



UNIVERSITI PUTRA MALAYSIA

***DESIGN OF SILICON NITRIDE METAL-INSULATOR-METAL CAPACITOR
USING 0.15 μm GALLIUM ARSENIDE TECHNOLOGY***

RASIDAH SANUSI

FK 2010 79

**DESIGN OF SILICON NITRIDE METAL-INSULATOR-METAL CAPACITOR
USING 0.15 μm GALLIUM ARSENIDE TECHNOLOGY**

By

RASIDAH SANUSI

**Thesis Submitted to the School of Graduate Studies, Universiti Putra
Malaysia, in Fulfilment of the Requirements for the Degree of
Master of Science**

October 2010

This work is dedicated to my beloved parents

Hj. Sanusi Hassan

&

Hjh. Siti Ramlah Kosnan

And not forgotten to my brothers and sisters

Hj. Dr. Sahrir Hj. Sanusi

Saidi Hj. Sanusi

Hj. Abdul Rahman Hj. Sanusi

Hasnah Hj. Sanusi

Soliha Hj. Sanusi

Solihaton Hj. Sanusi

Mohd Amin Hj. Sanusi

Mohd Hassan Hj. Sanusi

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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Chairperson : Associate Professor Roslina Mohd Sidek, PhD

Faculty : Engineering

Generally there are two groups of devices in GaAs technology, which are active and passive devices. Passive devices commonly used in GaAs are resistor, capacitor, inductor and transmission lines. This research work only focus on MIM capacitor device.

The aim of this research work is to design and develop a model for Si_3N_4 MIM capacitor type which are fabricated on GaAs substrate so that they could be used in high frequency, as an example 2.4 GHz frequency (S band) of applications. Physical and electrical characteristics of the Si_3N_4 MIM capacitor devices for 0.15 μm GaAs technology are analyzed during layout design stage. 19 dimensions of Si_3N_4 MIM capacitor layout design are sent for fabrication. The fabricated devices are measured at frequency range between 0.1 to 20 GHz, and their electrical performances show some variation when compared to the simulation. Due to the variation of the devices, an equivalent circuit which represents the electrical performance of measured devices is

introduced. Through tuning and optimization, model parameters of the equivalent circuit which fit to the measurement value was obtained.



ACKNOWLEDGEMENTS

In the name of Allah, the Most Gracious, the Most Merciful. First and foremost, my sincere 'syukur' to Allah the Almighty for giving me the strength and chance to finish this research work although it took time to complete it. With His blessing, I managed to accomplish such work that may give benefits to others.

The research work has been carried out with the assistance of many individuals, local and foreign semiconductor organizations. On top of it, I would like to say my gratefulness to my supervisor, Dr. Roslina Mohd Sidek for giving me the support, guidance, encourage, advice and 'doa' while this project took place. I am also grateful to other members of the supervisory committee, Dr. Syed Javaid Iqbal and Mr. Rahman Wagiran.

I am indebted to TM R&D Sdn. Bhd. for granting me the assistance throughout my postgraduate programme. Hence, I like to give my appreciations to my dearest colleagues, especially my direct superior, Dr. Ahmad Ismat Abdul Rahim for giving me support, advice, 'doa' and also guidance, and to Amiza Rasmi and Norhapizin Kushairi who persuade me to finish my postgraduate program, and also to the rest, Norman Fadhil Idham Muhammad, Mohd Azmi Ismail, Nazif Emran Farid, Siti Amalina Enche Abdul Rahim and Siti Maisurah Mohd Hassan from Electron Device Technology cluster, Hesly Afida Hasim, Lee Hock Guan, Ahsaari Yusof and Mr. Asban Dollah from Fabrication Techniques cluster, to Mr. Mohamed Razman Yahya, my superior, to Dr. Abdul Fatah Awang Mat, TM R&D Sdn. Bhd.

General Manager, who gave their continuous advice and support. And also not forgotten thank you to Mohd Nizam Othman who helped me to design and characterize the devices, provided me all the documentations I require and prayed for me during his visit to Mecca.

I would also like to extend special thanks to my friends, Ana Salleza Md. Salleh, Emma Ziezie Mohd Tarmizi, Norazamimah Bogal, Azlan Rashid and Shahrul Nizam Abu Bakar for their never-ending support and their uplifting spirit during my studies.

Last but not least, I express my deepest love and appreciation to my parents and my family for providing me their continuous support, inspiration and love that motivated me to realize my goals.

I owe my gratefulness and appreciation to everybody who wished me, and pray for me to do the best in the postgraduate study directly and indirectly. Without their support, guidelines, 'doa' and understanding, this work might not have been completed. Thank you very much.

I certify that a Thesis Examination Committee has met on 29 October 2010 to conduct the final examination of Rasidah binti Sanusi on her thesis entitled 'Design of Silicon Nitride Metal-Insulator-Metal Capacitor Using 0.15 μm Gallium Arsenide Technology' in accordance with Universities and University College Act 1971 and the Constitution of the Universti Pertanian Malaysia [P.U.(A) 106] 15 March 1998. The committee recommends that the student be awarded the Master of Science.

