

Semiconductor



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What is semiconductor?

- ❖ There are two type of materials in the world. It is conductor and nonconductor
 - Conductor is material that electricity leads well
 - Nonconductor is material that electricity does not lead well

semiconductor has medium properties of conductor and nonconductor

- ❖ Semiconductor= Semi (half) +Conductor



What is semiconductor made of?

- ❖ Semiconductor is made by wafer. Wafer is a round shape silicon(Si) plate
 - ❖ The major material of semiconductor is Silicon wafer that made by 99.999999999 degree of purity silicon.
- ❖ Semiconductor also include Boron(B), and Phosphorus (P)
 - ❖ In pure wafer, electricity doesn't lead well. So add third and fifth low chemical element in periodic table. Include third low element, it call positive semiconductor (P type) and fifth low element , it call negative semiconductor. (N type)



Simple Semiconductor

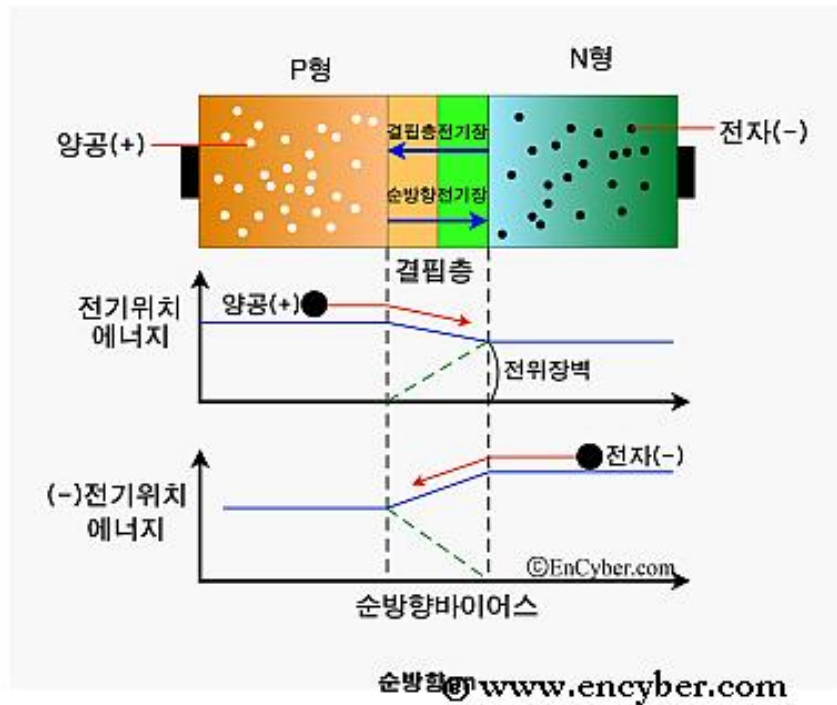


- ❖ Diod
 - ❖ Diode is the simplest semi-conductor which allows current only to pass in one direction.
- ❖ Transistor
 - ❖ Transistor also used diodes but they are more complicated in that they have three layers. It has PNP and NPN sandwich. This makes the transistors look like back to back diodes. Hence literally assumed no current will pass. But when a small current is introduced at the centre layer, it's amplified hence making of a silicon chip which can hold thousands of transistors and such acting as switches. Hence one can create Boolean gates and from this which can be applied practically on micro processors chips.

