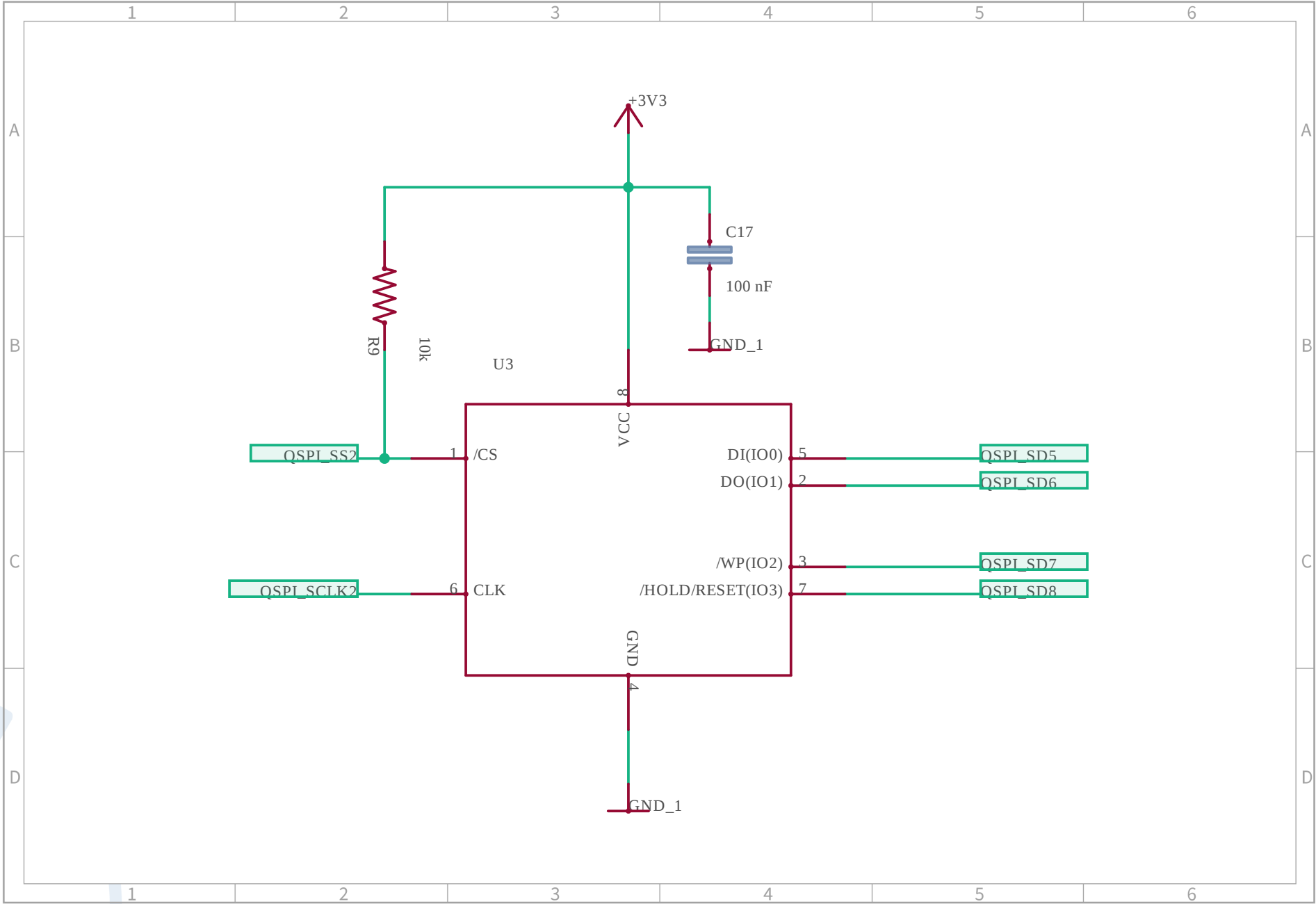
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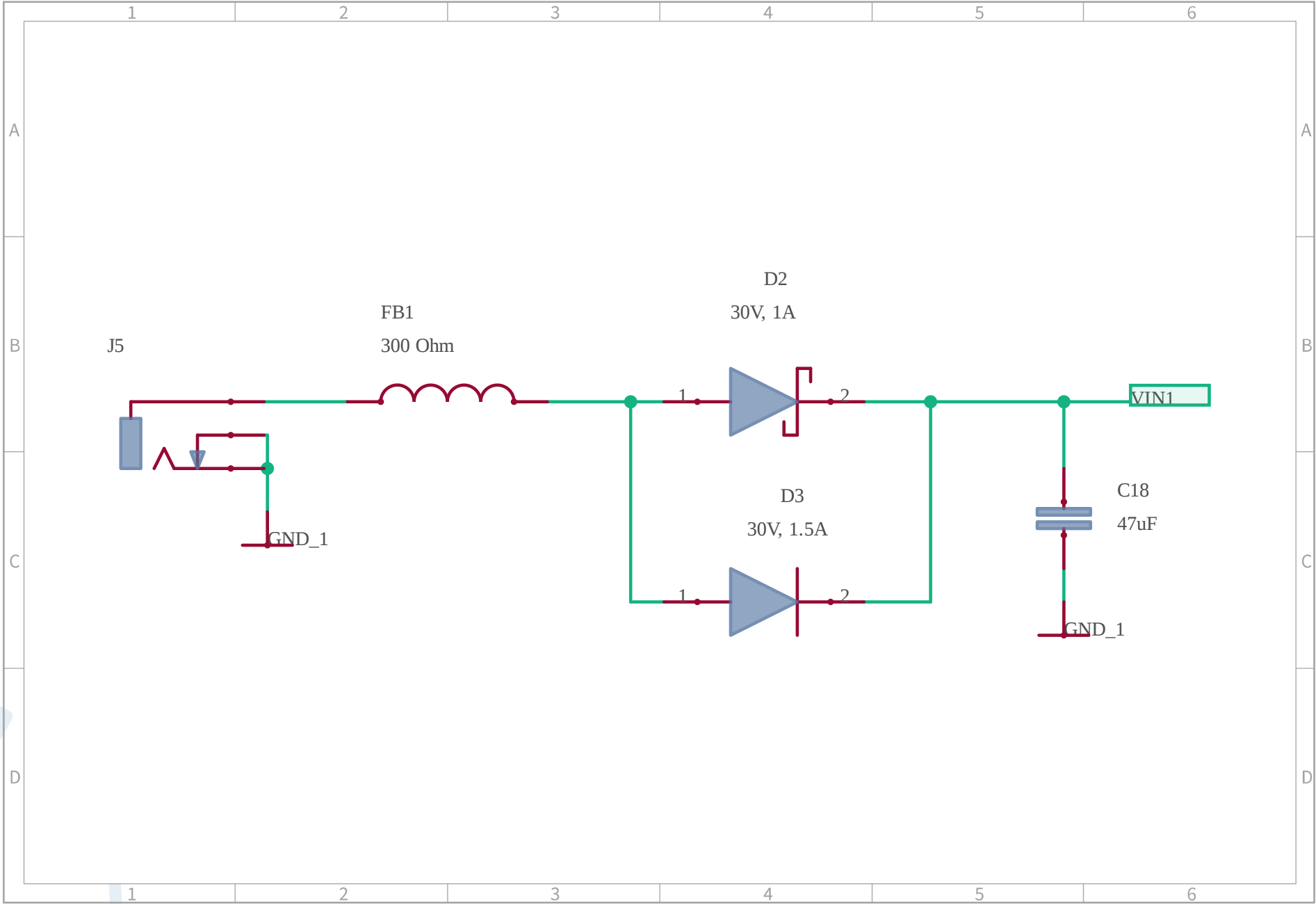


