Optimization of CNFET Op amp for high frequency operation in Sub-10-nm node

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Abstract

This paper presents optimization of various parameters of carbon nanotube field effect transistor (CNFET) based op amp in sub-10 nm node for high frequency operation. Parameters such as, channel length, gate oxide thickness, gate dielectric constant, spacer doping, spacer dielectric constant and pitch, are optimized. For high frequency operation of op amp, optimum values of CNFET parameters are found to be 10 nm channel length, 10 dielectric constant of gate oxide, 3 nm gate oxide thickness, 5 nm pitch, zero source/drain doping concentration, 4 dielectric constant of spacer oxide. Performance of CNFET op amp incorporating these optimum values is investigated and compared with previous work. Obtained results reveals significant differences among previously designed Si CMOS op amp, 32 nm CNFET and the sub-10-nm CNFET op amp investigated here. © 2016 IEEE.

Author keywords

Carbon nanotube field effect transistor (CNFET)  Channel length  Gate oxide thickness  Spacer dielectric

Indexed keywords

Engineering controlled terms:  Carbon nanotube field effect transistors  Carbon nanotubes  Gate dielectrics  Gates (transistor)  High frequency amplifiers  Nanosensors  Nanotechnology  Nanotubes  Operational amplifiers  Yarn

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ISBN: 978-150902963-1
Source Type: Conference Proceeding
Original language: English

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doi: 10.1109/TED.2015.2457453


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