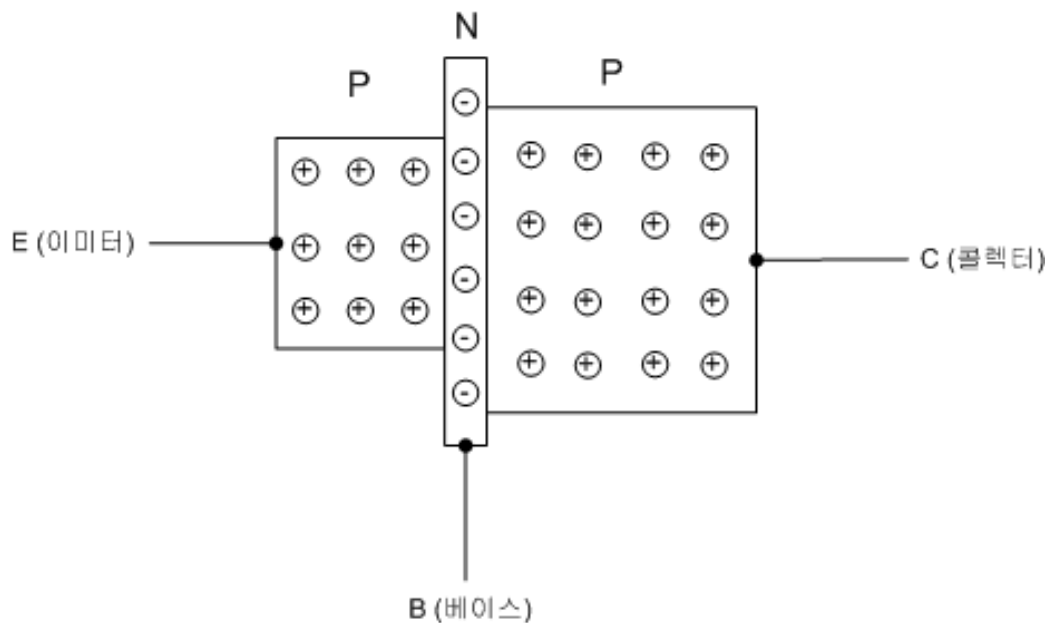




Diod

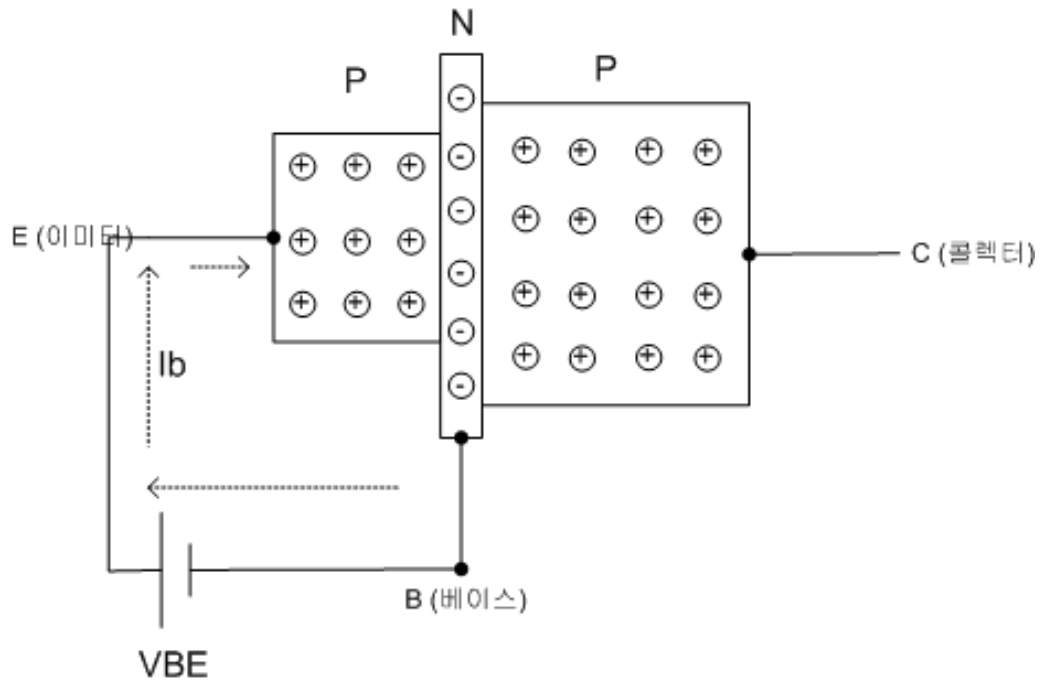


Transistor(PNP)

