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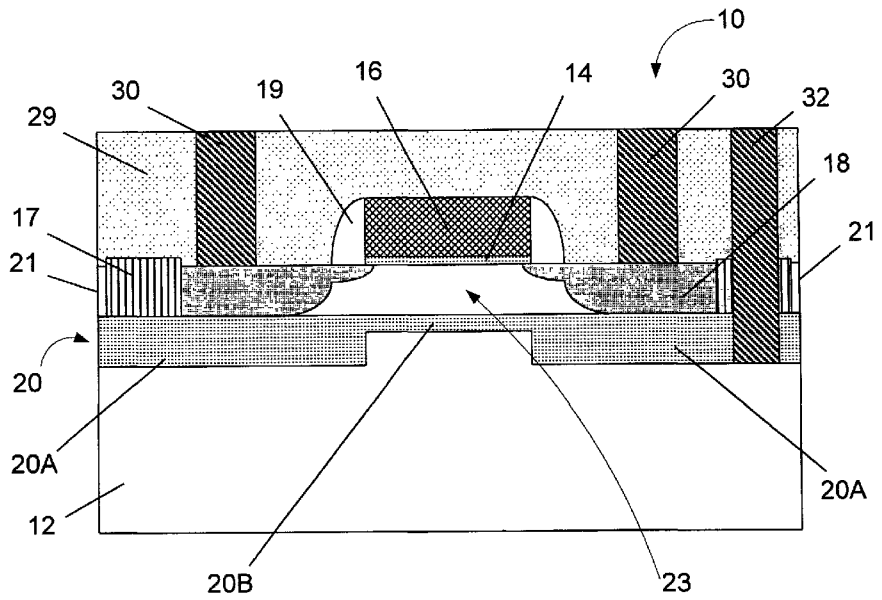
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(54) Title: SEMICONDUCTOR DEVICE FORMED OVER A MULTIPLE THICKNESS BURIED OXIDE LAYER, AND METHODS OF MAKING SAME



(57) Abstract: The present invention is generally directed to a semiconductor device formed over a multiple thickness buried oxide layer 20, and various methods of making same. In one illustrative embodiment, the device comprises a bulk substrate 12, a multiple thickness buried oxide layer 20 formed above the bulk substrate 12, and an active layer 21 formed above the multiple thickness buried oxide layer 20, the semiconductor device being formed in the active layer 21 above the multiple thickness buried oxide layer 20. In some embodiments, the multiple thickness buried oxide layer 20 is comprised of a first section 20B positioned between two second sections 20A, the first section 20B having a thickness that is less than the thickness of the second sections 20A. In one illustrative embodiment, the method comprises performing a first oxygen ion implant process 42 on a silicon substrate 40, forming a masking layer 44 above the substrate 40, performing a second oxygen ion implant process 46 on the substrate 40 through the masking layer 44, and performing at least one heating process on the substrate 40 to form a multiple thickness buried oxide layer 20 in the substrate 40. In another illustrative embodiment, the method comprises performing a first oxygen ion implant process 46 on a silicon substrate 40, forming a masking layer 44 above the substrate 40, performing a second oxygen ion implant process 42 on the substrate through the masking layer 44, and performing at least one heating process on the substrate 40 to form a multiple thickness buried oxide layer 20 in the substrate 40. In yet another illustrative embodiment, the method comprises forming a multiple thickness buried oxide layer 20 using a wafer bonding technique.

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