HOT CARRIER DEGRADATION REDUCTION USING

ION IMPLANTATION OF SILICON NITRIDE LAYER

ABSTRACT

A method of reducing hot carrier degradation and a semiconductor structure so formed are disclosed. One embodiment of the method includes depositing a silicon nitride layer (40) over a transistor device (10A, 10B), ion implanting (44) a species (48) into the silicon nitride layer (40) to drive hydrogen from the silicon nitride layer (40), and annealing (60) to diffuse the hydrogen into a channel region of the transistor device (10A, 10B). The species (48) may be chosen from, for example: germanium (Ge), arsenic (As), xenon (Xe), nitrogen (N), oxygen (O), carbon (C), boron (B), indium (In), argon (Ar), helium (He), and deuterium (De). The ion implantation (44) modulates atoms in the silicon nitride layer (40) such as hydrogen, nitrogen and hydrogen-nitrogen bonds such that hydrogen can be controllably diffused into the channel region (30).

Fig. 3



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