CMOS TRANSMISSION GATE

CMOS TRANSMISSION GATE:

CMOS transmission gate is an electronic switch which is connected by the input logic level. CMOS transmission gate consists of one n-channel MOSFET and one p-channel MOSFET connected in parallel.

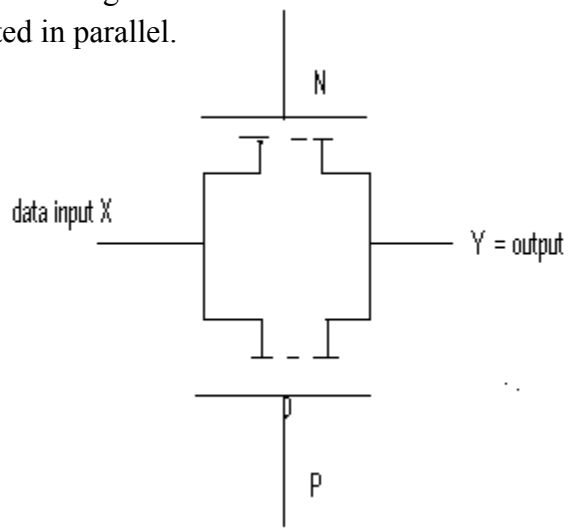


Figure 6.22

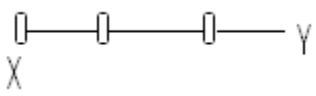
N- channel substrate is connected to the ground

P- channel substrate is connected to the V_{DD}

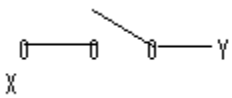
When n – channel gate is connected to V_{CC} and P – channel gate is connected to ground, transmission gate acts as a closed switch

N = 1

P = 0



When n – channel gate is connected to ground and P – channel gate is connected to V_{CC}, transmission gate acts as a open switch



P = 1

N = 0

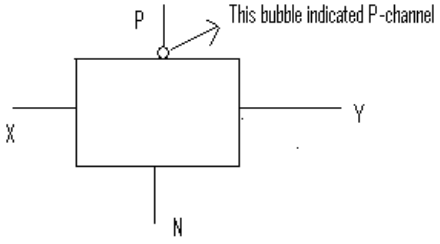


Figure 6.23

Ex-or gate using CMOS transmission gate:-

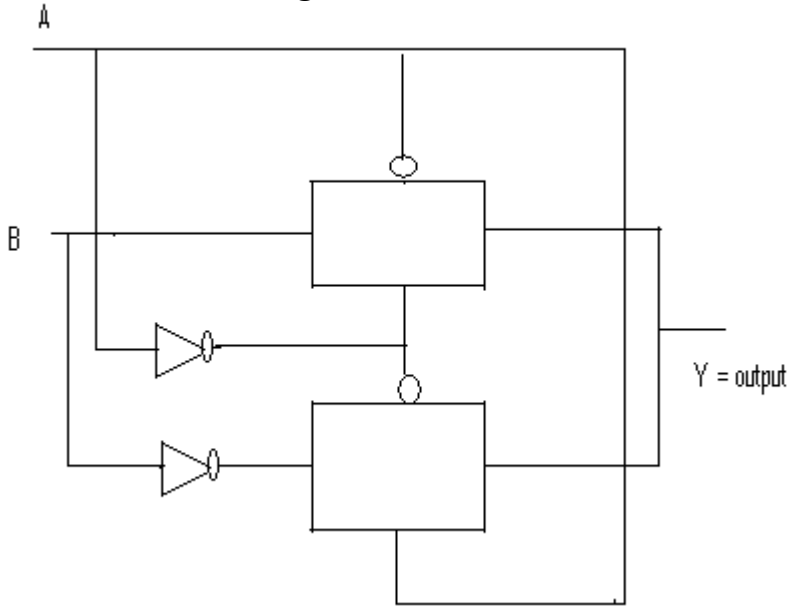


Figure 6.24

A	B	TG1	TG2	OUTPUT
0	0	C.S	0.S	0
0	1	C	0	1
1	0	Open	closed	1
1	1	opne	Closed	0

Multiple, common bus refer mo

CMOS/TTL Interfacing:

Interfacing: It means connecting the output of the one circuit or system to the input of another circuit or system with different electrical characteristics. If the two circuits

having different electrical characteristics are used, then interfacing circuit must be needed. It takes the outputs from the drive circuit and modifiers it and given to the load circuit.

TTL driving CMOS circuit:

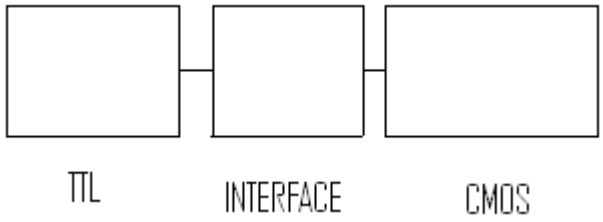


Figure 6.25

	CMOS	**TTL**
IIN	1μA	40 μA
IIL	1μA	1.6 mA
ION	4 mA	0.4mA
IOL	4 mA	16 mA

Here the TTL logic family gate acts as a driving circuit and CMOS circuit acts as a loading circuit, from the table the input current values of cmos are very low compared with the output current capabilities of the TTL has no problem of meeting cmos input current requirements. But when we compare the TTL output voltages with the cmos input voltage requirements V_{OH} minimum value for TTL << V_{IH}(min) for cmos. For the situations we need pull up resistor to pull the TTL output to 5v. This is also known as interface.

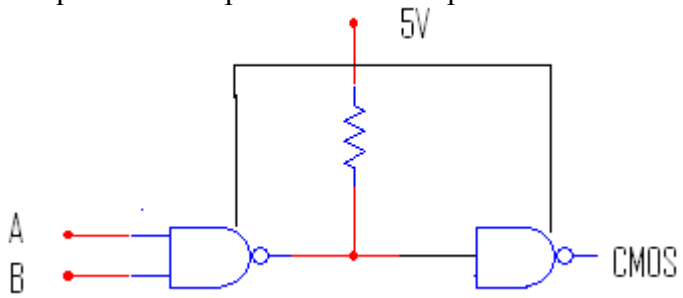


Figure 6.26