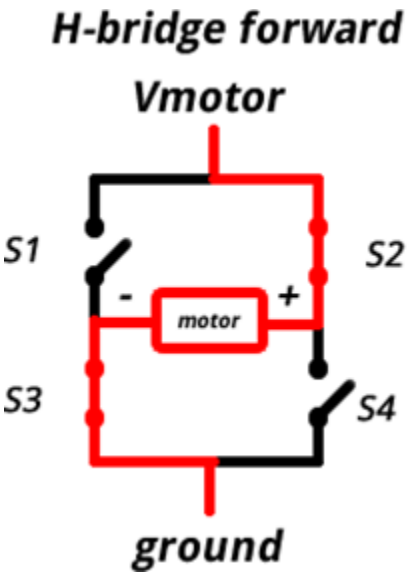
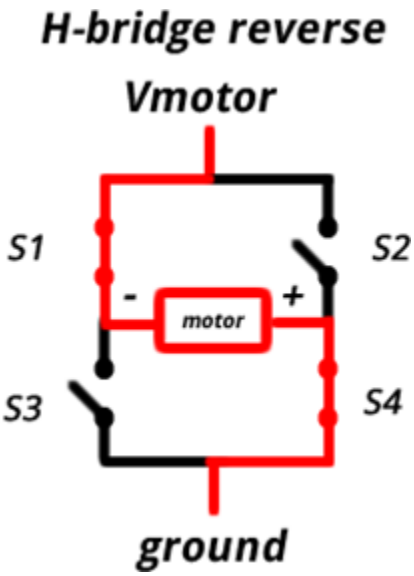
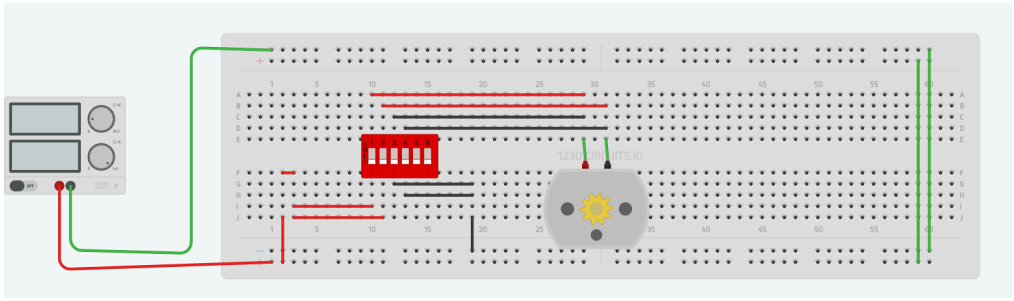
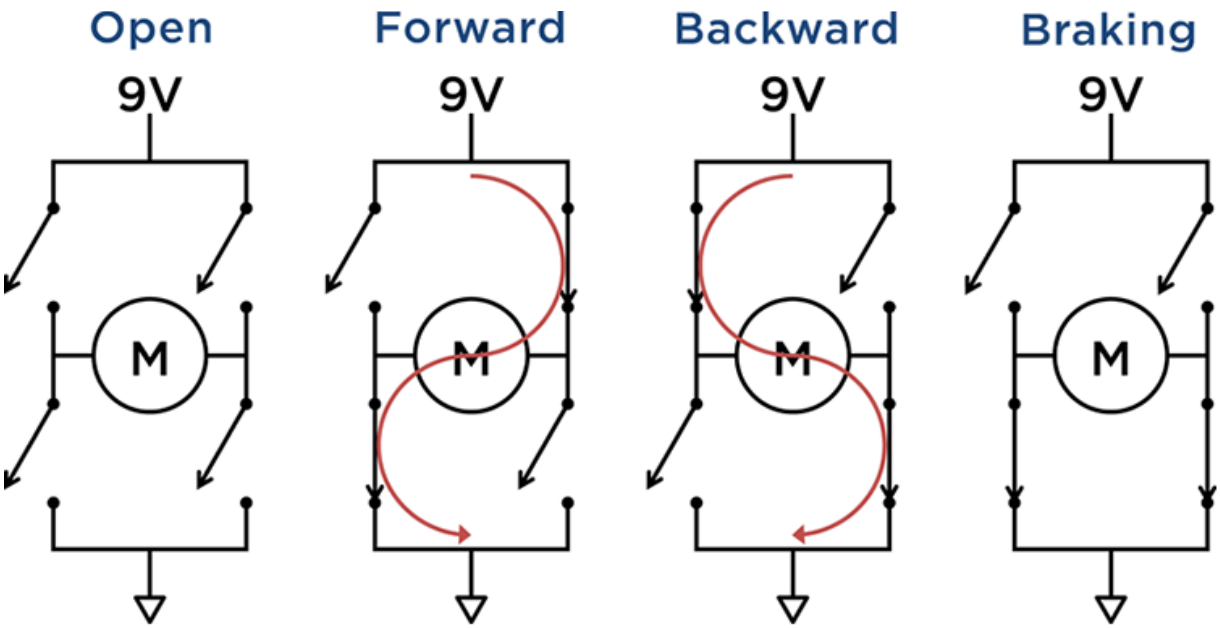
H Bridge Part 1 – FOUR SWITCH CIRCUIT



