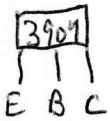
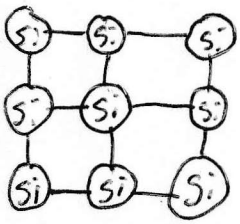
How a transistor Works

NPN 3904 Bipolar Junction Transistor

PNP

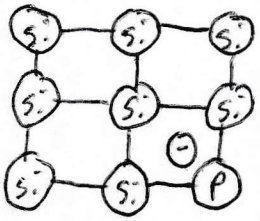


Review PN Junctions



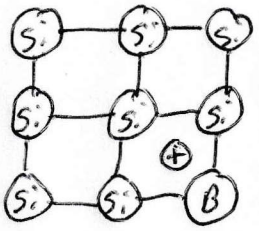
Si: = 4 Valence electrons

N

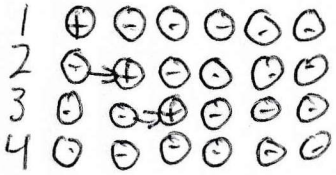


N-Type, Carriers: electrons
Doped with Phosphorus.
5 Valence electrons

P

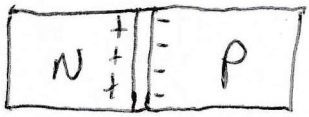


P-Type, carriers = Holes
Doped with Boron
3 Valence electrons



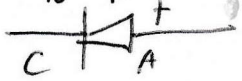
election flow

Hole flow



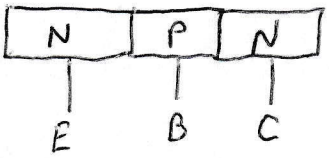
Depletion Region

Diode



.7V to overcome Depletion region

How a transistor Works

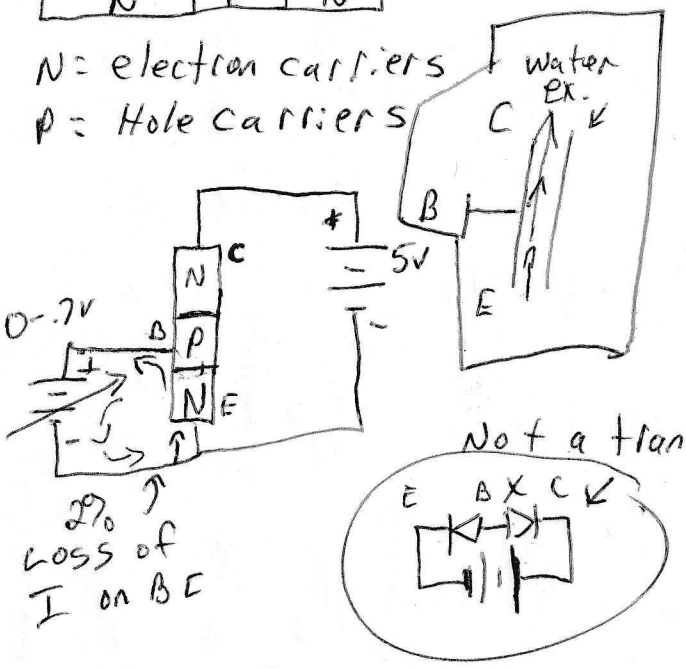


switch → Cutoff - 0-0V
Saturation - 1-.7V

Amplifier → Active mode

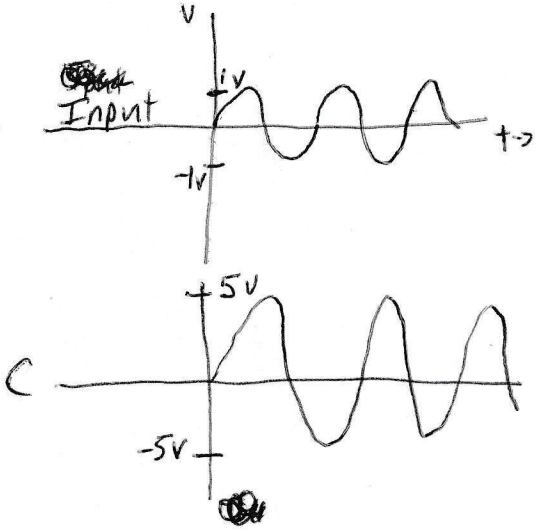
BJT
Bipolar Junction Transistor
(BJT)

N = electron carriers
P = Hole carriers

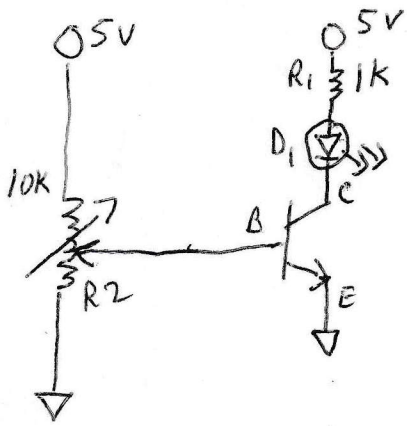


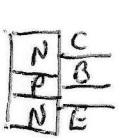
No loss of I on BC

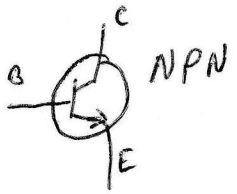
Not a transistor

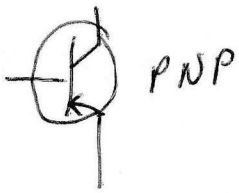


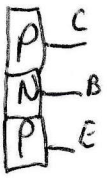
LAB

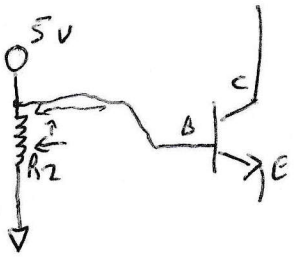

5V
5V
R1 1K
D1
10K
B
C
R2
E

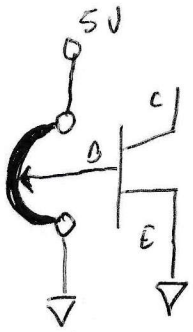

N
P
N
C
B
E

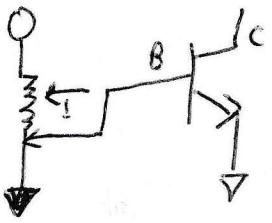

C
B
NPN
E


PNP


P
N
P
C
B
E


5V
C
B
R2
E


5V
C
B
E


B
C
I