Sri Indu
College of Engineering & Technology
UGC Autonomous Institution
Recognized under 2(f) & 12(B) of UGC Act 1956,
NAAC, Approved by AICTE &
Permanently Affiliated to JNTUH
Estd.2001

FABRICATION OF COMPONENTS ON MONOLITHIC IC

Faculty Name: Mrs. Swetha

Student's Name : **V. Sneha**

YEAR/Semester : *II / II*

Roll No : **23D45A0412**

Branch : **Electronics And Communication Engineering (ECE)**

Subject : **Linear And Digital IC Applications**

- A better enhancement in circuits technology is the invention of Integrated Circuits.
- An Integrated Circuit is a miniaturized integration of complete electronic circuits on a single semiconductor chip (mainly Silicon).
- Compared to discrete circuits, Integrated Circuits consume less power, cost less, are more reliable, have a higher frequency and speed.

Classification of ICs on basis of chip sizes

- Integrated Circuits can be classified based on its integration scale
- Classification on basis of applications
- Classification on basis of Fabrication

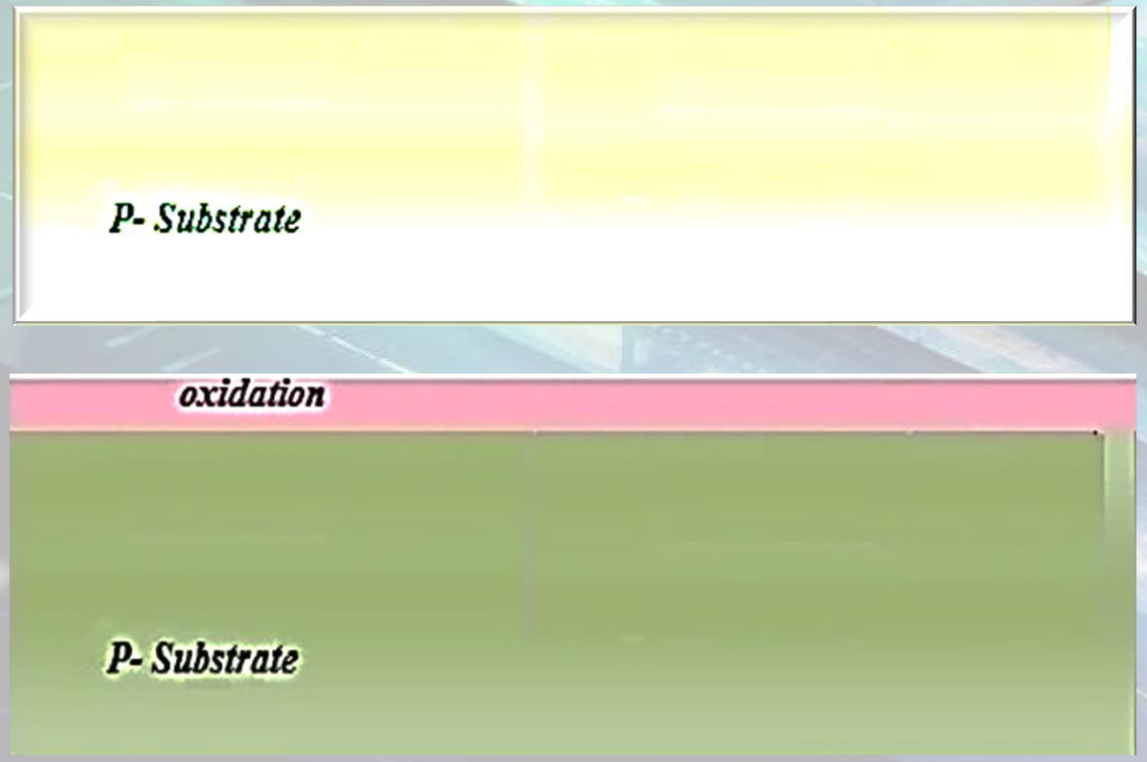
Monolithic Integrated Circuits

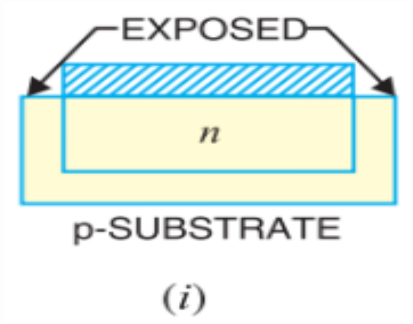
- As the word implies, Monolithic Integrated Circuits are manufactured or fabricated on a single chip of Silicon.
- All the active and passive circuit components are formed at the same time, using diffusion steps.
- Monolithic ICs are mostly used in applications where identical characteristics of components are required and hence they are cheap and highly reliable.