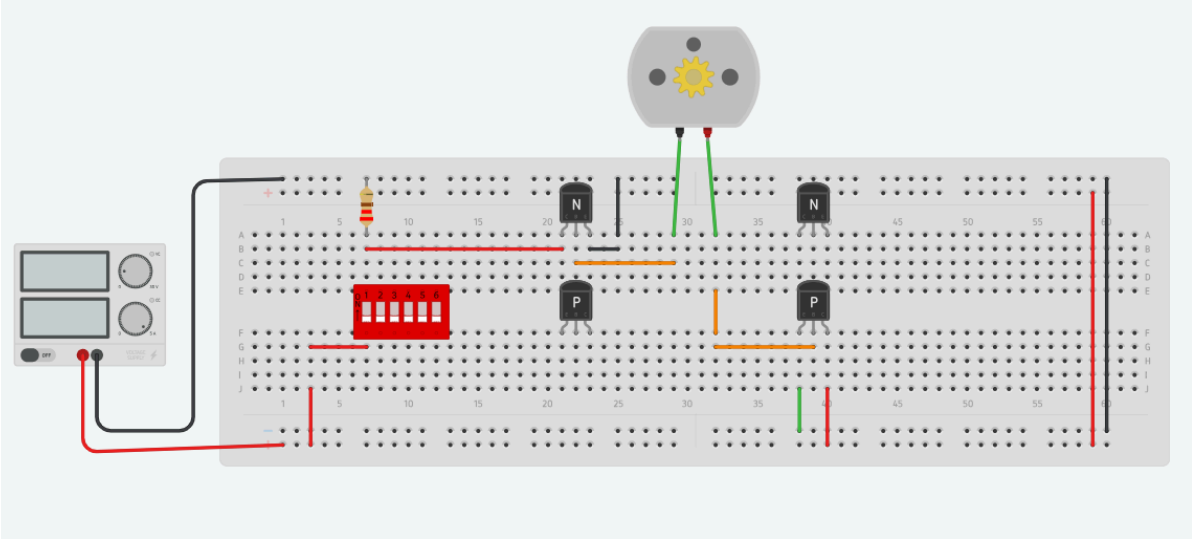






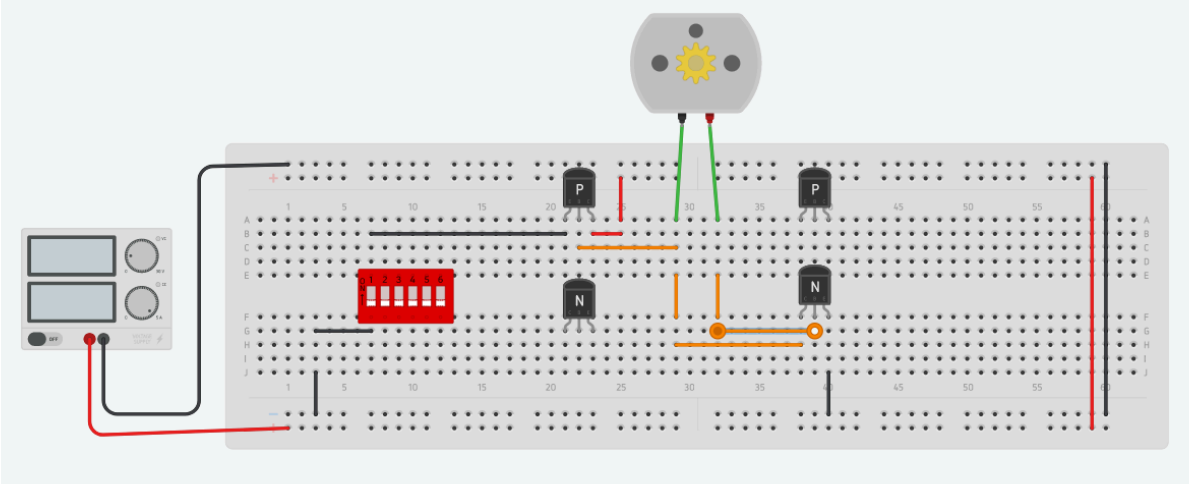
Now try creating a partial H-Bridge with Transistors

