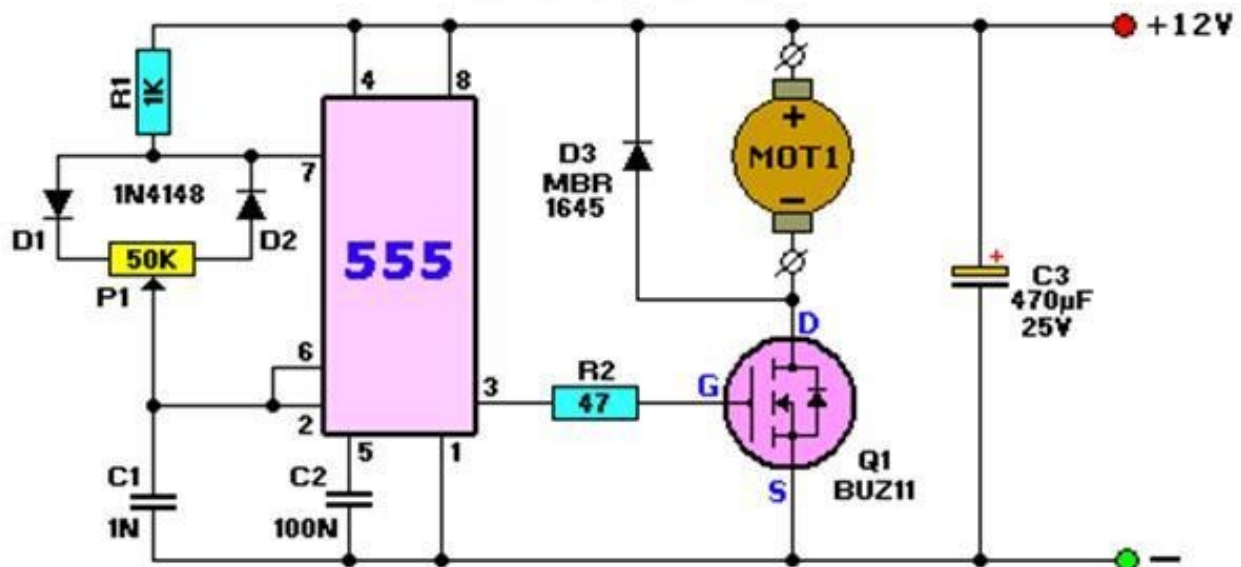## Pulse Width Modulator with 555

Parts List:

R1   = 1K
R2   = 47 ohm
P1   = 50K potentiometer
C1   = 0.001µF, (1nF) ceramic
C2   = 0.1µF, (100nF), ceramic
C3   = 470µF, 25V, electrolytic
D1,D2   = 1N4148, general purpose signal diodes
D3   = MBR1645, NTE6081, or similar. 45V/16A Schottky Diode
Q1   = BUZ11, NTE2389, MosFET, High Speed Switch, N-channel, 30V/35A
IC1   = NE555, 8-pin Timer/Oscillator

Couple Notes:

This circuit is capable of regulating 12V motors and DC light bulbs. No coolrib required for Q1 or D3 if the current does not exceed 2A. If it does, a sufficient coolrib for both the Schottky Diode (D3) and MosFET Q1 is required.
The regulation is obtained via PWM or Pulse Width Modulation. The output pin 3 of the 555 provides square-wave with an adjustable duty-cycle. What that basically means is that the pulse width changes the speed of the motor. The output from the 555 feeds the mosfet via current limiting resistor R2 of 47 ohms. Because the MosFET Q3 only "switches" and is not behaving like a pot, its energy-waste level is negligible, and also provides the motor more coupling at low rpm. The maximum current Q1 can provide (safely) is about 10A. The replacement type mentioned in the parts list (NTE2389) can provide up to 35A at 60V. I use a cpu-cooler-fan for additional cooling at high rpm.