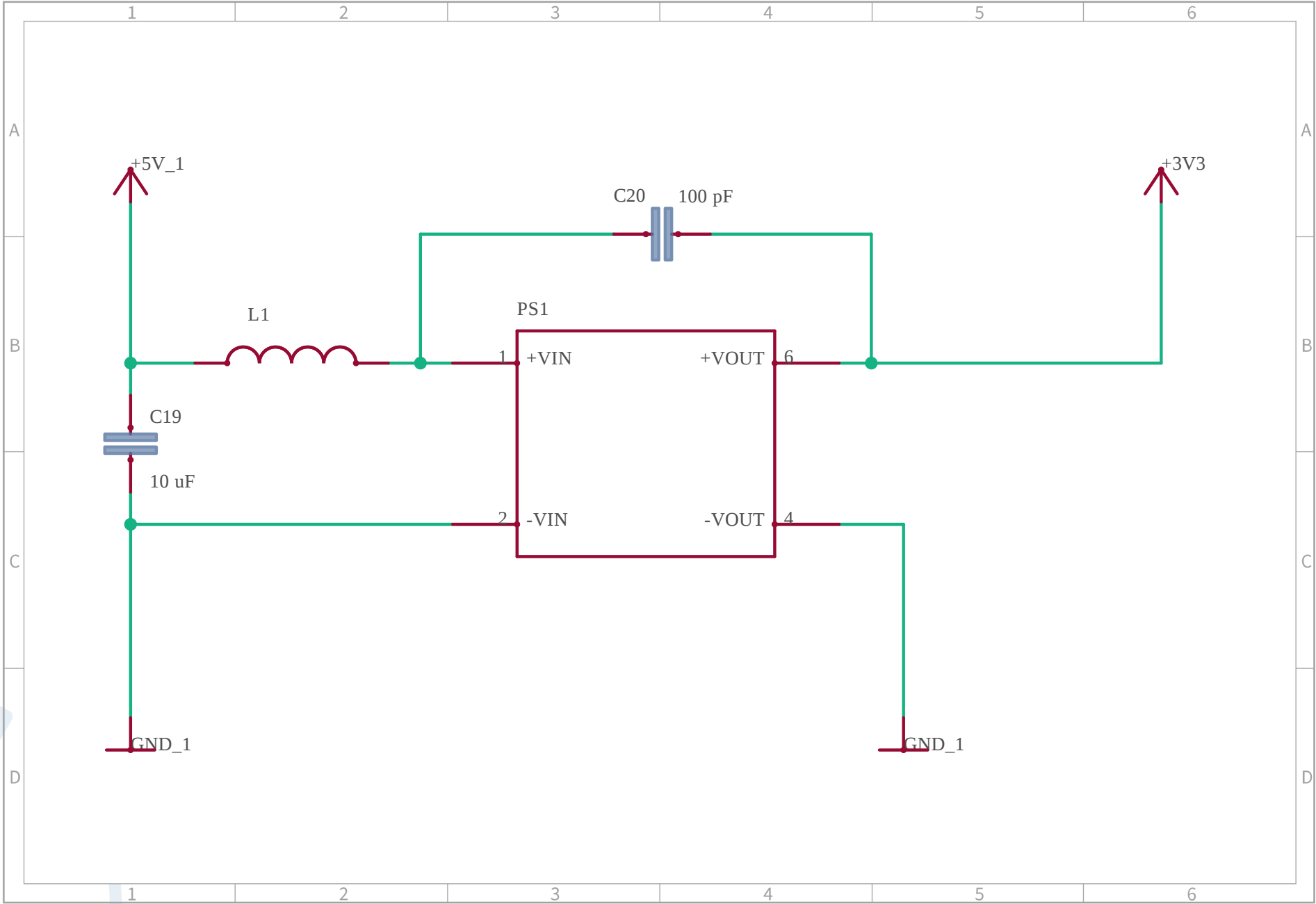


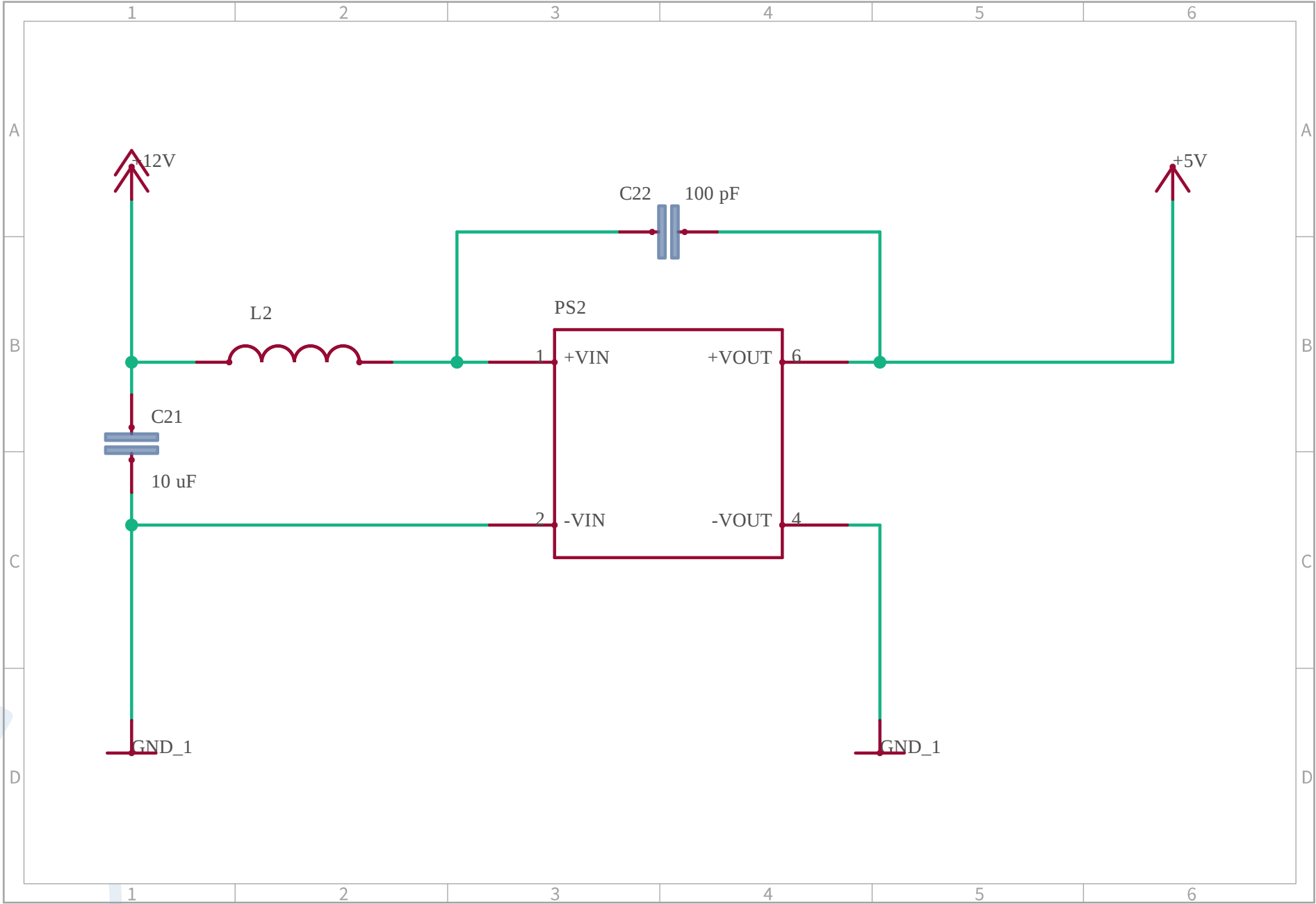


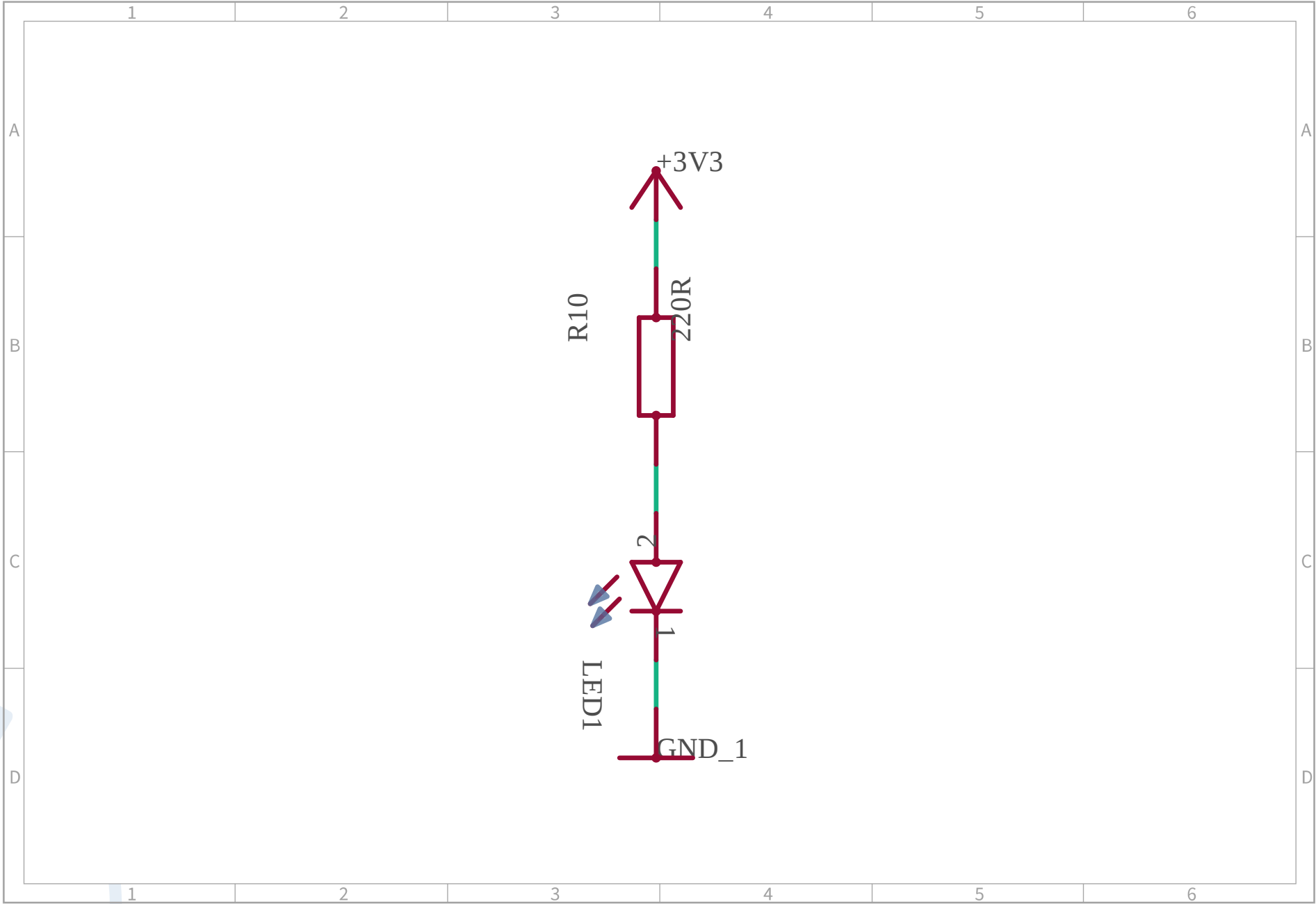


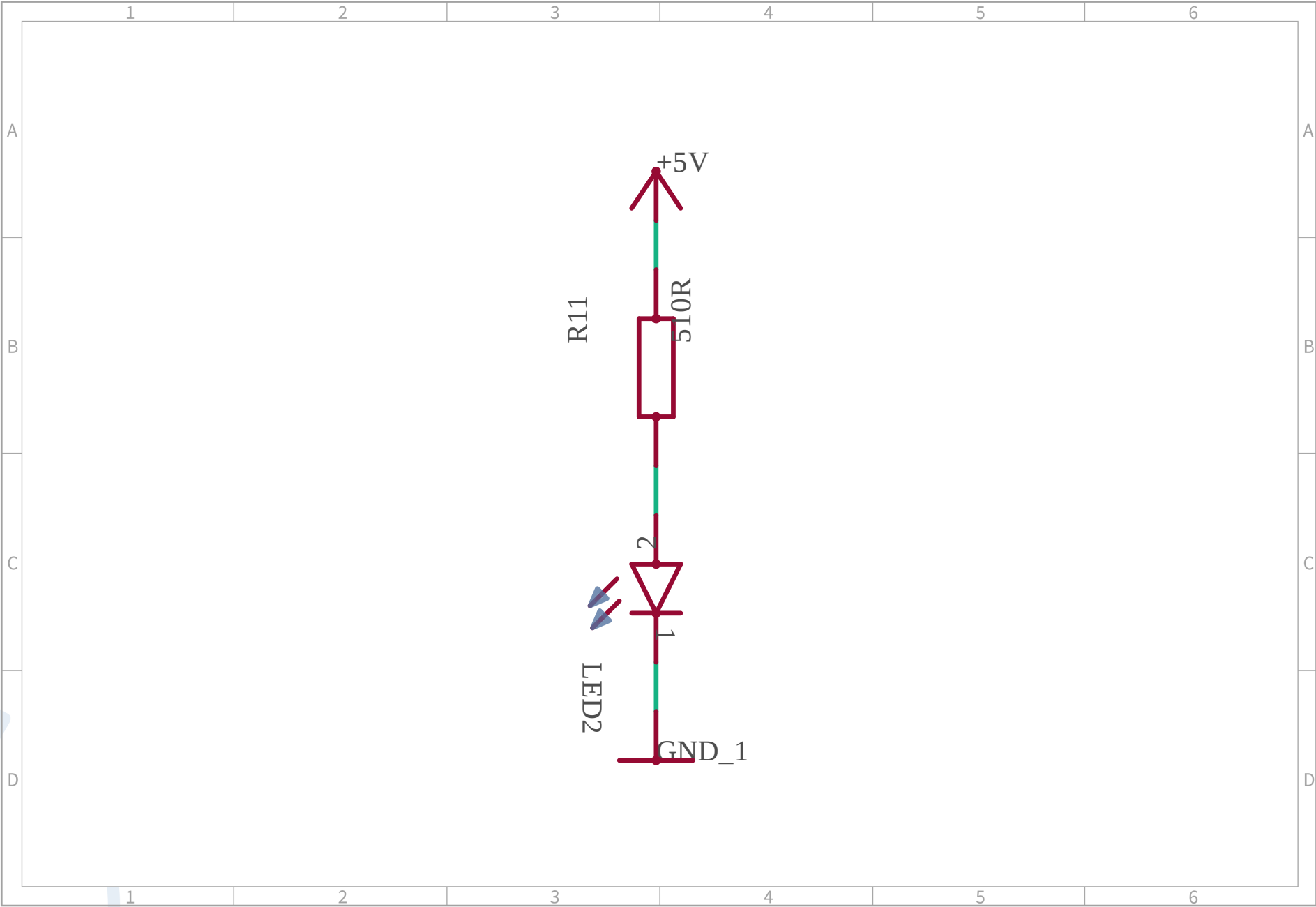


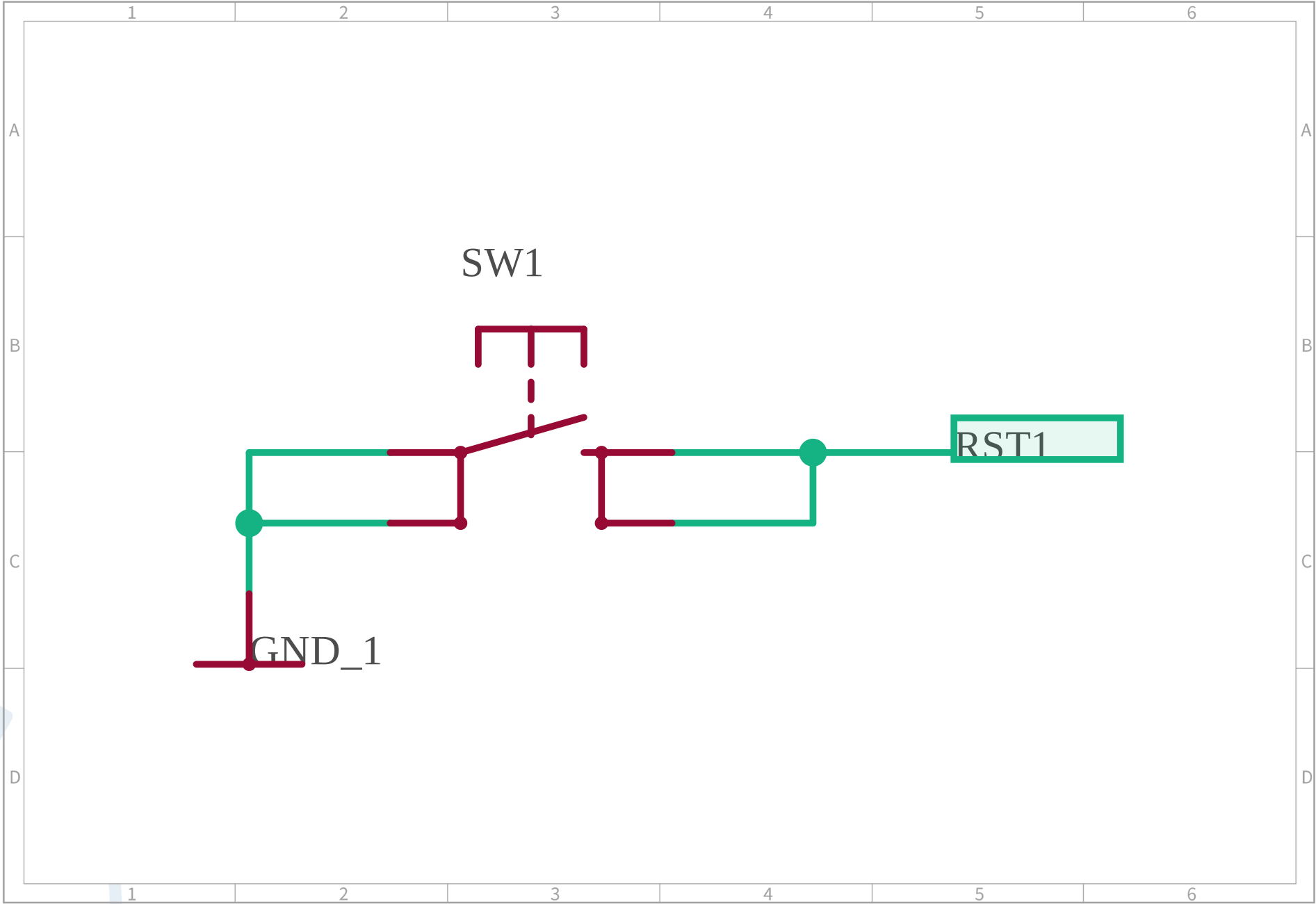


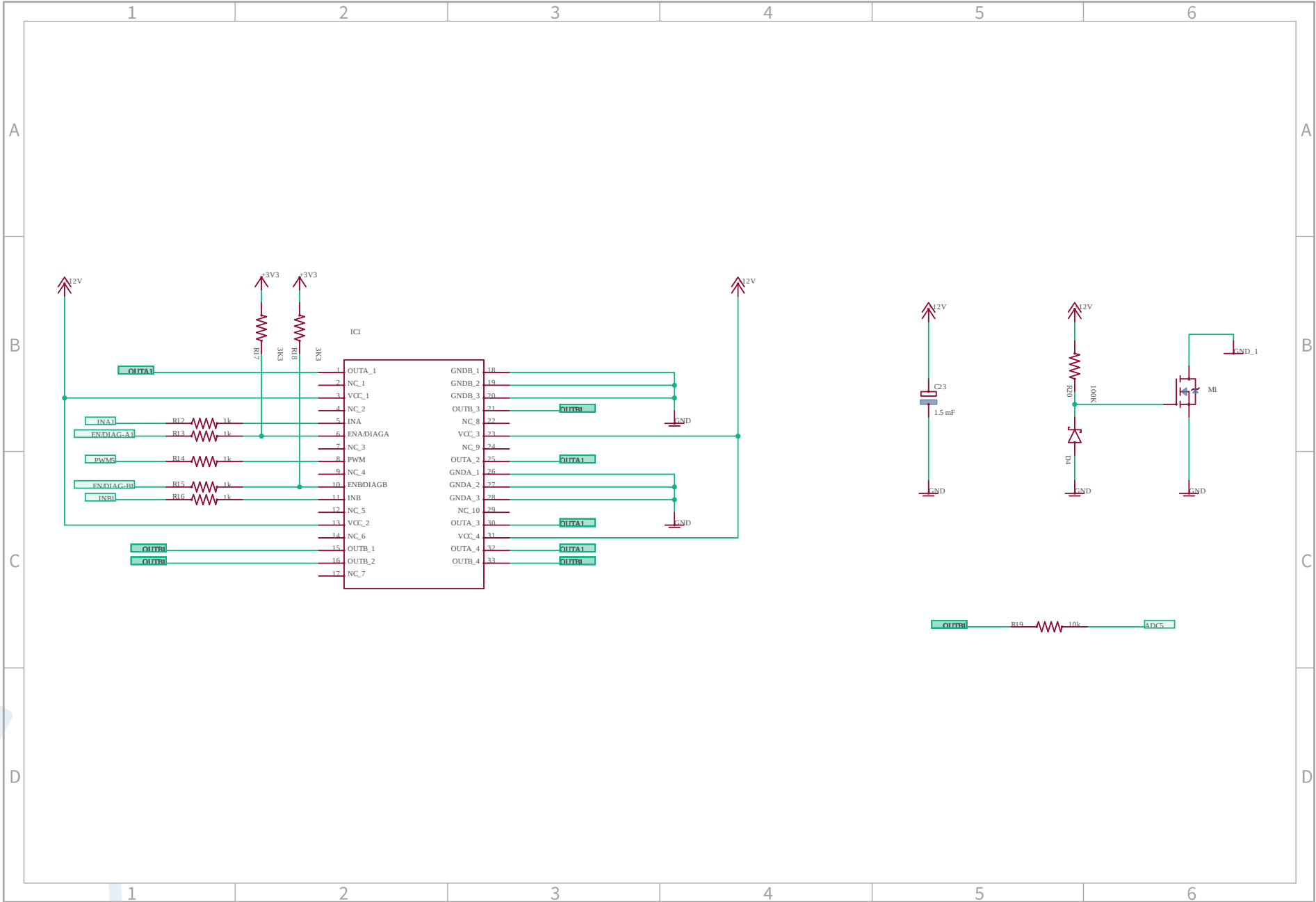


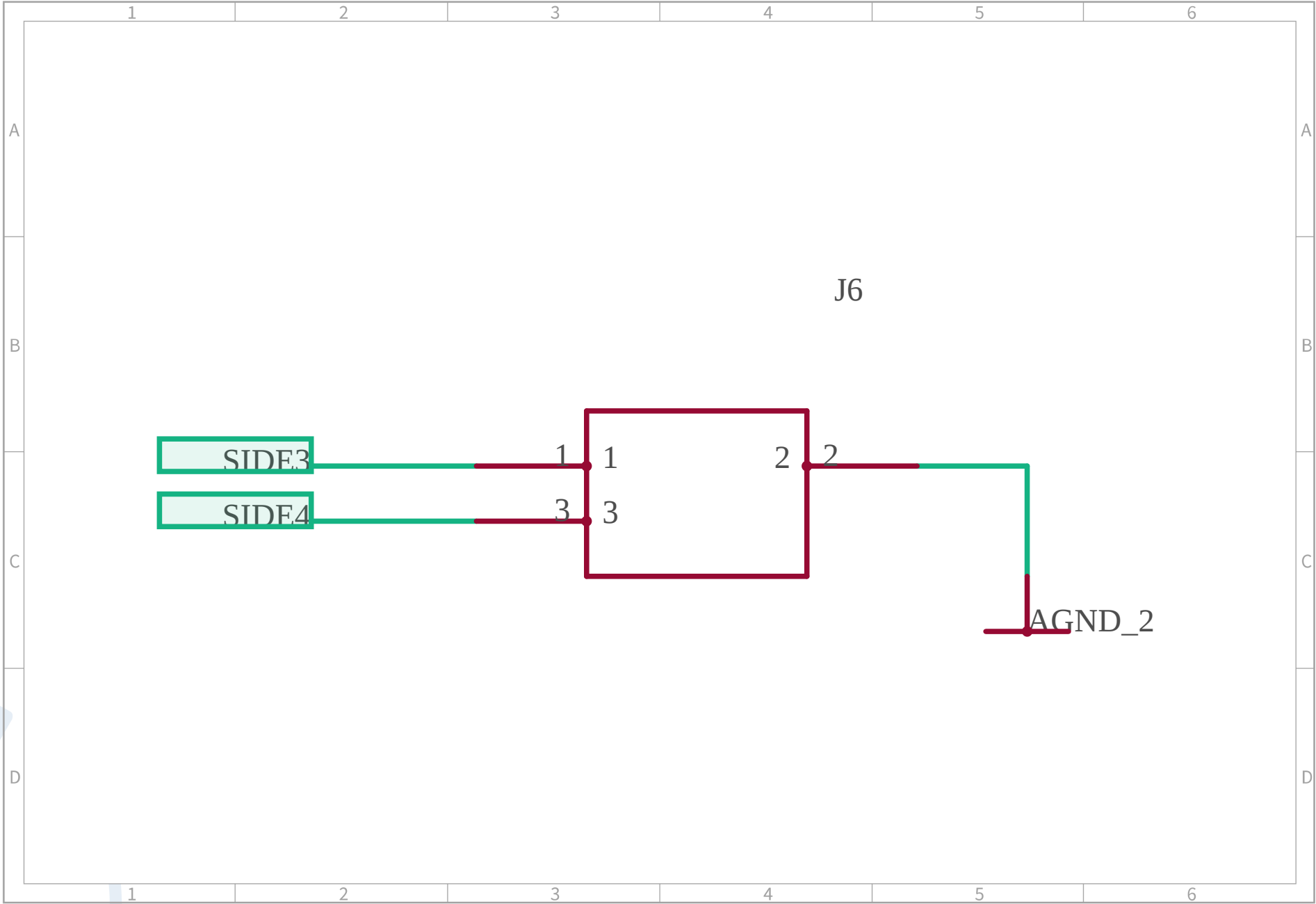


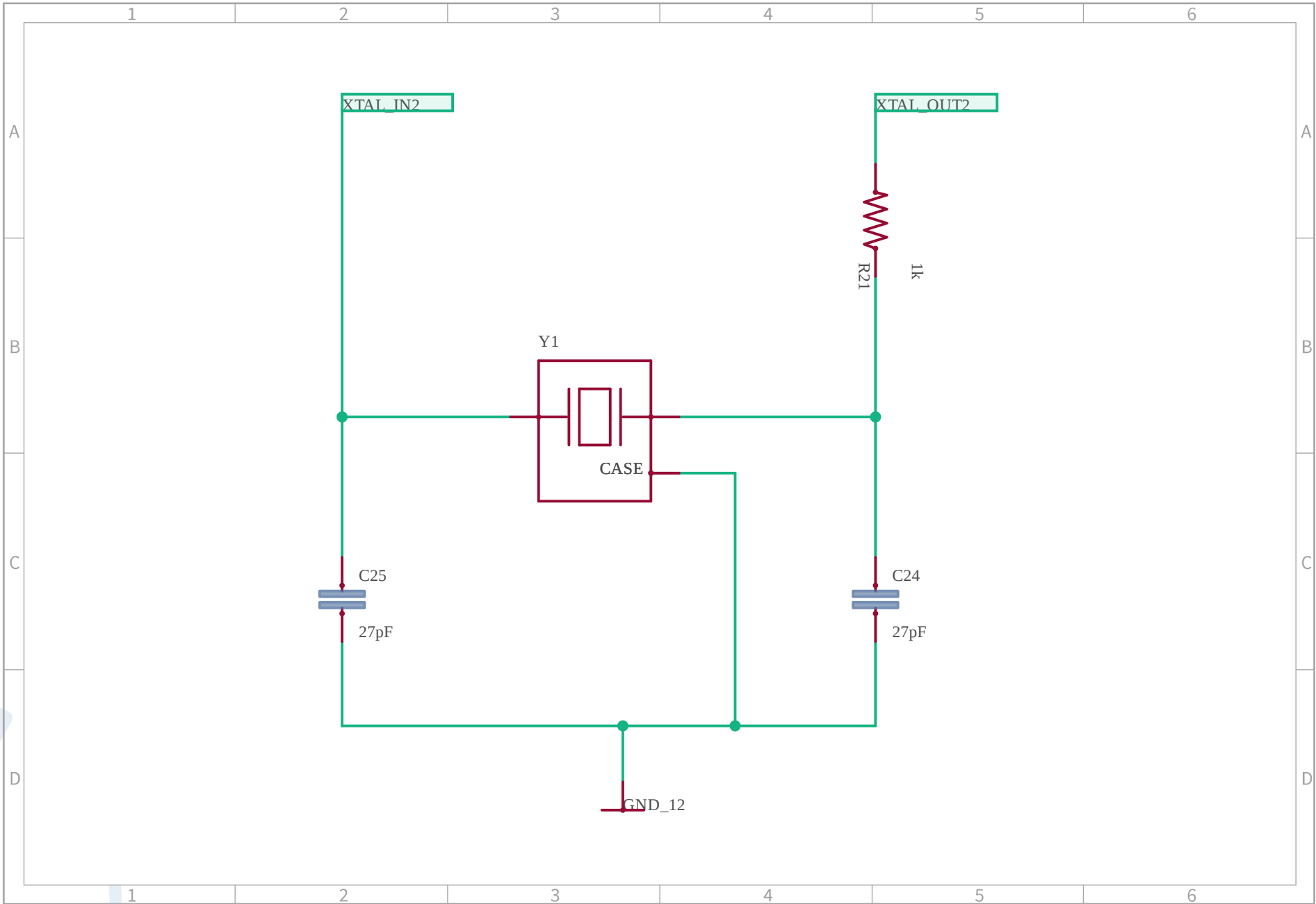


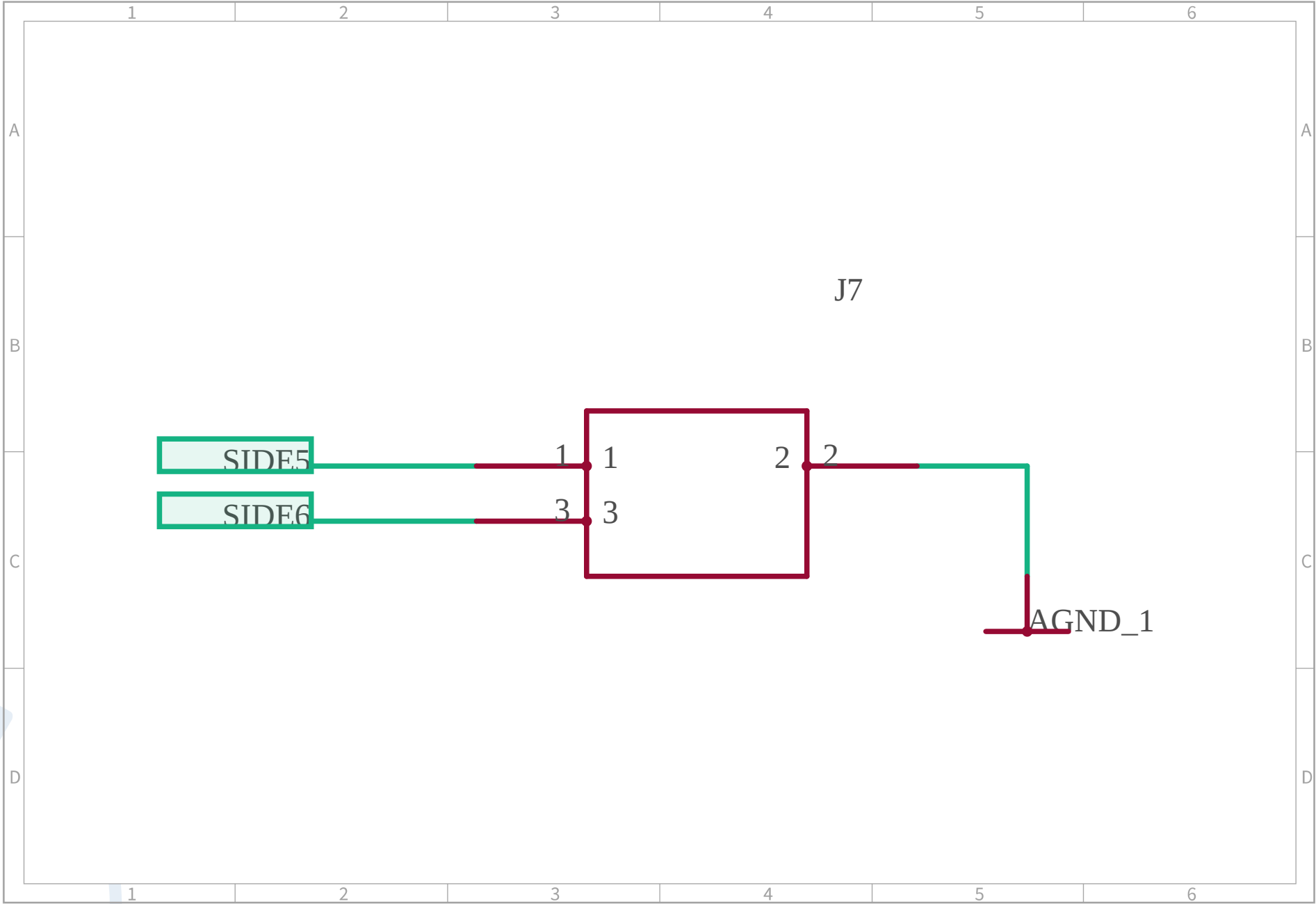


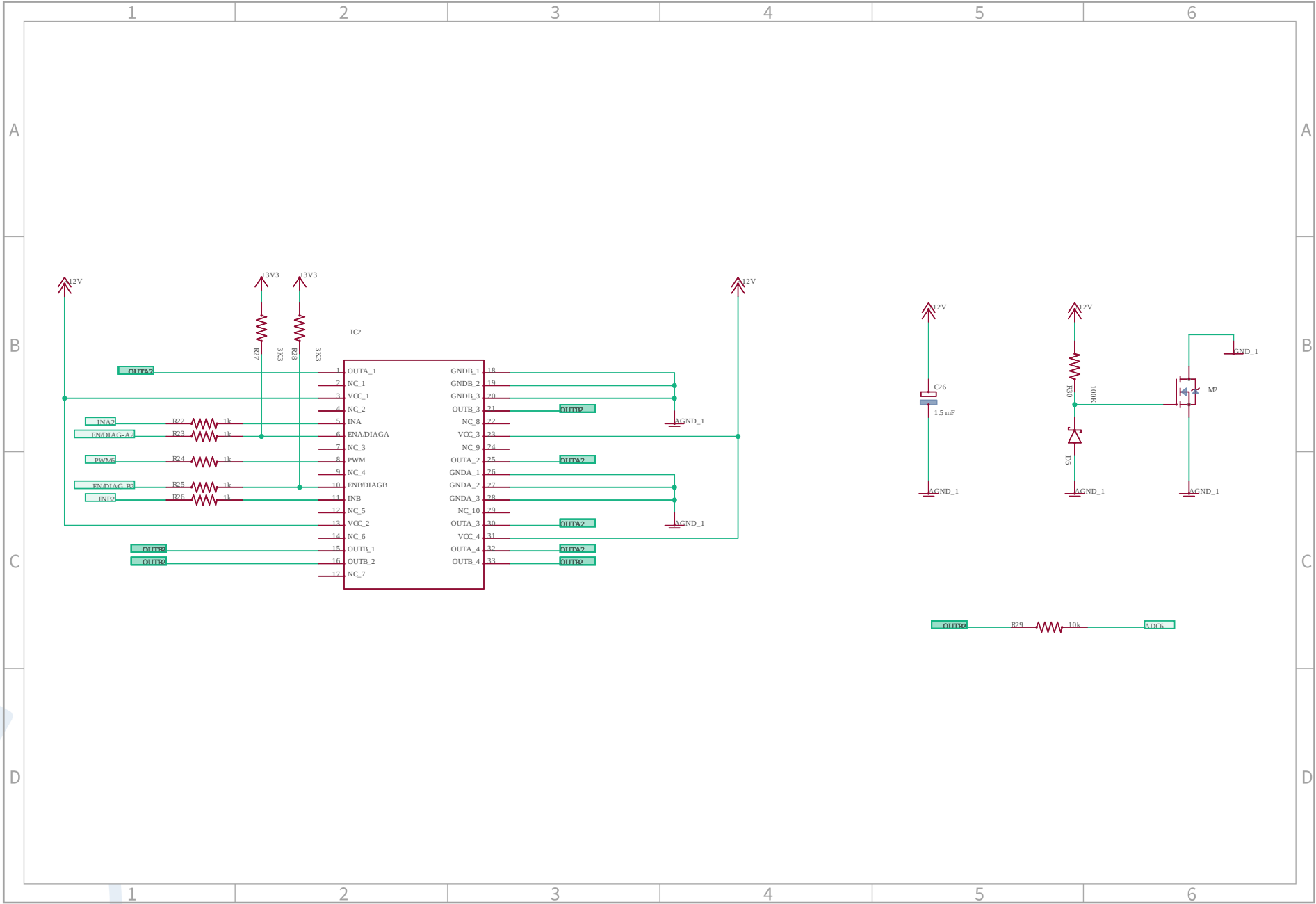


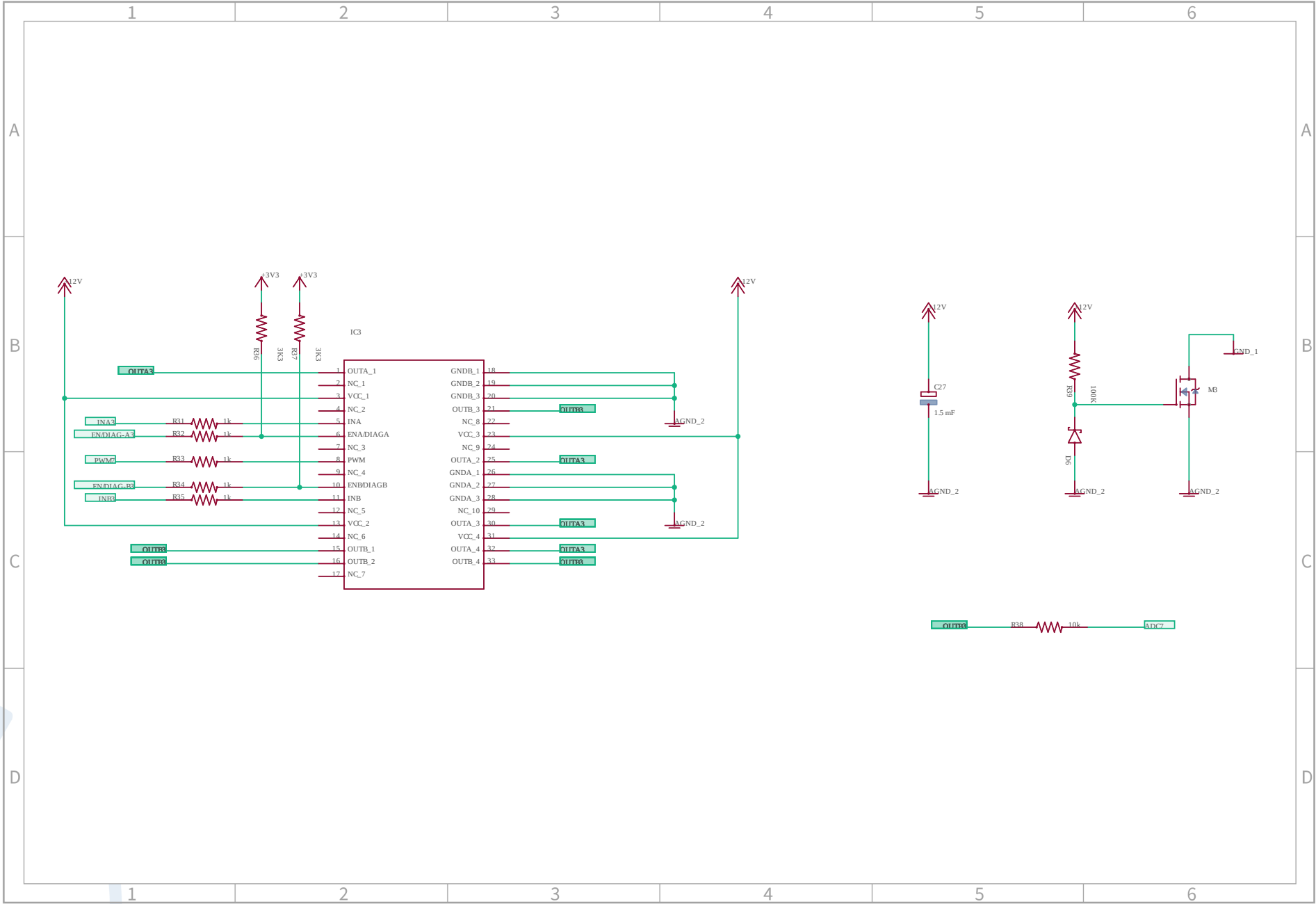


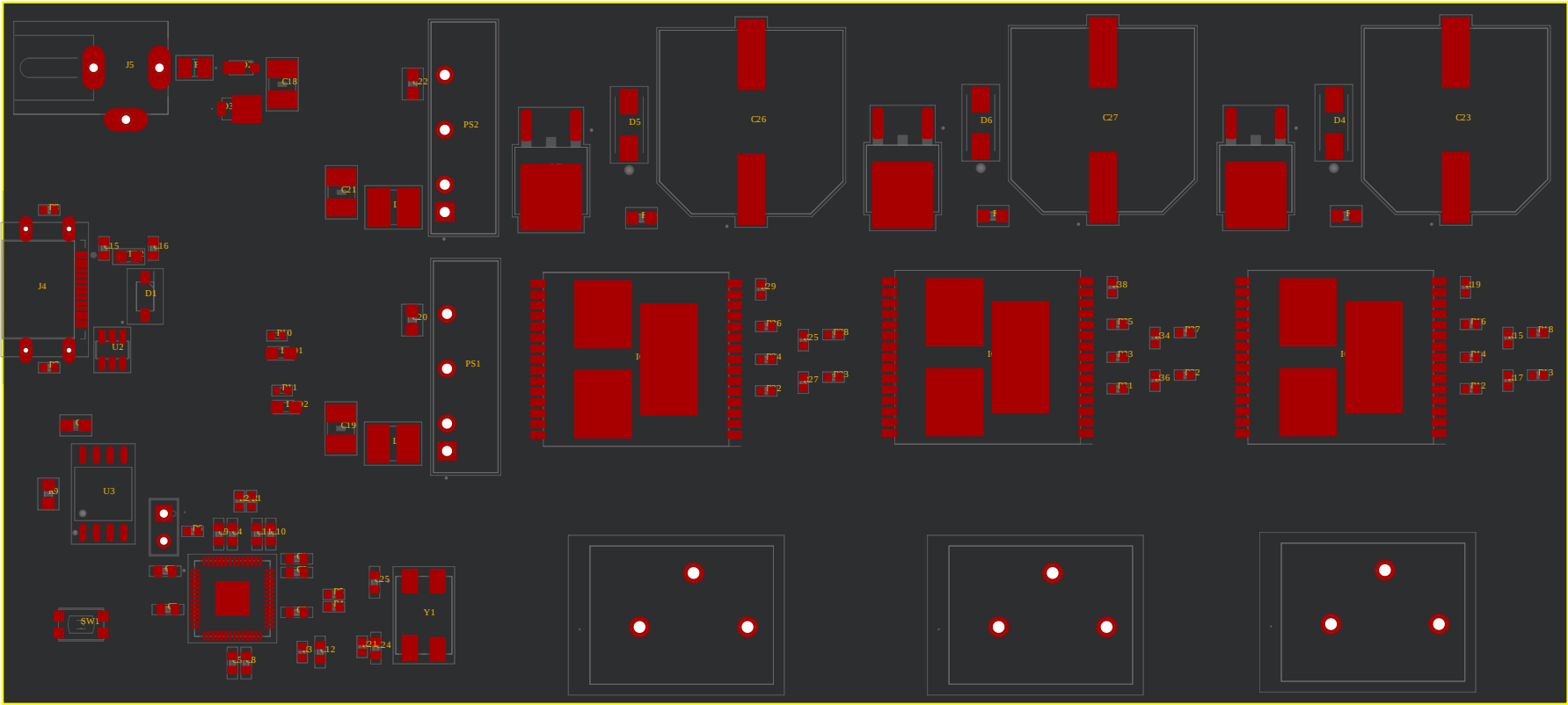


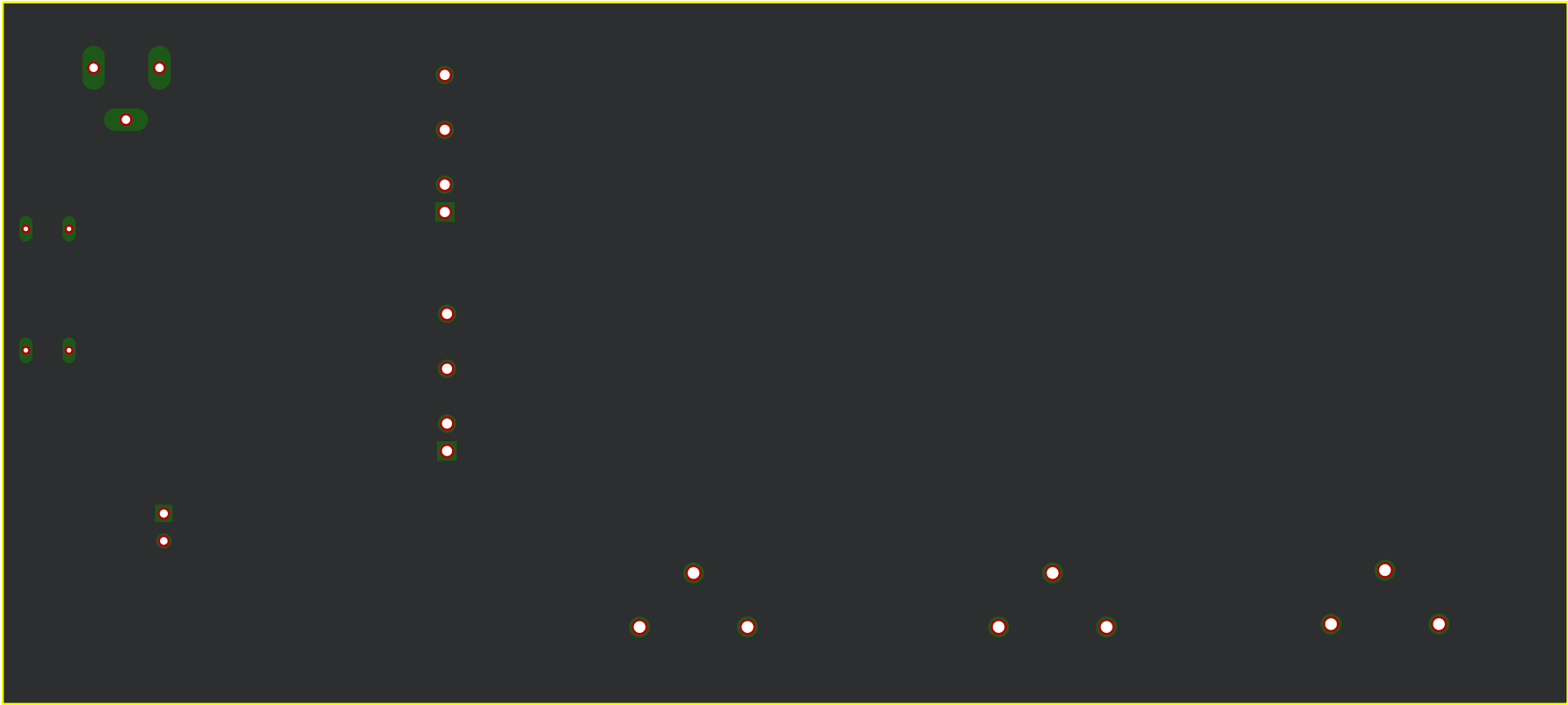