TINKERCAD VERSION (ONLY) BELOW

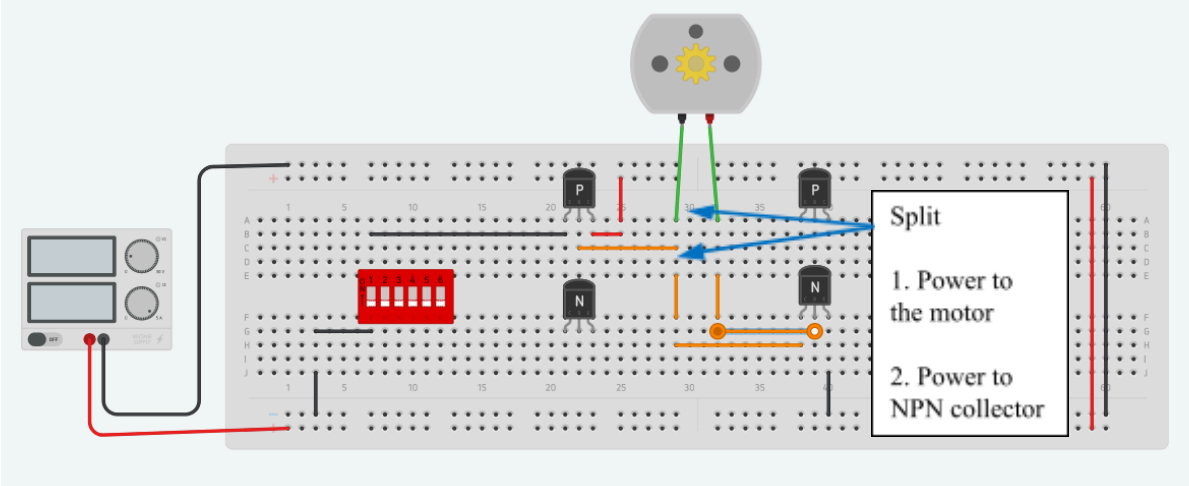


The above diagram is based on C**B**E Transistor layout pins NOT the **B**CE layout as your transistors

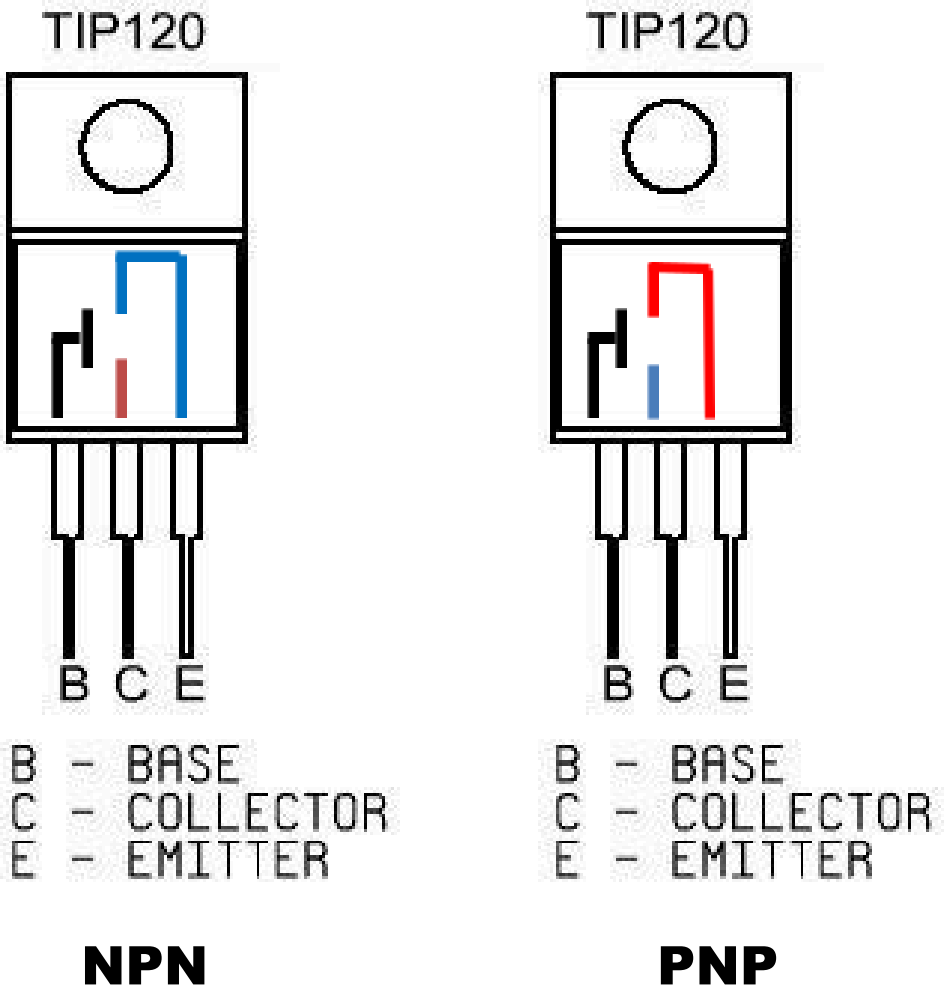
IN – CLASS (ACTUAL) BREADBOARD VERSION BELOW



