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Transient Performance Analysis of Gate Inside Junctionless Transistor (GI-JLT)

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Abstract : In this paper, the transient device performance analysis of n-type Gate Inside Junctionless Transistor (GIJLT)has been evaluated. 3-D Bohm Quantum Potential (BQP)transport device simulation has been used to evaluate the delay and power dissipation performance. GI-JLT has a number of desirable device parameters such as reduced propagation delay, dynamic power dissipation, power and delay product, intrinsic gate delay and energy delay product as compared to Gate-all-around transistors GAA-JLT. In addition to this, various other device performance parameters namely, on/off current ratio, short channel effects (SCE), transconductance Generation Factor(TGF) and unity gain cut-off frequency (fT) and subthreshold slope (SS) of the GI-JLT and Gate-all-around junctionless transistor(GAA-JLT) have been analyzed and compared. GI-JLT shows better device performance characteristics than GAA-JLT for low power and high frequency applications, because of its larger gate electrostatic control on the device operation.

Keywords : gate-inside junctionless transistor GI-JLT, gate-all-around junctionless transistor GAA-JLT, propagation delay, power delay product
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