

Power Supply / Regulation

Sheet: PowerSupply

File: PowerSupply.sch

J12 Barrel_Jack

5-12V POWER INPUT

GND5

GND1

SW2 SW_SPST

VIN

+10V_REG

+5V_REG

3.3V_REG

3.3VA_REG

VPP

+5V

+3.3V

+3.3VA

The diagram shows a MIDI input circuit. A 5-pin DIN connector (J_MIDLIN1) is connected to a 6N135 optoisolator (U21). The DIN connector pins are labeled 1, 2, 3, 4, and 5. Pin 1 is connected to pin 1 of the optoisolator. Pin 2 is connected to pin 2 of the optoisolator. Pin 3 is connected to pin 3 of the optoisolator. Pin 4 is connected to pin 4 of the optoisolator. Pin 5 is connected to pin 5 of the optoisolator. The optoisolator has a yellow body with a green LED on the left and a phototransistor on the right. The phototransistor is connected to a 270R resistor (R9) and a 4K7 resistor (R9). The 270R resistor is connected to a +5V supply. The 4K7 resistor is connected to a TP4 test point. The phototransistor is also connected to a MIDI_RX line. A note indicates that the 270R resistor should be changed to 270R if using a 6N137 optoisolator.

The diagram illustrates a 4-to-1 multiplexer circuit. A 4-to-1 switch, labeled SW1 SW_DIP_x04, has four data inputs (1, 2, 3, 4) and one output (5). The inputs are connected to four resistors: R119 (1K), R120 (1K), R121 (1K), and R122 (1K). The other ends of these resistors are connected to a common +3.3V supply. The output of the switch (pin 5) is connected to the output of the multiplexer, which is labeled CONFIG4. The four data inputs of the multiplexer are labeled CONFIG1, CONFIG2, CONFIG3, and CONFIG4. The output of the multiplexer is connected to a common ground (GND).

The diagram shows the pinout for the STM32F051K8Tx microcontroller. Key connections include:

- Power:** VDD and VDDA are connected to +3.3V. VSS and GND are connected to GND.
- Reset:** NRST is connected to GND through a 10k resistor (R1). BOOT0 is connected to GND.
- Peripherals:**
 - ADC_IN0, ADC_IN1, and ADC_IN2 are connected to PA1, PA7, and PA13 respectively.
 - CONFIG1 through CONFIG4 are connected to PA14 through PA17.
 - TIM1_CH1, TIM1_CH2, and TIM1_CH3 are connected to PA8, PA9, and PA10.
 - SWDIO and SWCLK are connected to PA12 and PA13.
 - TIM2_CH1, TIM2_CH2, and TIM2_CH3 are connected to PB3, PB4, and PB5.
 - MIDL_RX is connected to PB7.

Below the main pinout, there are two detailed circuit diagrams for the power supply:

- 3.3V Regulator:** A circuit with capacitors C6 (100nF), C28 (100nF), and C32 (4.7uF) connected to the +3.3V and GND pins.
- 3.3VA Regulator:** A circuit with capacitors C33 (10nF) and C34 (1uF) connected to the +3.3VA and GND pins.

At the bottom, there are two additional diagrams:

- ICSP:** A diagram showing the connection of the ICSP pins (SWCLK, SWDIO, NRST) to a Molex 2Way KK254 connector (J1).
- TPs:** A diagram showing the connection of the test points (TP19, TP42, TP44, TP46, TP50) to a common ground.

The schematic shows two identical LED channels, Output Channel 1 and Output Channel 2. Each channel consists of the following components and connections:

- Input Stage:** A VPP input is connected to the VIN pin of a ChannelFaultProtection block (Sheet: ChannelFaultProtection1 for Channel 1, Sheet: ChannelFaultProtection2 for Channel 2). The CH_PWR output of this block is connected to a +5V supply and the CH_PWR pin of a ChannelStatusLED block.
- Status LED Stage:** The ChannelStatusLED block (Sheet: ChannelStatusLED1 for Channel 1, Sheet: ChannelStatusLED2 for Channel 2) has four pins: +5V, CH_PWR, CH_DISABLE_SW (labeled BLUE), and CH_LED4. The CH_LED1 pin is connected to the STATUS1_ANODE pin of a D_STATUS1 LED_RAGB component. The CH_LED2 pin is connected to the STATUS2_ANODE pin of a D_STATUS2 LED_RAGB component. The CH_LED3 pin is connected to the CH_LED4 pin.
- Driver Stage:** The CH_PWR output of the ChannelStatusLED block is connected to the CH_PWR pin of a ChannelNMOS block (Sheet: ChannelNMOS1 for Channel 1, Sheet: ChannelNMOS2 for Channel 2). The CH_GATE pin of the ChannelNMOS block is connected to a TIM2_CH1 or TIM2_CH2 input. The CH_ANODE pin of the ChannelNMOS block is connected to the J_OUT1 or J_OUT2 Barrel_Jack_Switch component. The CH_CATHODE pin of the ChannelNMOS block is connected to the LED STRIP component.

[illegible]

Output Channel 4

VPP

Sheet: ChannelFaultProtection4

VIN

CH_PWR

CH4_PWR

File: ChannelFaultProtection.sch

TIM3_CH2

Sheet: ChannelNMOS4

CH_PWR

CH_ANODE

CH_CATHODE

File: ChannelNMOS.sch

Berrel_Jack_Switch

LED STRIP

+5V

Sheet: ChannelStatusLED5

+5V

CH_PWR

CH_LED1

CH_LED2

CH_LED3

STATUS5_ANODE

D_STATUS_5 LED_RAGB

STATUS5_ANODE

Sheet: ChannelStatusLED4

CH_PWR

CH_DISABLE_SW

CH_LED2

CH_LED3

CH_LED4

STATUS4_ANODE

File: ChannelStatusLED.sch

The schematic shows two output channels, Channel 5 and Channel 6, each consisting of a fault protection block, an IMOS block, and a status LED block.

Output Channel 5:

- ChannelFaultProtection6:** VIN is connected to VPP. CH_PWR is connected to CH5_PWR.
- ChannelIMOS5:** CH_PWR is connected to CH5_PWR. CH_GATE is connected to TIM3_CH3. CH_ANODE is connected to J_OUT5 (Barrel_Jack_Switch). CH_CATHODE is connected to LED STRIP.
- ChannelStatusLED6:** CH_LED1 is connected to +5V. CH_LED2 is connected to STATUS6_ANODE. CH_LED3 is connected to J_OUT5 (Barrel_Jack_Switch). CH_LED4 is connected to LED STRIP.

Output Channel 6:

- ChannelFaultProtection6:** VIN is connected to VPP. CH_PWR is connected to CH6_PWR.
- ChannelIMOS6:** CH_PWR is connected to CH6_PWR. CH_GATE is connected to TIM3_CH4. CH_ANODE is connected to J_OUT6 (Barrel_Jack_Switch). CH_CATHODE is connected to LED STRIP.
- ChannelStatusLED6:** CH_LED1 is connected to +5V. CH_LED2 is connected to STATUS6_ANODE. CH_LED3 is connected to J_OUT6 (Barrel_Jack_Switch). CH_LED4 is connected to LED STRIP.

