

## ACKNOWLEDGEMENT

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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## DECLARATION SHEET

I hereby declare that my Final Year Project Thesis is the result of my research work under supervision of Pn. Nor Baizura Binti Ahamad. All literature sources used for the writing of this thesis have been adequately referenced.

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## **APPROVAL AND DECLARATION SHEET**

**This project report titled ‘Design Buck Converter For 12Vdc to 6Vdc’ was prepared and submitted by Mohd Safarizal Bin Yaacob (Matrix Number: 081070505) and has been found satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement for the bachelor of Engineering (Industrial Electronic Engineering) in Universiti Malaysia Perlis (UniMAP)**

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## ABSTRAK

Bekalan kuasa mod pensuisan (SMPS) ataupun pensuisan bolehubah, adalah sebuah penukar kecekapan tahap voltan arus terus (VDC) kepada tahap voltan arus terus (VDC) yang lain, melalui penyimpanan yang bersifat magnetik iaitu kearuhan (induktor) atau tahap pemindahan, contohnya aliran arus berterusan yang tetap, aliran arus beban, dan biasanya pada kuasa yang kecil iaitu beberapa kilowatt. Penukar voltan arus terus DC-DC diperlukan kerana ia tidak seperti arus voltan ulang-alik AC, dimana DC tidak boleh hanya dinaikkan ke atas atau ke bawah menggunakan sebuah pengubah. Dalam hal lain, penukar voltan DC-DC adalah setara dengan pengubah arus terus DC. Tujuan projek ini adalah untuk membangunkan dan menganalisa prestasi penukar penurunan voltan (buck converter) dalam kecekapan, kehilangan kuasa yang rendah dan kelajuan pensuisan yang tinggi. Dalam simulasi, software PSIM digunakan untuk merekabentuk litar penurunan voltan (buck converter). Dari hasil simulasi, akhirnya merekabentuk litar sebenar bagi penurunan voltan (buck converter). Signal Lebar Modulasi (PWM) digunakan sebagai modulasi signal dalam menghasilkan atau memberikan signal untuk pensuisan dalam rangkaian sistem ini.

## ABSTRACT

A switched mode power supply (SMPS) or switching regulator, efficiently converts a DC voltage level to another DC voltage level, via an intermediate magnetic (inductor) storage or transfer stage, such that a continuous, possibly constant, load current flows, usually at power levels below a few kilowatts. DC-DC Converters are needed because unlike AC, DC can't simply be stepped up or down using a transformer. In many ways, a DC-DC converter is the DC equivalent of a transformer. The purposes of this project were design and analyze the performance of conventional buck converter in term efficiency, low power loss and high speed switching. In simulation, PSIM software used to design of circuit conventional buck converter. From result of simulation, lastly develop the hardware circuit of conventional buck converter. Pulse width Modulation (PWM) used as pulse width modulation in generate pulse trigger to switching in circuit.

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## LIST OF ABBREVIATIONS

AC	Alternating Current
BJT	Bipolar Junction Transistor
CMOS	Complementary Metal Oxide Semiconductor
CCM	Continuous Conduction Mode
DCM	Discontinuous Conduction Mode
DC	Direct Current
ESL	Equivalent Series Inductance
ESR	Equivalent Series Resistance
IC	Integrated Circuit
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
PWM	Pulse Width Modulation
SMPS	Switch Mode Power Supplies
PCB	Printed Circuit Board
PDA	Personal Digital Assistants



## LIST OF SYMBOLS

V	Volts
Hz	Hertz
A	Ampere
F	Farad
W	Watt
VA	Volt Ampere
H	Henry
D or Dsw	Duty Cycle
VDC	Direct Current Voltage
VAC	Alternating Current Voltage
$\Omega$	Ohm
T	Period
$\eta$	Efficiency

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