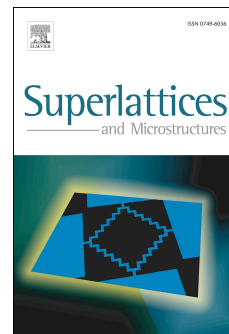


# Accepted Manuscript

Performance improvement of doped TFET by using plasma formation concept

Deepak Soni, Dheeraj Sharm, Shivendra Yadav, Mohd. Aslam, Neeraj Sharma



PII: S0749-6036(17)31576-8

DOI: [10.1016/j.spmi.2017.10.012](https://doi.org/10.1016/j.spmi.2017.10.012)

Reference: YSPMI 5306

To appear in: *Superlattices and Microstructures*

Received Date: 29 June 2017

Revised Date: 10 October 2017

Accepted Date: 12 October 2017

Please cite this article as: D. Soni, D. Sharm, S. Yadav, M. Aslam, N. Sharma, Performance improvement of doped TFET by using plasma formation concept, *Superlattices and Microstructures* (2017), doi: 10.1016/j.spmi.2017.10.012.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Performance Improvement of Doped TFET by Using Plasma Formation Concept

Deepak Soni, Dheeraj Sharma, Shivendra Yadav, Mohd. Aslam, \*Neeraj Sharma

*Nanoelectronics and VLSI Lab.*

*Electronics and Communication Engineering Discipline*

*PDPM Indian Institute of Information Technology, Jabalpur, 482005, India.*

*Department of Computer Engineering\*,*

*Ramrao Adik Institute of Technology\* Nerul, Navi Mumbai India*

---

## Abstract

Formation of abrupt doping profile at tunneling junction for the nanoscale tunnel field effect transistor (TFET) is a critical issue for attaining improved electrical behaviour. The realization of abrupt doping profile is more difficult in the case of physically doped TFETs due to material solubility limit. In this concern, we propose a novel design of TFET. For this, P<sup>+</sup> (source)-I (channel)-N (drain) type structure has been considered, wherein a metal electrode is deposited over the source region. In addition to this, a negative voltage is applied to the source electrode (SE). It induces the surface plasma layer of holes in the source region, which is responsible for steepness in the bands at source/channel junction and provides the advantage of higher doping in source region without any addition of the physical impurity. The proposed modification is helpful for achieving steeper band bending at the source/channel interface, which enables higher tunneling generation rate of charge carriers at this interface and overcomes the issue of low ON-state current. Thus, the proposed device shows the increment of 2 decades in drain current and 252 mV reduction in threshold voltage compared with conventional device. The optimisation of spacer length ( $L_{SG}$ ) between source/gate

---

*Email addresses:* [deepaksoni09@gmail.com](mailto:deepaksoni09@gmail.com) (Deepak Soni), [dheeraj24482@gmail.com](mailto:dheeraj24482@gmail.com) (Dheeraj Sharma), [shivendra1307@gmail.com](mailto:shivendra1307@gmail.com) (Shivendra Yadav), [mohd.aslam22d@gmail.com](mailto:mohd.aslam22d@gmail.com) (Mohd. Aslam), [neeraj16ks@gmail.com](mailto:neeraj16ks@gmail.com) (\*Neeraj Sharma)

Download English Version:

<https://daneshyari.com/en/article/7939204>

Download Persian Version:

<https://daneshyari.com/article/7939204>

[Daneshyari.com](https://daneshyari.com)