

XNOR gate

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The **XNOR gate** (sometimes, EXNOR, ENOR, and, rarely, NXOR, XAND) is a digital logic gate whose function is the logical complement of the exclusive OR (XOR) gate. The two-input version implements logical equality, behaving according to the truth table to the right. A high output (1) results if both of the inputs to the gate are the same. If one but not both inputs are high (1), a low output (0) results. The algebraic notation used to represent the XNOR operation is $S = A \odot B$.

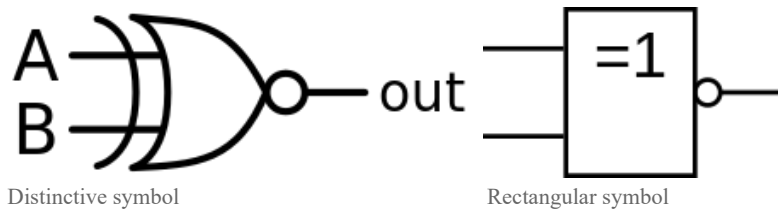
Input		Output
A	B	A XNOR B
0	0	1
0	1	0
1	0	0
1	1	1

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Symbols

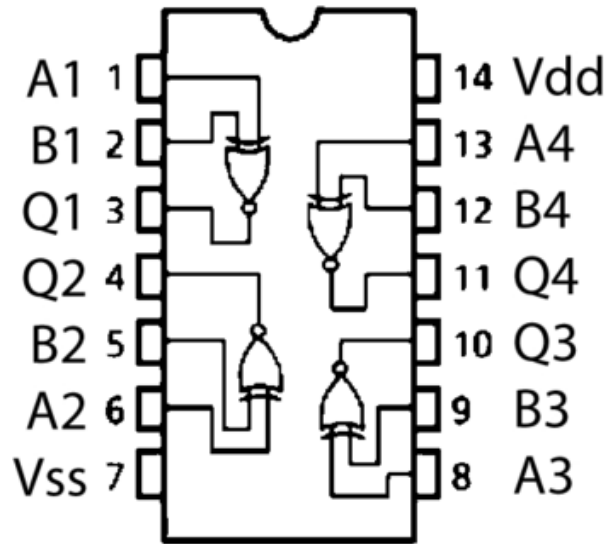
There are 2 symbols for XNOR gates: one with distinctive shape and one with rectangular shape and label. The distinctive symbol for the XNOR gate is that of the XOR gate with an added inversion bubble.



The XNOR gate with inputs *A* and *B* implements the logical expression $A \cdot B + \overline{A} \cdot \overline{B}$.

Hardware description and pinout

XNOR gates are represented in most TTL and CMOS IC families. The standard 4000 series CMOS IC is the 4077 and the TTL IC is the 74266. Both include four independent, two-input, XNOR gates. The pinout diagram is as follows:



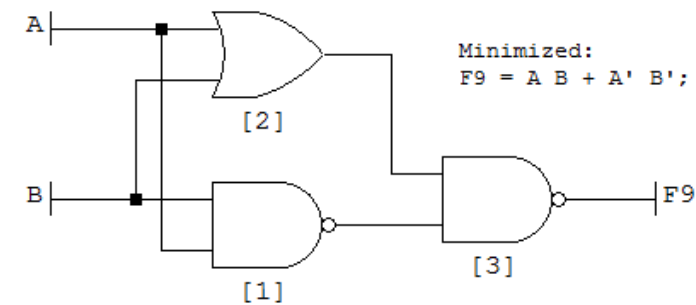
Pinout diagram of a 74266 quad XNOR DIP-format IC.

1. Input A1
2. Input B1
3. Output Q1
4. Output Q2
5. Input B2
6. Input A2
7. V_{ss} (GND)
8. Input A3
9. Input B3
10. Output Q3
11. Output Q4
12. Input B4
13. Input A4
14. V_{dd} (V_{cc})

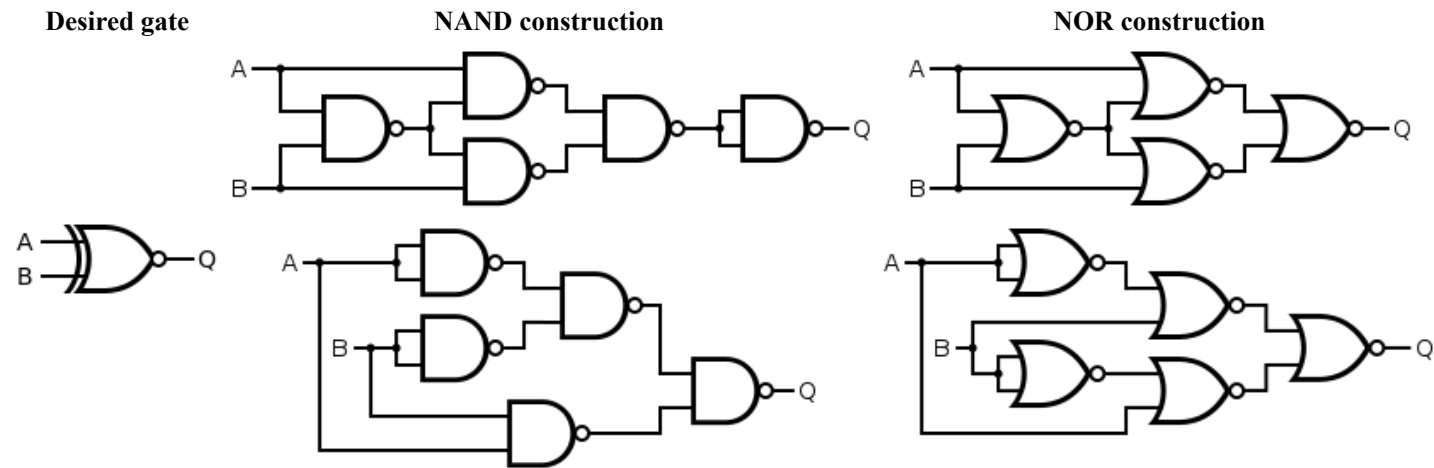
This device is available from most semiconductor manufacturers such as NXP. It is usually available in both through-hole DIP and SOIC format. Datasheets are readily available in most datasheet databases. DIL is a dual in-line package, and SIL is a single in-line package.

Alternatives

If no specific XNOR gates are available, one can be made from NAND gates or NOR gates in the configurations shown below. In fact, any logic gate can be made from combinations of only NAND gates or only NOR gates. Two possible configurations constructed from NAND gates and two possible configurations constructed from NOR gates are shown below.



XNOR gate circuit using three mixed gates



See also

- AND gate
- OR gate
- NOT gate
- NAND gate
- NOR gate
- XOR gate
- Kronecker delta function
- Logical biconditional
- If and only if
- XAND (Wiktionary)

References

- Texas Instruments© CD4077 Datasheet (<http://www.ti.com/lit/ds/snos367a/snos367a.pdf>)

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