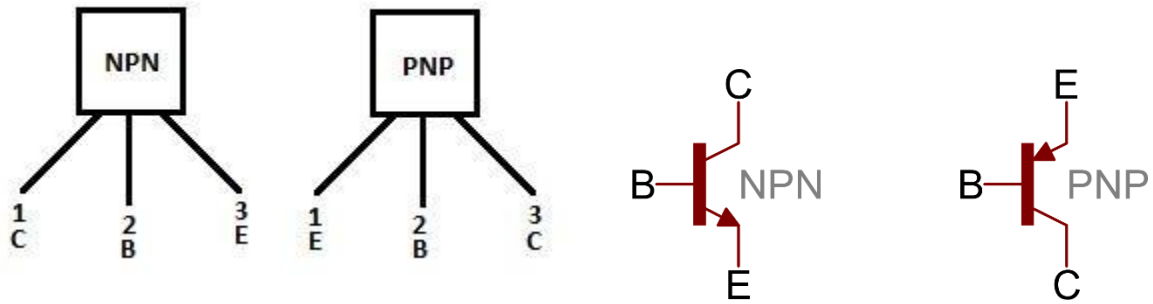
Notice the relation between the PNP and the NPN transistor
Follow the Positive from Power source into the Emitter on the PNP (P) transistor. Remember the N in the middle indicates a negative Base (trigger) or drain towards ground.
Positive voltage follows out of the collector.
Positive voltage goes into the motor and out and goes into the collector side of another transistor NPN (N).
Positive voltage is split coming out of the previous PNP transistor and also goes into the Base (trigger) of the NPN which indicates a positive Base (trigger) to allow voltage to flow through

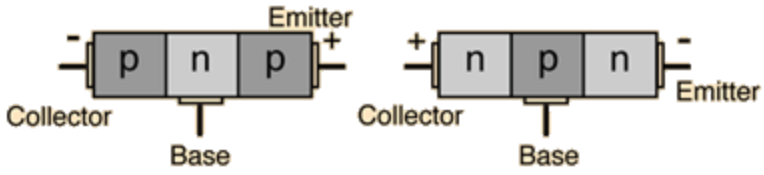


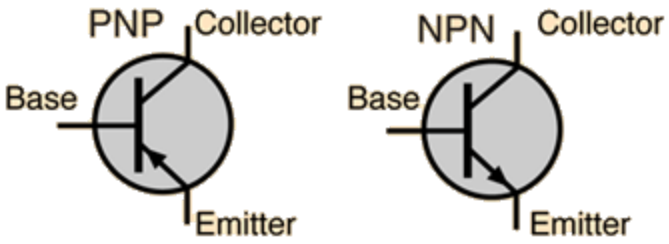
TIP 125



A traditional transistor would alternately look like below (CBE OR EBC)



