APPLICATIONS OF NAND Gate

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ABSTRACT: This paper discusses the various applications oj NAND gate in various Integration circuits. A brief on each type is also presented. The nand gate plays a vital role.

Keywords: NAND, applications.

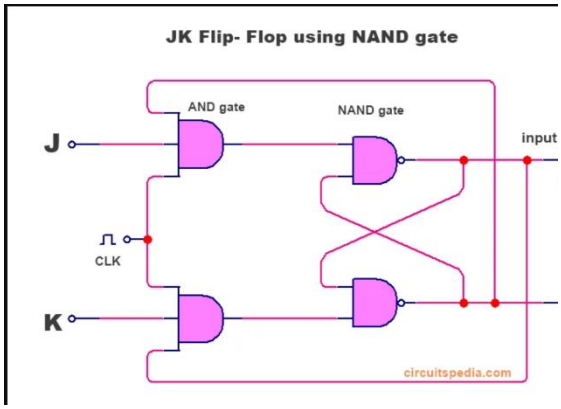
1. INTRODUCTION

The NAND gate is a Universal Gate, so it can be used to construct any basic logic gate without using any other Gate. Implementing logical functions using a NAND gate consumes less power than other gates. Also, it can solve complex Logical Problems. Simplify Logical Expressions: Using only the NAND gate, we can simplify any complex logical circuits and represent them more simply. It is used in arithmetic logic, Decoder, Encoder, Multiplexers, Demultiplexers, Clock Generators, Logical operations and to store Data. This paper restricts its discussion to three widely used applications of NAND gate namely: Flip Flop(FF), Decoder and Multiplexer.

2. APPLICATIONS

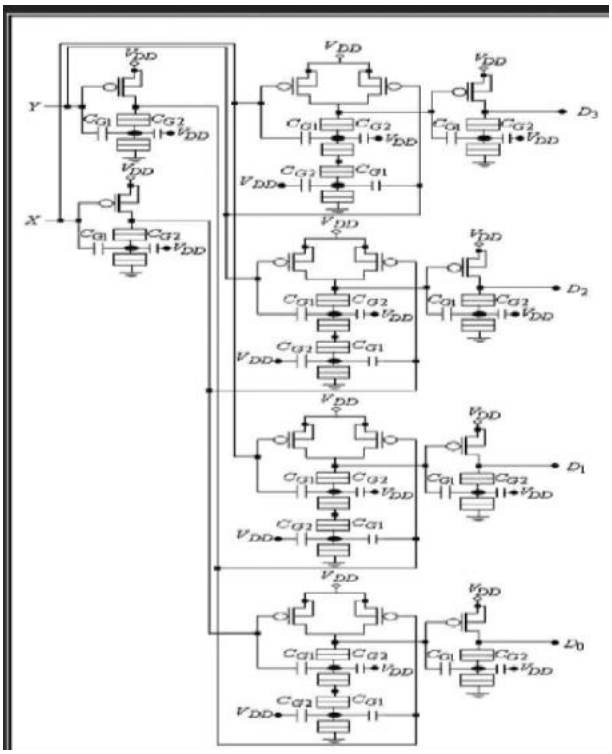
The applications of NAND gate are briefly discussed and the influence on their performance is studied.

1. JK Flip Flop (FF): The name JK flip-flop is termed from the inventor Jack Kilby from texas instruments. Due to its versatility they are available as IC packages. The major applications of JK flip-flop are Shift registers, storage registers, counters and control circuits.

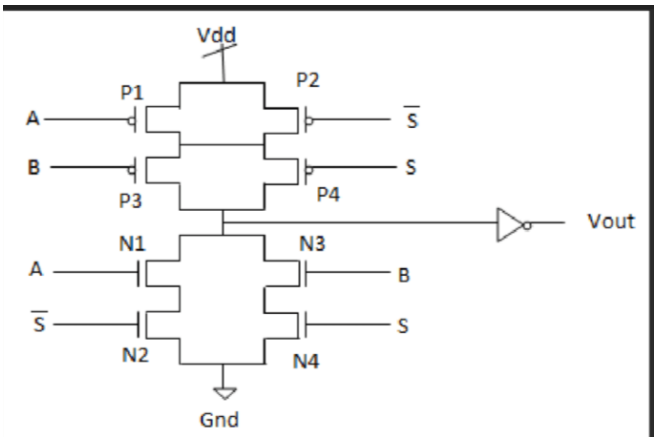


Symbol	Parameter	Value
V_{CC}	DC Supply Voltage (Referenced to GND)	– 0.5 to + 7
V_{in}	DC Input Voltage (Referenced to GND)	– 1.5 to V_{CC} +
V_{out}	DC Output Voltage (Referenced to GND)	– 0.5 to V_{CC} +
I_{in}	DC Input Current, per Pin	± 20
I_{out}	DC Output Current, per Pin	± 25
I_{CC}	DC Supply Current, V_{CC} and GND Pins	± 50

2. Decoder:
A decoder is a circuit component that decodes an input code. Given a binary code of n-bits, a decoder will tell which code is this out of the 2n possible codes



3. Multiplexer: The multiplexer can select and output one signal from multiple input signals. When the signal of the select input (SELECT) is L, the input (A) is selected and the logic of the input (A) is output (Y). On the other hand, when the signal of the select input (SELECT) is H, the input (B) is selected and the logic of the input (B) is output to output (Y).



CONCLUSION

Therefore from the aforementioned applications, it is evident that emphasis should be on the design of the NAND gate to ensure its efficiency as it is incorporated in a plethora of applications.