

STUDY ON FABRICATION OF SIGE N-CHANNEL MOSFET

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Abstract

SiGe n-channel MOSFET is a new material used in making microchips for less expensive, high performance communications tools. Low energy consumption makes silicon germanium transistors a treasure for many people in microelectronics.

This paper discuss about the developing of Si/SiGe in n-channel MOSFET. SiGe n-channel MOSFET is design for 0.44um channel length using SILVACO TCAD tools. The project involves in measurements of Id-Vd and Id-Vg characteristics which compare between the SiGe n-channel MOSFET and the conventional Si n-channel MOSFET.

The result show that the SiGe n-channel MOSFET has better performance than the conventional Si n-channel MOSFET in terms of the electrical characteristics.

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CHAPTER 1

1.1 Introduction

Researcher nowadays very interested in SiGe n_channel MOSFET materials and its application due to the reason that the material has improve properties compared to bulk silicon, higher carrier mobility in strained p-channel or tensile strained n-channel to build the MOSFET. The SiGe n-channel MOSFET has higher speed than conventional Si n-channel MOSFET that have the same technology and same channel length

The main objective of the project is to develop SiGe in n-channel MOSFET. Silicon and Germanium are both well-known as semiconducting elements. Si and Ge have the same crystal structure. Thus the layer of one material can be placed on the other if consistent atomic order is maintained. However, there is an approximately four percent greater natural spacing between atoms in germanium.

Here conventional Si n-channel MOSFET is compared to SiGe n-channel MOSFET with the same channel length and same technology. The channel length used here is 0.44 μ m.