CHAPTER 1

INTRODUCTION

This chapter will describe about the whole inspiration of the project thesis which cover the project overview, problem statement, objective, scope of the project and the thesis outline.

1.1 Introduction

The insulated gate bipolar transistor or IGBT is a three-terminal power semiconductor device, noted for high efficiency and fast switching. It switches electric power in many modern appliances. It is designed to rapidly turn on and off. The IGBT combines the simple gate-drive characteristics of the MOSFET with the high-current and low–saturation-voltage capability of bipolar transistors.

Nowadays, there are bulk types of IGBT available in the market for various type of electrical and electronics use as well. The selection of these components should be properly done by specifically recognize their characteristics and limitations. This may effects the future performance of a system and effectively saving costs.

1.2 Overview

This project is based on the product of today IGBT which come in various types and packages. This sometimes bring problem to such event on which type of effective power electronic switching (in this matter IGBT) to take consideration.

There are factors of selectivity that should be included in the proper pick of the component. Lack of these factors will result in maybe poor performance and highly cost the defect of the system because even a typical type of an IGBT would cost a high value in money.

Thus, this project will basically show experiment and analysis of some types of IGBT available on the market these days. So that, hopefully it will assists viewer in proper selection of the component.

1.3 Problem Statement

Test circuit of Insulated-gate Bipolar Transistor (IGBT-type IRG4RC10U) will be operated when gate voltage, Vg is applied to the Gate-terminal. IR2109 (MOSFET/IGBT Driver) will amplify the pulse signal from function generator due to DC voltage supply input amplitude. Output of IR2109 connected to IGBT gate in the test circuit and the circuit operates. In the test circuit, capacitor and inductor will store voltage and current respectively. The event of the charging and discharging of the component observed and analyzed. Power dissipation and losses in the circuit calculated due to the test. The result is then compared to IGBT-type IRG4BC20SD.

1.4 Objective

i. To design a test circuit of IGBT
ii. To compare between 2 types of IGBT
iii. To analyze the switching characteristics

1.5 Scope of the Project

There are 3 scopes for this project to achieve.