

1962

MECL- I ICs featuring ECL go on sale (Motorola, U.S.A.)

~ Integrated Circuit ~

Logic circuits using a bipolar process include RTL, DTL, TTL, etc. using a saturation region of transistor operation, and ECL (Emitter Coupled Logic) using an unsaturated region. Although the logic circuit using the saturation region is easy to use because the output signal is stable and the logic amplitude can be taken large, there is a disadvantage that the accumulation effect is caused by injecting minority carriers into the base and the switching time is delayed.

On the other hand, the ECL circuit has a differential amplifier configuration in which the emitters of the transistors are coupled as shown in the Figure below. An intermediate value of the logic amplitude is applied as a reference voltage to the base (V_{BB}) on one side of this circuit, and the operation of the left and right transistors is switched depending on whether the input voltage of the opposite side transistor is larger or smaller than the reference value. Then, logic is formed by making multiple inputs. Since the ECL uses the unsaturated region of the transistor for operation, the storage effect does not occur and the switching time is very fast. In addition, since either one of the transistors always operates, power fluctuation during switching is small and the output amplitude is also small, and there is an advantage that generation of noise can be suppressed, but there is a disadvantage that power consumption is large.

The MECL-I series, which was commercialized by Motorola, was very fast as a logic circuit at the time with an average propagation delay time of 6 ns, and it was mainly used for large computers requiring ultra-high speed operation. The package was a 10 pin TO-5 can type.

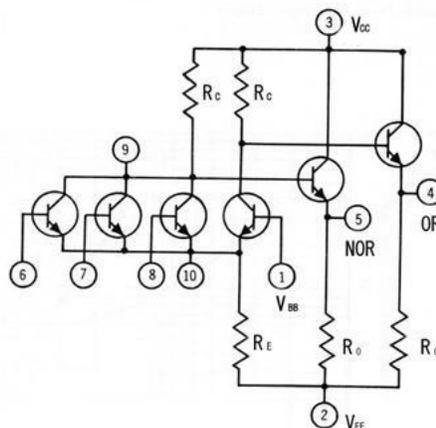


Figure: MC306G 3-input gate circuit