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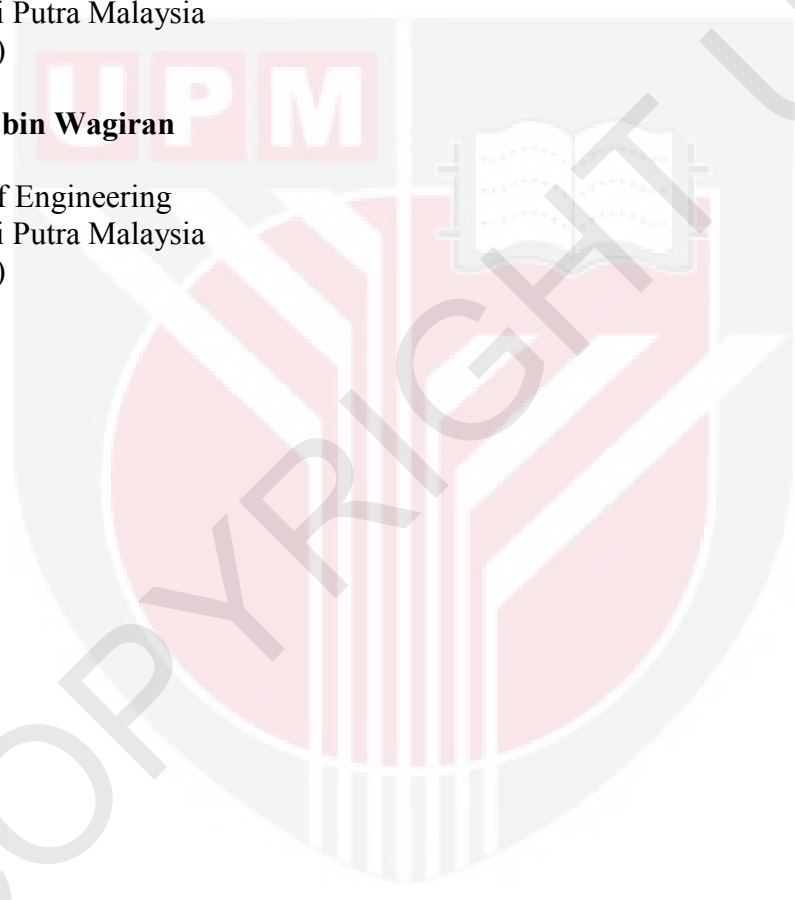
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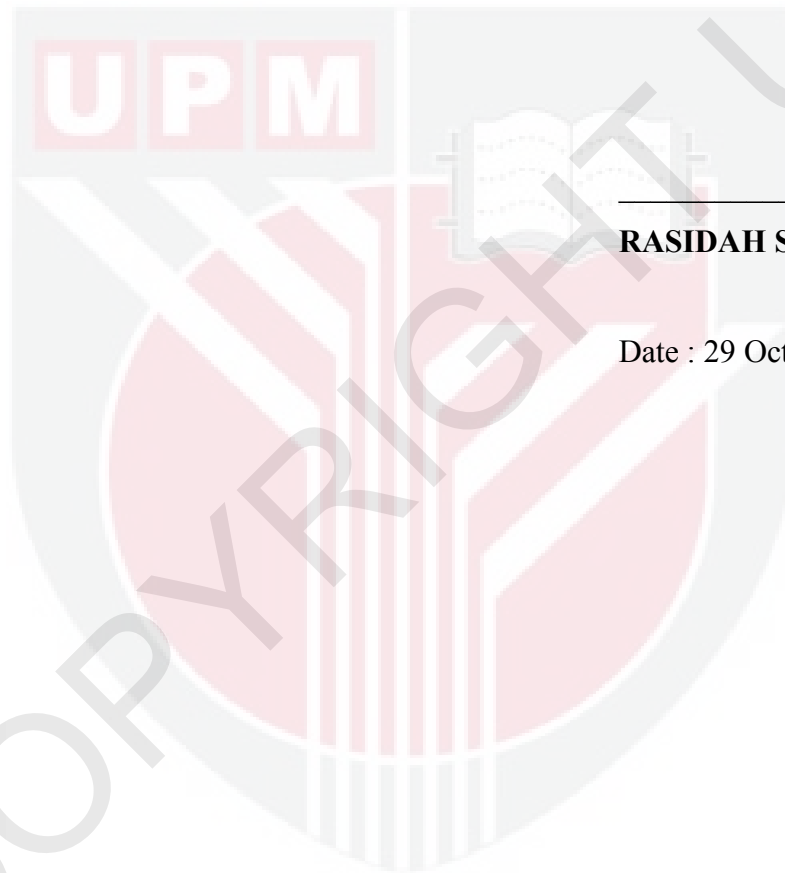
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DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently submitted for any other degree at UPM or other institutions.



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Date : 29 October 2010



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