

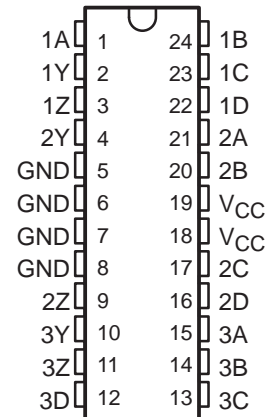
- Suitable for Use in Applications Such as:
 - Differential Line Drivers
 - Complementary Input Circuits for Decoders and Code Converters
- Flow-Through Architecture Optimizes PCB Layout
- Center-Pin V_{CC} and GND Pin Configurations Minimize High-Speed Switching Noise
- EPIC™ (Enhanced-Performance Implanted CMOS) 1- μ m Process
- 500-mA Typical Latch-Up Immunity at 125°C

description

The 74AC11800 is a triple 4-input AND/NAND gate. Elimination of decode spikes in symmetrical decoder and code-converter applications makes the device useful for applications such as a decoder or differential line driver.

The 74AC11800 is characterized for operation from –40°C to 85°C.

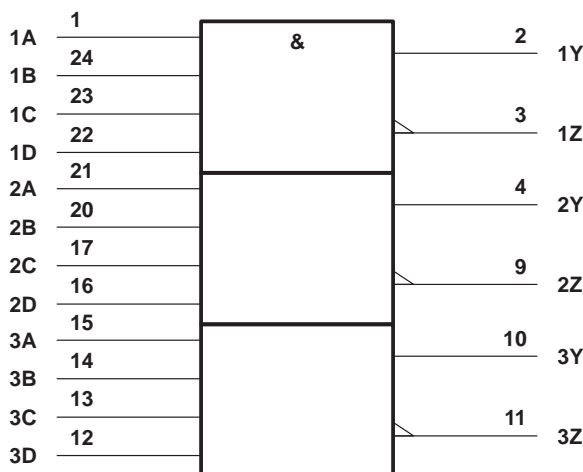
DW PACKAGE
(TOP VIEW)



FUNCTION TABLE

| INPUTS | | | | OUTPUTS | |
|--------|---|---|---|---------|---|
| A | B | C | D | Y | Z |
| L | X | X | X | L | H |
| X | L | X | X | L | H |
| X | X | L | X | L | H |
| X | X | X | L | L | H |
| H | H | H | H | H | L |

logic symbol†



logic diagram, each section (positive logic)



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



74AC11800

TRIPLE 4-INPUT AND/NAND GATES

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absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

| | |
|--|----------------------------|
| Supply voltage range, V_{CC} | –0.5 V to 7 V |
| Input voltage range, V_I (see Note 1) | –0.5 V to $V_{CC} + 0.5$ V |
| Output voltage range, V_O (see Note 1) | –0.5 V to $V_{CC} + 0.5$ V |
| Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) | ±20 mA |
| Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$) | ±50 mA |
| Continuous output current, I_O ($V_O = 0$ to V_{CC}) | ±50 mA |
| Continuous current through V_{CC} or GND | ±150 mA |
| Storage temperature range | –65°C to 150°C |

‡ Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

recommended operating conditions (see Note 2)

| | | MIN | NOM | MAX | UNIT |
|---------------------|------------------------------------|------------------|------|----------|------|
| V_{CC} | Supply voltage | 3 | 5 | 5.5 | V |
| V_{IH} | High-level input voltage | $V_{CC} = 3$ V | 2.1 | | V |
| | | $V_{CC} = 4.5$ V | 3.15 | | |
| | | $V_{CC} = 5.5$ V | 3.85 | | |
| V_{IL} | Low-level input voltage | $V_{CC} = 3$ V | | 0.9 | V |
| | | $V_{CC} = 4.5$ V | | 1.35 | |
| | | $V_{CC} = 5.5$ V | | 1.65 | |
| V_I | Input voltage | 0 | | V_{CC} | V |
| V_O | Output voltage | 0 | | V_{CC} | V |
| I_{OH} | High-level output current | $V_{CC} = 3$ V | | –4 | mA |
| | | $V_{CC} = 4.5$ V | | –24 | |
| | | $V_{CC} = 5.5$ V | | –24 | |
| I_{OL} | Low-level output current | $V_{CC} = 3$ V | | 12 | mA |
| | | $V_{CC} = 4.5$ V | | 24 | |
| | | $V_{CC} = 5.5$ V | | 24 | |
| $\Delta t/\Delta v$ | Input transition rise or fall rate | 0 | | 10 | ns/V |
| T_A | Operating free-air temperature | –40 | | 85 | °C |

NOTE 2: Unused or floating inputs must be held high or low.

