

R1 = 10k pull up/down resistor

Current @ 15v

$$I = V / R$$

$$= 15 / 10000$$

$$= 0.0015A$$

$$= 1.5mA$$

TR20 = 2N3055

TR21 = 2N2955

Gate current is 1.5A

Power:

$$P = V \times I$$

$$= 15v \times 1.5A$$

$$= 22.5W$$

2N3055 max rated at 15A | 115W | 20-70 Hfe

Gain of TR20/21 approx 20.

Gain of BC108/179 approx 240.

Base current:

$$I_b = I_c / H_{fe}$$

$$= 1.5A / 20 \times 240$$

$$= 0.0003125A$$

$$= 312.5\mu A$$

For R8 to sink 15A in TR21:

$$I = 312.5\mu A$$

$$R = V / I$$

$$= 15v / 0.0003125A$$

$$= 48,000 \text{ ohms}$$

$$= 47k \text{ (preferred)}$$

P = V x I

$$= 15v \times 0.0003125A$$

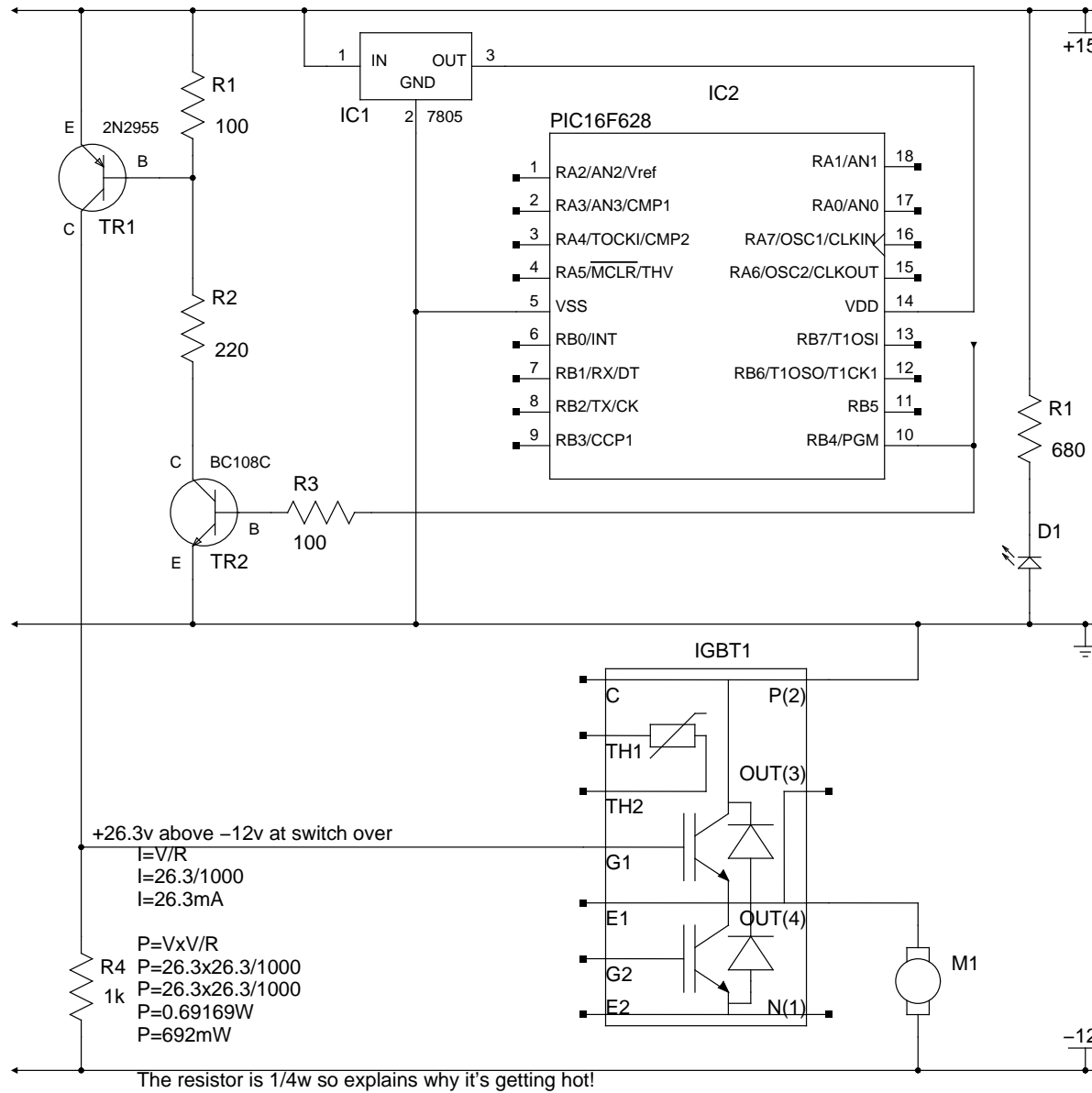
$$= 0.0046875W$$

$$= 4.7mW$$

Provided by PIC 5v @ 200mA

BC179C 100mA | 300mW | Hfe ~240 PNP

BC108C 100mA | 300mW | Hfe ~200 NPN



SWITCH SPEED:

$$Q = I \times t$$

For full switch on of 2MB1450U4N:

$$Q = 1mC$$

$$t = Q / I$$

$$= 0.001 / 15$$

$$= 0.000067 \text{ S}$$

$$= 67nS$$

Input capacitance 50nF

$$Q = C \times V$$

$$V = Q / C$$

$$= 0.001C / 0.00005F$$

$$= 20V$$

Aim for switch time 500nS

$$I = C \times V / t$$

$$= 0.00005F \times 15v / 0.0005S$$

$$= 1.5A$$

+26.3v above -12v at switch over

$$I = V/R$$

$$I = 26.3/1000$$

$$I = 26.3mA$$

$$P = V \times I$$

$$P = 26.3 \times 26.3/1000$$

$$P = 26.3 \times 26.3/1000$$

$$P = 0.69169W$$

$$P = 692mW$$

The resistor is 1/4w so explains why it's getting hot!