

CSE2209: Digital Electronics and Pulse Techniques

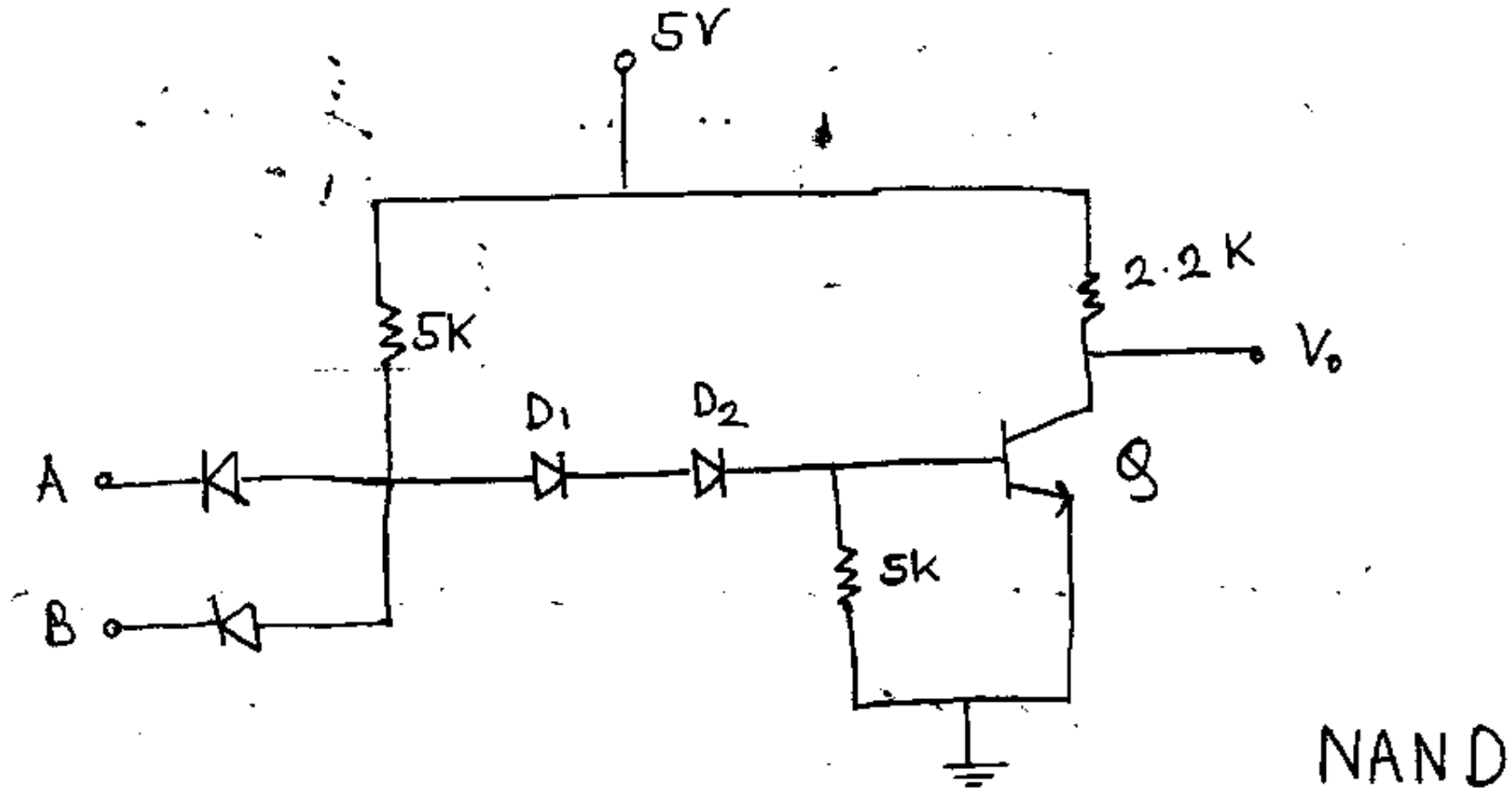
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Integrated Circuits

In order to be fabricated in an IC, low voltage and low resistance among all the elements need to be ensured. The previous circuits were not ICs, but this circuit works like a fabricated IC.

