Title	A Comparative Study of Fixing One Barrier Varying Another Barrier for a Resonant Tunneling Diode
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Published Journal Name	AIUB Journal of Science and Engineering (AJSE)
Type of Publication	Journal
Volume	22 Issue 1
Publisher	AIUB Journal of Science and Engineering (AJSE)
Publication Date	April 30, 2023
ISSN	1608 – 3679 (print) 2520 – 4890 (Online)
DOI	https://doi.org/10.53799/ajse.v22i1.567
URL	https://doi.org/10.53799/ajse.v22i1.567
Other Related Info.	Page No: 105 - 111

Abstract

In this research paper, effects of fixing one barrier and varying another barrier have been analyzed and compared for a GaAs/Al0.3Ga0.7As based double barrier resonant tunnelling diode for two different models - Hartree Quantum Charge model and semi-classical Thomas Fermi model. VI characteristic graphs are studied to assess the overall performance of both models. The simulations are carried out in a nanoelectronics modelling tool suite – Nano electronic Modelling 5 (NEMO5) considering Non-Equilibrium Green's Function (NEGF), at room temperature of 300K and biased voltage of 0 to 0.5 V. In this paper, it was demonstrated that a very larger amount of current is supplied by both models when the first barrier is varied and second barrier is fixed in comparison to the first barrier when kept fixed and second barrier is varied. But as quantum charge inside the quantum well is existed in the Hartree model, so overall Hartree model supplied a greater amount of current compared to the Thomas Fermi model. Quantum charge inside its quantum well is not present in the Thomas Fermi model. But a better NDR region is created by the Thomas Fermi model in both varied first barrier-fixed second barrier and fixed first barrier-varied second barrier cases compared to the Hartree model. This NDR region can be used for numerous digital applications. On the other hand, a vast range of analog applications can be used by the Hartree model that produced larger current per unit voltage.