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[54] SELECTIVE GERMANIUM DEPOSITION ON SILICON AND RESULTING STRUCTURES

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[58] **Field of Search** 357/65, 67, 70, 23.9, 357/23.11, 52, 59

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[57] **ABSTRACT**

The invention is a method of selectively forming contacts on ultra shallow source and drain junctions. The method comprises forming a gate structure that defines a gate on a silicon substrate, portions of which are covered with a layer of silicon dioxide while the portions adjacent the gate form a silicon surface. The gate structure includes a surface material upon which germanium will not deposit at a temperature that is otherwise high enough to cause germanium to deposit from a germanium containing gas onto a silicon surface, but that is lower than the temperature at which germanium will deposit on the gate surface material. A source and drain are formed in the silicon substrate in the portions adjacent the gate by adding dopant atoms and in which the source and drain are separated by an active region of the silicon substrate defined by the gate structure. The substrate is then exposed to a germanium containing gas at a temperature high enough to cause the germanium to deposit from the germanium containing gas into the silicon surface but lower than the temperature at which the germanium will deposit on the gate structure surface material. The result is self-aligned germanium contacts to the source and the drain. The method can further comprise selectively depositing a metal on the germanium and annealing the deposit to form a germanide compound from the reaction between the deposited germanium and the deposited metal.

4 Claims, 2 Drawing Sheets