
数字世界精彩无限

Fundamentals of Logic Design

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2.2 复合逻辑运算

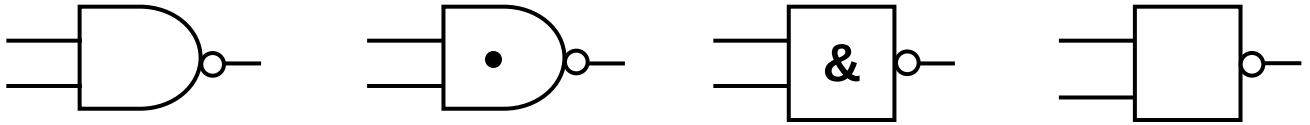
几种常用的复合逻辑运算

- 与非，或非
- 与或非
- 异或
- 同或

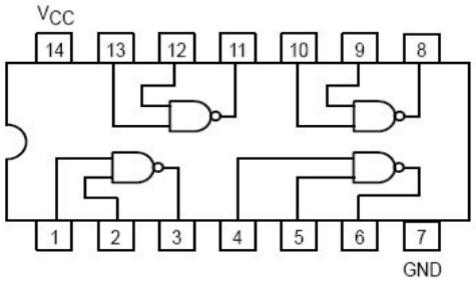
2.2 复合逻辑运算

1. 与非 （NAND）　　$F=\overline{AB}$

- 逻辑符号



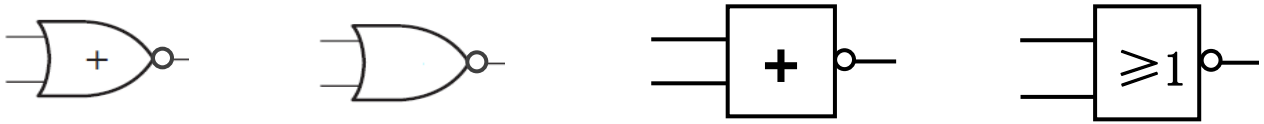
- 典型芯片： 74LS00



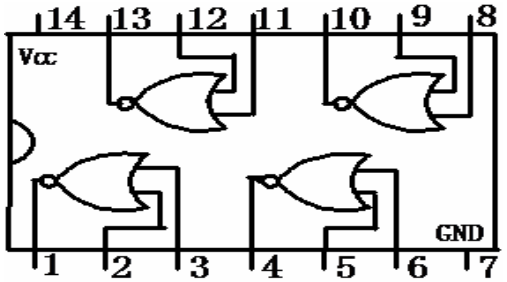
2.2 复合逻辑运算

2. 或非（NOR）　　$F=\overline{A+B}$

- 逻辑符号



- 典型芯片：　74LS02

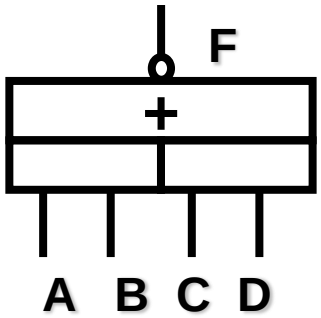


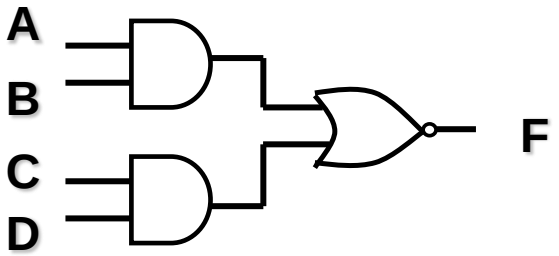
2.2 复合逻辑运算

3. 与或非（AND-OR-NOT）

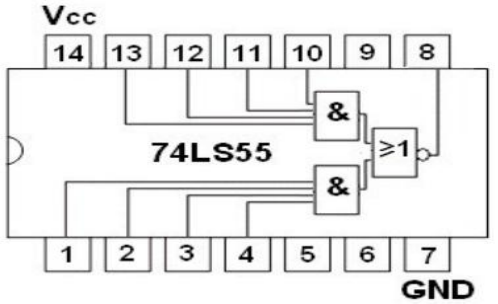
$$F=\overline{AB+CD}$$

- 逻辑符号





- 典型芯片： 74LS51,74LS55



2.2 复合逻辑运算

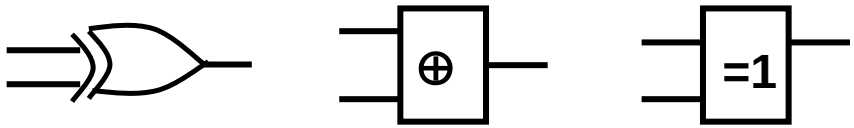
4. 异或

$$F= A\oplus B= \bar{A}B+A\bar{B}$$

真值表

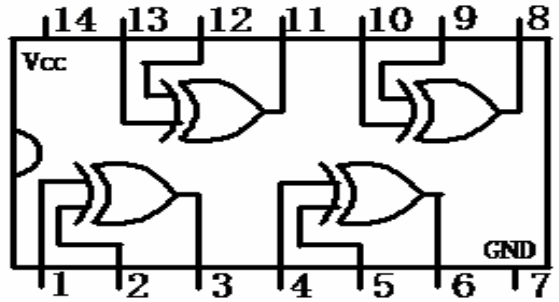
