EFFECTIVE ISLOATION WITH HIGH ASPECT RATIO SHALLOW TRENCH ISOLATION AND OXYGEN OR FIELD IMPLANT

ABSTRACT

A method for forming shallow trench isolation (STI) with a higher aspect ratio is given. This method allows the formation of narrower and deeper trench isolation regions while avoiding substrate damage due to excessive etching and severe microloading effects. In addition, it yields uniform depth trenches while avoiding problems of etch residue at the bottom of the trench. This method is achieved by using a process where a trench is etched, and an oxide layer grown along the bottom and sidewalls of the trench. Oxygen or field isolation ions are then implanted into the bottom of the trench. A nitride spacer is then formed along the bottom and sidewalls of the trench, followed by an isotropic etch removing the nitride and oxide from the bottom of the trench. An oxide deposition then fills the trench, followed by a planarization step completing the isolation structure.

(Figure 5)