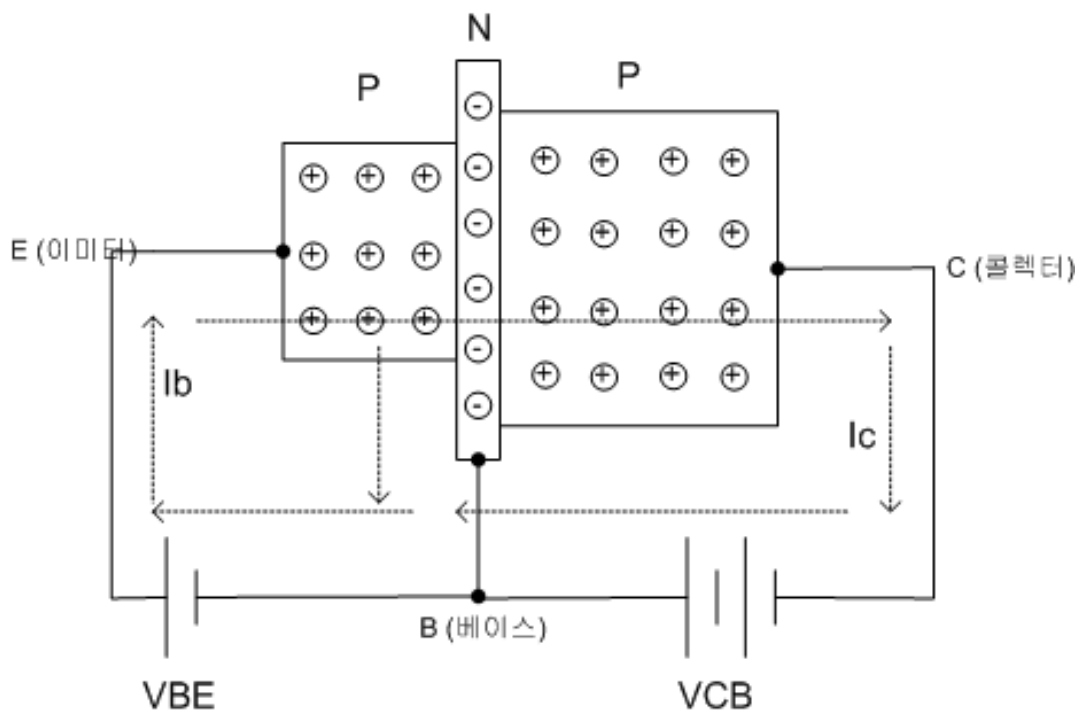




Transistor(PNP)

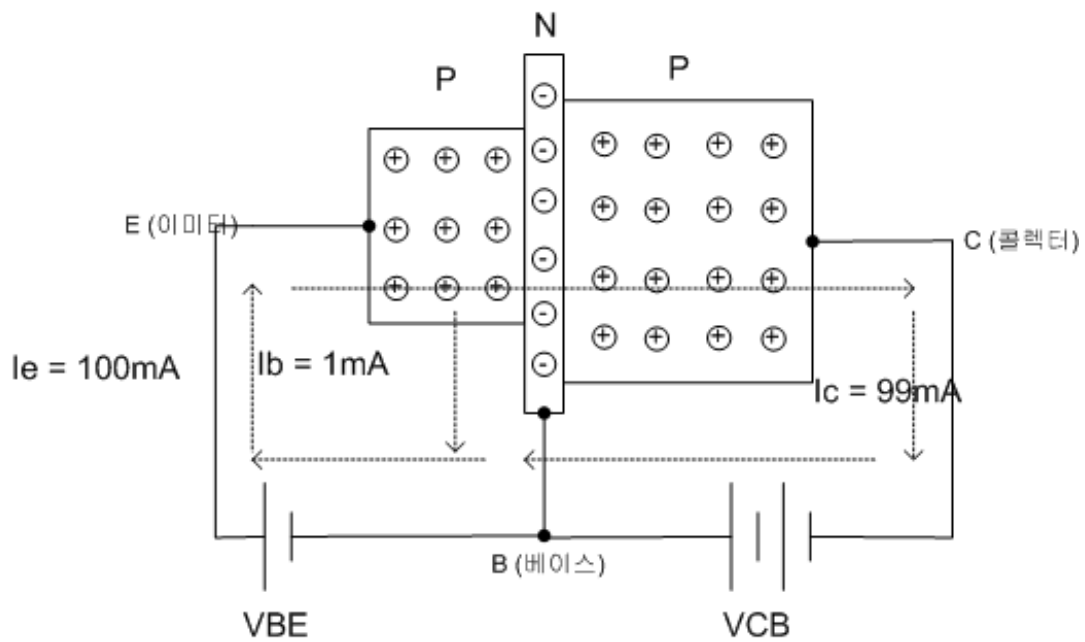


Transistor(PNP)

