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| **Title:** | Linear Pocket Profile Based Threshold Voltage Model For Sub-100 nm n-MOSFET Incorporating Substrate and Drain Bias Effects | | |
| **Author(s) Name:** | Muhibul Haque Bhuyan and Quazi Deen Mohd Khosru | | |
| **Contact Email(s):** | muhibulhb@aiub.edu | | |
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| **Abstract:** |  |
| Abstract— This paper presents a threshold voltage model of pocket implanted sub-100 nm n-MOSFETs incorporating the drain and substrate bias effects using two linear pocket profiles. Two linear equations are used to simulate the pocket profiles along the channel at the surface from the source and drain edges towards the center of the n-MOSFET. Then the effective doping concentration is derived and is used in the threshold voltage equation that is obtained by solving Poisson’s equation in the depletion region at the surface. Simulated threshold voltages for various gate lengths fit well with the experimental data already published in the literature. The result is compared with two other pocket profiles used to derive the threshold voltage models of n-MOSFETs. The comparison shows that the linear model has a simple compact form that can be utilized to study and characterize the pocket implanted advanced ULSI devices. | |