

0.1 Exercise 4: Behaviour Analysis of Circuits Including a 74HC02 Gate

The 74HC02 is an integrated circuit of NOR gates. Firstly, the propagation delays and the transition times are measured for this gate in a no-load output condition. Then these parameters are measured in the case in which the gate is connected in the circuit in Figure. In the following table, the results of the mentioned measures are shown.

Propagation and Transition Times' Measurements

	No-load	Loaded with circuit
t_{pHL}	1,5ns	1,05ns
t_{pLH}	12,5ns	14,4ns
t_f	32ns	30,7ns
t_r	41,4ns	43,2ns

In the previous table it can be seen that the four parameters remain practically the same while being the 74HC02 in the no-load situation and incorporated in the circuit. However, the small differences have opposite behaviours depending on the input signal's edge. In the case of a rising edge in the input signal, the propagation delay t_{pLH} and the transition time t_r are bigger if the 74HC02 forms part of the circuit, than if the 74HC02 is in a no-load situation.

Circuit's Response to Frequency Increment

Alimentation Voltage and Temperature of the IC

Se pone un capacitor de desacople para que cuando se pida corriente, la fuente VCC no sea alterada creando ripples no deaseados