Barrel Shifter using NMOS Pass Transistor Logic

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Abstract

Barrel Shifter is important function to optimize the RISC processor so it is used for rotating and transferring the data either in the left or right direction. This shifter is useful in lots of signals processing ICs. The Arithmetic and the Logical Shifters additionally can be changed by the Barrel Shifter Because with the rotation of the data it also supplies the utility the data right, left change all mathematically or logically. A purpose of this paper is to design the CMOS 8-bit barrel shifter using CMOS with the help of NMOS Pass Transistors Logic. The Main concern of this paper is to design and study about barrel shifter of 8-bit that is used in RISC processor.

1 Reference Circuit Details

Barrel Shifter is an important component in arithmetic logic unit. It is used for logical shift left, logical shift right arithmetic shift left, arithmetic shift right, rotate left and rotate right. Barrel shifter is implemented using CMOS NMOS pass transistor Logic with sky water 130nm Technology using designed using eSim. The transistors are Positioned to right shift operation. Arithmetical and Logical shifting is also done by using Barrel Shifter. In Logical shifting, bits were shifted left/right and empty places are filled with zeroes. In Arithmetic Shifting is same as logical shifting except in right shift the empty place is filled with MSB. Barrel Shifter can shift n bit in a single clock cycle. Barrel Shifter is known as Rotator as it rotates the data bits in a cycle in such a way that the empty spots are filled with the bits shifted from the other hand bits are observed and these are cross validated to confirm the functionality. Arithmetical and Logical shifting is also done by using Barrel Shifter. In Logical shifting, bits were shifted left/right and empty places are filled with zeroes. In Arithmetic Shifting is same as logical shifting except in right shift the empty place is filled with MSB. Barrel Shifter can shift n bit in a single function /clock cycle. Barrel Shifter is known as Rotator as it rotates the data bits in a cycle in such a way that the empty spots are filled with the bits shifted from the other hand

2 Reference Circuit

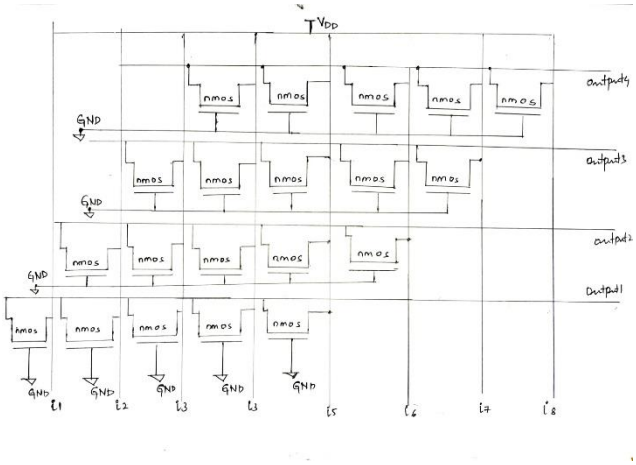

Figure 1: Reference circuit diagram.

3 Reference Circuit Waveforms

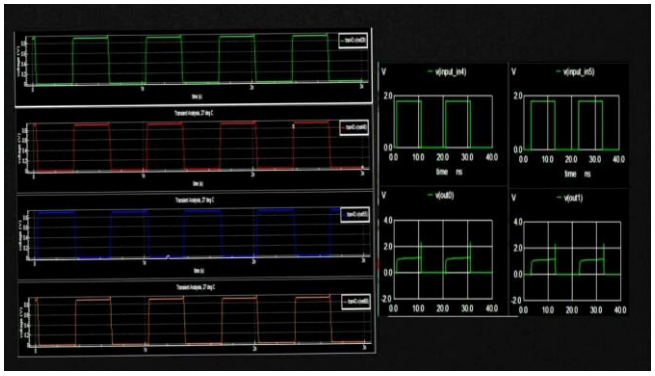

Figure 2: Reference waveform

References

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