Output Channel 9

Sheet: ChannelFaultProtection9

VIN CH_PWR CH9_PWR

File: ChannelFaultProtection.sch

Sheet: ChannelStatusLED9

+5V CH_LED1 (RED) CH_LED2 (GREEN) CH_LED3 (BLUE) CH_LED4

STATUS9_ANODE STATUS9_ANODE

File: ChannelStatusLED.sch

Sheet: ChannelNMOS9

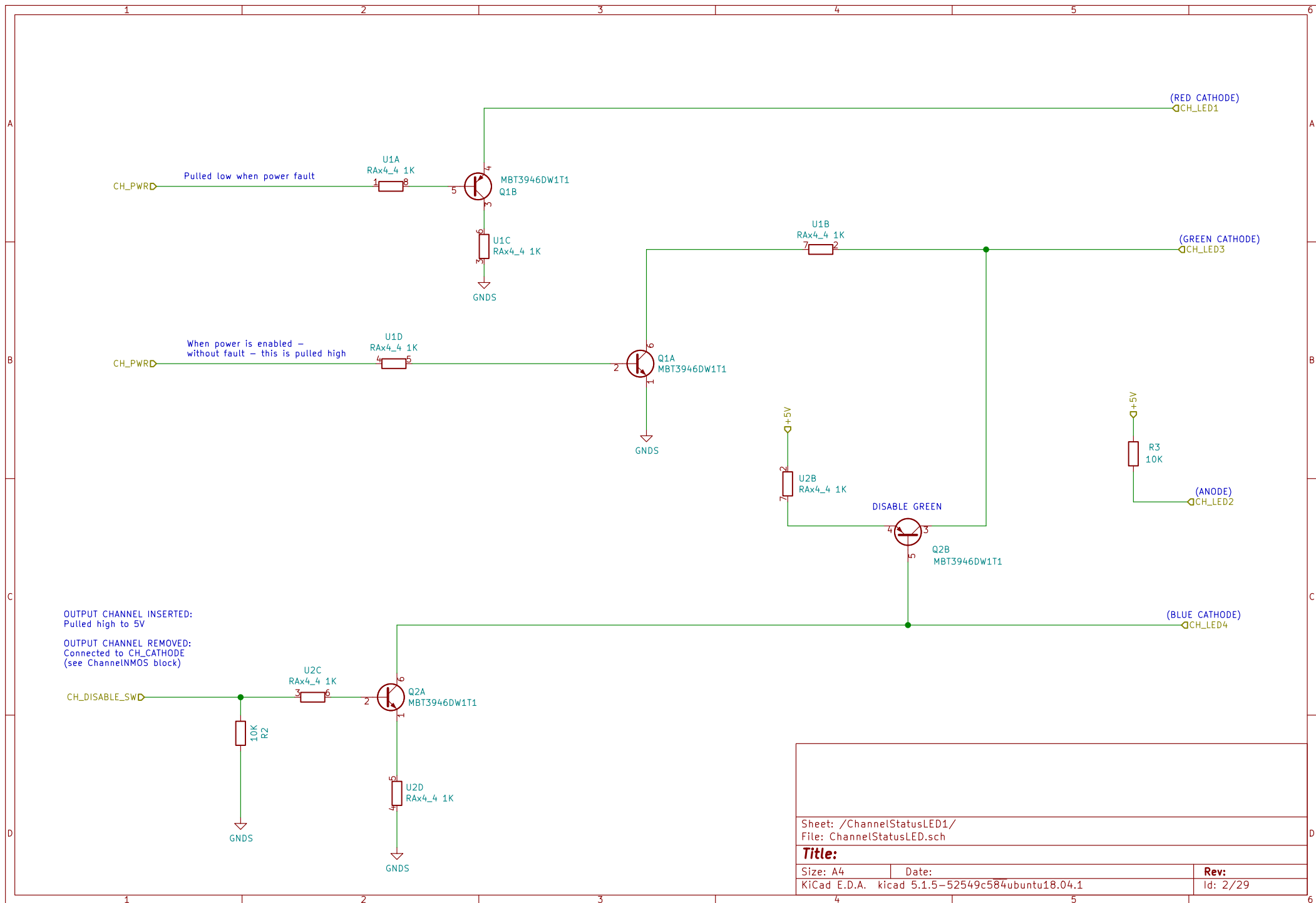
CH_PWR CH_ANODE CH_GATE CH_CATHODE

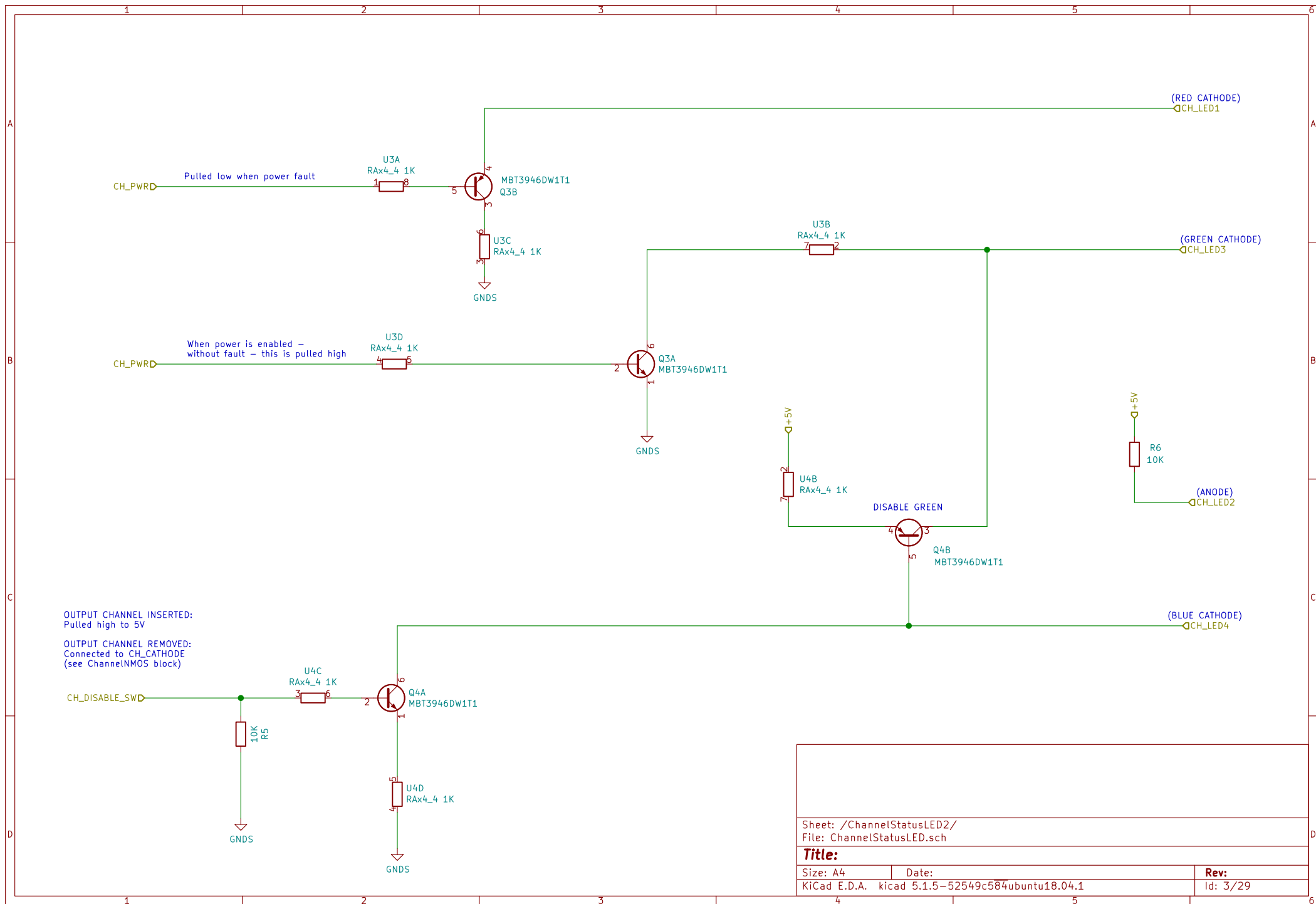
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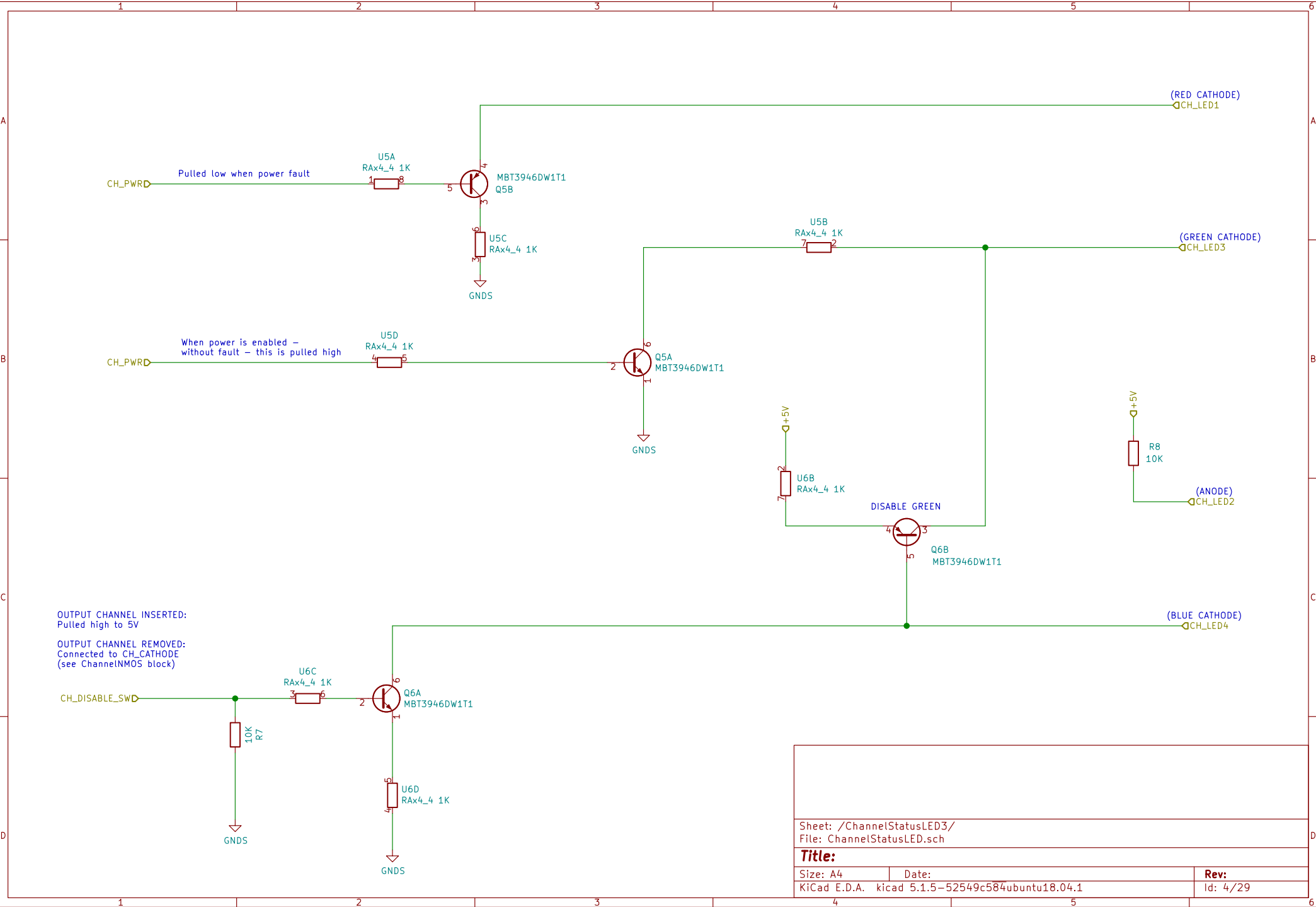
I_OUT9 Barrel/Jack_Switch

