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ABSTRACT

METHOD OF ANGLE IMPLANT TO IMPROVE TRANSISTOR REVERSE NARROW WIDTH EFFECT

A new angle implant is provided that reduces or eliminates the effects of narrow channel impurity diffusion to surrounding regions of insulation. A layer of pad oxide is created over the surface of a silicon substrate, a layer of silicon nitride is deposited and patterned such that the layer of pad oxide is exposed where Shallow Trench Isolation regions are to be created. A layer of photoresist is deposited, patterned and etched to expose the surface of the p-well that has been created in the surface of the substrate, p-type impurity is then implanted into the corners of the STI region that are adjacent to NMOS device that is to be created over the p-well. The process is then repeated in reverse image order to perform a n-type implant into the corners of the STI region that are adjacent to the PMOS device that is to be created over a n-well region that has been created in the surface of the substrate. The p-type and n-type implants are angle implants that penetrate under the patterned layer of silicon nitride, thus penetrating into the corners of the STI regions underlying the patterned layers of silicon nitride. The substrate is, after the p-type and n-type angle implants, processed in the conventional manner to create STI trenches, fill the trenches with oxide and planarize the surface of the oxide that has been deposited inside the STI trenches.

FIGURE 5

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