ABSTRACT

METHOD OF FORMING SHALLOW TRENCH ISOLATION REGIONS WITH IMPROVED CORNER ROUNDING

A method of forming a shallow trench isolation (STI), region in a semiconductor substrate featuring a process sequence that results in desired rounded corners for the sides of active device regions located butting the STI region, has been developed. The process sequence features formation of, followed by removal of, a silicon dioxide layer which was thermally grown in a top portion of the semiconductor substrate, wherein the top portion of semiconductor was subjected to an ion implantation procedure prior to the oxidation procedure. The above process sequence results in a recessed portion of semiconductor located adjacent to unoxidized portions of semiconductor which underlay an oxidation resistant shape, and feature rounded corners. Insulator spacers are then formed on the sides of the oxidation resistant shape, overlying and protecting the rounded corners of subsequent active device regions from a dry etch procedure used to selectively define a shallow trench shape in the exposed semiconductor region. Insulator filling and planarization procedures result in the formation of an STI region, located adjacent to active device regions which feature the desired rounded corners.

FIGURE 10