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Title: A Vertically Movable Gate Field Effect Transistor (VMGFET) on a Silicon-on-Insulator (SOI) Wafer

Background: The vertically moveable gate field effect transistor (VMGFET) is a component that would be part of an integrated circuit (IC), a key component used in the semiconductor market. FET's are transistors that use electric current to control conductivity along a channel of a semi-conducting material or terminal. Other vertically moveable gate FETs exist, but the innovation of this invention is that the field effect transistor utilizes a highly doped, single, crystalline silicone as a gate structure as opposed to metal and poly-silicon deposits. The advantage of using one silicone crystal instead of metal include: 1) limited internal stresses; 2) allowance for longer gate length; 3) and, increased sensitivity of transistor.

Benefits: The novelty of this technology is the highly doped silicon device layer of the SOI wafer as a gate material and a mildly doped handle layer. Within the semiconductor production industry, 'doping' is defined as the process by which impurities are intentionally introduced into an extremely pure semiconductor. This method will reduce the deposition and etching processing steps, insure the alignment of the gate and channel structure while allowing the source/drain regions to be doped at the same time as the gate. In effect, it reduces the number of processing steps by using the single silicon wafer, decreasing overall fabrication time while generating cost savings in the fabrication process.

Market Potential/Applications: VMGFETs are described as the brains of most electronics that possess IC's such as computers, cell phones and TV's. In addition, due to the high sensitivity of the transistor, other potential applications include using the transistor as an accelerometer module in cell phones.

IP Status: US Patent issued. **9,450,066** (**September 2016**).

Licensing Contact Information: Reddy Venumbaka, Ph.D., Director, Technology Transfer and Contracts. Tel; (512) 245-2672, e-mail: reddy@txstate.edu.