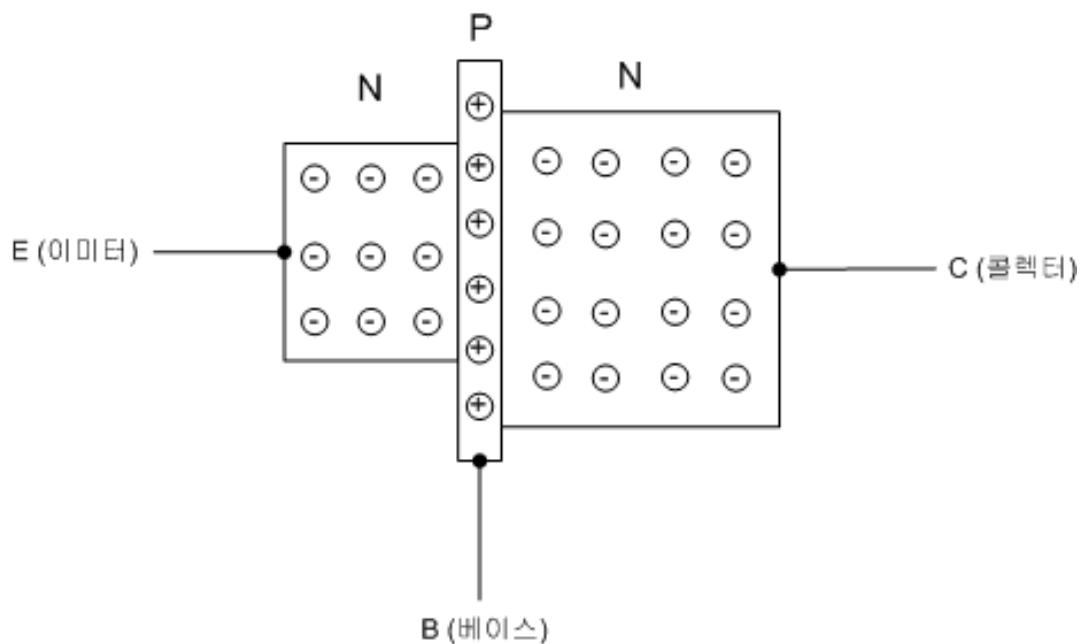




Transistor(PNP)



Transistor(NPN)



Development of semiconductor

	Major Component	Inventor	Year
First Generation	Vacuum tube	John Ambrose Fleming	1902
Second Generation	Transistor (TR)	John Bardeen, William Shockley, Walter Brattain	1947
Third Generation	Integrated circuit (IC)	Jack Kilby	1958
Fourth Generation	Large scale integration (LSI)		1980s
Fifth Generation	Very large scale integration (VLSI)		1990s

Type of semiconductor

- ❖ It is classified with two type
 - ❖ 1. Memory semiconductor (Have save function)
 - ❖ RAM, DRAM, ROM, Flash Memory etc.
 - ❖ 2. Non-Memory semiconductor (Didn't have save function)
 - ❖ Micro manufactures (CPU, Logic, ASIC, IC, micro component etc.)



How save the memory in memory semiconductor?



- ❖ There are many sell in memory semiconductor. Sell is the room that save memory.

Sell is composed one transistor and capacitor. Amount of sell is made memory semiconductor's name. For example 256M DRAM has 256 million sell in them.