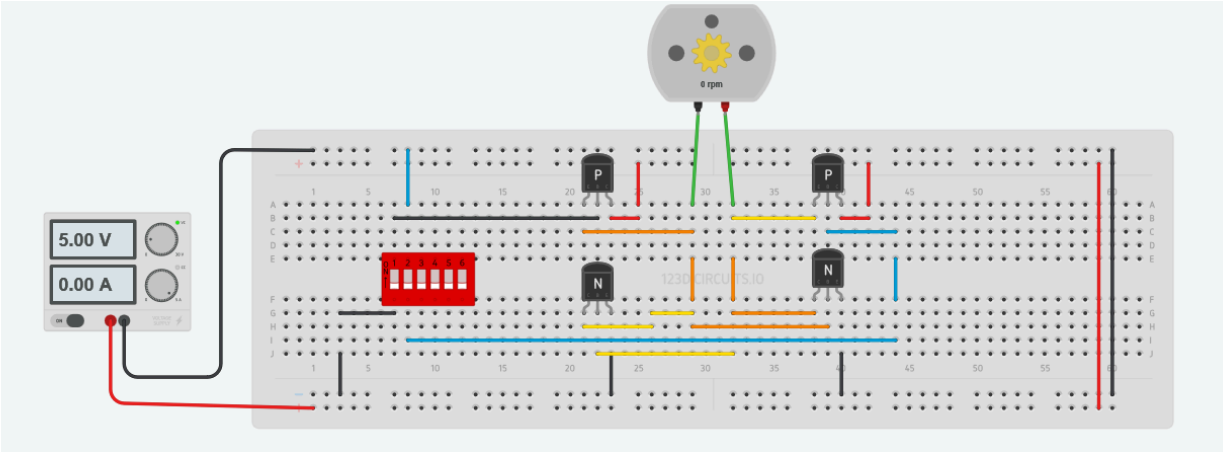

Emitter
-
+
p
n
p
Collector
Base
+
-
n
p
n
Emitter
Collector
Base


PNP
Collector
Base
Emitter
NPN
Collector
Base
Emitter

H Bridge Full Circuit

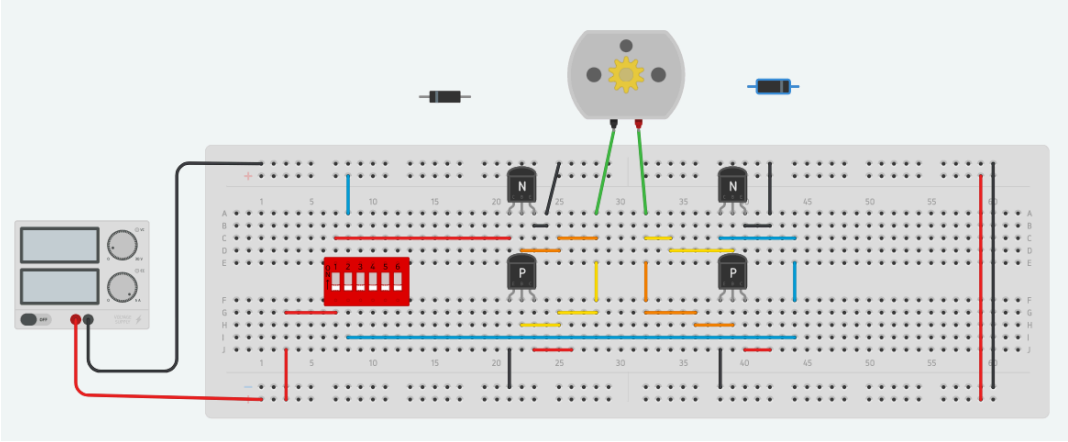
Two different orientations.

1) Most popular is the PNP to the top or motor side.