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER | TEST CONDITIONS | V _{CC} | T _A = 25°C | | | MIN | MAX | UNIT |
|-----------------|---|-----------------|-----------------------|-----|------|------|------|------|
| | | | MIN | TYP | MAX | | | |
| V _{OH} | I _{OH} = – 50 µA | 3 V | 2.9 | | | 2.9 | | V |
| | | 4.5 V | 4.4 | | | 4.4 | | |
| | | 5.5 V | 5.4 | | | 5.4 | | |
| | I _{OH} = – 4 mA | 3 V | 2.58 | | | 2.48 | | |
| | | 4.5 V | 3.94 | | | 3.8 | | |
| | | 5.5 V | 4.94 | | | 4.8 | | |
| | I _{OH} = – 75 mA† | 5.5 V | | | | 3.85 | | |
| V _{OL} | I _{OL} = 50 µA | 3 V | | | 0.1 | | 0.1 | V |
| | | 4.5 V | | | 0.1 | | 0.1 | |
| | | 5.5 V | | | 0.1 | | 0.1 | |
| | I _{OL} = 12 mA | 3 V | | | 0.36 | | 0.44 | |
| | | 4.5 V | | | 0.36 | | 0.44 | |
| | | 5.5 V | | | 0.36 | | 0.44 | |
| | I _{OL} = 75 mA† | 5.5 V | | | | | 1.65 | |
| I _I | V _I = V _{CC} or GND | 5.5 V | | | ±0.1 | | ±1 | µA |
| I _{CC} | V _I = V _{CC} or GND, I _O = 0 | 5.5 V | | | 4 | | 40 | µA |
| C _i | V _I = V _{CC} or GND | 5 V | | 4 | | | | pF |

† Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.

switching characteristics over recommended operating free-air temperature range, V_{CC} = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | T _A = 25°C | | | MIN | MAX | UNIT |
|------------------|---------------|-------------|-----------------------|-----|------|-----|------|------|
| | | | MIN | TYP | MAX | | | |
| t _{PLH} | A, B, C, or D | Y or Z | 2.5 | 5.8 | 9.8 | 2.5 | 10.7 | ns |
| t _{PHL} | | | 2.7 | 6.2 | 10.9 | 2.7 | 12 | |

switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | T _A = 25°C | | | MIN | MAX | UNIT |
|------------------|---------------|-------------|-----------------------|-----|-----|-----|-----|------|
| | | | MIN | TYP | MAX | | | |
| t _{PLH} | A, B, C, or D | Y or Z | 2.2 | 4.6 | 7.2 | 2.2 | 7.7 | ns |
| t _{PHL} | | | 2.3 | 4.8 | 7.7 | 2.3 | 8.4 | |

operating characteristics, V_{CC} = 5 V, T_A = 25°C

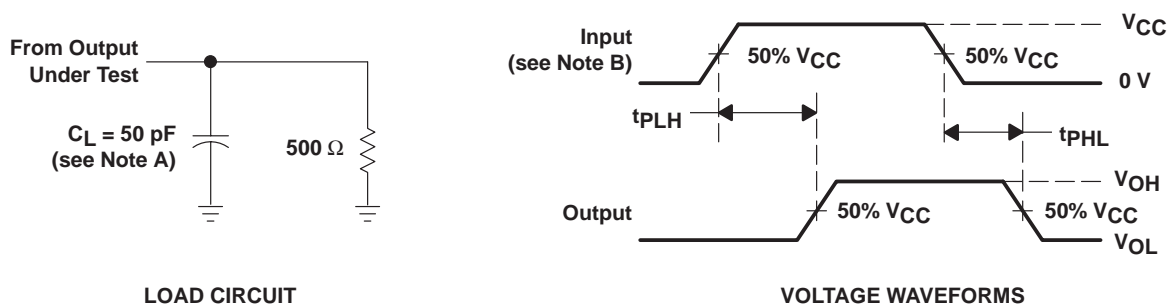
| PARAMETER | | TEST CONDITIONS | TYP | UNIT |
|-----------------|--|-----------------------------------|-----|------|
| C _{pd} | Power dissipation capacitance per gate | C _L = 50 pF, f = 1 MHz | 63 | pF |

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PARAMETER MEASUREMENT INFORMATION



- NOTES:
- A. C_L includes probe and jig capacitance.
 - B. Input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r = 3 \text{ ns}$, $t_f = 3 \text{ ns}$.
 - C. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

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