

ABSTRACT

Erny Anugrahany, Jurusan Teknik Elektro, Fakultas Teknik Universitas Brawijaya Malang, 2014. *Perancangan 8 Bit Multiplexer dan Demultiplexer dalam Satu IC dengan Teknologi High Speed CMOS*, Dosen Pembimbing : Ir. M. Julius St., MS dan Dr.-Ing Onny Setyawati, ST.,MT.,MSc

This design aimed to analyze and design the 8 Bit Multiplexer and demultiplexer in a single IC using High Speed CMOS. Depiction of the layout process is done by using software Microwind2. Testing is done using a series of programs with a value of $CL = B2Spice\ 5PF$, $KN = 45\mu A/V^2$ and $KP = 18\mu A/V^2$ to obtain average 12ns propagation delay.

Specification of simulation results VTC is $V_{IH} = 2.805V$; $V_{IL} = 2.695V$; $V_{OH} = 5V$; $V_{OL} = 0V$; $NMH = NML = 2.195V$ and $2.695V$. The simulation results on the propagation delay of the multiplexer is active condition $t_{PLH} = 3.16ns$, $t_{PHL} = 1ns$, and $t_{PD} = 2.08ns$. While simulating the conditions of active demultiplexer generates value $= 3.2ns$ t_{PLH} , $t_{PHL} = 1ns$, and $t_{PD} = 2.1ns$. Power dissipation of $0.125mW$. IC 8 Bit Multiplexer and demultiplexer HCMOS has a layout without a pad I / O with an area $385.6\mu m \times 25.7\mu m$ and use the pad I / O with an area $1430.5\mu m \times 1430.5\mu m$.

The results of the design and simulation of IC 8 Bit Multiplexer and demultiplexer HCMOS by comparing the value of the same capacitance ($CL = 15pF$ for TTL and CMOS $CL = 50pF$ for) values obtained propagation delay and power dissipation are better than IC DM74LS151 ($TPD = 12.5ns$ and $PDP = 375pJ$), IC MC74HC151A ($TPD = 34ns$ and $PDP = 17000pJ$), IC 74LS138 ($TPD = 20ns$ and $PDP = 640pJ$) and IC MC74HC138A ($TPD = 27ns$ and $PDP = 13500pJ$).

Keywords: B2Spice, Power Dissipation, Propagation Delay, Multiplexer-demultiplexer, HCMOS