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Title:Small-signal modeling of gate-all-around (GAA) junctionless (JL) MOSFETs for sub-millimeter wave applications

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Abstract:In this paper, we present the radiofrequency (RF) modeling for gate-all-around (GAA) junctionless (JL) MOSFETs with 30-nm channel length. The presented non-quasi-static (NQS) model has included the gate-bias-dependent components of the source and drain (S/D) resistances. RF characteristics of GAA junctionless MOSFETs have been obtained by 3-dimensional (3D) device simulation up to 1 THz. The modeling results were verified under bias conditions of linear region (V_{GS} = 1 V, V_{DS} = 0.5 V) and saturation region (V_{GS} = V_{DS} = 1 V). Under these conditions, the root-mean-square (RMS) modeling error of Y_{22}-parameters was calculated to be below 2.4%, which was reduced from a previous NQS modeling error of 10.2%.