

PASS TRANSISTOR LOGIC

Switches and switch logic can be formed from simple n or p transistors and from the complementary switch i.e. the transmission gate. The complex transmission gate came into picture because of the undesirable threshold effects of the simple pass transistors. Transmission gate gives good non degraded logic levels. But this good package came at the cost of larger area and complementary signals required to drive the gates

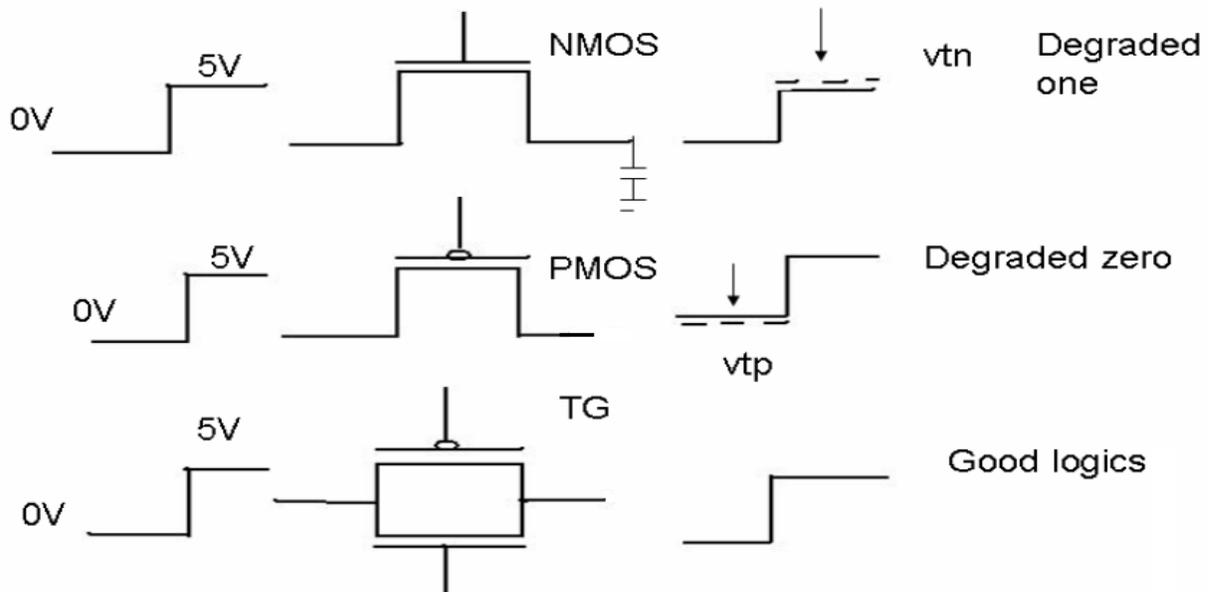


Figure 12: Some properties of pass transistor.

3.10 CMOS Technology Logic Circuit Structures

Many different logic circuits utilizing CMOS technology have been invented and used in various applications. These can be divided into three types or families of circuits:

1. Complementary Logic

- Standard CMOS
- Clocked CMOS (C2MOS)
- BICMOS (CMOS logic with Bipolar driver)

2. Ratio Circuit Logic

- Pseudo-NMOS
- Saturated NMOS Load
- Saturated PMOS Load
- Depletion NMOS Load (E/D)
- Source Follower Pull-up Logic (SFPL)

3. Dynamic Logic:

CMOS Domino Logic

NP Domino Logic (also called Zipper CMOS)

NOR A Logic

Cascade voltage Switch Logic (CVSL)

Sample-Set Differential Logic (SSDL)

Pass-Transistor Logic

The large number of implementations shown so far may lead to confusion as to what to use where. Here are some inputs

1. Complementary CMOS

The best option, because of the less dc power dissipation, noise immune and fast. The logic is highly automated. Avoid in large fan outs as it leads to excessive levels of logic.

2. BICMOS

It can be used in high speed applications with large fan-out. The economics must be justified.

PSUEDO –NMOS

Mostly useful in large fan in NOR gates like ROMS, PLA and CLA adders. The DC power can be reduced to 0 in case of power down situations

Clocked CMOS

Useful in hot electron susceptible processes.

CMOS domino logic

Used mostly in high speed low power application. Care must take of charge redistribution. Precharge robs the speed advantage.

CVSL

This is basically useful in fast cascaded logic .The size; design complexity and reduced noise immunity make the design not so popular.

Hybrid designs are also being tried for getting the maximum advantage of each of them into one.