Abstract

This paper reports a numerical modeling of a NPN SiGe heterojunction bipolar transistor (HBT) taking into account the impact of electrically active defects in the HBT device. The purpose was to investigate the DC and low frequency noise performances of SiGe HBT taking into account effect of base implantation defects. These defects physically located at emitter-base junction,
are responsible for parasitic current fluctuations at the origin of low frequency noise in devices. The first part of the paper deals with degradation of DC characteristics of the device due to the influence of extrinsic base implantation defects. The aim was to identify the parasitic effects of implantation defects on the HBT static characteristics. Generally, the presence of these defects in the structure, results in a no ideal behavior of the base currents. The second part of the paper deals with the analysis of low frequency noise (LFN) in the SiGe HBT. Usually, LFN of these devices was related to the existence of defects and imperfections in the semiconductor. The purpose was to examine the impact of implantation defects on the noise in SiGe HBTs. In this fact, the LFN of SiGe HBT was characterized, and a discussion of the possible physical origins of low-frequency noise is presented.

Reference

Low frequency noise in UHV/CVD epitaxial Si and SiGe bipolar transistors. IEEE J. Solid State Circuits, 1458-1467.


**Index Terms**

Computer Science

Electronic Devices

**Key words**

SiGe HBT Defect Low frequency noise (LFN)