ABSTRACT

METHOD OF PATTERNING GATE ELECTRODE WITH ULTRA-THIN GATE DIELECTRIC

A new method is provided for the creation of ultra-thin gate oxide layers. Under the first embodiment, sacrificial oxide and nitride are deposited, openings are created in the layer of nitride where the ultra-thin layer of gate oxide is to be created. A layer of poly is deposited over the layer of nitride. The layer of polysilicon is polished, leaving the poly deposited inside the openings. The nitride is removed leaving the gate structure in place overlying the grown gate oxide. Under the second embodiment, sacrificial oxide and nitride are deposited followed by the deposition of TEOS oxide. The layers of TEOS, oxide and nitride are patterned creating openings that expose the surface areas of the layer of sacrificial oxide where the ultra-thin layers of gate oxide are to be grown. A thin conformal layer of nitride is deposited over the structure, this thin layer of conformal nitride is etched to form thin spacers on the sidewalls of the openings in the layers of TEOS oxide and nitride. Pre-gate clean is performed that removes the TEOS oxide and the sacrificial oxide on the bottom of the openings, gate oxidation is performed creating the ultra-thin layers of gate oxide. Poly is deposited, polished back followed by removal of the nitride leaving the poly gate structure in place and overlying the ultra-thin layer of gate oxide.

FIGURE 2 IS SUGGESTED FOR PUBLICATION