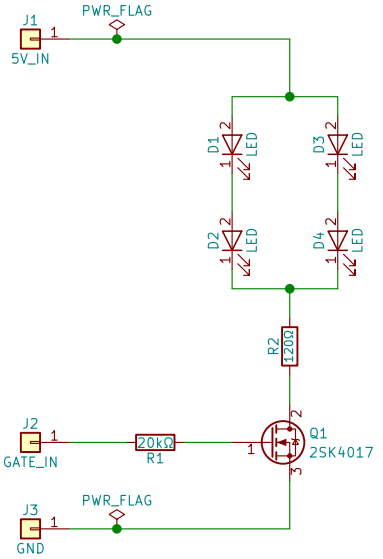
* Connect 5V_IN (J1) with 5 volts power pin of Raspberry Pi (RasPi).
* Connect GATE_IN (J2) with any GPIO pin of RasPi which is set as an output.
* Connect GND (J3) with any ground pin of RasPi.
* Q1 is a N-channel power MOSFET (enhancement mode).
  I used 2SK4017. Equivalents are needed to have enough drain current,
  on 3.3 volts of gate-source voltage.
* D1 to D4 are 3mm LEDs. I used 4 of LT3U31P;
  the forward voltage (VF) is 1.85 to 2.5 volts,
  and the maximum forward current (IF) is 30 milliamperes.
* R1 is the current limiter for the J2 to J3 circuit.
  There is parasitic capacitance between Gate and Source of the MOSFET.
  This capacitance makes the peak current when Gate is switched on.
  The peak current may make your RasPi brownout,
  so R1 is applied to limit the peak current.
  However, MOSFETs have leakage current between Gate and Source,
  and the leakage makes voltage drop on R1.
* R2 is the current limiter for the J1 to J3 circuit. I calculated this as described below.
  (5 - (2 * 1.85)) / 0.005 = 260: (260 * 260) / (260 + 260) = 130:
  5 is the voltage from the power supply, 1.85 is the minimum forward voltage of each LED.
  The forward voltage is multiplied by 2 because 2 LEDs are lined in series.
  0.005 is the current of the circuit to light LEDs.
  260 is the resistance for each pair of LEDs.
  Two pairs of LEDs are lined in parallel, so the resistance needs to be combined in parallel.
  So I used a 120 ohms resister which the value is close to 130 ohms.
  My experience was 12.5 milliamperes at the J1 to J3 circuit when Gate is on.
  This means LEDs are driven with 6.25 milliamperes because two pairs of LEDs are lined in parallel.
  Note that the actual forward voltage of each LED is approx 1.7 volts in my experience.



JimmyKenMerchant

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Title: LED Driver with Power MOSFET

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