

SN54LS386A, SN74LS386A QUADRUPLE 2-INPUT EXCLUSIVE-OR GATES

MARCH 1974 — REVISED MARCH 1988

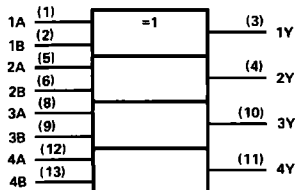
- Electrically Identical to SN54LS86A/SN74LS86A
- Mechanically Identical to SN54LS86/SN74LS86
- Total Average Propagation Delay Times . . . 10 ns
- Typical Total Power Dissipation . . . 30.5 mW

FUNCTION TABLE
(EACH GATE)

| INPUTS | | OUTPUT |
|--------|---|--------|
| A | B | |
| L | L | L |
| L | H | H |
| H | L | H |
| H | H | L |

H = high level
L = low level

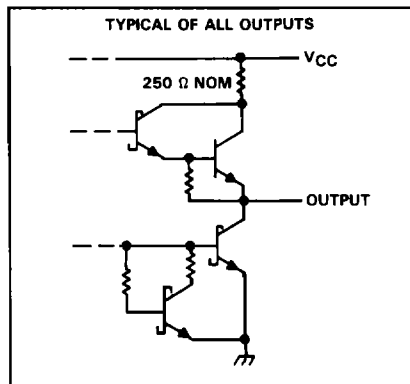
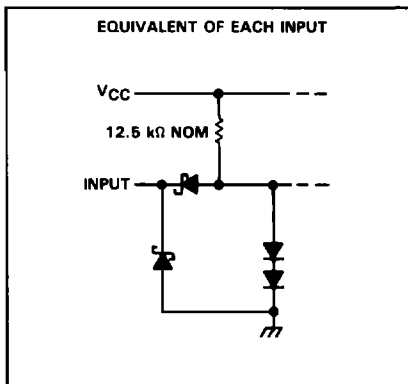
logic symbol†



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

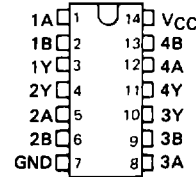
Pin numbers shown are for D, J, N, and W packages

schematics of inputs and outputs



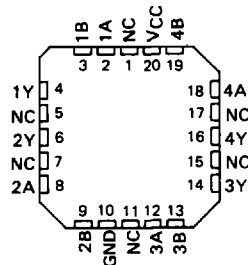
SN54LS386A . . . J OR W PACKAGE
SN74LS386A . . . D OR N PACKAGE

(TOP VIEW)



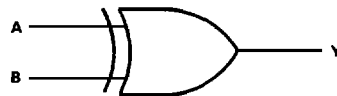
SN54LS386A . . . FK PACKAGE

(TOP VIEW)



NC -- No internal connection

logic diagram (each gate)



positive logic

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

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TTL Devices

PRODUCTION DATA documents contain information 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.

TEXAS
INSTRUMENTS

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2-917

SN54LS386A, SN74LS386A

QUADRUPLE 2-INPUT EXCLUSIVE-OR GATES

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

| | |
|--|----------------|
| Supply voltage, V_{CC} (see Note 1) | 7 V |
| Input voltage | 7 V |
| Operating free-air temperature range: SN54LS386A | -55°C to 125°C |
| SN74LS386A | 0°C to 70°C |
| Storage temperature range | -65°C to 150°C |

NOTE 1: Voltage values are with respect to network ground terminal.

recommended operating conditions

| | SN54LS386A | | | SN74LS386A | | | UNIT |
|---------------------------------------|------------|-----|------|------------|-----|------|---------|
| | MIN | NOM | MAX | MIN | NOM | MAX | |
| Supply voltage, V_{CC} | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | V |
| High-level output current, I_{OH} | | | -400 | | | -400 | μ A |
| Low-level output current, I_{OL} | | | 4 | | | 8 | mA |
| Operating free-air temperature, T_A | -55 | | 125 | 0 | | 70 | °C |

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

| PARAMETER | TEST CONDITIONS† | SN54LS386A | | | SN74LS386A | | | UNIT |
|--|---|------------|------|-----|------------|------|-----|---------|
| | | MIN | TYP‡ | MAX | MIN | TYP‡ | MAX | |
| V_{IH} High-level input voltage | | 2 | | | 2 | | | V |
| V_{IL} Low-level input voltage | | | 0.7 | | | 0.8 | | V |
| V_{IK} Input clamp voltage | $V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$ | | -1.5 | | | -1.5 | | V |
| V_{OH} High-level output voltage | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = V_{IL \text{ max}}, I_{OH} = -400 \mu\text{A}$ | 2.5 | 3.4 | | 2.7 | 3.4 | | V |
| V_{OL} Low-level output voltage | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 4 \text{ mA}$ | 0.25 | 0.4 | | 0.25 | 0.4 | | V |
| | $V_{IL} = V_{IL \text{ max}}, I_{OL} = 8 \text{ mA}$ | | | | 0.35 | 0.5 | | |
| I_I Input current at maximum input voltage | $V_{CC} = \text{MAX}, V_I = 7 \text{ V}$ | | 0.2 | | | 0.2 | | mA |
| I_{IH} High-level input current | $V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$ | | 40 | | | 40 | | μ A |
| I_{IL} Low-level input current | $V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$ | | -0.8 | | | -0.8 | | mA |
| I_{OS} Short-circuit output current§ | $V_{CC} = \text{MAX}$ | -20 | -100 | | -20 | -100 | | mA |
| I_{CC} Supply current | $V_{CC} = \text{MAX}, \text{ See Note 2}$ | 6.1 | 10 | | 6.1 | 10 | | mA |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

§ Not more than one output should be shorted at a time.

NOTE 2: I_{CC} is measured with the inputs grounded and the outputs open.

switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$

| PARAMETER | FROM (INPUT) | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|-----------|--------------|------------------|---|-----|-----|-----|------|
| t_{PLH} | A or B | Other input low | $C_L = 15 \text{ pF}, R_L = 2 \text{ k}\Omega,$ | 12 | 23 | ns | |
| t_{PHL} | | | | 10 | 17 | | |
| t_{PLH} | A or B | Other input high | See Note 3 | 20 | 30 | ns | |
| t_{PHL} | | | | 13 | 22 | | |

NOTE 3: Load circuits and voltage waveforms are shown in Section 1

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