

Improvement of threshold voltage and OFF-state leakage characteristics of triple gate junctionless tunnel field effect transistor using device engineering techniques in Silvaco simulator

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Abstract: In this paper, a kind of junctionless tunneling field effect transistor was analyzed and simulated by using Silvaco Atlas software. The threshold voltage beside OFF-state current was studied, by using engineering technique devices, it was given some strategies with transferring High-k oxide of Si₃N₄ to Al₂O₃ and HfO₂, as well as by replacing High-k oxide Al₂O₃ with Low-k base structure which has been SiO₂, to reduce threshold voltage and OFF-state leakage current. Finally, with High-k combination idea, a stimulating result and better software attitude was found which in source and drain side the High-k, HfO₂ was use and in main gate side, Si₃N₄ was used.

Keywords : Keyword: junctionless tunneling field effect transistor, Silvaco Atlas software, device engineering technique, threshold voltage, OFF-state leakage current.

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دانشگاه آزاد اسلامی، واحد رشت - سامانه بانک اطلاعات پایان نامه ها