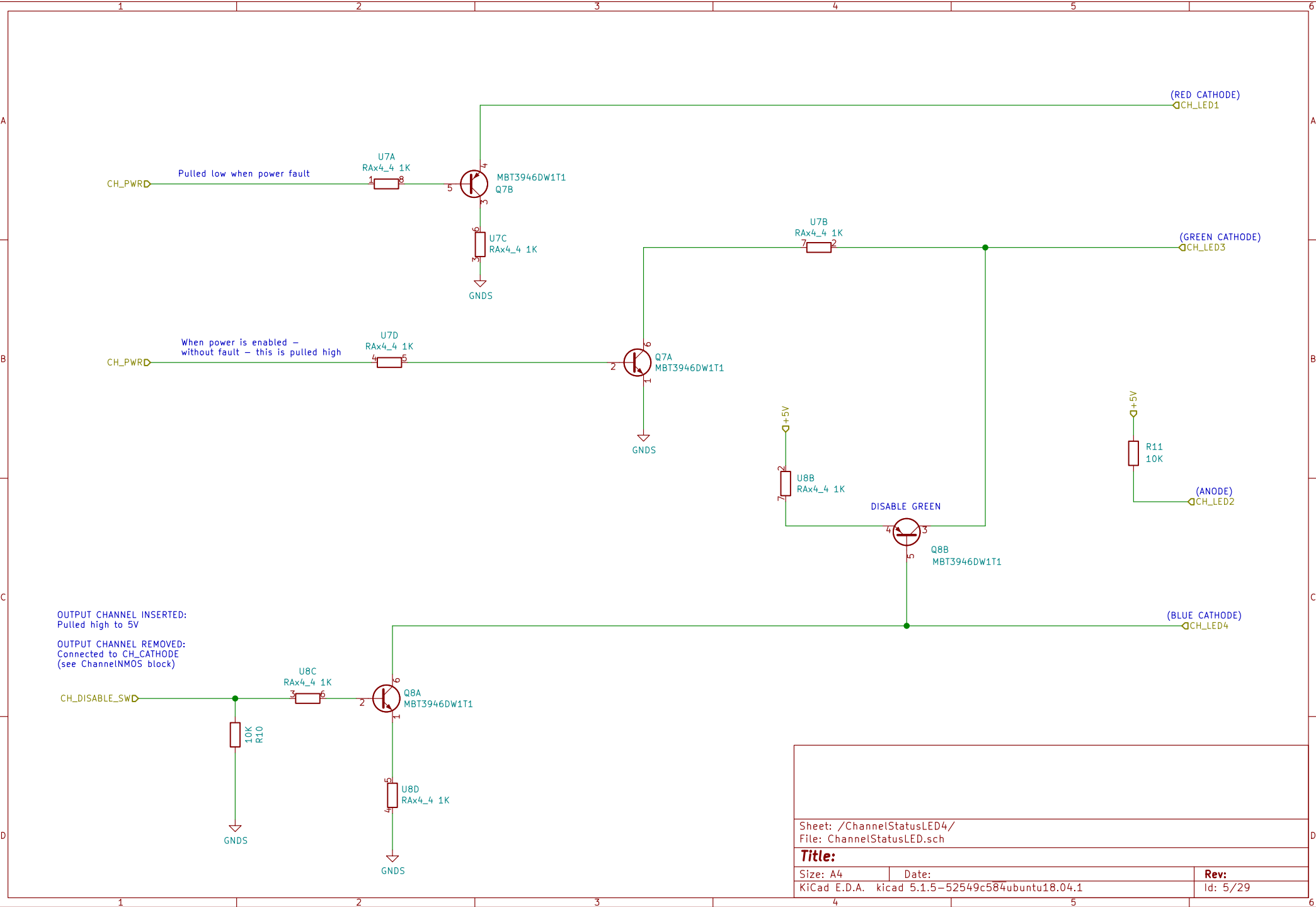
LED STRIP

				Sheet: / File: MidiLedController.sch			
				Title:			
				Size: A2 Date: 2019-10-28 Rev: A			
				KiCad E.D.A. kicad 5.1.5-52549c584ubuntu18.04.1 Id: 1/29			









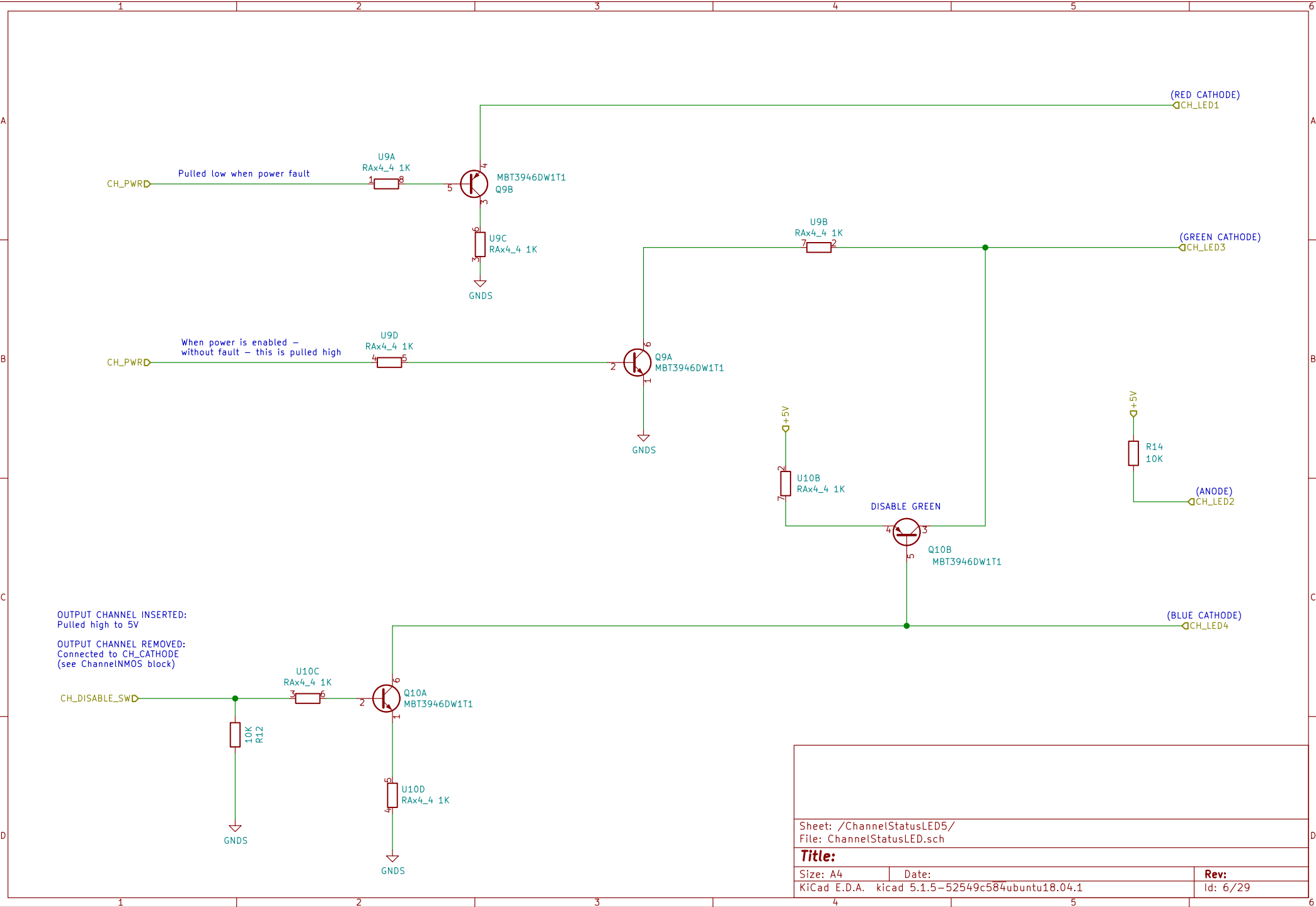
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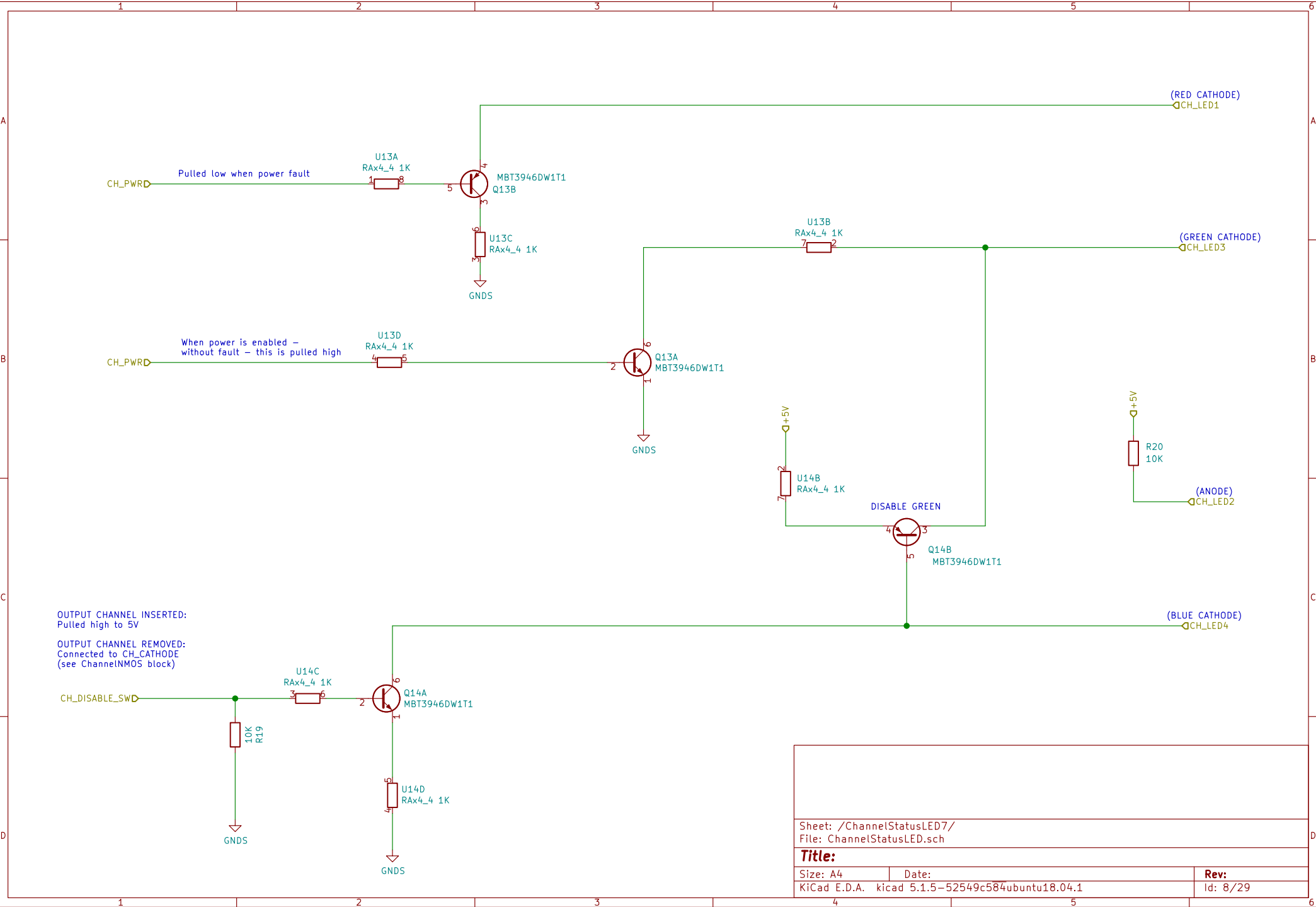
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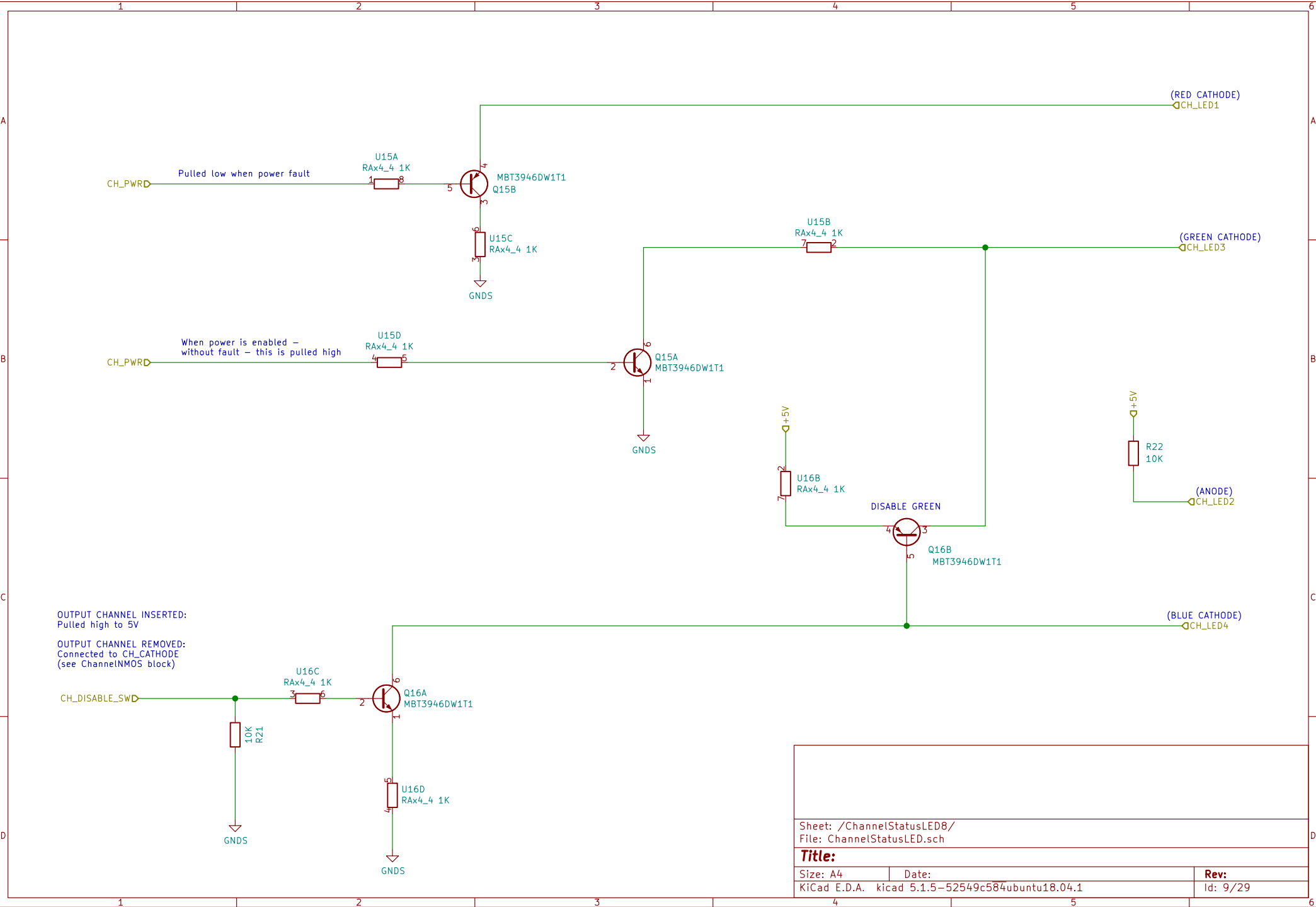
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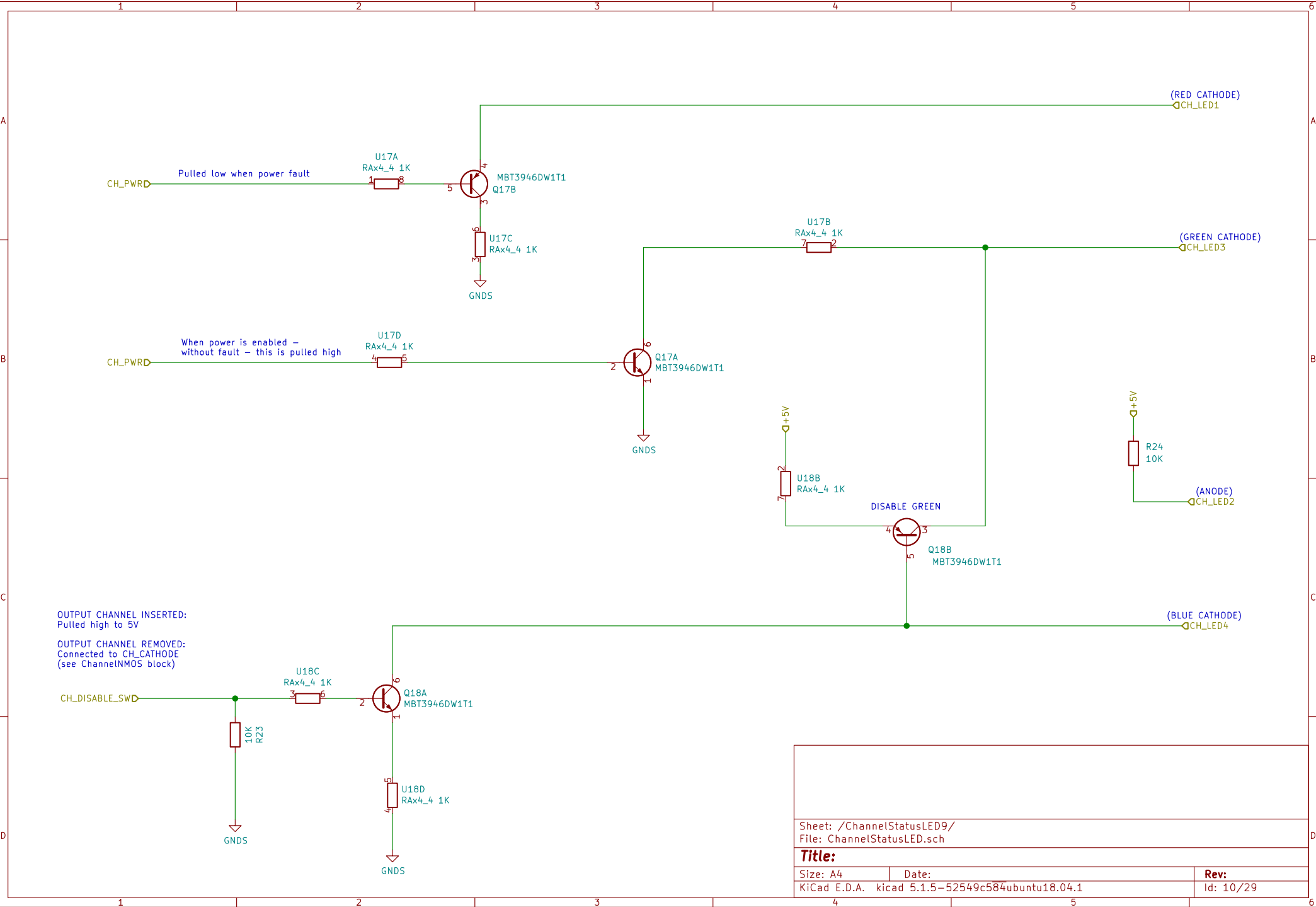
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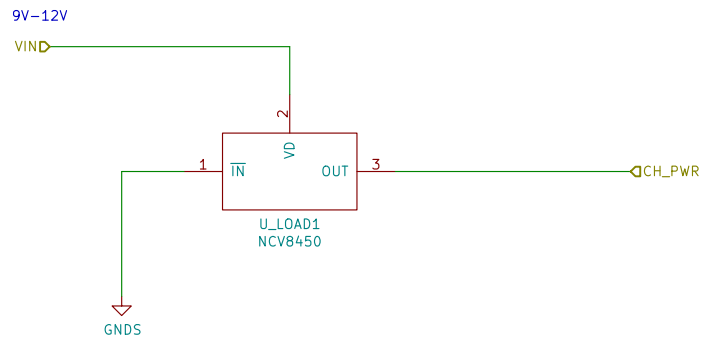






