DIAMOND CHIP

Presented By:

Avinash Gautam
I.T. Engineer

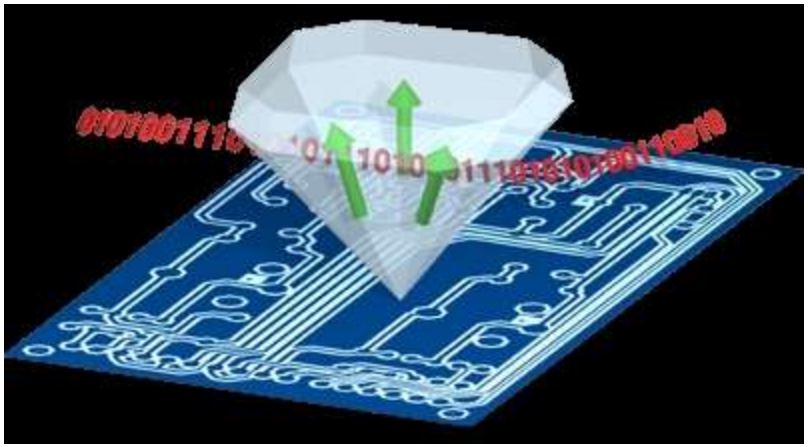
SOME FACTS…

- Carbon is not a semiconductor.
- Some of the carbon allotropes can acts as semiconductors

What is a Diamond chip ?

- Diamond or carbon chip is electronic chip manufactured on structure carbon wafer.

- It can also be defined as an electronic chip manufactured using carbon as the wafer.



Properties of Diamond :

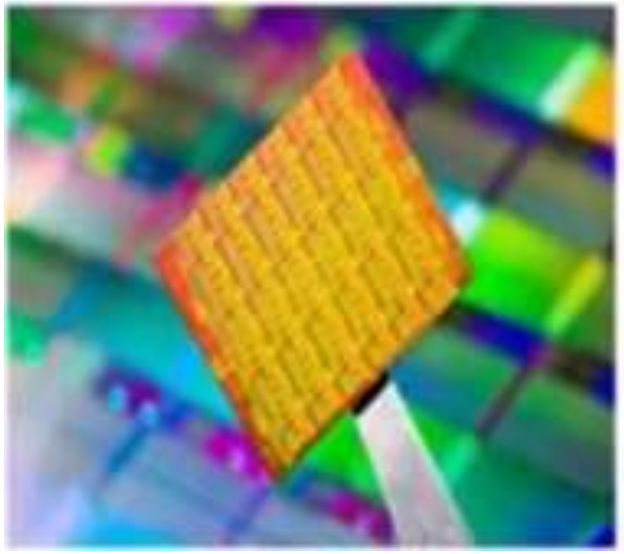
- Diamond is allotrope of carbon and it is the hardest material in nature.
- It has small toughness.
- It is a good electrical insulator , but good thermal conductor

Diamond As a Semiconductor :

- Diamond is a insulator ,but it can be made conducting by doping it with certain elements.
- Boron ➡ p –type doping element.
- Nitrogen ➡ n-type doping element.
- After doping diamond can act like a semiconductor.
- But this process is very difficult and Time consuming.

Invention of Diamond Chip :

- A diamond semiconductor operates on 81 GHz frequency ,and it is more then twice speed of earlier devices.
- Developed by the NIPPON TELEGRAPH and TELEPHONE CORPORATION (NIT), Japan.



Properties of Diamond Chip :

- Diamond chip can withstand a temperature of 500 degree Celsius , but 150 degree Celsius for silicon chip.
- It can operate on 81GHz frequency.
- Can resist voltages up to 200V , where as 20V for silicon.

Advantages :

- Smaller components are possible.
- It works at higher temperature.
- Faster than silicon chip.
- Large power carrying capacity

Smaller Components are Possible :

- As the size is smaller – it is possible to cut very smaller lines through diamond structural carbon.

- We can imagine a transistor whose size is one hundredth of silicon transistor .

Faster Than Silicon Chip :

- Mobility of the electrons inside the doped diamond structure carbon is higher than that of in the silicon structure.

- As the size of the silicon is higher than that of carbon , the chance of the collision of electrons , with large silicon aroms increases as compared to carbon chip.

Disadvantages :

- Very expensive than silicon.
- Electricity can not flow smoothly through diamond .
- Doping of diamond is very difficult .

Applications :

- In microcontrollers.
- Smaller , speedier computer chips can be made using diamond chips.
- In automobiles and in airoplanes.
- The chip would be most useful in devices located near hot burning engines .

Conclusions :

- The diamond chip replaces the need of all silicon chip in every aspect in future generations…

Any *QURIES* ???

THANK YOU