

THE EFFECT OF ANNEALING TIME ON P-N JUNCTION DIODE AND ITS DEVICE
CHARACTERISTICS

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ABSTRACT

THE EFFECT OF ANNEALING TIME ON P-N JUNCTION DIODE AND ITS DEVICE CHARACTERISTICS

The execution of this project is to investigate the effect of annealing time on p-n junction diode and its device characteristics. The parameters that were observed are dopant distributions during diffusion doping process, the optimum annealing time and current-voltage characteristic of a typical diode. The methodology was carried out using n-type diffusion furnace where the junction depth of diffused p-type dopant into silicon substrate for junction formation is observable. Factor affecting dopant distribution is investigated. The current-voltage characteristic of p-n junction diode in electrical testing is observed and analyzed. By introducing high temperature to the silicon surface during annealing process, it gave effect to dopant distribution where dopants diffused into silicon substrate which changed the conductivity of the semiconductor. Thus, through a process of doping this dopant increased the conductivity of the semiconductor. Therefore, p-n junction is formed and the ideal p-n junction characteristic is obtained. On the other hand, the optimum annealing time during fabrication process was found in producing the ideal p-n junction diode.

CHAPTER 1

INTRODUCTION

1.1 Background

This research was executed as an attempt to observe the effect of annealing time on p-n junction diode and its device characteristics. A semiconductor that has been doped with acceptor impurities and into the surface of which donor atoms are diffused forms an extremely interesting junction known as the p-n junction diode. The p-n junction diode is the most fundamental of all the semiconductor devices, and for this reason we devote an entire volume to it. The concept of performing this research emerge for the reason that in order to get the best p-n junction diode for optical devices, the effect of heating in fabrication capability on p-n junction diode need to be concerned during electrical testing. Thus, to get an ideal I-V characteristics curve, the thermal budget to p-n junction diode during fabrication process should be considered. Not only that, dopant distributions during diffusion doping process also should be considered in order to enhance the quality of junction diode.