Integrated Circuit DTL NAND gate (positive logic)

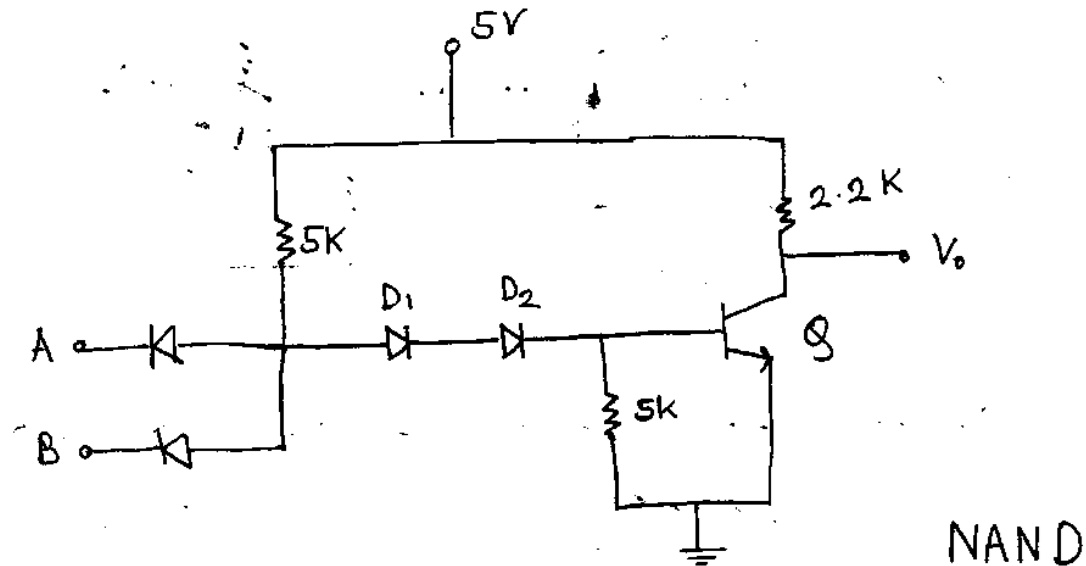


Noise Margin

False logic can be caused by switching transients, power-supply noise spikes, coupling between leads, etc. The noise voltage at the input which will cause the circuit to malfunction when the output is in the 0(1) state is called the *noise-margin* $NM(0)$ [$NM(1)$].

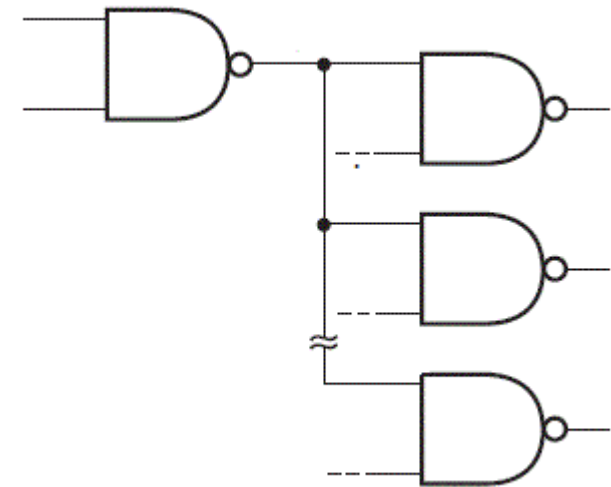
Fan in

- Number of inputs in the circuit. The fan in of this circuit is 2.



Fan Out

- The fan-out is defined as the maximum number of inputs (load) that can be connected to the output of a gate without degrading the normal operation.
- Number of similar gates that can be driven by a logic gate safely. If N number of similar gates are driven by a logic gate safely, then the fan out of the circuit is N



NAND Gate Fan out

Power Dissipation

As a result of applied voltage and currents flowing through the logic IC's, some power will be dissipated in it in the form of heat. The power drawn by an IC from the power supply.

$$P_{avg} = \frac{P(0) + P(1)}{2}$$

Limitations of a Transistor

See from Book Page 131 - 132