شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

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Ain Shams University
Faculty of Engineering
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GaN – Based WPT System for Remote Charging Applications

A Thesis
Submitted in partial fulfillment of the requirements of the degree of
Doctor of Philosophy in Electrical Engineering
(Electronics and communications)

By
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Master of Science in Electrical Engineering
(Electronics and Communications)
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Cairo, 2021

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Thesis: **GaN – Based WPT System for Remote Charging Applications**
Degree: **Doctor of Philosophy in Electrical Engineering - Electronics and communications**

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Statement

This thesis is submitted as a partial fulfillment of Doctor of Philosophy in Electrical Engineering, Faculty of Engineering, Ain Shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or a qualification at any other scientific entity.

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Summary

This thesis focuses on design of a power oscillator at specific frequency to send suitable power from transmitter. We used GaN transistor in the design for its high power and fast switching frequency. GaN based design is very promising in the high power and high frequency applications.

The first chapter is an introductory chapter for the whole thesis, presenting the main concept and developing the thesis organization.

The second chapter gives a background on the transistor used in the thesis. It also present the transistor main construction, the physical phenomena and practical measurement for the transistor in our lab.

The third chapter introduces the concept of the wireless power transfer. The main application for the thesis is wireless charging for low power devices.

The fourth chapter proposes the design of the power oscillator using the GaN transistor. Simulation study is presented beside the Monte Carlo study.

The fifth chapter introduces a differential version of the design to double the power sent from the transmitter.

The last chapter gives a comparative study between the results in this thesis and previous published work. Future works will be presented.

Key words: wireless power transfer (WPT); e-GaN HEMT; class E power amplifier (PA); power oscillator (PO)

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