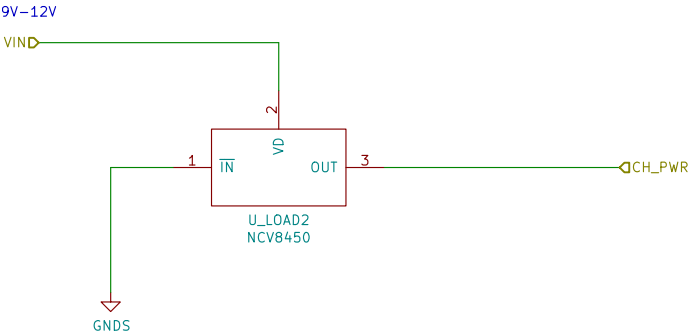


FAULT PROTECTIONS



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FAULT PROTECTIONS



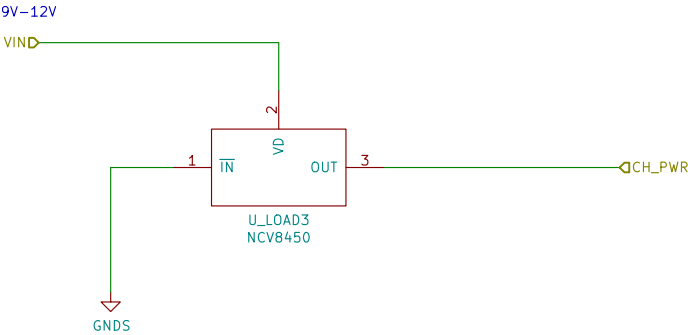
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Rev:
Id: 12/29

FAULT PROTECTIONS



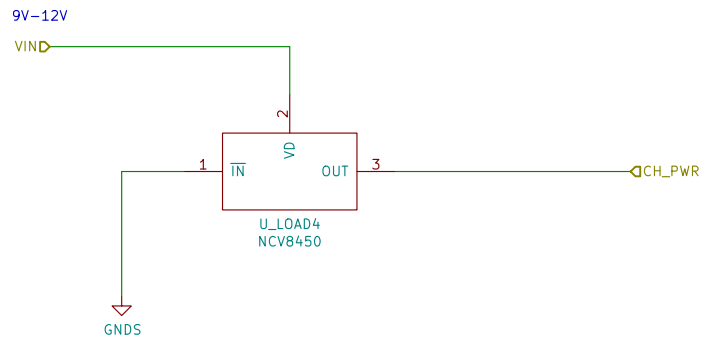
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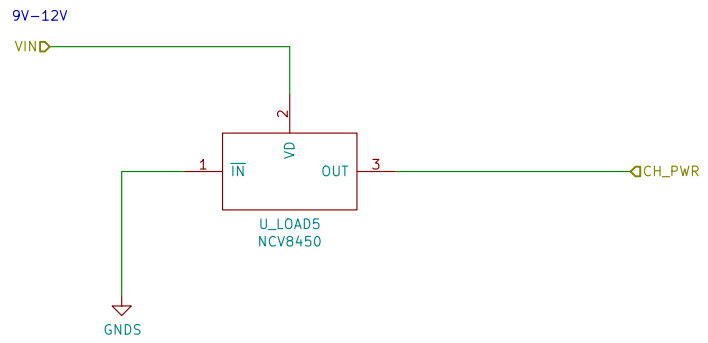
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FAULT PROTECTIONS