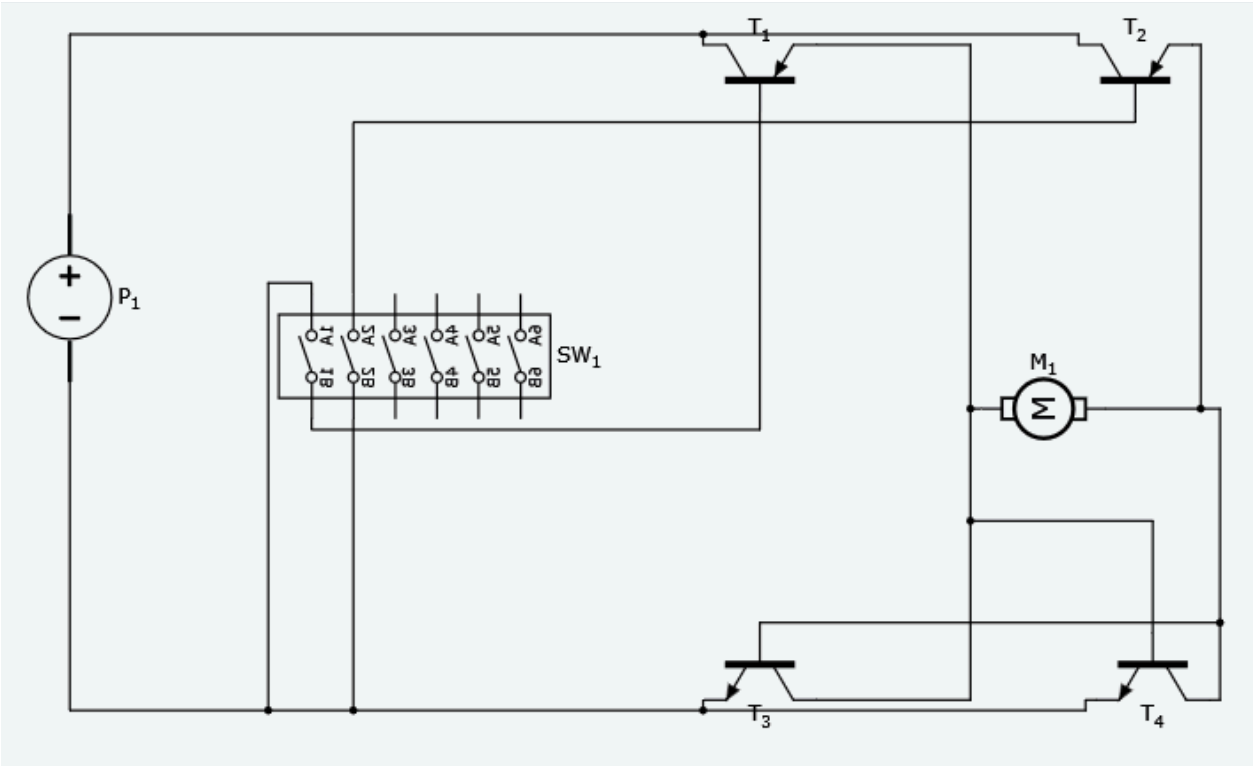


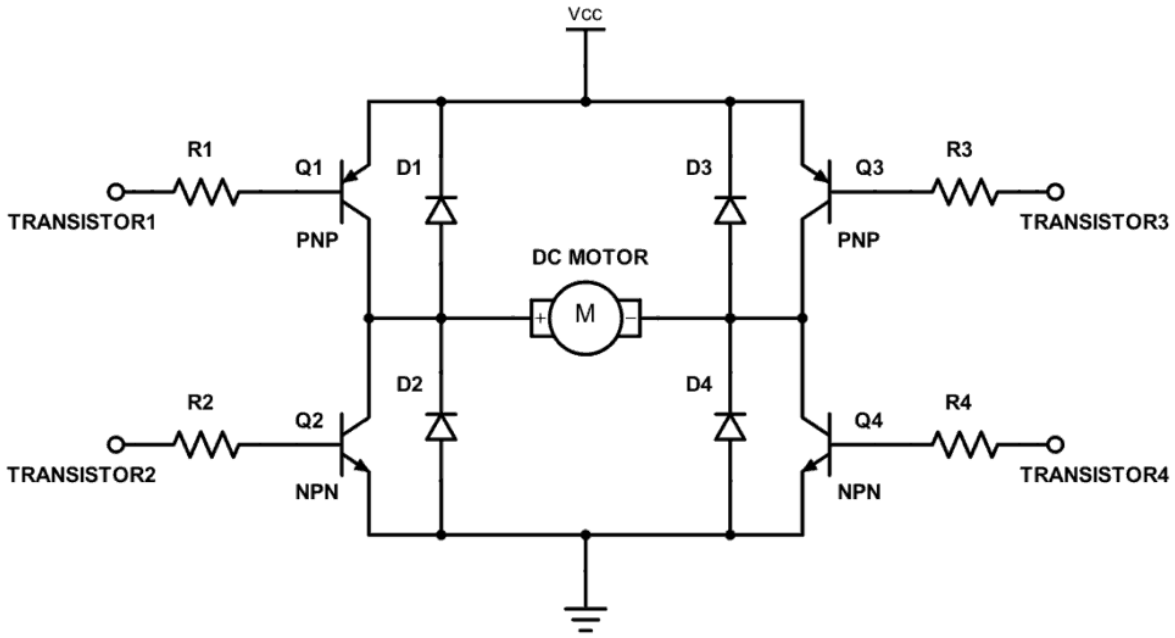
Note however, the switch is connected to ground (GND) or Negative - since PNP TIP 125 base requires LOW or GND as the trigger for the BASE.

