UNIVERSITI MALAYSIA PERLIS
SCHOOL OF MICROELECTRONIC ENGINEERING

ANALOGUE DIGITAL CONVERTER for E-TONGUE APPLICATION

by

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DECLARATION OF AUTHORSHIP

This project report titled Analogue Digital Converter for E-tongue Application was prepared and submitted by Amin Jamain B. Mohd Khairy (Matrix Number: 071010053) and has been found satisfactory in terms of scope, quality and presentation as partial fulfilment of the requirement for the Bachelor of Engineering (Electronic Engineering) in Universiti Malaysia Perlis (UniMAP).

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ANALOGUE DIGITAL CONVERTER for E-TONGUE APPLICATION

ABSTRACT

This work presents a report on designing analogue digital converter (ADC) for e-tongue application. In work for convert an analogue signal from the measurement subject to digital signal which is will be process by another device. In a standard 0.35um CMOS technology, 3-bits flash ADC is design in Mentor Graphic software. This device are consists of 8 comparator, 1 priority encoder and 3 flip-flop circuit. The proposed ADC is used 2.5V and -2.5V power supply to full operating speed. Minimum output of ADC is 0.0V, while the maximum output is 2.5V.

PENUKAR ANALOG-DIGIT BAGI APLIKASI E-LIDAH

ABSTRAK

Kajian ini mengenai laporan kepada rekabentuk penukar analog-digit (ADC) untuk aplikasi e-lidah. Di dalam peranti ini ia menukar isyarat analog daripada sumber menjadi isyarat digital yang akan diproses oleh peranti lain menjadi satu sistem. Dengan menggunakan teknologi CMOS standard 0.35um, 3-bit flash ADC direka menggunakan perisian "Mentor Graphic". Peranti ini terdiri daripada 8 pembanding, 1 pengekod keutamaan dan 3 litar flip-flop. ADC yang direka ini menggunakan 2.5V dan-2.5V power supply untuk membolehkan ia beroperasi penuh. Voltan keluaran minimum ADC adalah 0.0V, manakala voltan keluaran maksimum adalah 2.5V.

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ABBREVIATIONS

ADC	Analogue-to-digital converter
MOSFET	Metal oxide semiconductor field effect transistor
CMOS	Complementary metal oxide semiconductor
nMOS	n-channel metal oxide semiconductor
pMOS	p-channel metal oxide semiconductor
SAR	Successive-approximation Register
DAC	Digital-to-analogue converter
$T_{discharge}$	Time discharged
V_{ref}	Reference voltage
V_{bias}	Bias voltage
I_{ref}	Reference current
V_{OH}	High output voltage
V_{OL}	Low output voltage
ΔV	Voltage difference
V_{DS}	Drain-to-source voltage
V_{GS}	Gate-to-source voltage
V_{TH}	Threshold voltage
W/L	Ratio of width and length
K'	transconductance
λ	lambda
μm	micrometre
nm	Nanometre
PVT	Pressure, Volume, Temperature
A_v	Voltage gain