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标题: A computational study of high-frequency behavior of graphene field-effect transistors
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摘要: High Frequency potential of graphene field-effect transistors (FETs) is explored by quasi-static self-consistent ballistic and dissipative quantum transport simulations. The unity power gain frequency f(MAX) and the cut-off frequency f(T) are modeled at the ballistic limit and in the presence of inelastic phonon scattering for a gate length down to 5 nm. Our major results are (1) with a thin high-k gate insulator, the intrinsic ballistic f(T) is above 5 THz at a gate length of 10 nm. (2) Inelastic phonon scattering in graphene FETs lowers both f(T) and f(MAX), mostly due to decrease of the transconductance. (3) f(MAX) and f(T) are severely degraded in presence of source and drain contact resistance. (4) To achieve optimum extrinsic f(MAX) performance, careful choice of DC bias point and gate width is needed. (C) 2012 American Institute of Physics. [http://dx.doi.org/10.1063/1.4712323]
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