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(54) Title: UNITED METHOD AND APPARATUS TO PREVENT LATERAL OXIDATION IN A TRANSISTOR UTILIZING AN ULTRA THIN OXYGEN-DIFFUSION BARRIER

(57) Abstract: A method and apparatus of preventing lateral oxidation through gate dielectrics that are highly permeable to oxygen diffusion, such as high-k gate dielectrics. According to one embodiment of the invention, a gate structure is formed on a substrate, the gate structure having an oxygen-permeable gate dielectric. An oxygen diffusion barrier is then formed on the sidewalls of the gate structure to prevent oxygen from diffusing laterally into the oxygen-permeable gate dielectric, thus preventing oxidation to the substrate underneath the gate dielectric or to the electrically conductive gate electrode overlying the gate dielectric.