ABSTRACT

A LOCOS MASK FOR SUPPRESSION OF NARROW SPACE FIELD OXIDE THINNING AND OXIDE PUNCH THROUGH EFFECT

A novel design of an oxidation mask for improved control of birds beak and more specifically for tailoring and smoothing the field oxide isolation profile in the vicinity of the birds beak. The mask design is particularly advantageous for narrow field isolation spacings found in sub half-micron integrated circuit technology. The mask uses a thin tapered silicon nitride foot along its lower edge to allow nominal expansion of the oxide during the early stages of oxidation, thereby permitting in-situ stress relief as well as a smoothing of the oxide profile. The taper of the foot provides a gradual increase in mask stiffness as oxidation proceeds under the mask edge, allowing greatest flexibility during the early rapid growth period followed by increasing stiffness during the later stages when the growth rate has slowed, thereby inhibiting the penetration of birds beak. Shear stresses responsible for dislocation generation are reduced by as much as fifty fold. This stress reduction is accompanied by an improvement in surface topography as well as suppression of oxide punchthough and the narrow oxide thinning effect.

(FIGURE 4 IS SUGGESTED FOR PUBLICATION)

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