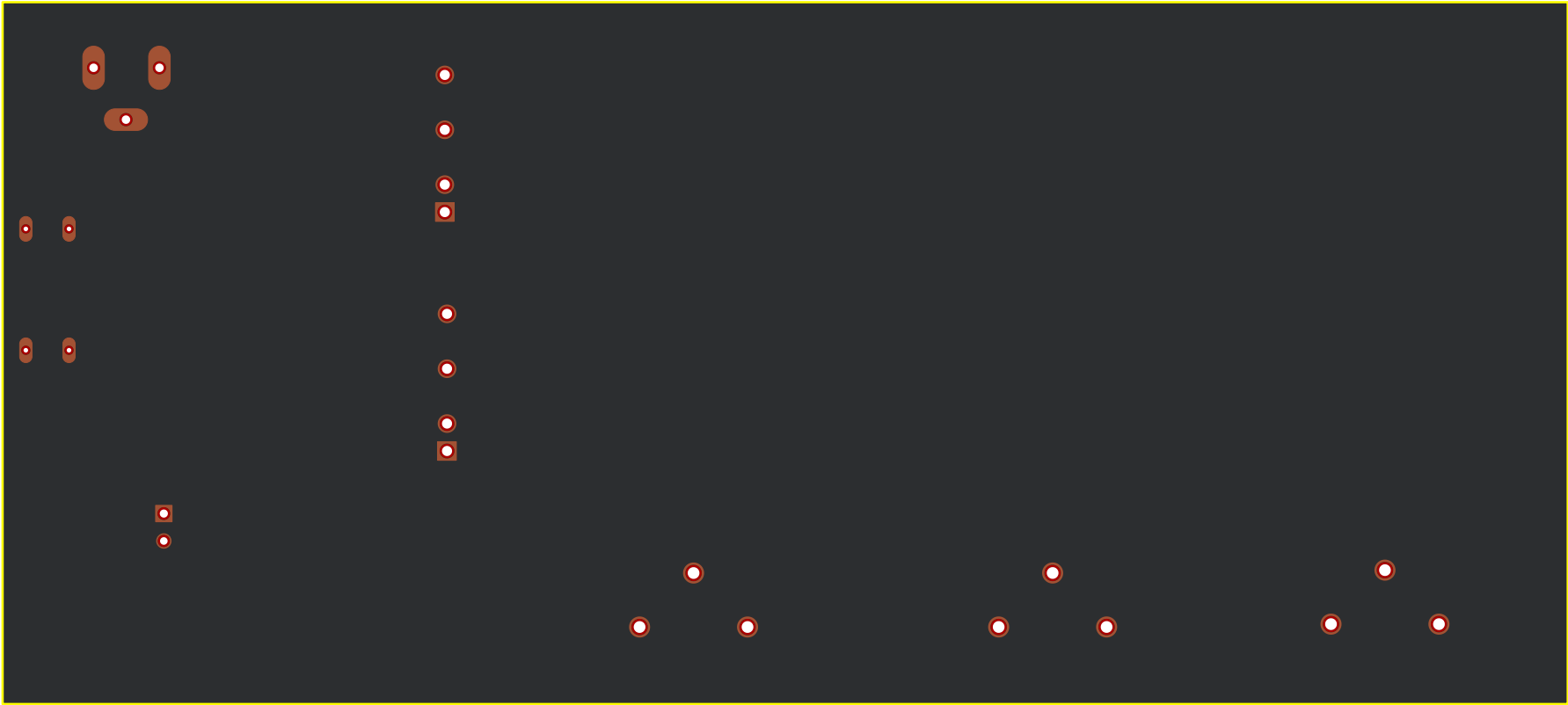


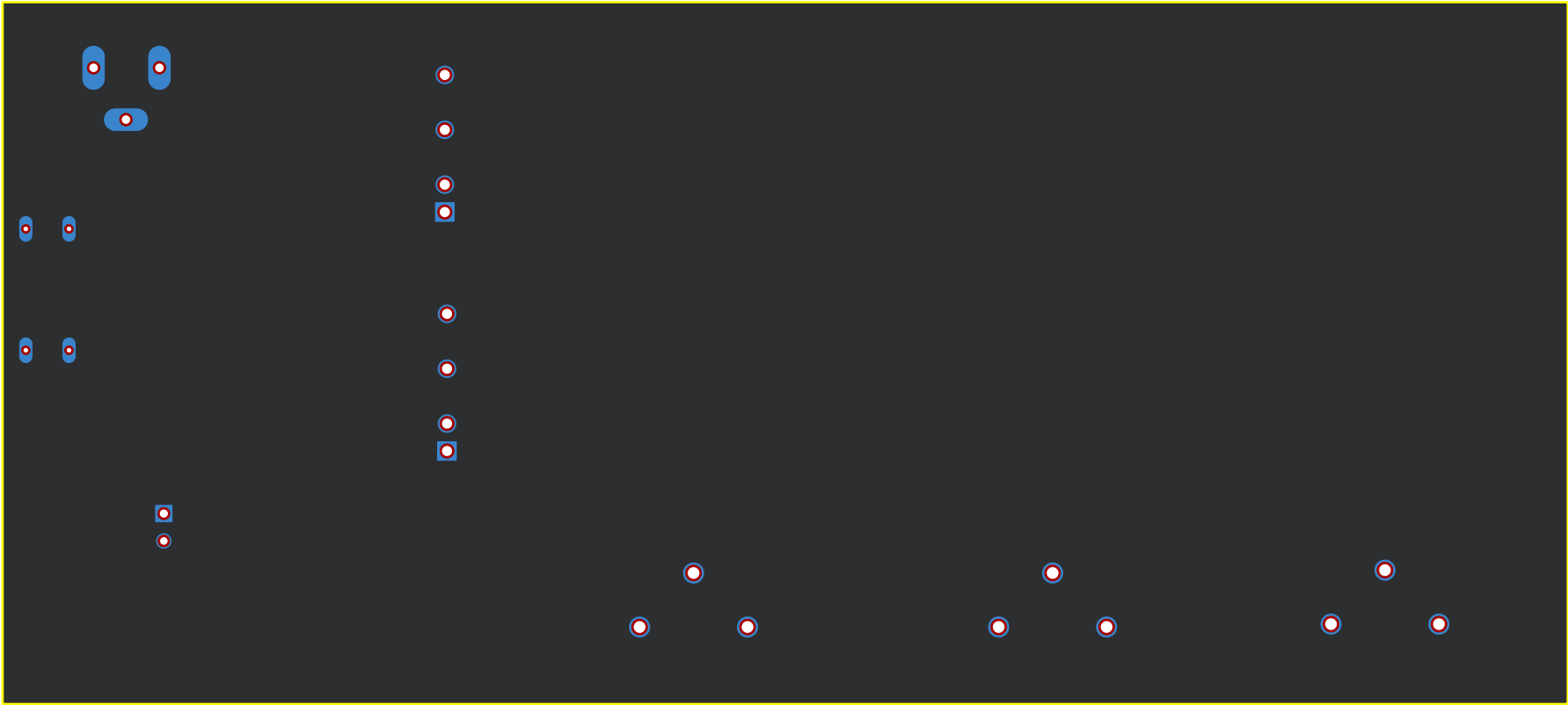












Part	Value	Package	Description	Man. P/N	Man. Name
J1			Terminal Block RCP 3 POS 5mm Solder ST Thru-Hole 10A	1-2834014-3	TE Connectivity
C1	100nF	0402	Multilayer Ceramic Capacitor 0.1 uF 10 V +/- 10% X5R	0402ZD104KAT2A	KYOCERA AVX
C2	100nF	0402	Multilayer Ceramic Capacitor 0.1 uF 10 V +/- 10% X5R	0402ZD104KAT2A	KYOCERA AVX
C3	100nF	0402	Multilayer Ceramic Capacitor 0.1 uF 10 V +/- 10% X5R	0402ZD104KAT2A	KYOCERA AVX