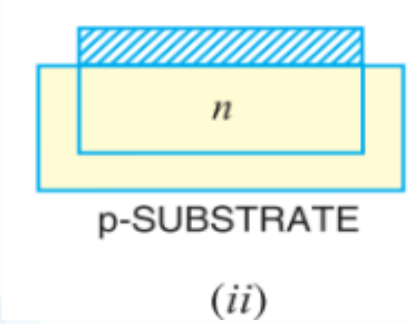
Diodes

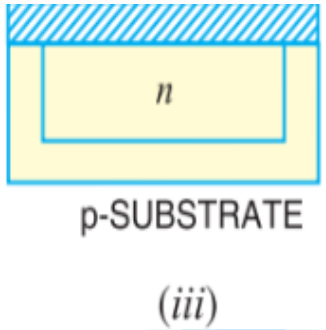
One or more diodes are formed by diffusing one or more small n-type deposits at appropriate locations on the substrate.

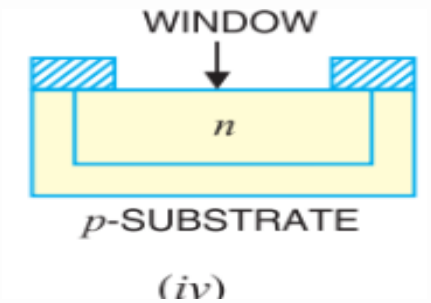
The below Figure shows how a diode is formed on a portion of substrate of a monolithic IC.

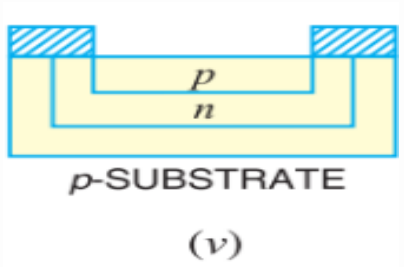


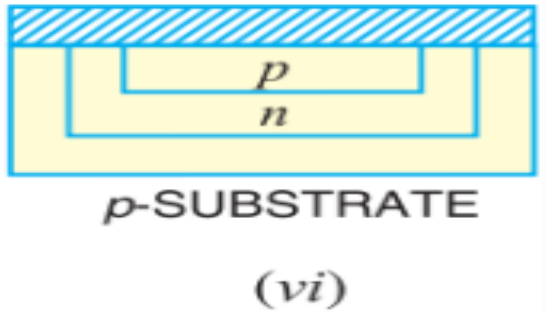




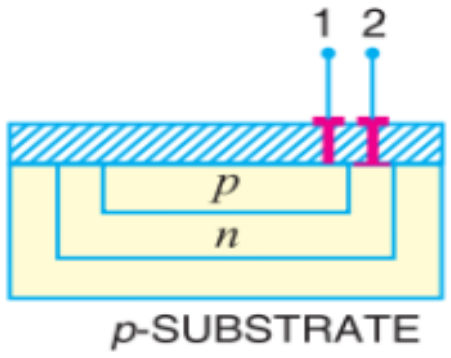


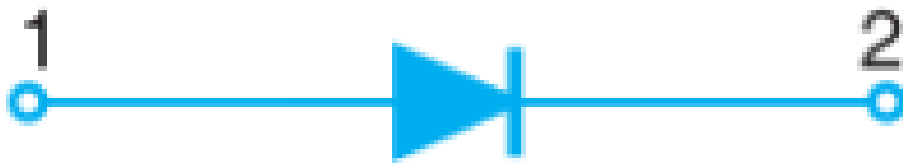






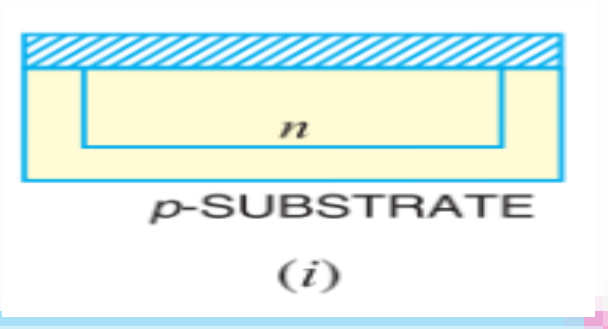
The last step is to attach the terminals. For this purpose, we etch the SiO2 layer at the desired locations as shown in Figures

