UNIVERSITI TEKNOLOGI MARA

DESIGN AND ANALYSIS OF EXTERNAL PRE TESTER BOARDS USING OP-AMPS FOR FAST BPMU AND DPS TESTING

HASLIZA ABU HASSAN

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ABSTRACT

This research presents the hardware and software development, and analysis of three external pre-tester boards (I_{CC}, I_{SINK} and I_{SOURCE}) for Gage Repeatability & Reproducibility (GR&R) current analysis of Board per Measurement Unit (BPMU) and Digital Power Supply (DPS) boards. GR&R is a measurement system analysis technique to assure a stable gage measurement that ensures consistent measurements during repeated tests under similar characteristics, conditions or parameters. The external pre-tester boards were used to test BPMU and DPS boards on three J750 Automated Test Equipments (J750 ATE).

The external pre-tester boards were analyzed for improvement in three areas: their usage as an acceptance tool during manufacturing, reduction in testing time, and their ability to predict and foretell future bugs. The analysis have proven the application of the pre-tester boards as an acceptance tool and prediction of future bugs (with their ability to detect faulty channels based on GR&R test results), and 85% time reduction in detection of faulty channels. Time reduction improves productivity, and thus it can be said the external pre-tester boards have the potential to be adopted in high-volume electronics manufacturing.

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CHAPTER 1

INTRODUCTION

1.1   Research Background

   The semiconductor manufacturing is a USD 249 billion industry that deals with design and fabrication of semiconductor devices [1].   The industry is primarily mechanized and usually of large scale, processing materials into partly finished or finished products. In semiconductor manufacturing industry, the entire process from start to ready-for-shipment packaged chips takes about five to seven weeks [2].   The flow of the manufacturing process is shown in Figure 1.1.
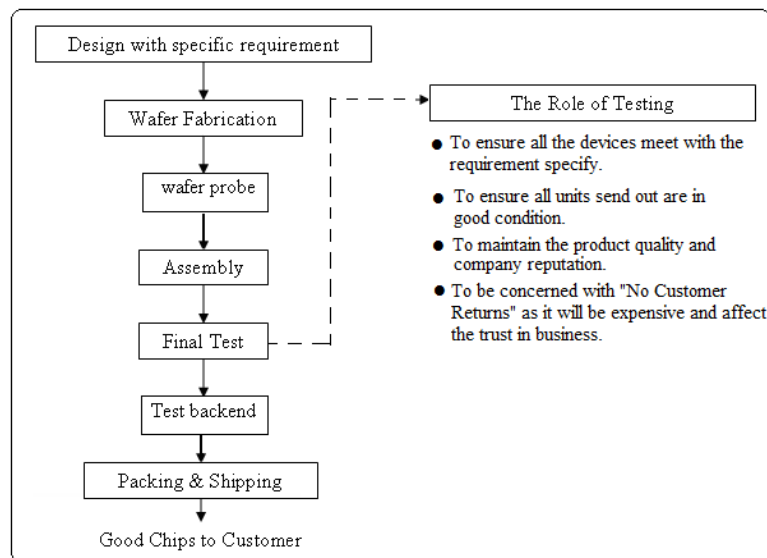

Figure 1.1: Semiconductor manufacturing process