METHOD TO FORM A BALLOON SHAPED STI USING A MICRO MACHINING TECHNIQUE TO REMOVE HEAVILY DOPED SILICON

Abstract

The invention describes three embodiments of methods for forming a balloon shaped STI trench. The first embodiment begins by forming a barrier layer over a substrate. An isolation opening is formed in the barrier layer. Next, ions are implanted into said substrate through said isolation opening to form a Si damaged or doped first region. The first region is selectively etching to form a hole. The hole is filled with an insulating material to form a balloon shaped shallow trench isolation (STI) region. The substrate has active areas between said balloon shaped shallow trench isolation (STI) regions. The second embodiment differs from the first embodiment by forming a trench in the substrate before the implant. The third embodiment forms a liner in the trench before an isotropic etch of the substrate through the trench.

Fig. 10