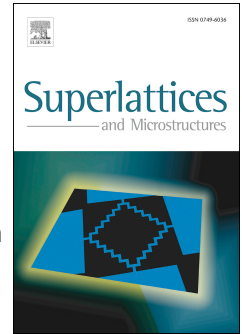


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Alemienla Lemtur, Dheeraj Sharma, Priyanka Suman, Jyoti Patel, Dharmendra Singh Yadav, Neeraj Sharma



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Alemienla Lemtur, Dheeraj Sharma, Priyanka Suman, Jyoti Patel,
Dharmendra Singh Yadav, Neeraj Sharma

*Electronics and Communication Engineering Discipline, PDPM-Indian Institute of
Information Technology, Design and Manufacturing Jabalpur 482005, M.P and
Department of Computer Science Engineering Ramrao Adik Institute of Technology
Nerul, Navi Mumbai, 400706, INDIA.*

Abstract

Illustration of importance of gate all around (GAA) structure and hetero-junction formed by III-V semiconductor compounds has been analysed through GaAsP/AlGaSb CP-TFET (charge plasma tunnel field effect transistor). Charge plasma concept has been incorporated here to make this device more immune towards random dopant fluctuations (RDF). A high driving current of 1.28×10^{-5} A/ μm and transconductance (g_m) of $96.4 \mu\text{S}$ at supply voltages $V_{GS} = 1\text{V}$ and $V_{DS} = 0.5\text{V}$ is achieved. Further, implications of employing this device in analog/RF circuits have been supported with simulated results showing a high cut-off frequency of 34.5 THz and device efficiency of 3.45 MV^{-1} . Apart from this, an insight of the linearity performances has also been included. Simultaneously, all the results are compared with a conventional gate all around charge plasma TFET.

Keywords: GAA, charge plasma, RDF, hetero-junction.

Email addresses: alemlmtr78@gmail.com (Alemienla Lemtur),
dheeraj24482@gmail.com (Dheeraj Sharma), priyankasuman007@gmail.com
(Priyanka Suman), jyotipatelec39@gmail.com (Jyoti Patel),
tech.dharmendra26@gmail.com (Dharmendra Singh Yadav), neeraj16ks@gmail.com
(Neeraj Sharma)

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