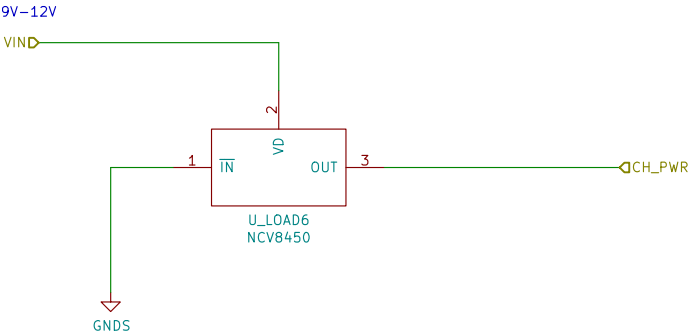
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FAULT PROTECTIONS



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FAULT PROTECTIONS



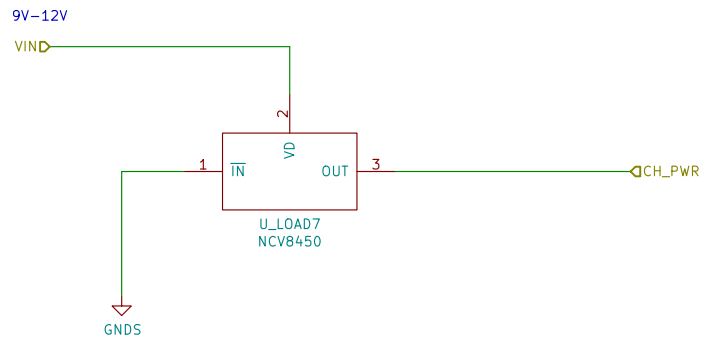
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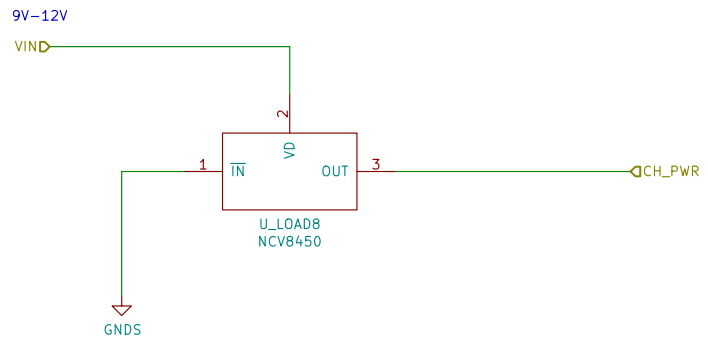
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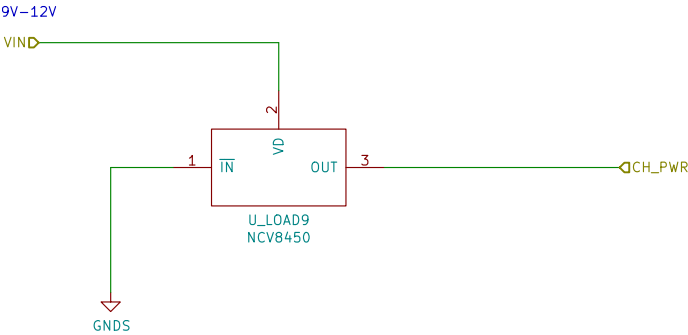
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FAULT PROTECTIONS