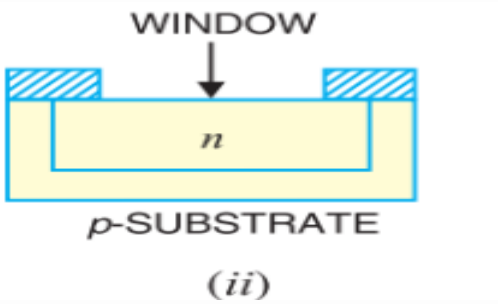


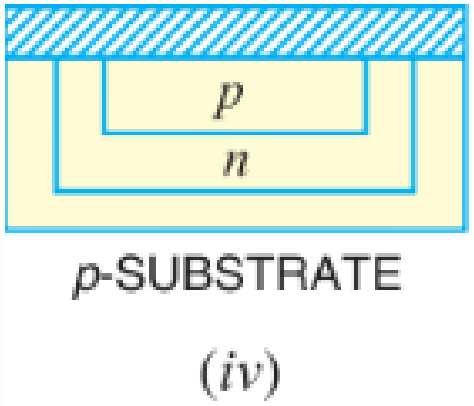


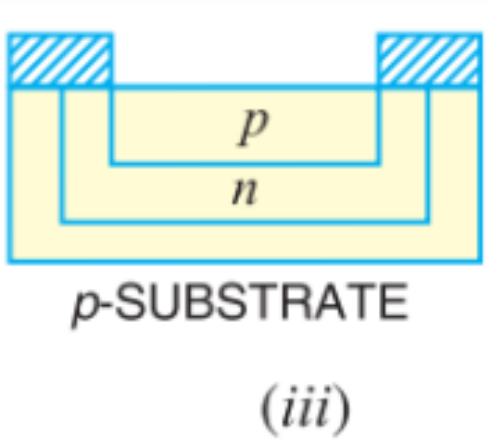
Resistors

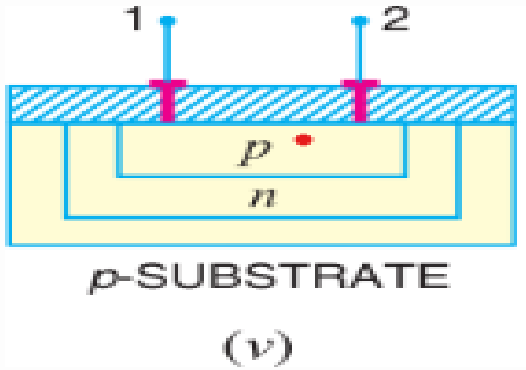
This is how a resistor is formed on a portion of the substrate of a monolithic IC.

