**DC Motor Driver User Manual**

# Features

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| --- | --- |
| Input voltage for the Driver circuit (J2) | Min: 12V, MAX:15V |
| Input voltage for the DC motor (J3) | MAX: 30V |
| Output current for the DC motor (J1) | MAX: 30A (3 FET-s and big heatsink) |
| Back EMF protection | Dual schottky diode |
| Reverse current protection | - |
| Input voltage indicator LED | - |
| Output overcurrent protection with fuse | Output current + 25% |
| Low MOSFET temperatures | A single MOSFET can be used with a very small heatsink switching 5A continuously. |

# Functionality

**Single or dual Supply:**

* Two supplies are needed if a single supply isn’t sufficient (The input voltage falls below the minimum allowed voltage).
* To use two supplies connect JP1 jumper with a thick cable, use J2 for the driver circuit supply and J3 for the power supply for the motor.

**Component management:**

|  |  |  |
| --- | --- | --- |
| Use case | Optional components | Value modification |
| 6A, Single supply | Q2, Q3 | C8:470uF, F1:8A |
| 12A, Single supply | Q3 | C8:1000uF, F1:16A, C4:220uF |
| 18A, Single supply | - | C8:2200uF, F1:24A , C4:330uF |
| 6A, Dual supplies | Q2, Q3 | F1:8A |
| 12A, Dual supplies | Q3 | F1:16A, C4:220uF |
| 16A, Dual supplies | - | F1:24A, C4:330uF |

# Components

**R1:**

* This limits the output current of the MOSFET Driver, it is best to be as small as possible to charge the gate capacitance fast, but leave 10-20% of current reserve to the maximum of the Driver.

**R2:**

* This controls the frequency of the PWM, it is recommended to use 20kHz, because that isn’t audible for the human ear, but in this case the diodes can get very hot, this can be changed as needed if you can tolerate the lower frequency sound or the hot diode.

**D1, D2:**

* It is strongly recommended to use two diodes in parallel in a TO220 package!
* This must be a high-speed schottky diode (not a normal 50-60Hz diode)!
* It can get hot if the PWM frequency is high (>20kHz). You can either use two diodes, use a heatsink or reduce the frequency.

**J1, J2, J3:**

* Be aware of the current rating of these components, it will limit the Drivers current capability!

**Q1, Q2, Q3:**

* One MOSFET can be used with a really small heatsink up to approximately 6A.
* One MOSFET can be safely used for up to 10A if big enough heatsink is used!
* The gate-capacitance is a very important parameter, especially if multiple MOSFET-s are used.

**PCB:**

* The high current traces need to be soldered.
* It isn’t recommended to use this board for more than 30A because of the traces!
* Mount the PCB in a way that will let its bottom to breathe, because of the heat dissipation, there are also breathing via-s on the board.