

FABRICATION OF 50  $\mu\text{m}$  TRANSISTOR AND  
AlNiAu INTERCONNECTION PROCESS

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## **APPROVAL AND DECLARATION SHEET**

**This project report titled Fabrication of 50 $\mu$ m Transistor and AlNiAu Interconnection using Lift-Off Process was prepared and submitted by Shaffie Bin Husin (Matrix Number: 041010578) and has been found satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement for the Bachelor of Engineering (Microelectronic Engineering) in Universiti Malaysia Perlis (UNIMAP).**

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## **FABRIKASI 50 $\mu$ m TRANSISTOR DAN ANTARASAMBUNGAN AlNiAu**

### **ABSTRAK**

Secara umumnya proses fabrikasi transistor bermula dengan pembersihan substrat, pembentukan kawasan salir, D dan sumber, S, oksida get dan penglogaman untuk sentuhan S, D dan G. Topeng adalah amat perkara penting untuk membangunkan corak pindahan dalaman semasa proses fabrikasi. Pemilihan topeng foto yang berkualiti adalah penting semasa proses litografi foto dijalankan. Projek ini dijalankan di makmal bilik bersih UniMAP Faktor utama projek ini tidak berjaya adalah kerana kualiti topeng yang digunakan tidak sesuai untuk pembentukan corak yang bersaiz kecil. AlNiAu (Aluminum, Nikel, Emas) boleh diendapkan dengan menggunakan process penenapan nikel tanpa elektrik rendaman emas. Dengan menggunakan lapisan rintang foto sebagai pelindung kepada lapisan pelindung silikon nitride, Ia bermula dengan Al pemendapan, diikuti oleh pembersihan, pengaktifan, penzinkan, penenapan Ni dan akhir sekali rendaman Au.

## **ABSTRACT**

Generally process fabrication transistor will starts by cleaning the wafer, formation region drain, D and source, S, get oxide and deposited aluminum as contact with the source, drain and gate. Mask is very important thing to develop the pattern transfer in fabrication process Based on that, the project fabrication transistor not successful because quality of mask not very compatible to develop the smaller size. AlNiAu as the interconnection involved of several steps. It starts with Al deposition, the follow by cleaning, activation and zincation to remove the oxide layer thus, provide good adhesive. The next process is nickel deposition and lastly gold in deposited on top of Ni. Gold is used because of is not easily oxidize upon exposure for environment. Size of bond pad, chemical and temperature during the process and most important is thickness of aluminum, passivation and also photoresist layer, must be determined to achieve consistent result.

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## LIS OF SYMBOLS, ABBREVIATIONS OR NOMENCLATURE

Al	Aluminum
Au	Gold
Å	Armstrong
AFM	Atomic Force Microscopy
B <sub>2</sub> H <sub>6</sub>	Diborane
CD	Critical Dimension
D	Diffusion coefficient
EDX	Energy Disperse XRay
exp	Exponent
E <sub>a</sub>	Activation energy
IC	Integrated Circuit
k	Boltzmann constant
MOS	Metal Oxide Semiconductor
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
Ni	Nickel
PR	Photoresist
PVD	Physical Vapor Deposition
PECVD	Plasma Enhanced Chemical Vapor Deposition
RIE	Reaction Ion Etch
SiO <sub>2</sub>	Silicon dioxide
SEM	Scanning Electron Microscope
T	Temperature
UV Light	Ultraviolet Light