Abstract

LOCOS WITH BIRD'S BEAK SUPPRESSION BY A N_2 IMPLANTATION

The present invention provides a method of fabricating a field oxide layer having a reduced bird's beak using a nitride foot 70 and a first field oxide region 80A as a N_2 implant mask. The N_2 implant suppresses oxide growth around the perimeter of the field oxide and reduces the bird's beak. A pad oxide layer 20 and a first nitride layer 30 are formed over a substrate. The first nitride layer is partially etched back forming a residual first nitride layer in the areas where the field oxide will be formed. A polysilicon spacer is formed on the sidewalls of the first nitride layer and over a portion of the residual first nitride layer. The residual first nitride layer 31 is etched using the spacer 60 as an etch mask forming a nitride foot 70. The substrate is thermally oxidized in the field oxide area using the first nitride layer and the foot 60 as an oxidation barrier forming a first field oxide layer 80A having a bird's beak 85. Nitrogen ions are then implanted into the bird beak region 90 forming a nitrogen implanted bird's beak region 90. The substrate is thermally oxidized forming a second field oxide layer 80B wherein the bird's beak is reduced due to the nitrogen implant. In other embodiments, the first field oxide layer is removed and a recessed second field oxide layer 82 is formed (with and without the foot 70).

(FIGURE 1 IS SUGGESTED FOR PUBLICATION)