

#flo #inclass

1 | silicon!

kinda dope, bro.

n: stands for negative! BUT THE ACTUAL SILICON IS NEUTRAL - there is a free electron, but it's not overall negative - extra electron can move around - but the extra element ALSO has an extra proton, so it cancels

p: stand for positive! BUT it's also neutral - cus the things just cancel - same as n-type but opposite

n-type: electrons free to migrate p-type: crystal structure need electrons to fill hole

put them next to each other, u get a diffusion force as the electrons from n move to fill the holes in p

space charge region: where the junction between the p-doped and n-doped meet, and cancel. not very conductive! virtually, not even doped?

why is this useful? IDK.

1.0.1 | why we care about junctions

between p and n dopes regions application of external voltage to a junction:

base case: [p] [--] [n] if you put, + [p] [-] [n] - then the neutral region shrinks, because the charges on both ends "push" the electrons. this is called **forward bias** where bias is the external voltage from say a battery

the other direction, **reverse bias** - [p] [-] [n] + the neutral region expands!

title: AKA

neutral region, depletion region, all the same.

this means, current can flow one direction, but NOT THE OTHER WAY! like, a diode! from LEDs.

- forward bias: reduce depletion region
- reverse bias: expand depletion region

forward bias is non-linear! there's a threshold where current jumps way up scale of forward and reverse bias are not the same!

#question : avalanche breakdown vs zener breakdown. what are they? I don't know! neither does mark!

#review

i want one!

title: a junction

an n-type and a p-type next to each other

1.0.2 | types of transistors

1. NPN BJT *n-type, p-type, n-type bipolar junction transistor*

-[N,P,N]- - | -bat- | +

this cant conduct, because their will nessasarily be forward bias in one direction and reverese bias in the other

positive to the p is forward bias -mark

so how do we get current to flow?

BJT has: - base, collector, emitter - base - coming back to this.. because it's hard to understand - voltage into the base relates to current?

2. MOSFET **metal-oxide-semiconductor field-effect transistor**

MOSFET.png|400 the idea is that u can bridge these two n-regions? #review this..

can seperate n's with a capacitor, then u can charge the capacitor to connect the n-regions

****the point of transistors**:**

tiny signals can be used to control much bigger signals.

effectively, on off switches, or, weak signal controlling strong signal

1.0.3 | **switches!**

so far, they have been physical! you gotta make the things touch! but these arn't physical. and we have millions and millions inside our devices

and they can store info

also wanna get this!