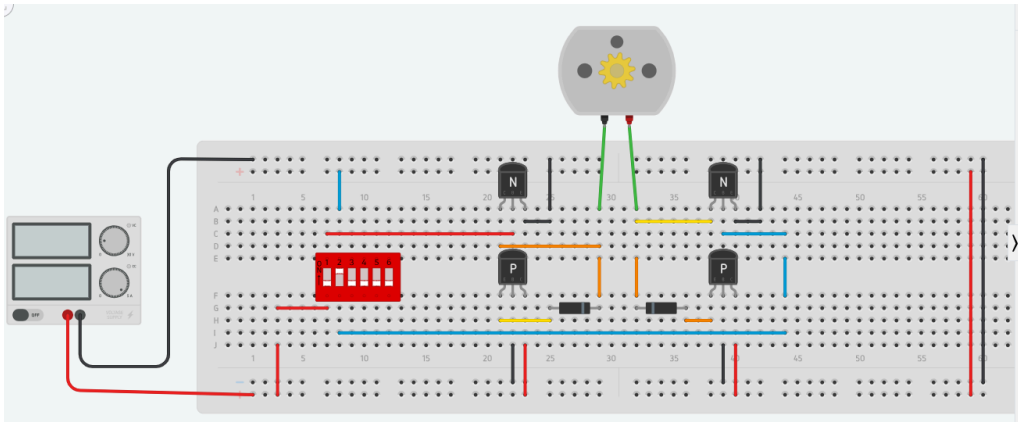
2) NPN to the top or motor side



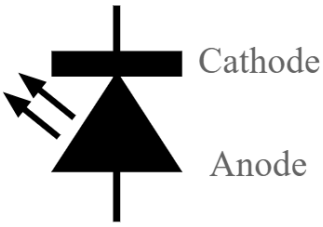
Easier orientation to power as it follows a tradition power (positive current) in through the Switch (Positive - to NPN TIP 120 since the base is triggered by a positive voltage.