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FAULT PROTECTIONS

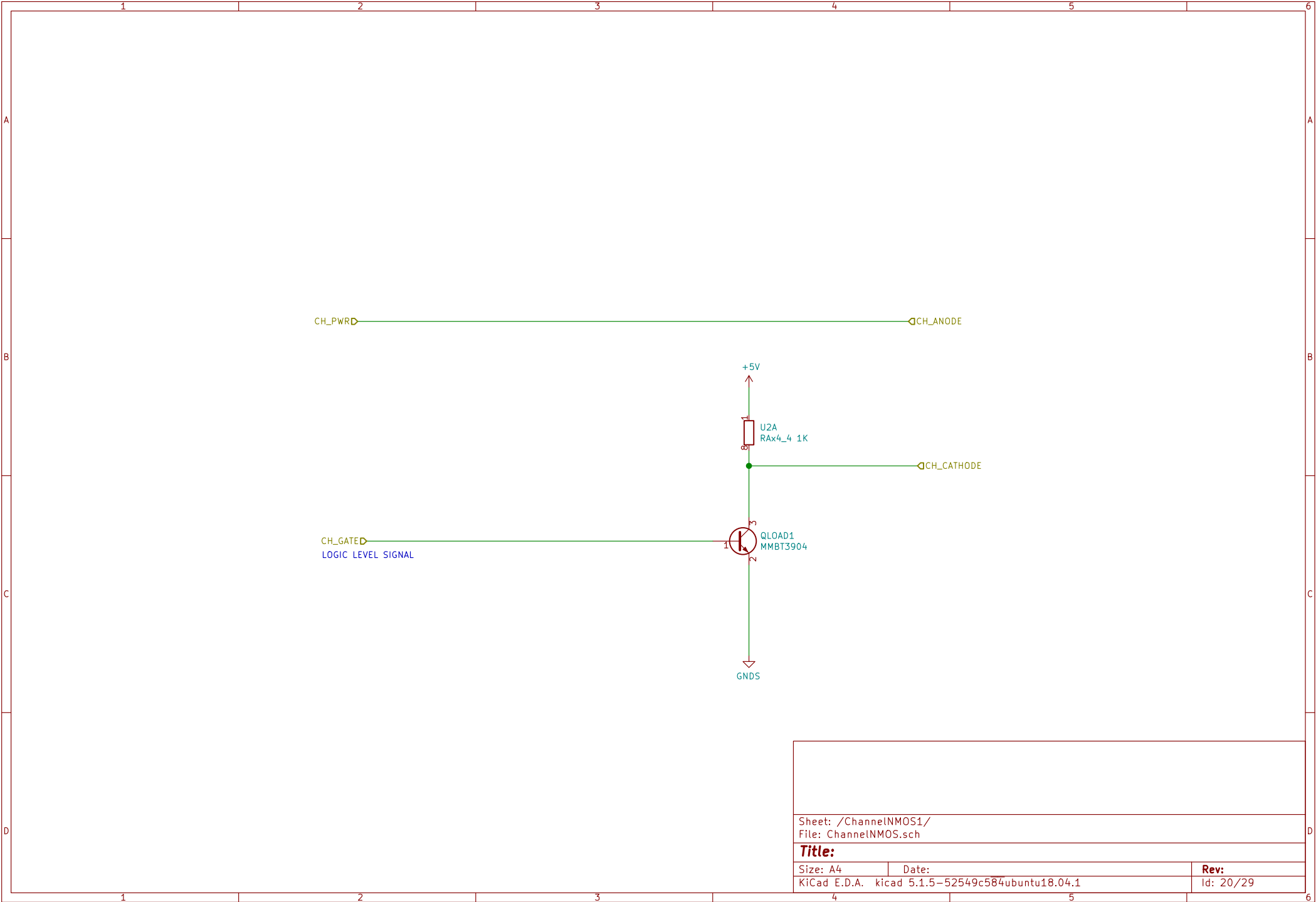


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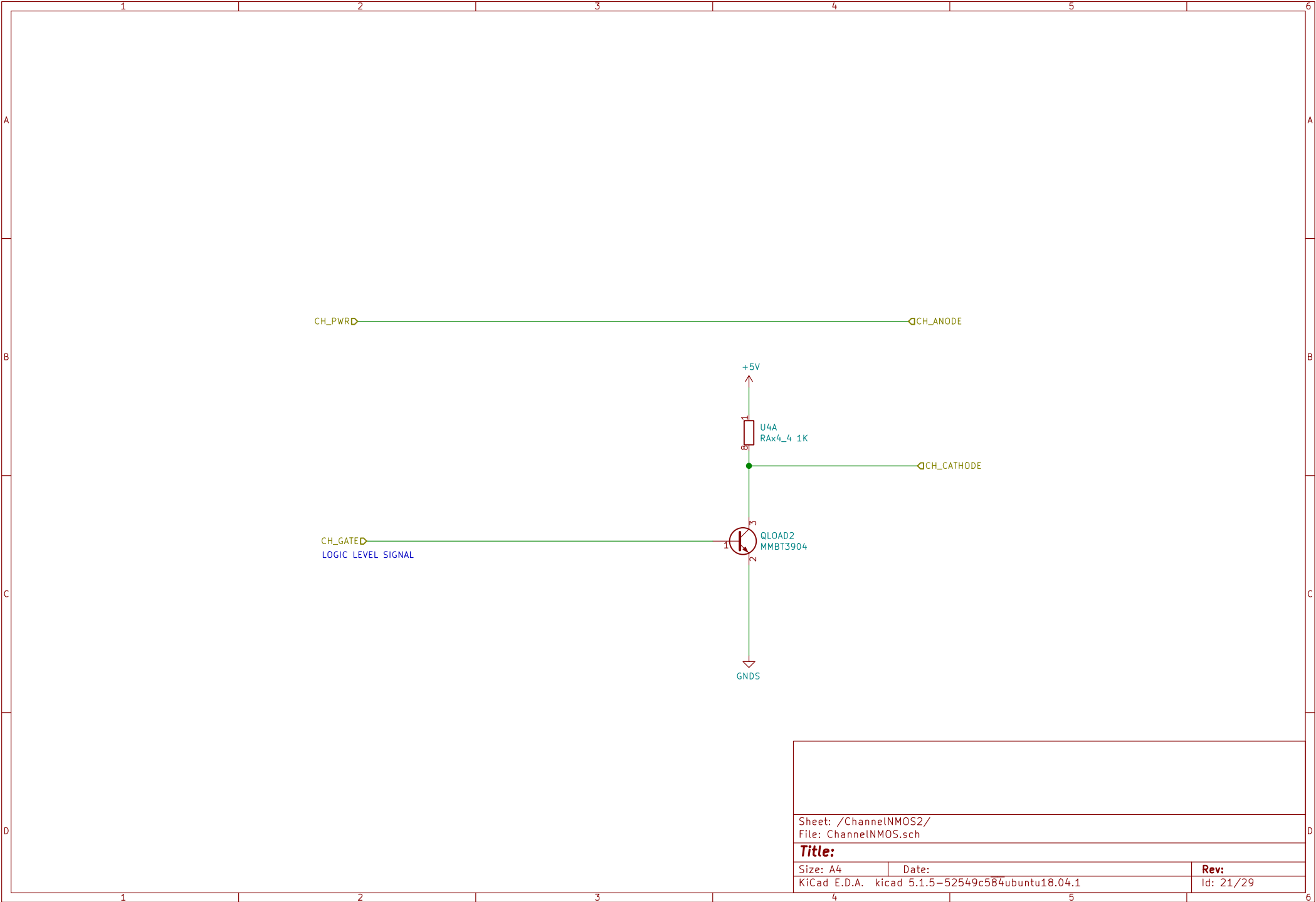
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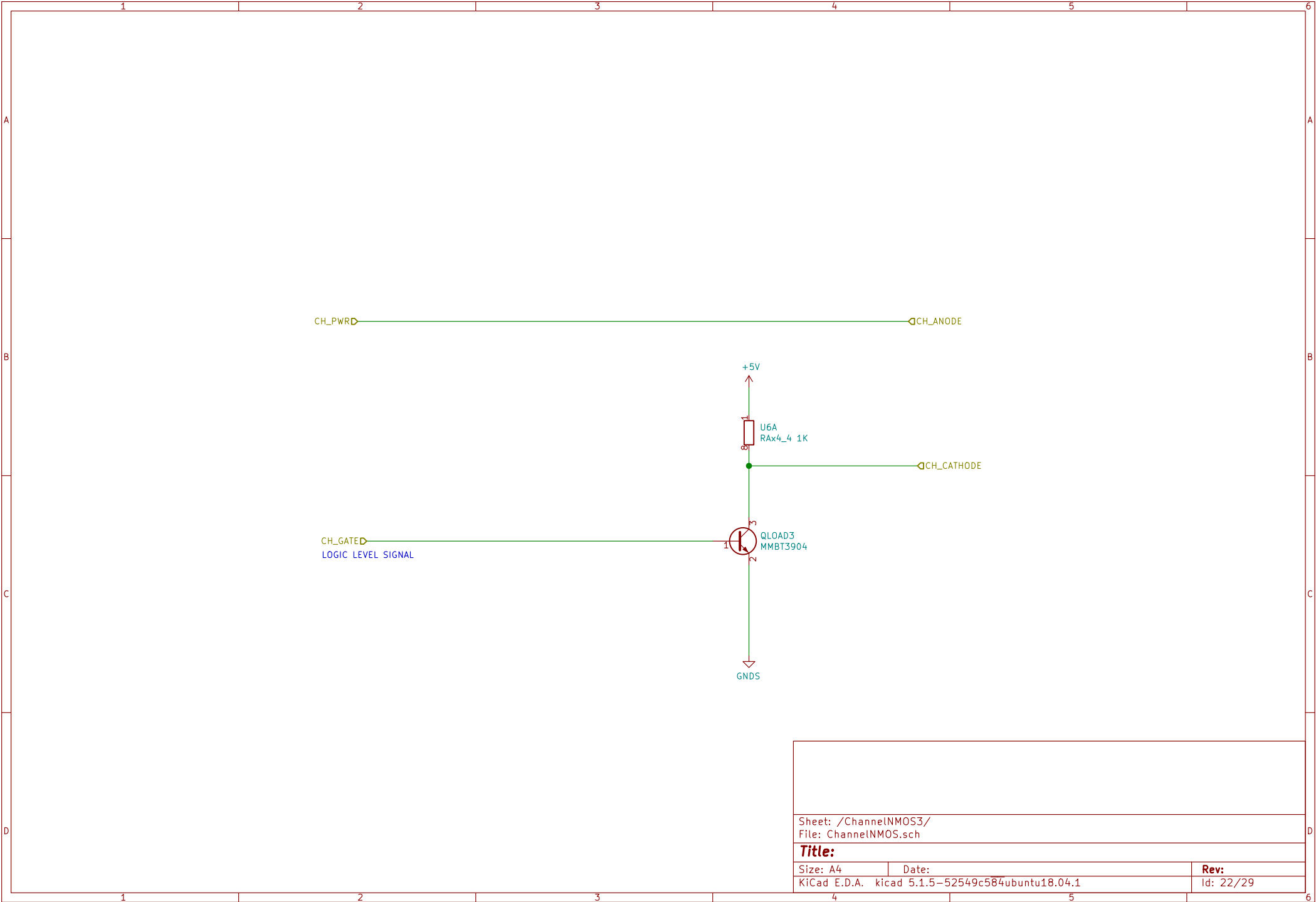
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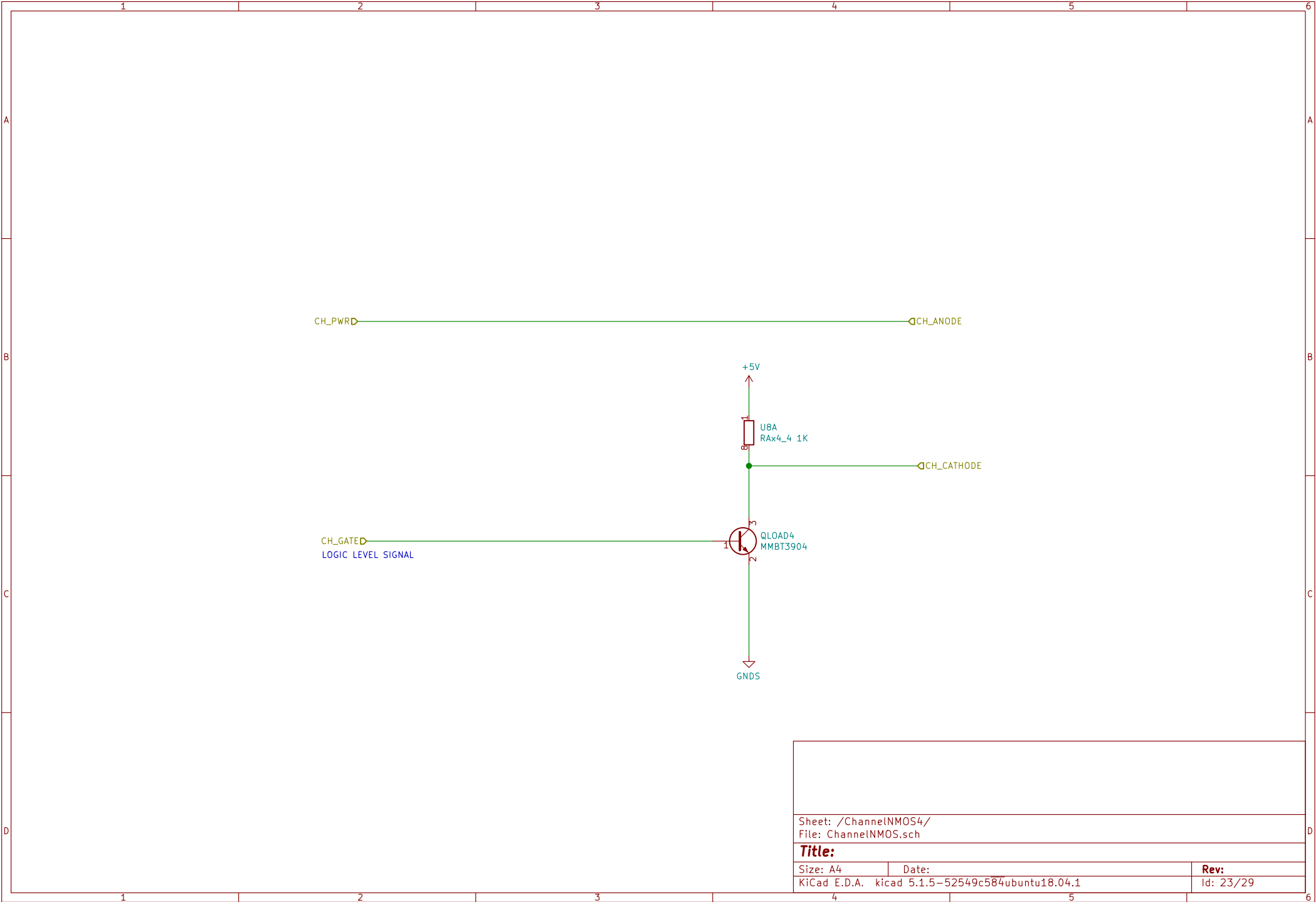
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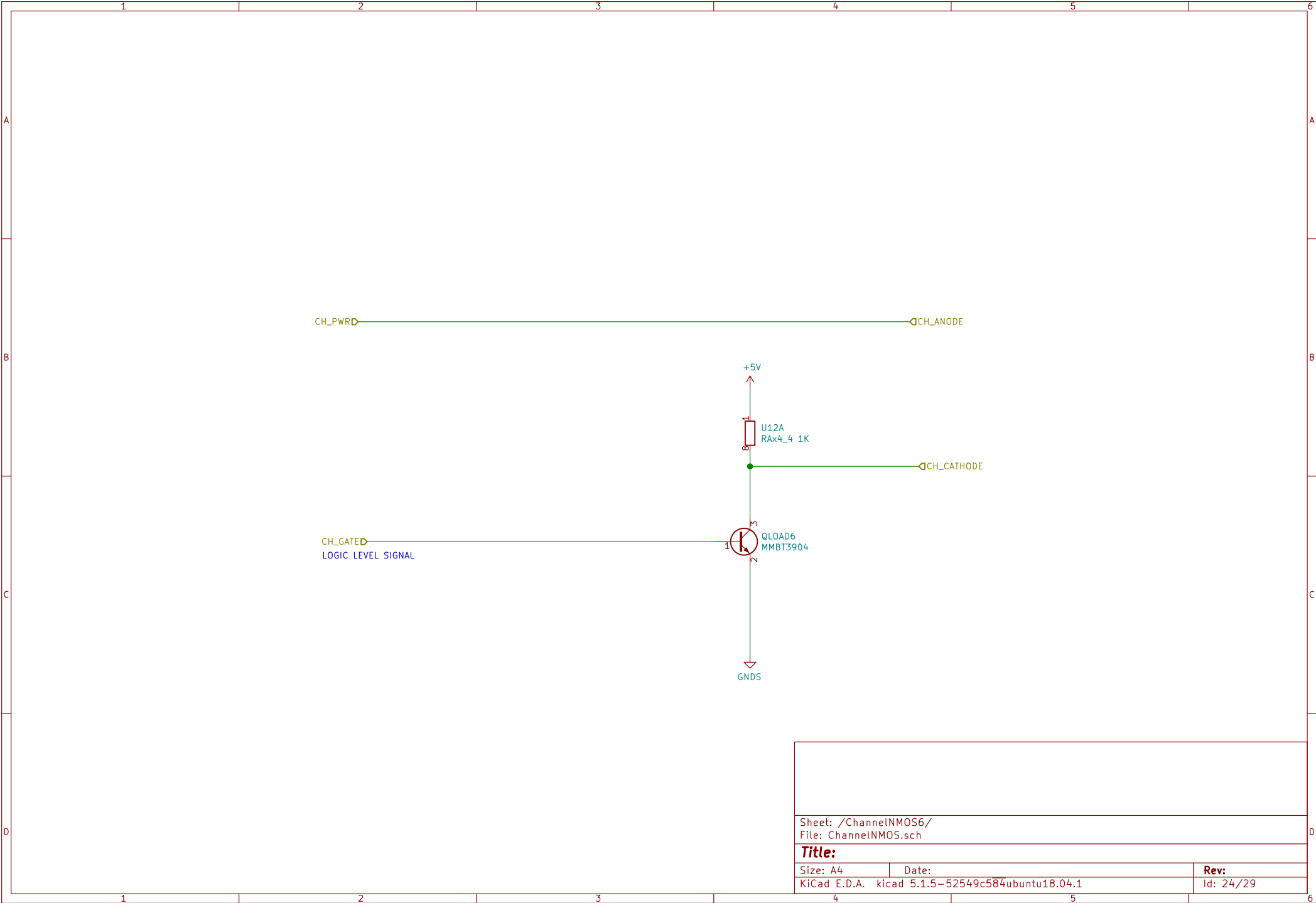


