3. Principle of DC-Motor Control by PWM **V1.1**
UFO Doctor, 30th Oct. 2011

1. Introduction

The control of a DC Motor by PWM is an easy task with an enhancement type N-MOSFET such as e.g. BUZ 10: I_{Dmax}=23A, V_{DSmax}=50V, $R_{DS(on)}$=70mΩ
This type of FET turns on at V_{GS} of about 3 V, is switched off at floating gate and does to get hot at currents less than 1A (heating with 70 mW only!)

- Thermal Protections:

The FET should be thermally contacted to the copper plane of the PCB (take care not to short circuiting the FET!) This is very important for tiny FET's!

- Over current protection

Low cost high-power, low ohmic DC-Motors will kill the FET in milliseconds if blocked! There are many complains about this topic in the Internet. Thus, use circuit Fig. 2!

2. Control Principles

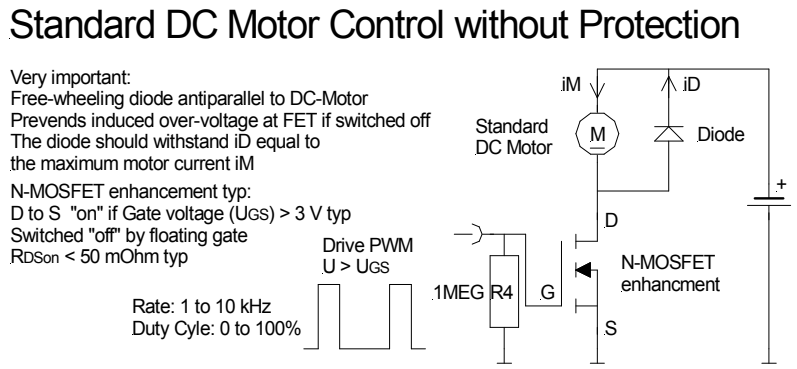

Fig. 1.
Control circuit for small DC-motors.

Ok if the current of a blocked motor is below the specified i_{Dmax} and the current does not overheat the motor.

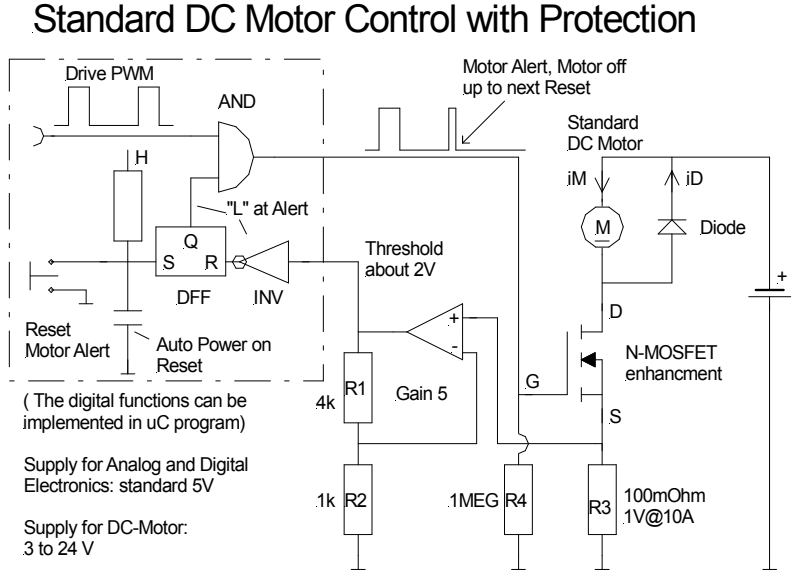

Fig. 2.
Control circuit for strong DC-Motors

(Good example: X-UFO by Silverlit!)

If the motor consumes too much (here 10A), the PWM drive of the FET is switched off.

Cannot be started again, needs a reset (or battery off/on)

3. Conclusion

A professional power electronics engineer will be not satisfied with these simplified instructions, but it is a good beginning at least!

Good Luck and kind regards from the old UFO Doctor