A	B	F
0	0	0
0	1	1
1	0	1
1	1	0

- 逻辑符号



2.2 复合逻辑运算

- 典型芯片： 74LS86



- 应用
  - 全加器（Full adder）
  - 半加器（Half-adder）

2.2 复合逻辑运算

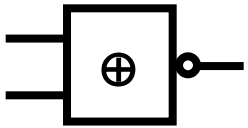
5. 同或

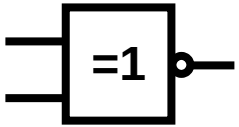
$$F = A \equiv B \quad \text{or} \quad F = A \odot B = \overline{A}\,\overline{B} + AB$$

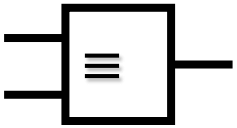
真值表

A	B	F
0	0	1
0	1	0
1	0	0
1	1	1

- 逻辑符号

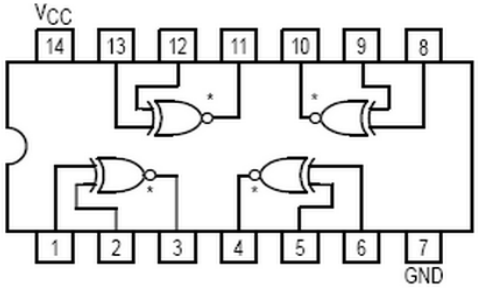






2.2 复合逻辑运算

- 典型芯片： 74LS266



- 应用
  - 等值比较器

2.2 复合逻辑运算

- 异或及同或运算的性质

$A \oplus 1 = \bar{A}$　　$A \odot 1 = A$

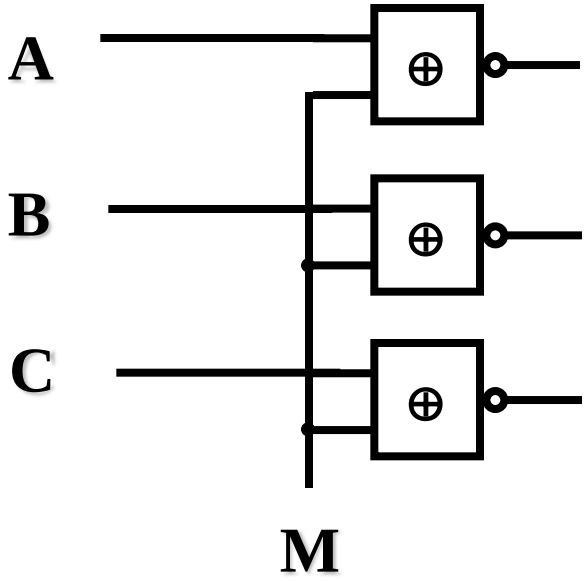
$A \oplus 0 = A$　　$A \odot 0 = \bar{A}$

$A \oplus A = 0$　　$A \odot A = 1$

$A \oplus \bar{A} = 1$　　$A \odot \bar{A} = 0$

2.2 复合逻辑运算

- 应用



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