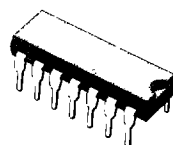
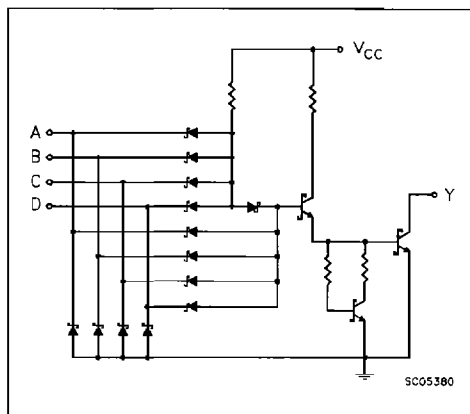


## DUAL 4-INPUT NAND GATE

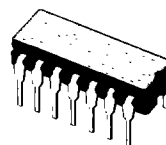
### DESCRIPTION

The T74LS22 is a high speed DUAL 4-INPUT NAND GATE fabricated in LOW POWER SCHOTTKY technology.

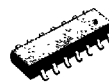
### SCHEMATIC



**B1**  
(Plastic Package)



**D1**  
(Ceramic Package)



**M1**  
(Micro Package)



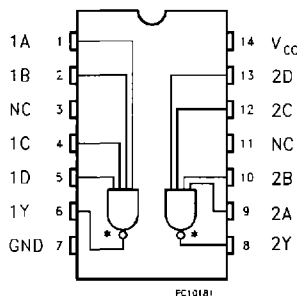
**C1**  
(Plastic Chip Carrier)

### ORDER CODES :

T74LS22 D1      T74LS22 C1  
T74LS22 B1      T74LS22 M1

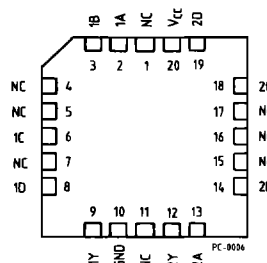
### PIN CONNECTION (top view)

#### DUAL IN LINE



\* Open Collector Outputs

#### CHIP CARRIER



NC = No Internal Connection

## LOGIC DIAGRAM AND TRUTH TABLE

|                                                                                   |   |   |   |   |   |
|-----------------------------------------------------------------------------------|---|---|---|---|---|
|  | A | B | C | D | Y |
|                                                                                   | L | X | X | X | H |
|                                                                                   | X | L | X | X | H |
|                                                                                   | X | X | L | X | H |
|                                                                                   | X | X | X | L | H |
|                                                                                   | H | H | H | H | L |
|                                                                                   | H | H | H | L | L |

L = LOW Voltage Level  
H = HIGH Voltage Level  
X = Don't Care

## ABSOLUTE MAXIMUM RATINGS

| Symbol   | Parameter                         | Value        | Unit |
|----------|-----------------------------------|--------------|------|
| $V_{CC}$ | Supply Voltage                    | - 0.5 to 7   | V    |
| $V_I$    | Input Voltage, Applied to Input   | - 0.5 to 15  | V    |
| $V_O$    | Output Voltage, Applied to Output | - 0.5 to 5.5 | V    |
| $I_I$    | Input Current, Into Inputs        | - 30 to 5    | mA   |
| $I_O$    | Output Current, Into Outputs      | 50           | mA   |

Stresses in excess of those listed under "Absolute Maximum Ratings" may cause permanent damage to the device.

This is a stress rating only and functional operation of the device at these or any other conditions in excess of those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## GUARANTEED OPERATING RANGE

| Part Numbers | Supply Voltage |       |        | Temperature     |
|--------------|----------------|-------|--------|-----------------|
|              | Min.           | Typ.  | Max.   |                 |
| T74LS22XX    | 4.75 V         | 5.0 V | 5.25 V | 0 °C to + 70 °C |

XX = package type.

## DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

| Symbol    | Parameter                 | Limits |          |       | Test Condition<br>(note 1)                                                     | Unit |
|-----------|---------------------------|--------|----------|-------|--------------------------------------------------------------------------------|------|
|           |                           | Min.   | Typ. (*) | Max.  |                                                                                |      |
| $V_{IH}$  | Input HIGH Voltage        | 2.0    |          |       | Guaranteed Input HIGH Voltage                                                  | V    |
| $V_{IL}$  | Input LOW Voltage         |        |          | 0.8   | Guaranteed Input LOW Voltage                                                   | V    |
| $V_{CD}$  | Input Clamp Diode Voltage |        | - 0.65   | - 1.5 | $V_{CC} = \text{MIN}$ , $I_{IN} = -18 \text{ mA}$                              | V    |
| $I_{OH}$  | Output HIGH Current       |        |          | 100   | $V_{CC} = \text{MIN}$ , $V_{OH} = 5.5$<br>$V_{IN} = V_{IL}$                    | μA   |
| $V_{OL}$  | Output LOW Voltage        |        | 0.25     | 0.4   | $I_{OL} = 4.0 \text{ mA}$                                                      | V    |
|           |                           |        | 0.35     | 0.5   | $I_{OL} = 8.0 \text{ mA}$<br>$V_{CC} = \text{MIN}$<br>$V_{IN} = 2.0 \text{ V}$ | V    |
| $I_{IH}$  | Input HIGH Current        |        | 1.0      | 20    | $V_{CC} = \text{MAX}$ , $V_{IN} = 2.7 \text{ V}$                               | μA   |
|           |                           |        |          | 0.1   | $V_{CC} = \text{MAX}$ , $V_{IN} = 7.0 \text{ V}$                               | mA   |
| $I_{IL}$  | Input LOW Current         |        |          | - 0.4 | $V_{CC} = \text{MAX}$ , $V_{IN} = 0.4 \text{ V}$                               | mA   |
| $I_{CCH}$ | Supply Current HIGH       |        | 0.4      | 0.8   | $V_{CC} = \text{MAX}$ , $V_{IN} = 0 \text{ V}$                                 | mA   |
| $I_{CCL}$ | Supply Current LOW        |        | 1.2      | 2.2   | $V_{CC} = \text{MAX}$ , Inputs Open                                            | mA   |

Notes : 1. For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating ranges.

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

(\*) Typical values are at  $V_{CC} = 5.0 \text{ V}$ ,  $T_A = 25 \text{ °C}$ .

**AC CHARACTERISTICS:**  $T_A = 25^{\circ}\text{C}$  (for AC test circuits and waveforms see databook introduction)

| Symbol    | Parameter                       | Limits |      |      | Test Conditions                                                              | Unit |
|-----------|---------------------------------|--------|------|------|------------------------------------------------------------------------------|------|
|           |                                 | Min.   | Typ. | Max. |                                                                              |      |
| $t_{PLH}$ | Turn Off Delay, Input to Output |        | 17   | 32   | $V_{CC} = 5.0\text{ V}$<br>$C_L = 15\text{ pF}$ , $R_L = 2.0\text{ K}\Omega$ | ns   |
| $t_{PHL}$ | Turn On Delay, Input to Output  |        | 15   | 28   |                                                                              | ns   |