

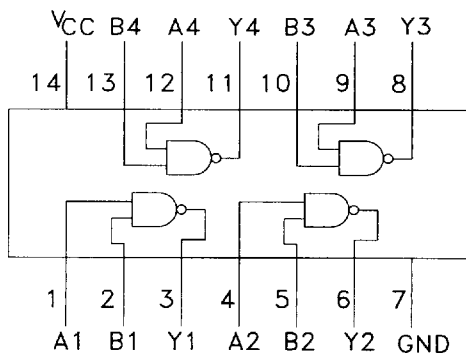
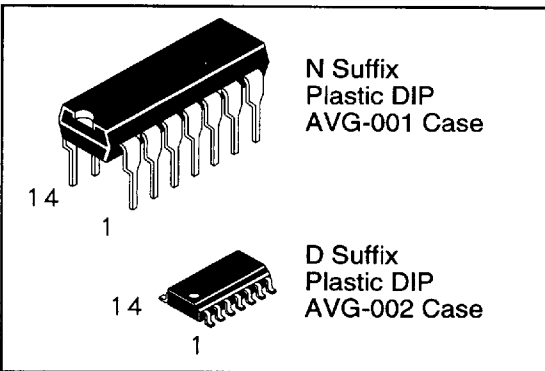
DV74ACT00 Available Q2, 1995

### Quad 2-Input NAND Gate

This device contains four independent gates, each of which performs the logic NAND function.

- Advanced very high speed CMOS
- Outputs source/sink 24 mA
- Transmission line driving 50 ohms
- ACT has TTL compatible inputs
- AC device operation guaranteed from 2 to 6 volts
- DC & AC Parameters guaranteed over -40 to +85°C

### DV74AC00 DV74ACT00



TRUTH TABLE  
Y = AB

| Inputs |   | Outputs |
|--------|---|---------|
| A      | B | Y       |
| L      | L | H       |
| L      | H | H       |
| H      | L | H       |
| H      | H | L       |

H=High Logic Level  
L=Low Logic Level  
X=Don't care

#### ABSOLUTE MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur.

| Symbol           | Parameter  | AC00, ACT00                   | Unit |
|------------------|--|-------------------------------|------|
| V <sub>CC</sub>  | DC Supply Voltage (Referenced to GND)            | - 0.5 to +7.0                 | V    |
| V <sub>IN</sub>  | DC Input Voltage (Referenced to GND)             | - 0.5 to V <sub>CC</sub> +0.5 | V    |
| V <sub>OUT</sub> | DC Output Voltage (Referenced to GND)            | - 0.5 to V <sub>CC</sub> +0.5 | V    |
| I <sub>IN</sub>  | DC Input Current, per Pin                        | ± 20                          | mA   |
| I <sub>OUT</sub> | DC Output Sink/Source Current, per Pin           | ± 50                          | mA   |
| I <sub>CC</sub>  | DC V <sub>CC</sub> or GND Current per Output Pin | ± 50                          | mA   |
| T <sub>stg</sub> | Storage Temperature                              | - 65 to +150                  | °C   |

#### GUARANTEED OPERATING CONDITIONS

| Symbol                             | Parameter                                       | Min                     | Typ | Max             | Unit |   |
|------------------------------------|---|-------------------------|-----|-----------------|------|---|
| V <sub>CC</sub>                    | Supply Voltage                                  | 'AC                     | 2.0 | 5.0             | 6.0  | V |
|                                    |   | 'ACT                    | 4.5 | 5.0             |      |   |
| V <sub>IN</sub> , V <sub>OUT</sub> | DC Input Voltage, Output Voltage, (Ref. to GND) | 0                       |     | V <sub>CC</sub> | V    |   |
| t <sub>r</sub> , t <sub>f</sub>    | Input Rise and Fall Time (Note 1)<br>AC Devices | V <sub>CC</sub> @ 3.0 V |     | 150             | ns/V |   |
|                                    |   | V <sub>CC</sub> @ 4.5 V |     | 40              | ns/V |   |
|                                    |   | V <sub>CC</sub> @ 5.5 V |     | 25              | ns/V |   |

**GUARANTEED OPERATING CONDITIONS (continued)**

| Symbol                          | Parameter  | Min                     | Typ | Max | Unit |
|---------------------------------|--|-------------------------|-----|-----|------|
| t <sub>r</sub> , t <sub>f</sub> | Input Rise and Fall Time (Note 2)<br>ACT Devices | V <sub>CC</sub> @ 4.5 V |     | 10  | ns/V |
|                                 |  | V <sub>CC</sub> @ 5.5 V |     | 8.0 | ns/V |
| T <sub>A</sub>                  | Operating Ambient Temperature Range              | -40                     | 25  | 85  | °C   |
| C <sub>IN</sub>                 | Input Capacitance V <sub>CC</sub> = 5.0 V        | V <sub>CC</sub> = 5.0 V | 4.5 |     | pF   |
| CPD                             | Power Dissipation Capacitance                    | V <sub>CC</sub> = 5.0 V | 30  |     | pF   |

