A Review on CNTFET based Digital Logic Circuit Designing

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Abstract- In this paper,a review is presented on the circuit designing using CNTFET technology and its advantages.Carbon nanotubes, as novel materials with one of a kind electronic qualities, have been expected to be used to build electronic gadgets for their preferable physical properties over those of conventional used silicon.

Keywords- CNTFET, Nano tubes, MOSFET

I. INTRODUCTION

In a MOSFET, the source and drain are associated by a leading surface channel through which bearers can stream when legitimately regulated by the gate voltage [1]. The source and drain areas can be either p or n write, yet they should both be of a similar sort, and of inverse kind to the body district. As of late, MOSFETs have been downsized fundamentally and the Si-SiO2 interface remains the most critical mix [2]. Downsizing the measurements of MOSFETs is a constant pattern. The challenges with diminishing the extent of the MOSFET incorporate the semiconductor gadget manufacture process, the requirement for low voltages, and with poorer electrical execution the need of circuit upgrade and advancement [3]. It has been expressed that smaller transistors switch quicker, which is the primary inspiration for downsizing the measurements of semiconductor gadgets [4][8] This area presents the attributes of carbon nanotubes and portrays a portion of their potential applications.

In the light of transport conductivity, carbon nanotubes can be catalogued as metallic or semiconducting carbon nanotubes [5], which is decided by the energy band gap between the atoms. The conductive type of the CNTs depends on its chirality [6]. Both metallic and semiconducting CNTs have been studied as potential electronic components and their electronic properties have been established. [11]

II. CNTFET TECHNOLOGY

The activity standard of carbon nanotube field-impact transistor (CNFET) is like that of conventional silicon gadgets. This three (or four) terminal gadget comprises of a semiconducting nanotube, going about as leading channel, connecting the source and drain contacts. The gadget is turned on or off electro statically by means of the gate. The semi 1D gadget structure gives better gate electrostatic control over the channel district than 3D gadget (e.g. mass CMOS) and 2D gadget structures [10]. As far as the gadget task instrument, CNFET can be classified as either Schottky Barrier (SB) controlled FET (SB-CNFET) or MOSFET-like FET[3][4][12]. The conductivity of SB-CNFET is represented by the larger part bearers burrowing through the SBs toward the end contacts. [12]The on-current and subsequently gadget execution of SB-CNFET is controlled by the contact protection because of the nearness of burrowing boundaries at both or one of the source and drain contacts, rather than the channel conductance, as appeared by Fig 1.3(a). [14]The SBs at source/drain contacts are because of the Fermi level arrangement at the metal-semiconductor interface.[15][9] Both the stature and the width of the SBs, and along these lines the conductivity, are adjusted by the entryway electrostatically. SB-CNFET indicates ambipolar transport conduct [4]. Figure 1 and 2 show energy band diagram of CNTFET in SB and MOS like form and an ideal cntfet representation.

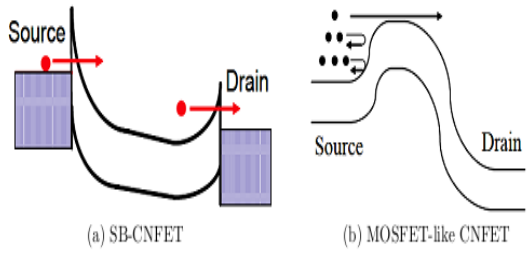

Fig.1: Band diagram for Energy(a) Schottky Barrier-CNFET and (b) MOS-like CNFET.

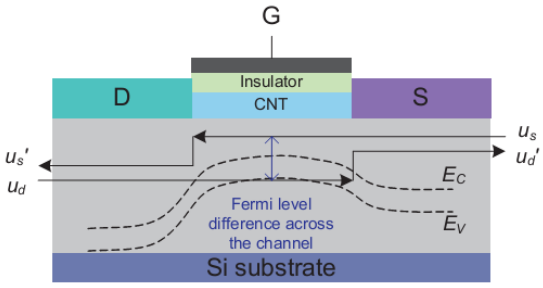

Fig.2: Ideal CNTFET

III. CONCLUSION

The Carbon Nanotube Field Effect Transistor (CNTFET) is a standout amongst the most encouraging gadgets among rising advancements to broaden as well as supplement the conventional Si MOSFET. As the qualities of a CNTFET is not the same as traditional mass CMOS, new plan technique must be built up. As request of new outline technique, this task break down the qualities of CNTFET, CNT interconnect

advances and propose new strategies to configuration circuits, for example, computerized, memory and I/O circuit. This has been proficient by proposing another streamlining strategy.

IV. REFERENCES

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