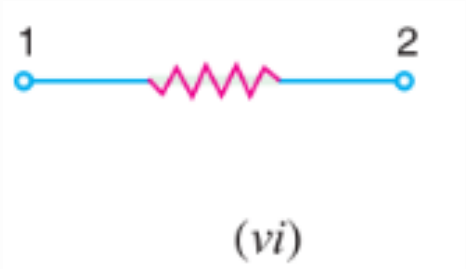






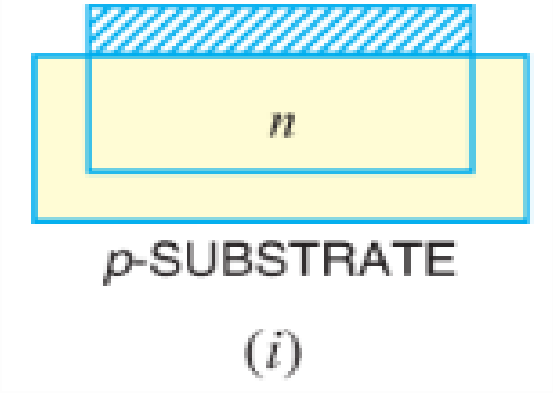


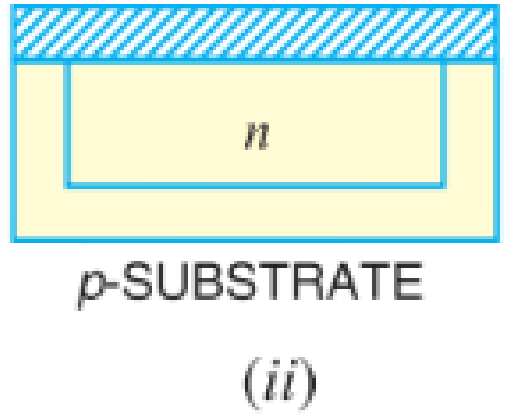


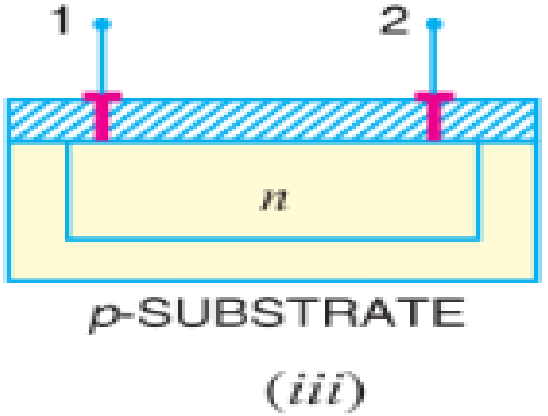


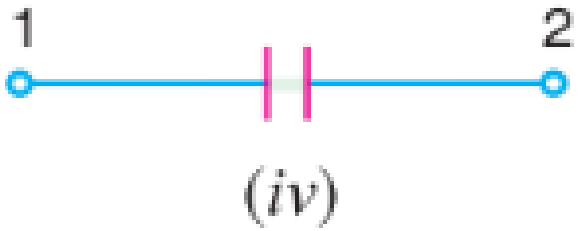
Capacitors

The process of fabricating a capacitor in the monolithic IC as follows



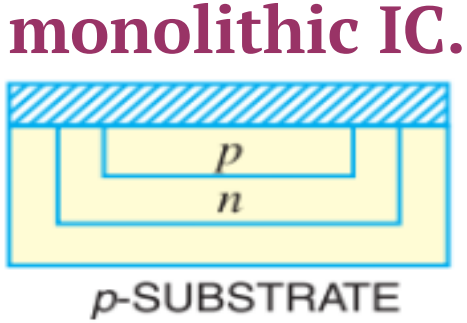




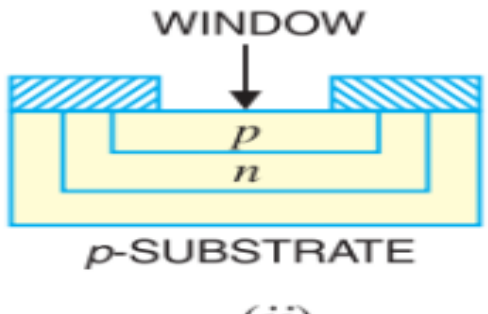


Transistor

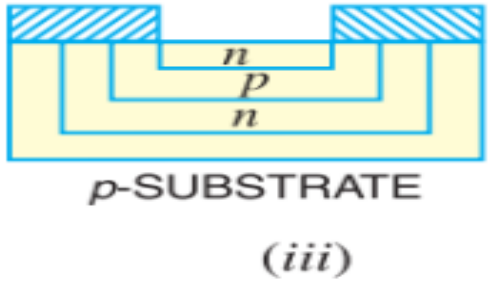
Transistors are formed by using the same principle as for diodes. The following shows how a transistor is formed on a portion of the substrate of a monolithic IC.



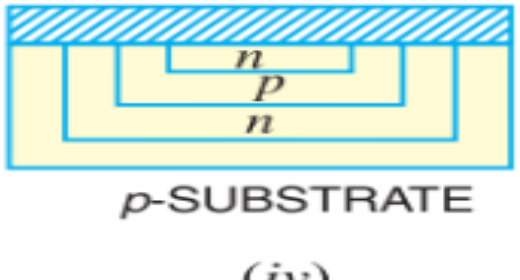
(*i*)



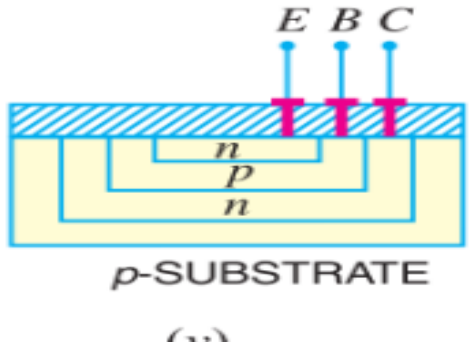
(*ii*)



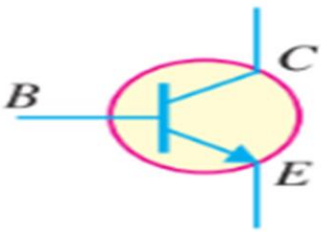
(*iii*)