T1
T2
P1
SW1
M1
T3
T4


Vcc
R1
Q1
D1
D3
Q3
R3
TRANSISTOR1
PNP
DC MOTOR
M
PNP
TRANSISTOR3
D2
D4
R2
Q2
Q4
R4
TRANSISTOR2
NPN
NPN
TRANSISTOR4

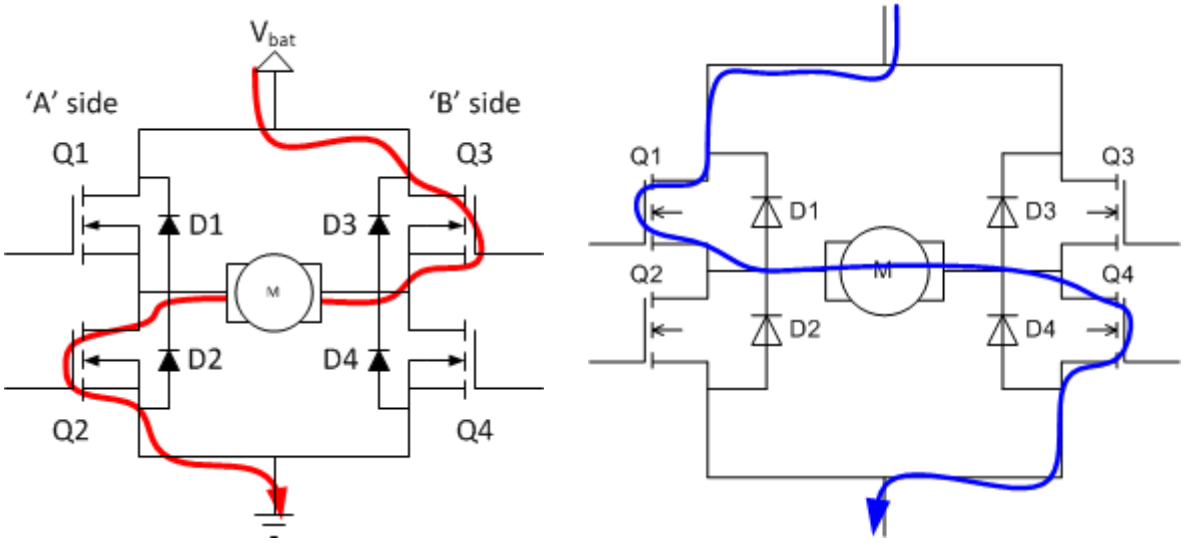


Full H Bridge with 2 Diodes

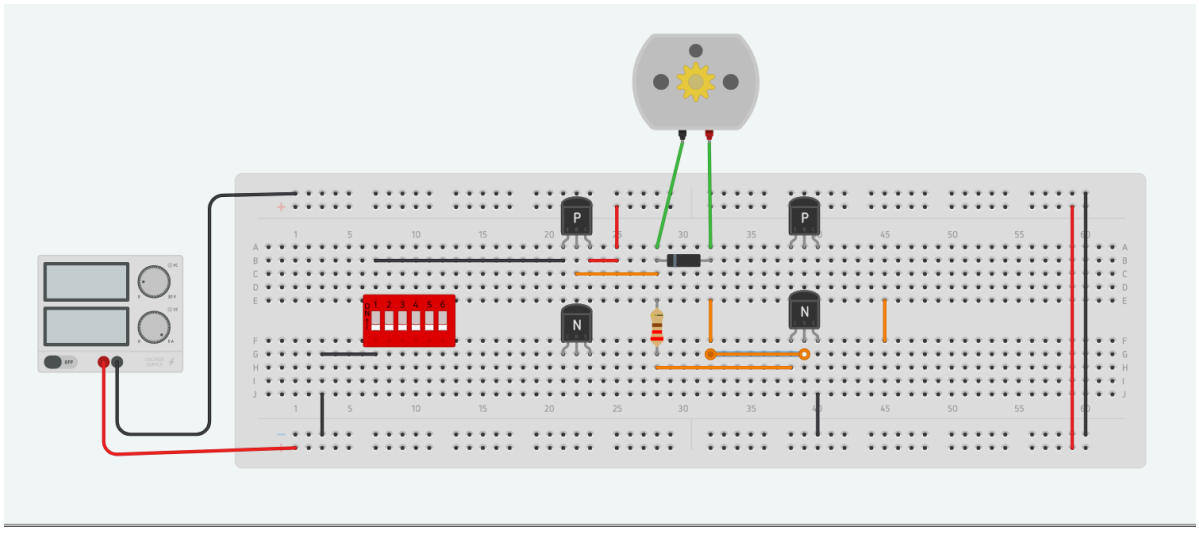


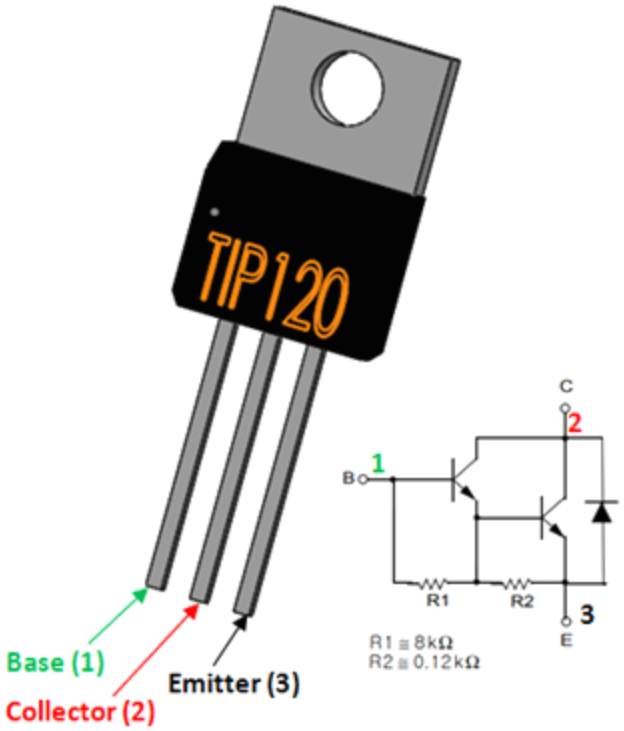
Notice LED – Light Emitting Diode has emitting arrows…

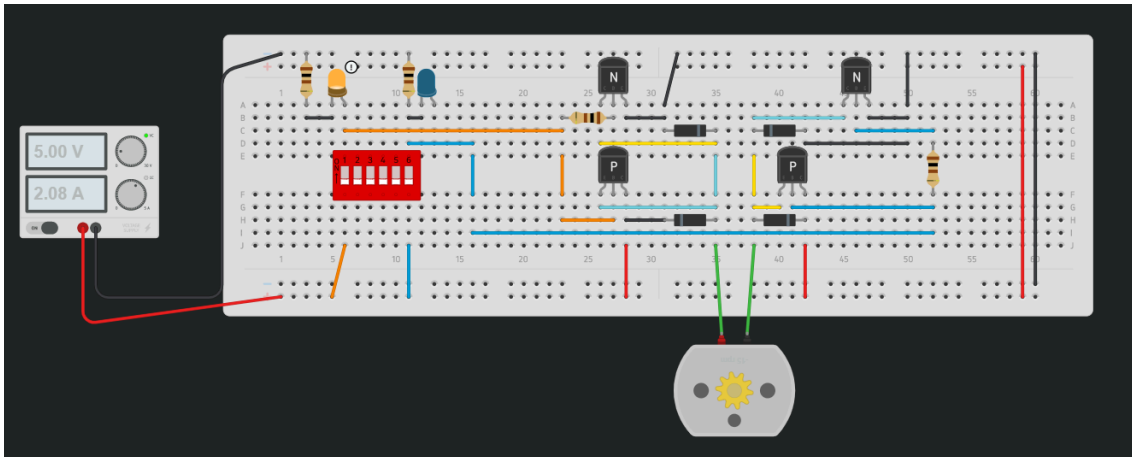
… and a standard diode does not



We will learn more about DIODES in PART 2







More References

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