

1) Introduction :

- * The miniaturization that has occurred in recent years leaves us to wonder about its limits.
- * Complete systems now appear on wafers thousands of times smaller than the single element.
- * The first integrated circuit (IC) working at Texas Instrument in 1958.
- * Today, the intel Pentium 4 processor has more than 42 million transistors.
- * The first device to be introduced here is the simplest of all electronic devices, yet has a range of applications that seems endless.

2) Semiconductor materials: Ge, Si and GaAs :

- * Semiconductors are a special class of elements having a conductivity between that of a good conductor and that of an insulator.
- * In the first few decades following the discovery of the diode in 1939 and the transistor in 1947 germanium was used almost, then it is discovered that it suffered from low levels of reliability due to its sensitivity to changes in temperature.
- * Si improved temperature sensitivities and silicon quickly became the semiconductor material of choice.
- * Computers were operating at higher and higher speeds, the development of the first GaAs transistor in the early 1970s. This new transistor had speeds of operation