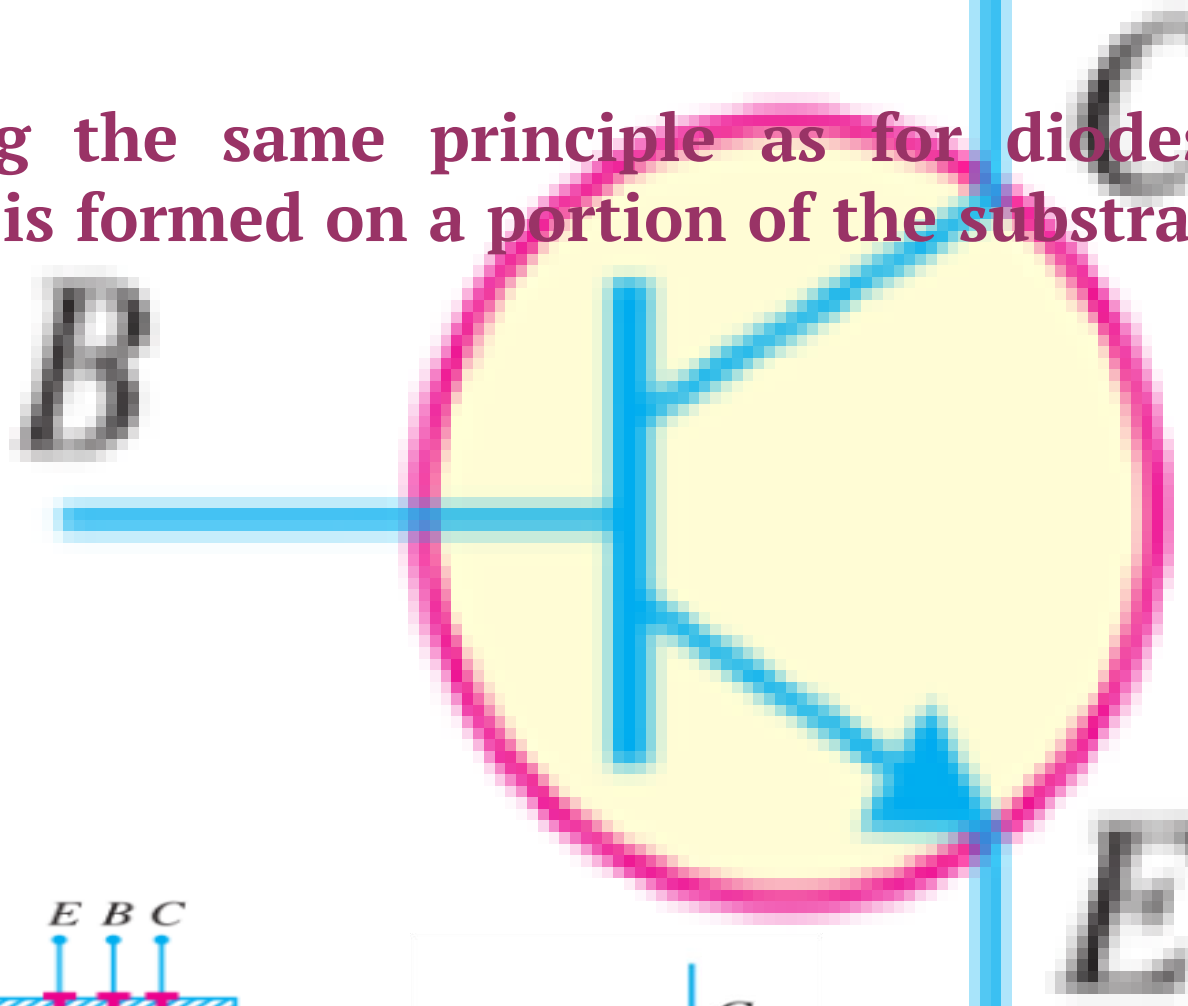
(*iv*)



(*v*)



(*vi*)



CONCLUSION

- In Integrated Circuits, a large number of active and passive elements along with their interconnections are developed over a small silicon wafer typically of 50 by 50 mils in cross section.

- The basic processes followed for production of such circuits include epitaxial growth, masked impurity diffusion, oxide growth, and oxide etching, using photolithography, removal of excess metal, formation of terminals for making pattern.


THANKYOU