

# SN54LS266, SN74LS266 QUADRUPLE 2-INPUT EXCLUSIVE-NOR GATES WITH OPEN-COLLECTOR OUTPUTS

SDLS151 – DECEMBER 1972 – REVISED MARCH 1988

- Can Be Used as a 4-Bit Digital Comparator
- Input Clamping Diodes Simplify System Design
- Fully Compatible with Most TTL Circuits

FUNCTION TABLE

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

H = high level, L = low level

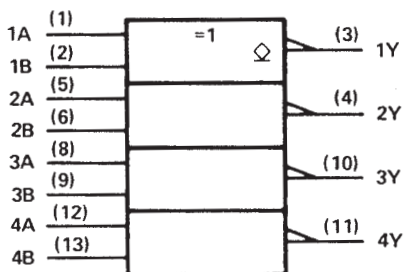
## description

The 'LS266 is comprised of four independent 2-input exclusive-NOR gates with open-collector outputs. The open-collector outputs permit tying outputs together for multiple-bit comparisons.

## logic symbol (each gate)



## logic symbol†



positive logic:  $Y = \overline{A \oplus B} = AB + \overline{AB}$

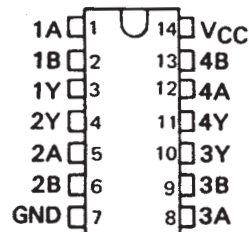
† This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.

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

SN54LS266 . . . J OR W PACKAGE

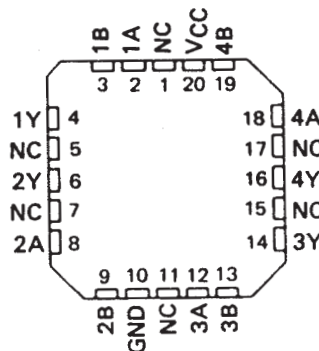
SN74LS266 . . . D OR N PACKAGE

(TOP VIEW)



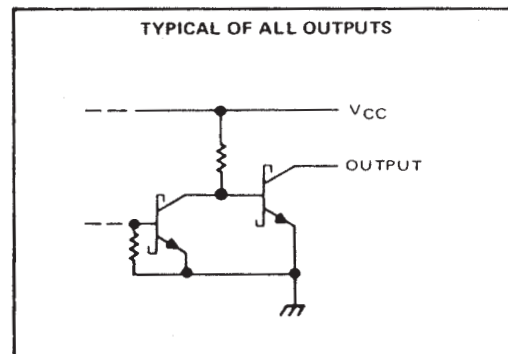
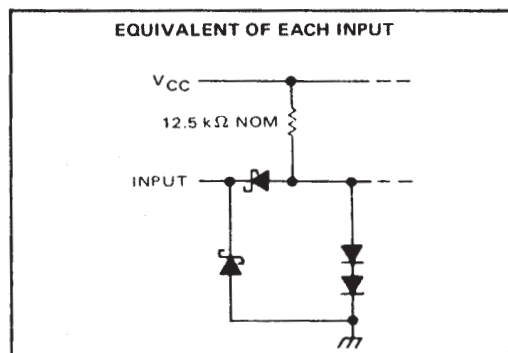
SN54LS266 . . . FK PACKAGE

(TOP VIEW)



NC – No internal connection

## schematic of inputs and outputs



# SN54LS266, SN74LS266

## QUADRUPLE 2-INPUT EXCLUSIVE-NOR GATES

### WITH OPEN-COLLECTOR OUTPUTS

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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: SN54LS266 | –55°C to 125°C |
| SN74LS266                                       | 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

|                                       | SN54LS266 |     |     | SN74LS266 |     |      | 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 voltage, $V_{OH}$   |           |     | 5.5 |           |     | 5.5  | V    |
| 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†                                                                                               | SN54LS266 |      |      | SN74LS266 |      |      | 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    |
| $I_{OH}$ High-level output current           | $V_{CC} = \text{MIN}$ , $V_{IH} = 2 \text{ V}$ ,<br>$V_{IL} = V_{IL \text{ max}}$ , $V_{OH} = 5.5 \text{ V}$   |           |      | 100  |           |      | 100  | μA   |
| $V_{OL}$ Low-level output voltage            | $V_{CC} = \text{MIN}$ ,<br>$V_{IH} = 2 \text{ V}$ ,<br>$V_{IL} = V_{IL \text{ max}}$ , $I_{OL} = 4 \text{ mA}$ | 0.25      | 0.4  |      | 0.25      | 0.4  |      | V    |
|                                              | $I_{OL} = 8 \text{ mA}$                                                                                        |           |      |      | 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   |      | μA   |
| $I_{IL}$ Low-level input current             | $V_{CC} = \text{MAX}$ , $V_I = 0.4 \text{ V}$                                                                  |           | –0.8 |      |           | –0.8 |      | mA   |
| $I_{CC}$ Supply current                      | $V_{CC} = \text{MAX}$ , See Note 2                                                                             | 8         | 13   |      | 8         | 13   |      | mA   |

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

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

NOTE 2:  $I_{CC}$  is measured with one input of each gate at 4.5 V, the other 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  | $C_L = 15 \text{ pF}$ ,<br>$R_L = 2 \text{ k}\Omega$ ,<br>See Note 3 | 18  | 30  |     | ns   |
| $t_{PHL}$  |              |                  |                                                                      | 18  | 30  |     |      |
| $t_{PLH}$  | A or B       | Other input high | See Note 3                                                           | 18  | 30  |     | ns   |
| $t_{PHL}$  |              |                  |                                                                      | 18  | 30  |     |      |

§  $t_{PLH}$  = propagation delay time, low-to-high-level output

$t_{PHL}$  = propagation delay time, high-to-low-level output

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



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## PACKAGING INFORMATION

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup>               |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|--------------------------------------------|
| SN54LS266J       | ACTIVE                | CDIP         | J               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| SN74LS266D       | ACTIVE                | SOIC         | D               | 14   | 50          | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74LS266DR      | ACTIVE                | SOIC         | D               | 14   | 2500        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74LS266N       | ACTIVE                | PDIP         | N               | 14   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC                             |
| SN74LS266N3      | OBSOLETE              | PDIP         | N               | 14   |             | None                    | Call TI          | Call TI                                    |
| SN74LS266NSR     | ACTIVE                | SO           | NS              | 14   | 2000        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SNJ54LS266FK     | OBSOLETE              |              |                 | 20   |             | None                    | Call TI          | Call TI                                    |
| SNJ54LS266J      | ACTIVE                | CDIP         | J               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| SNJ54LS266W      | ACTIVE                | CFP          | W               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**None:** Not yet available Lead (Pb-Free).

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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