C4	100nF	0402	Multilayer Ceramic Capacitor 0.1 uF 10 V +/- 10% X5R	0402ZD104KAT2A	KYOCERA AVX
C5	100nF	0402	Multilayer Ceramic Capacitor 0.1 uF 10 V +/- 10% X5R	0402ZD104KAT2A	KYOCERA AVX
C6	100nF	0402	Multilayer Ceramic Capacitor 0.1 uF 10 V +/- 10% X5R	0402ZD104KAT2A	KYOCERA AVX
C7	100nF	0402	Multilayer Ceramic Capacitor 0.1 uF 10 V +/- 10% X5R	0402ZD104KAT2A	KYOCERA AVX
C8	100nF	0402	Multilayer Ceramic Capacitor 0.1 uF 10 V +/- 10% X5R	0402ZD104KAT2A	KYOCERA AVX
C9	100nF	0402	Multilayer Ceramic Capacitor 0.1 uF 10 V +/- 10% X5R	0402ZD104KAT2A	KYOCERA AVX
C10	1uF	0402	0402 1 uF 16 V +/- 10 % Tolerance X5R Surface Mount Multilayer Cera...	0402YD105KAT2A	KYOCERA AVX
C11	1uF	0402	0402 1 uF 16 V +/- 10 % Tolerance X5R Surface Mount Multilayer Cera...	0402YD105KAT2A	KYOCERA AVX
C12	100nF	0402	Multilayer Ceramic Capacitor 0.1 uF 10 V +/- 10% X5R	0402ZD104KAT2A	KYOCERA AVX
R1	27.4	0402	Res Thick Film 0402 27.4 Ohm 1% 1/16W +/-100ppm/ Deg C	RC0402FR-0727R4L	Yageo
R2	27.4	0402	Res Thick Film 0402 27.4 Ohm 1% 1/16W +/-100ppm/ Deg C	RC0402FR-0727R4L	Yageo
R3	10k	0402	Res Thick Film 0402 10K Ohm 1% 1/16W +/-100ppm/ Deg C	RC0402FR-0710KL	Yageo
