

Analysis and Simulation of Electrical Nanoparticles in Manufacturing (Nano Transistors_Nano Regulators)

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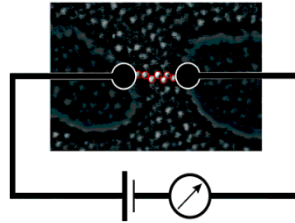
- **Abstract:**

Note : The simulated nano MOSFET and Double Gate MOSFET (DG MOSFET) transistors with DGMOSFET structure have lower I_{off} than SOI structure. The I_{on}/I_{off} ratio in DG structure is higher than SOI structure. The effect of reducing the drain induced barrier potential (DIBL) in SOI MOSFET is more severe than DG MOSFET structure. DG` has higher mobility than SOI structure.

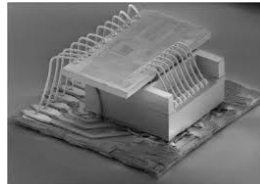
- **Keywords :** Nano particle , Nanoelectronic , Nano-Materials , Electronic Nanotechnology

Introduction •

Nanoscale MOS transistors are used in computers with very compact electronic circuits. In order to further reduce the size of circuit components to the nanoscale, perhaps even molecular scale, researchers have proposed several alternatives to transistors in ultra-compact circuits. These nanoscale electronic devices act like current transistors, acting as both switches and amplifiers. But, unlike today's field-effect transistors, which rely on the motion of electron masses in a bulk material, the new device takes advantage of quantum mechanical phenomena that occur at the nanoscale.



First, conventional transistors and their limitations and the problems of miniaturization are discussed, and to solve this problem, solid-state transistors that exploit quantum effects at the nanoscale, and among them, the resonant tunneling transistor is used. Electronic computers have become much more powerful than in the past, and transistors have gradually become smaller. However, reducing the size of current field-effect transistors will be impossible in the near future due to the effects of quantum mechanics and the limitations of manufacturing techniques. In the coming years, as mass production of transistors decreases from their current size to below 100 nm, the device will become difficult and expensive to manufacture. In addition, they can no longer function well as ultra-compact integrated circuits. To overcome this problem, there are basically two main classes of nanoelectronic switches that are also used as amplifiers.



Nano MOSFET and Double Gate MOSFET (DG MOSFET) transistors simulated with DGMOSFET structure have lower I_{off} than SOI structure. I_{on}/I_{off} ratio in DG structure is higher than SOI structure. The effect of drain induced barrier potential (DIBL) reduction in SOI MOSFET is more severe than DG MOSFET structure. DG` has higher mobility than SOI structure.

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