Semiconductor in our life



- ❖ Almost all electronic products have semiconductor
- ❖ Flash memory
- ❖ USB drive
- ❖ Computer, PDA, MP3 player, Digital camera, Cell phone etc.
- ❖ Home appliances

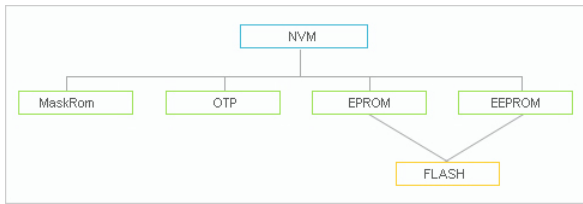




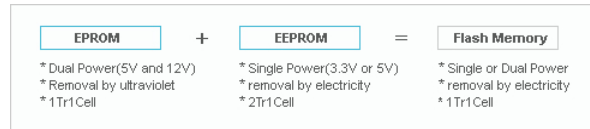
Flash memory (Tip)



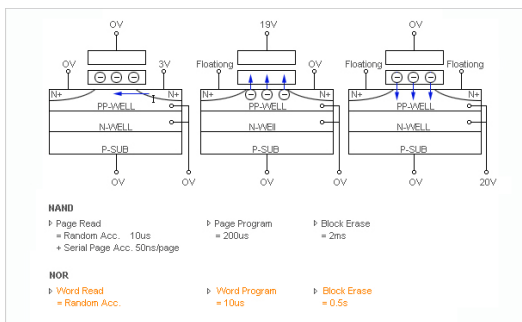
Flash creation



Flash memory



Working



Pin block diagram

44 TSOP II		48 TSOP I		48-pin TSOP I Standard Type 12mmx20mm		Pin Name	Pin Description
Vss	1	Vss	1	N.C.	1	I/O0-I/O7	Data input/Outputs
CLE	2	CE	2	N.C.	2	CLE	Command Latch Enable
ALE	3	RE	3	N.C.	3	ALE	Address Latch Enable
WP	4	R/B	4	N.C.	4	/WE	Write Enable
WE	5	SE	5	N.C.	5	/WP	Write Protect
N.C.	6	N.C.	6	N.C.	6	R/B	Ready/Busy
N.C.	7	N.C.	7	N.C.	7	/SE	Spare area enable
N.C.	8	N.C.	8	N.C.	8	Vcc	5V or 3.3V
N.C.	9	N.C.	9	N.C.	9	Vss	Ground
N.C.	10	N.C.	10	N.C.	10	N.C.	No Connection
N.C.	11	N.C.	11	N.C.	11	N.C.	No Connection
N.C.	12	N.C.	12	N.C.	12	N.C.	No Connection
N.C.	13	N.C.	13	N.C.	13	N.C.	No Connection
N.C.	14	N.C.	14	N.C.	14	N.C.	No Connection
N.C.	15	N.C.	15	N.C.	15	N.C.	No Connection
N.C.	16	N.C.	16	N.C.	16	N.C.	No Connection
N.C.	17	N.C.	17	N.C.	17	N.C.	No Connection
I/O0	18	I/O	18	N.C.	18	N.C.	No Connection
I/O1	19	I/O	19	N.C.	19	N.C.	No Connection
I/O2	20	I/O	20	N.C.	20	N.C.	No Connection
I/O3	21	I/O	21	N.C.	21	N.C.	No Connection
Vss	22	Vcc	22	N.C.	22	N.C.	No Connection

Why Korea lead the world semiconductor market?

- ❖ Semiconductor industry require great brain and ability and the Korean race proper it.
 - ❖ 1) Chopsticks culture = Development hand skill.
 - ❖ 2) Interior culture : Take off shoes in room =It is proper to sustain high cleanness.
- ❖ Course which need detailed drawing, calmness, cooperation.
 - ❖ It Also correct out race, too.



Future Semiconductor



- ❖ DRAM, SRAM, Flash memory and other have merits and demerits. so future memory are repletion this demerits.
- ❖ Future memory semiconductor
 - ❖ MCP – Combinate SRAM, DRAM, Flesh memory
 - ❖ Fusion memory – Combinate one memory to other memory
 - ❖ New memory – New type memory
- ❖ Future non-memory semiconductor
 - ❖ More and more small, minute, and accumulate.
 - ❖ Development nano semiconductor skill.