R4	4.7K	0402	Res Thick Film 0402 4.7K Ohm 1% 1/16W +/-100ppm/ Deg C	RC0402FR-074K7L	Yageo
R5	4.7K	0402	Res Thick Film 0402 4.7K Ohm 1% 1/16W +/-100ppm/ Deg C	RC0402FR-074K7L	Yageo
R6	1k	0402	Res Thick Film 0402 1K Ohm 1% 1/16W +/-100ppm/ Deg C	RC0402FR-071KL	Yageo
U1		QFN56	RP2040 chip for Raspberry Pi Pico - ARM Cortex-M0+ MCU 32-Bit	RP2040	Raspberry Pi
J2	1x2		Conn Unshrouded Header HDR 2 POS 2.54mm Solder ST Top Entry T...	22285024	Molex
J3			USB-C USB 2.0 Receptacle Connector 24 (16+8 Dummy) Position Sur ...	216990-0002	Molex
R7	5k1	0402	Res SMD 5.1K Ohm 5% 1/5W 0402	CRCW04025K10JNEDHP	Vishay
R8	5k1	0402	Res SMD 5.1K Ohm 5% 1/5W 0402	CRCW04025K10JNEDHP	Vishay
C13	1uF	0402	0402 1 uF 16 V +/- 10 % Tolerance X5R Surface Mount Multilayer Cera...	0402YD105KAT2A	KYOCERA AVX
C14	1uF	0402	0402 1 uF 16 V +/- 10 % Tolerance X5R Surface Mount Multilayer Cera...	0402YD105KAT2A	KYOCERA AVX
D1		SOD-123	BAT54T1 Series 30 V 600 mA Surface Mount Schottky Barrier Diode - ...	BAT54T1G	onsemi
FL1	100R @100MHz	0603	Ferrite Beads Multi-Layer 100Ohm 25% 100MHz 3A 30mOhm DCR 0603	BLM18KG101TN1D	Murata