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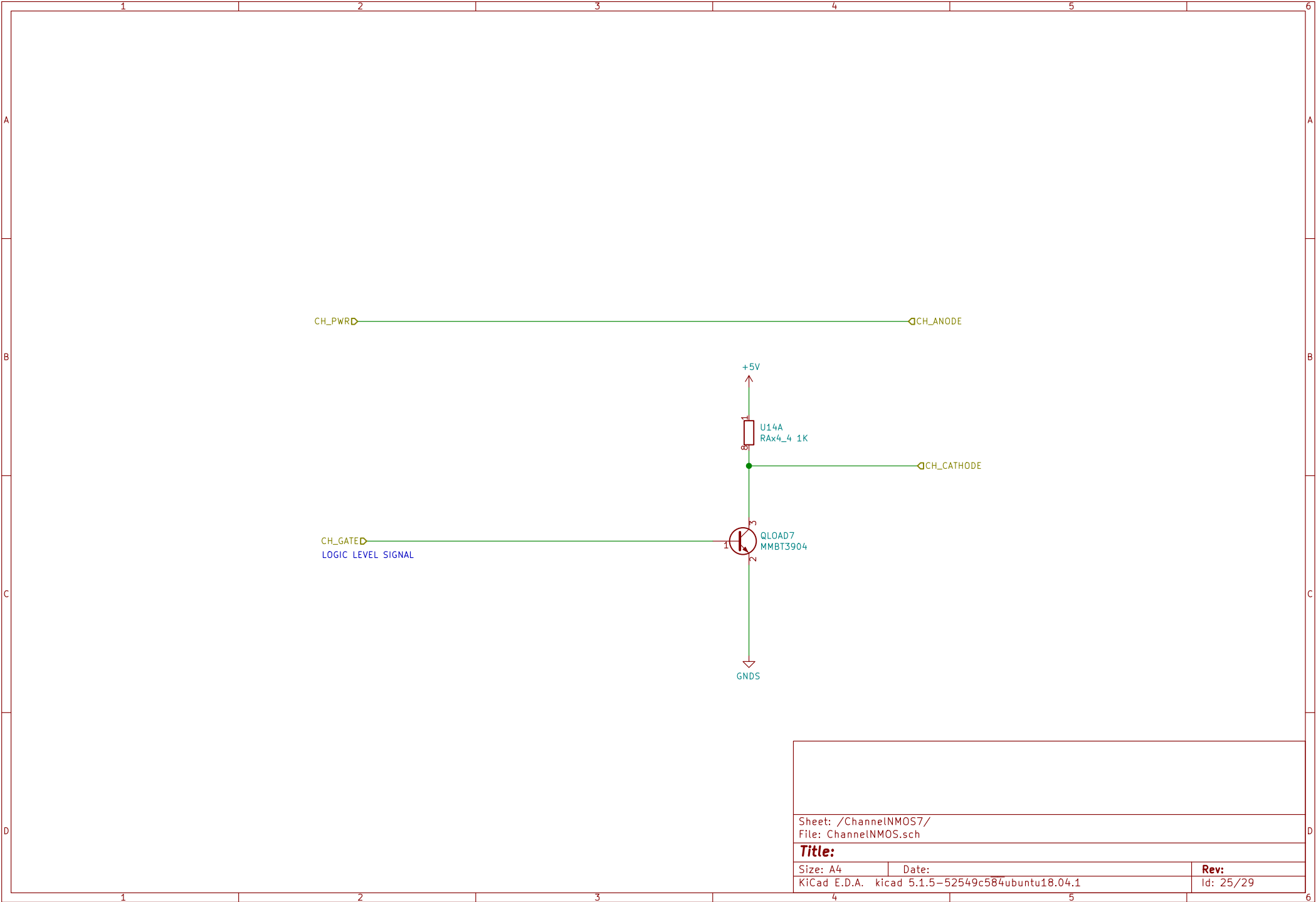


