



**Non-Confidential Description - PSU No. 3334**  
**"An Accumulation Type MOSFET Transistor (AMOSFET)"**

**Keywords:**

FET, MOSFET, AMOSFET, accumulation

**Links:**

[Inventor Website](#)

[US Patent 8,569,834](#)

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**Background**

A standard metal oxide semiconductor field effect transistor (MOSFET), a type of field effect transistor (FET) structure, utilizes heavily doped source and drain semiconductor regions to form ohmic contacts to a gate induced inversion-layer channel portion. The microelectronics industry is trending to smaller devices that allow for faster operating speeds and greater functionality per area. Nanowires, nanotubes, and nanoribbons are inherently small; hence there is a great deal of interest in fabricating FET devices using these materials. A pressing need exists for a gated microstructure that is simple to fabricate and has straightforward design rules.

**Invention Description**

The proposed invention is a novel accumulation type metal oxide semiconductor field effect transistor (AMOSFET). The AMOSFET is an accumulation type MOSFET because it relies on the formation of an accumulation layer under the gate for its on state. This invention utilizes a single doping type for the source, gate, and drain regions, thereby representing a major simplification step. This device has a number of distinct advantages over conventional MOSFETs and TFTs including: (1) simplicity of fabrication, (2) having an on-current that depends on the material doping and not on the gate capacitance, (3) having voltage drop regions I and III which can be integrated into the local interconnects, and (4) eliminating a number of issues plaguing today's conventional MOSFETs such as drain barrier lowering and tunneling.

**Advantages/Applications**

- Single doping type for source, gate, and drain regions
- Accumulation type MOSFET
- Eliminates drain barrier lowering and tunneling

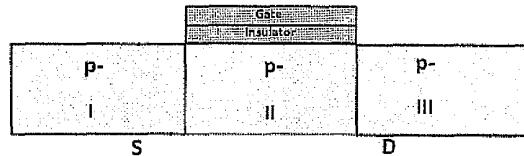


Figure 1: Overview of AMOSFET