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Abstract
In recent years, studies about Dual-Material Surrounding-Gate (DMSG) transistor have successively been proposed, and have attracted a lot of attention. For future ULSI's design, it is shown that Dual-Material Surrounding-Gate (DMSG) transistor have the following advantages, such as: reduced short channel effects (SCEs), high packing density, high-speed cut-off frequency, low-power consumption, the application of Stacked circuit design, the excellent gate control ability over the channel and reduced fringe-induced barrier lowering (FIBL). To apply the device to the simulation, it is nec-essary to develop an analytical 2D model to predict precisely the performance of the Dual-Material Surrounding-Gate (DMSG) MOSFETs.
On the basis of fully solution of two dimensional Poisson's equation, a new two dimensional model including channel potential, threshold voltage, subthreshold swing and subthreshold current for Dual-Material Surrounding-Gate (DMSG) MOSFETs is successfully developed. The new model is verified by published numerical simulations with a close agreement. This model can be applied for SPICE simulation because of its efficient computation.
Advisory Committee Chiang, Te-Kuang - advisor

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