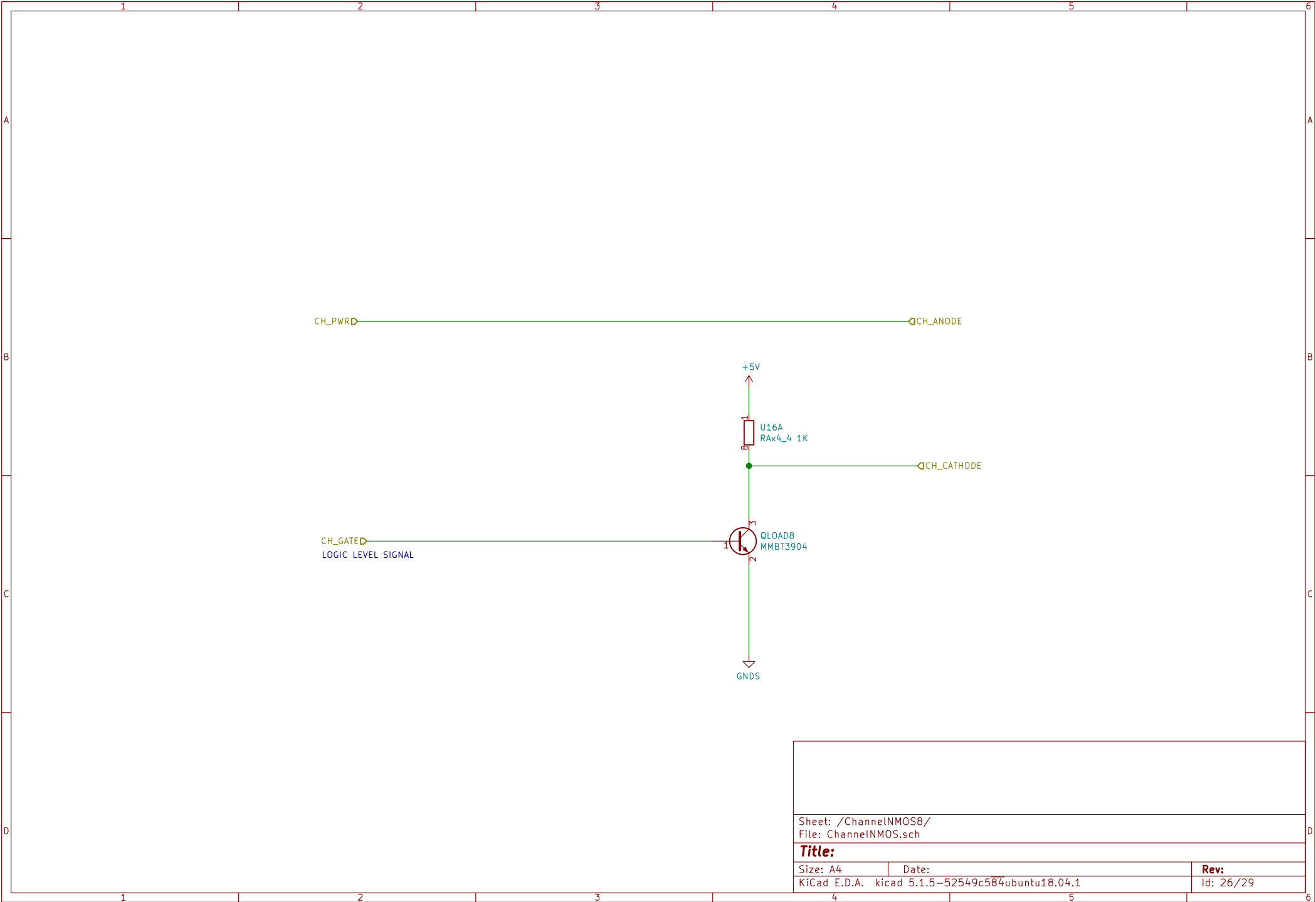


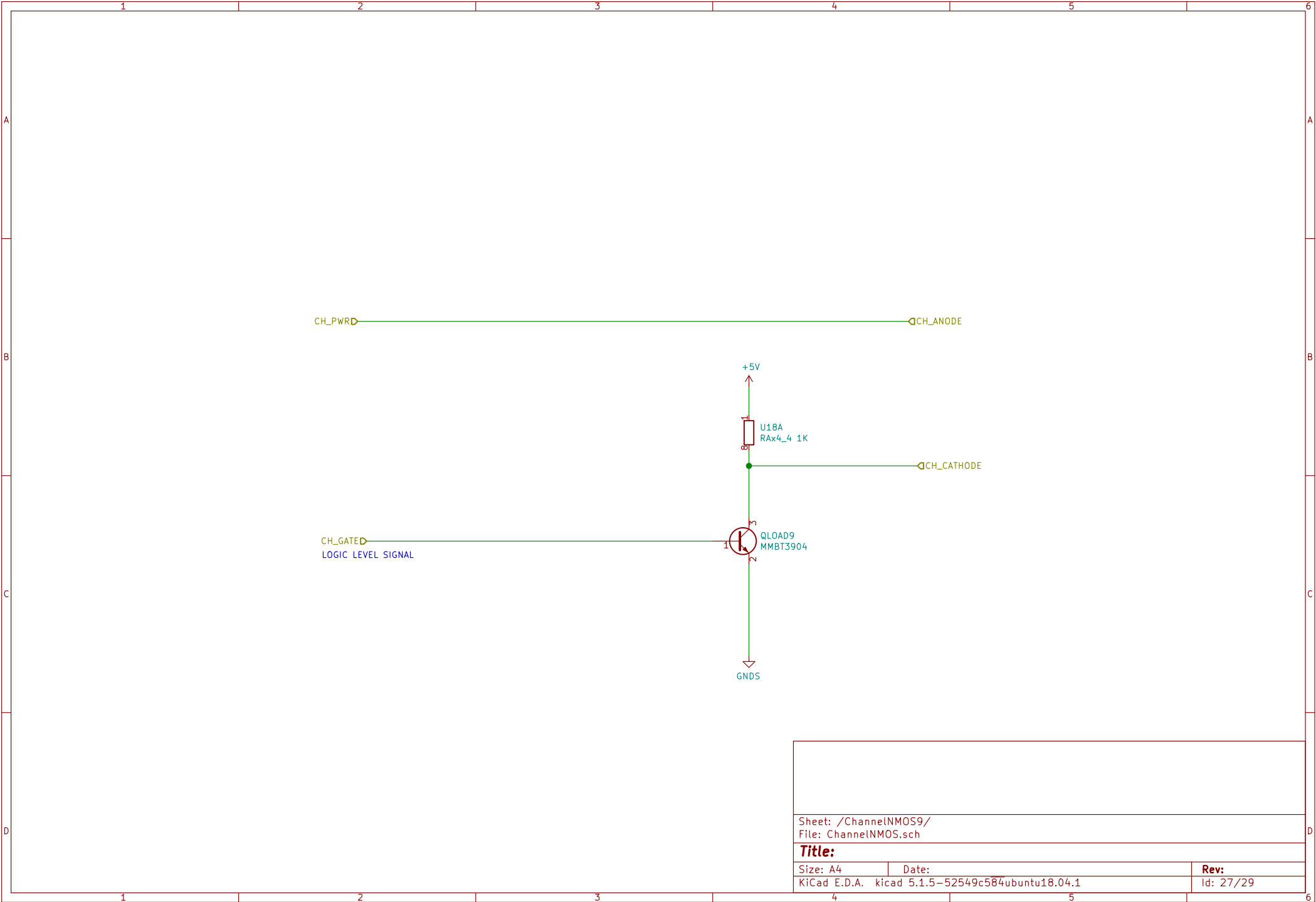




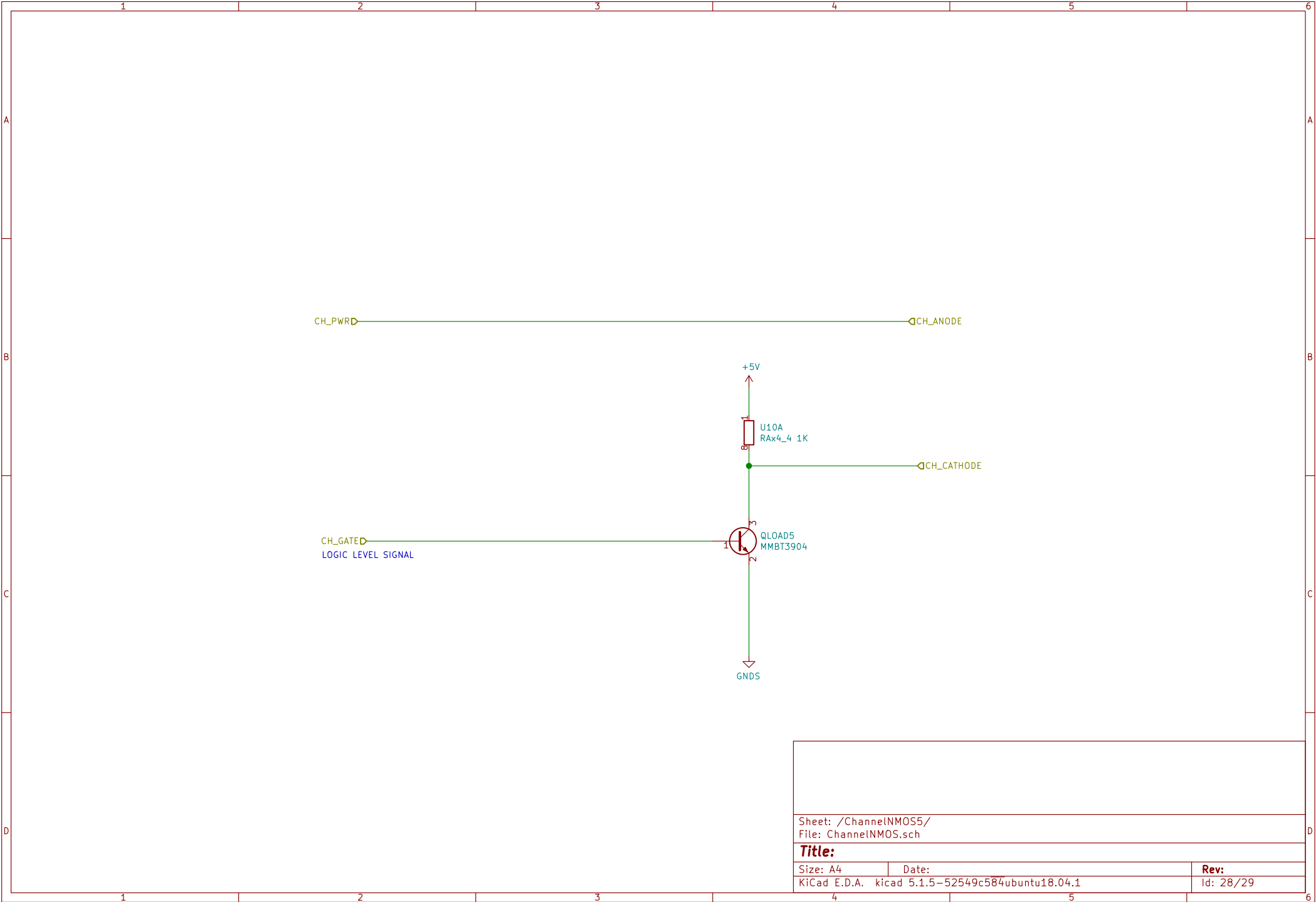
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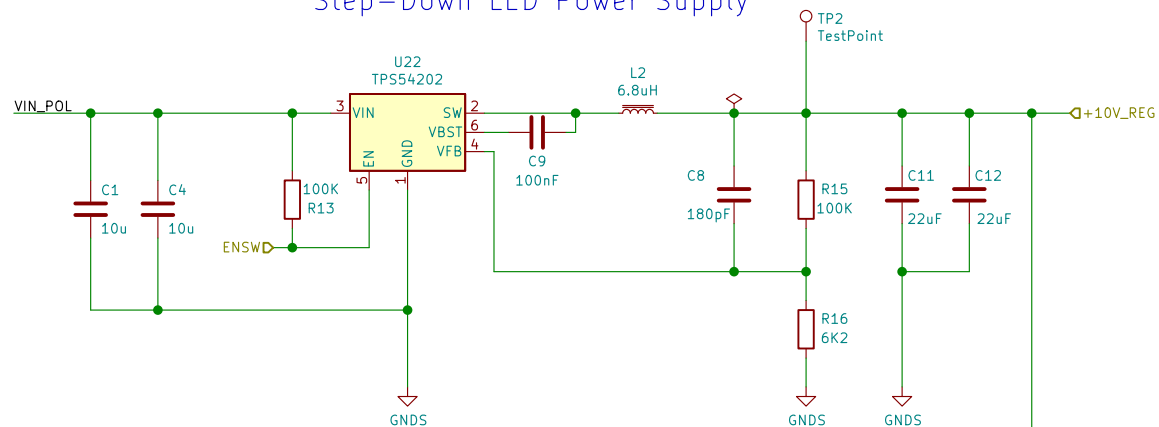




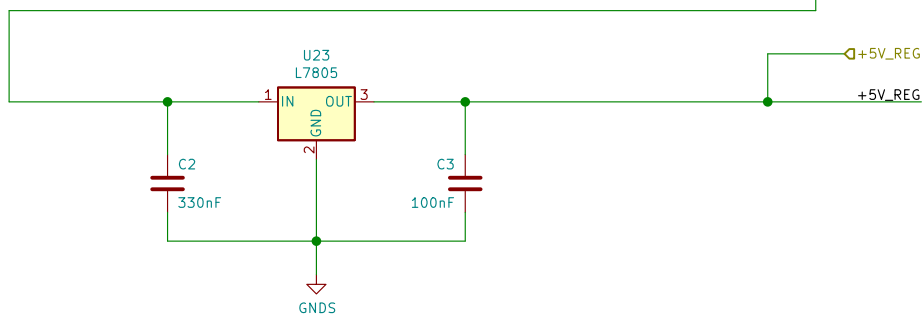
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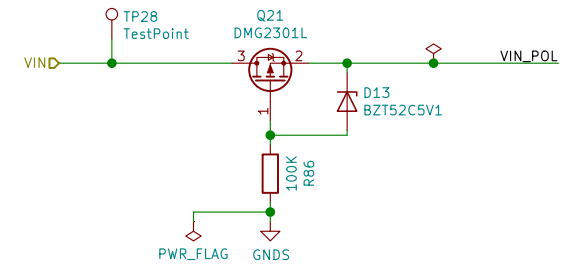
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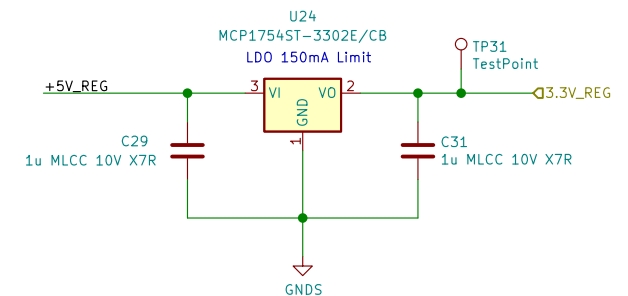
Step-Down Logic Power Supply



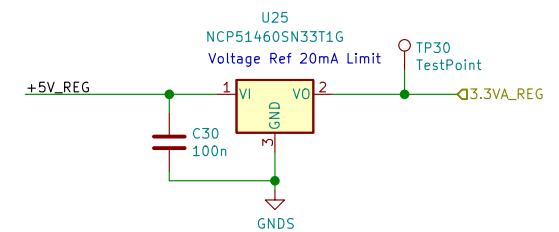
Power Input and Reverse Polarity Protection



MicroController VDD Regulation



MicroController VDDA Regulation



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