Part	Value	Package	Description	Man. P/N	Man. Name
U2		SOT-23-6	USBLC6 Series 2 Line 6 V Uni / Bi-Directional ESD Protection - SOT-23-6	USBLC6-2SC6	STMicroelectronics
C17	100 nF	0603	Multilayer Ceramic Capacitor 0.1 uF 16 V +/- 10% X5R	0603YD104KAT2A	KYOCERA AVX
U3	W25Q128JVSQ	SOIC-8	FLASH - NOR Memory IC 128Mb (16M x 8) SPI - Quad I/O, QPI, DTR ...	W25Q128JVSQ	Winbond Electronics
R9	10k	0603	Res Thick Film 0603 10K Ohm 1% 0.33W(1/3W) +/-100ppm/C	CRCW060310K0FKEAHP	Vishay
C18	47uF	1210	47uF, 10V, 10%, 1210, SMD capacitor X7R	GRM32ER71A476KE15L	Murata Electronics
D2	30V, 1A	DO-219AD-2	Diode Schottky, 30V, 1A, 2-Pin	MSS1P3L-M3_89A	Vishay
D3	30V, 1.5A	DO-220AA	Diode Schottky, 30V, 1.5A, 2-Pin SMP T/R	SS1P3L-M3_85A	Vishay
FB1	300 Ohm	0805	EMI Filter Beads, Chips & Arrays Impedance 30ohms IDC 3.0	MH2029-300Y	Bourns
J5		0805	Power Barrel Connector Jack 2.10mm ID (0.083")	151-7620E-E	5.50mm OD (0.217") Through Hole
C19	10 uF	1210	10uF, 50V, +/-10%, 1210 (3225 Metric), Ceramic Capacitor X7R	12105C106KAT2A	KYOCERA AVX
C20	100 pF	0603	100pF, +/-5%, 50V, Ceramic Capacitor C0G, NP0 0603 (1608 Metric)	C1608C0G1H101J080AA	TDK
L1	22 uH	1812	22 UH 630 mA Surface Mount Unshielded Wirewound Inductor	RLS-226-R	Recom Power
PS1		SIP-7	1W DC/DC-Converter 'ECONOLINE' SIP7 1kV unreg; V. In: 05; V. Out: ...	RE-053.3S	Recom Power
C21	10 uF	1210	10uF, 50V, +/-10%, 1210 (3225 Metric), Ceramic Capacitor X7R	12105C106KAT2A	KYOCERA AVX
C22	100 pF	0603	100pF, +/-5%, 50V, Ceramic Capacitor C0G, NP0 0603 (1608 Metric)	C1608C0G1H101J080AA	TDK
L2	22 uH	1812	22 UH 630 mA Surface Mount Unshielded Wirewound Inductor	RLS-226-R	Recom Power
PS2		SIP-7	1W DC/DC-Converter 'ECONOLINE' SIP7 4kV unreg; V. In: 12; V. Out: ...	RE-1205S	Recom Power
LED1	Green	0603	Green 520nm LED Indication - Discrete 3.2V 0603	150060GS75000	Würth Elektronik
R10	220R	0402	Res Thick Film 0402 220 Ohm 1% 1/16W +/-100ppm/ Deg C	RC0402FR-07220RL	Yageo
LED2	Green	0603	Green 520nm LED Indication - Discrete 3.2V 0603	150060GS75000	Würth Elektronik
R11	510R	0402	Res Thick Film 0402 510 Ohm 1% 1/16W +/-100ppm/ Deg C	RC0402FR-07510RL	Yageo
SW1			Switch Tactile N.O. SPST Button Gull Wing 0.05A 32VDC 1VA 200000C ...	KMR211GLFS	C&K Components
C23	1.5 mF	Radial-2	1500 uF 25V Aluminum Electrolytic Capacitors Radial, Can - SMD 500 ...	EEVFK1E152M	Panasonic
D4	60V 1A	SMA	MBRA Series 60 V 1 A Surface Mount Schottky Power Rectifier CASE- ...	MBRA160T3G	ON Semiconductor
IC1		SOIC-30	AUTOMOTIVE FULLY INTEGRATED H-BRIDGE MOTOR DRIVER, ...	VNH3SP30TR-E	STMicroelectronics
M1		TO-252-3	N-Channel MOSFET 60V 100A Automotive 3-Pin(2+Tab) DPAK	DMTH6004SK3-13	Diodes Inc.
R12	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R13	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo

Part	Value	Package	Description	Man. P/N	Man. Name
R14	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R15	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R16	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R17	3K3	402	3.3 kOhms +/-1% 0.063W, 1/16W Chip Resistor 0402 (1005 Metric) M...	RC0402FR-073K3L	Yageo
R18	3K3	402	3.3 kOhms +/-1% 0.063W, 1/16W Chip Resistor 0402 (1005 Metric) M...	RC0402FR-073K3L	Yageo
R19	10k	402	10 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-0710KL	Yageo
R20	100K	603	100 kOhm, +/-1%, 1/10W, 0603 (1608 Metric), Moisture Resistant Thic...	RC0603FR-07100KL	Yageo
J6			Terminal Block RCP 3 POS 5mm Solder ST Thru-Hole 10A	1-2834014-3	TE Connectivity
C24	27pF	0402	Multilayer Ceramic Capacitor 27 pF 25 V +/- 5%	04023A270JAT2A	KYOCERA AVX
C25	27pF	0402	Multilayer Ceramic Capacitor 27 pF 25 V +/- 5%	04023A270JAT2A	KYOCERA AVX
R21	1k	0402	Res Thick Film 0.05 Ohm 200% 1K RF4 SMD	CRCW04021K00JNTE	Vishay
Y1	12MHz		12 MHz +/-20ppm Crystal 18pF 50 Ohms 4-SMD	ABMM-12.000MHZ-B2-T	Abracon
J7			Terminal Block RCP 3 POS 5mm Solder ST Thru-Hole 10A	1-2834014-3	TE Connectivity
C26	1.5 mF	Radial-2	1500 uF 25V Aluminum Electrolytic Capacitors Radial, Can - SMD 500...	EEVFK1E152M	Panasonic
D5	60V 1A	SMA	MBRA Series 60 V 1 A Surface Mount Schottky Power Rectifier CASE-...	MBRA160T3G	ON Semiconductor
IC2		SOIC-30	AUTOMOTIVE FULLY INTEGRATED H-BRIDGE MOTOR DRIVER, ...	VNH3SP30TR-E	STMicroelectronics
M2		TO-252-3	N-Channel MOSFET 60V 100A Automotive 3-Pin(2+Tab) DPAK	DMTH6004SK3-13	Diodes Inc.
R22	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R23	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R24	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R25	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R26	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R27	3K3	402	3.3 kOhms +/-1% 0.063W, 1/16W Chip Resistor 0402 (1005 Metric) M...	RC0402FR-073K3L	Yageo
R28	3K3	402	3.3 kOhms +/-1% 0.063W, 1/16W Chip Resistor 0402 (1005 Metric) M...	RC0402FR-073K3L	Yageo
R29	10k	402	10 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-0710KL	Yageo
R30	100K	603	100 kOhm, +/-1%, 1/10W, 0603 (1608 Metric), Moisture Resistant Thic...	RC0603FR-07100KL	Yageo
C27	1.5 mF	Radial-2	1500 uF 25V Aluminum Electrolytic Capacitors Radial, Can - SMD 500...	EEVFK1E152M	Panasonic
D6	60V 1A	SMA	MBRA Series 60 V 1 A Surface Mount Schottky Power Rectifier CASE-...	MBRA160T3G	ON Semiconductor

Part	Value	Package	Description	Man. P/N	Man. Name
IC3		SOIC-30	AUTOMOTIVE FULLY INTEGRATED H-BRIDGE MOTOR DRIVER, ...	VNH3SP30TR-E	STMicroelectronics
M3		TO-252-3	N-Channel MOSFET 60V 100A Automotive 3-Pin(2+Tab) DPAK	DMTH6004SK3-13	Diodes Inc.
R31	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R32	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R33	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R34	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R35	1k	402	1 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-071KL	Yageo
R36	3K3	402	3.3 kOhms +/-1% 0.063W, 1/16W Chip Resistor 0402 (1005 Metric) M...	RC0402FR-073K3L	Yageo
R37	3K3	402	3.3 kOhms +/-1% 0.063W, 1/16W Chip Resistor 0402 (1005 Metric) M...	RC0402FR-073K3L	Yageo
R38	10k	402	10 kOhm, 1/16W, 5%, 0402, THICK FILM	RC0402JR-0710KL	Yageo
R39	100K	603	100 kOhm, +/-1%, 1/10W, 0603 (1608 Metric), Moisture Resistant Thic...	RC0603FR-07100KL	Yageo

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