 1. V<sub>IN</sub> from 30% to 70% V<sub>CC</sub>

 2. V<sub>IN</sub> from 0.8 to 2.0 V

**AC — 00**
**DC ELECTRICAL CHARACTERISTICS**

| Symbol                | Parameter                            | Conditions  | V <sub>CC</sub><br>(V) | AC00                   |                   |                                  | Unit |
|-----------------------|--------------------------------------|---|------------------------|------------------------|-------------------|----------------------------------|------|
|                       |                                      |   |                        | T <sub>A</sub> = +25°C |                   | T <sub>A</sub> = -40<br>to +85°C |      |
|                       |                                      |   |                        | Typ                    | Guaranteed Limits |                                  |      |
| V <sub>IH</sub>       | Minimum High Level<br>Input Voltage  | V <sub>OUT</sub> = 0.1V<br>or V <sub>CC</sub> - 0.1 V         | 3.0                    | 1.5                    | 2.1               | 2.1                              | V    |
|                       |                                      |   | 4.5                    | 2.25                   | 3.15              | 3.15                             |      |
|                       |                                      |   | 5.5                    | 2.75                   | 3.85              | 3.85                             |      |
| V <sub>IL</sub>       | Maximum Low Level<br>Input Voltage   | V <sub>OUT</sub> = 0.1V<br>or V <sub>CC</sub> - 0.1 V         | 3.0                    | 1.5                    | 0.9               | 0.9                              | V    |
|                       |                                      |   | 4.5                    | 2.25                   | 1.35              | 1.35                             |      |
|                       |                                      |   | 5.5                    | 2.75                   | 1.65              | 1.65                             |      |
| V <sub>OH</sub>       | Minimum High Level<br>Output Voltage | I <sub>OUT</sub> = -50 μA                                     | 3.0                    | 2.99                   | 2.9               | 2.9                              | V    |
|                       |                                      |   | 4.5                    | 4.49                   | 4.4               | 4.4                              |      |
|                       |                                      |   | 5.5                    | 5.49                   | 5.4               | 5.4                              |      |
|                       |                                      | V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>-12mA | 3.0                    |                        | 2.56              | 2.46                             | V    |
|                       |                                      |   | 4.5                    |                        | 3.86              | 3.76                             |      |
| I <sub>OH</sub> -24mA | 4.5                                  |   | 3.86                   | 3.76                   | V                 |                                  |      |
|                       | 5.5                                  |   | 4.86                   | 4.76                   |                   |                                  |      |
| V <sub>OL</sub>       | Maximum Low Level<br>Output Voltage  | I <sub>OUT</sub> = 50 μA                                      | 3.0                    | 0.002                  | 0.1               | 0.1                              | V    |
|                       |                                      |   | 4.5                    | 0.001                  | 0.1               | 0.1                              |      |
|                       |                                      |   | 5.5                    | 0.001                  | 0.1               | 0.1                              |      |
|                       |                                      | V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>12mA  | 3.0                    |                        | 0.36              | 0.44                             | V    |
|                       |                                      |   | 4.5                    |                        | 0.36              | 0.44                             |      |
| I <sub>OL</sub> 24mA  | 4.5                                  |   | 0.36                   | 0.44                   | V                 |                                  |      |
|                       | 5.5                                  |   | 0.36                   | 0.44                   |                   |                                  |      |
| I <sub>IN</sub>       | Maximum Input Leakage Current        | V <sub>IN</sub> = V <sub>CC</sub> or GND                      | 5.5                    |                        | ±0.1              | ±1.0                             | μA   |
| I <sub>CC</sub>       | Maximum Quiescent<br>Supply Current  | V <sub>IN</sub> = V <sub>CC</sub> or GND                      | 5.5                    |                        | 4.0               | 40                               | μA   |

**AC CHARACTERISTICS over full operating conditions**

| Symbol           | Parameter         | V <sub>CC</sub><br>±10%<br>(V) | AC00   |            |   |             | Unit |
|------------------|-------------------|--------------------------------|--|------------|---|-------------|------|
|                  |                   |                                | T <sub>A</sub> = +25°C<br>C <sub>L</sub> = 50 pF |            | T <sub>A</sub> = -40°C to +85°C<br>C <sub>L</sub> = 50 pF |             |      |
|                  |                   |                                | Min  | Max        | Min   | Max         |      |
| t <sub>PLH</sub> | Propagation Delay | 3.3<br>5.0                     | 2.0<br>1.5                                       | 9.5<br>8.0 | 2.0<br>1.5  | 10.0<br>8.5 | ns   |
| t <sub>PHL</sub> | Propagation Delay | 3.3<br>5.0                     | 1.5<br>1.5                                       | 8.0<br>6.5 | 1.0<br>1.0  | 8.5<br>7.0  | ns   |

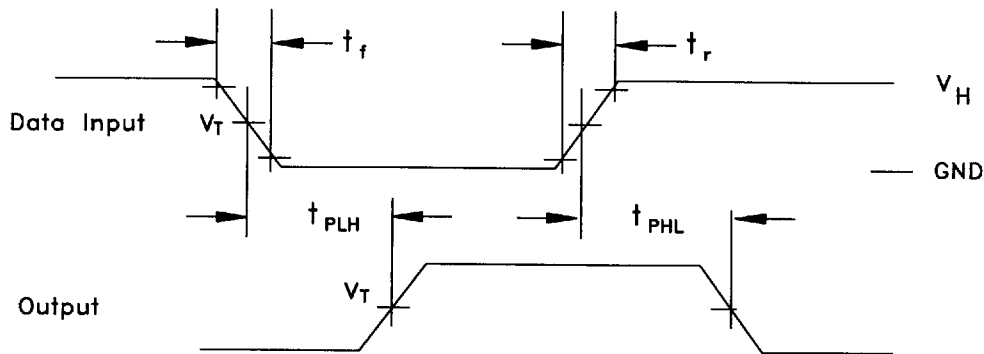
**DC ELECTRICAL CHARACTERISTICS**

| Symbol             | Parameter                             | Conditions  | V <sub>CC</sub><br>(V) | ACT00                  |                   |                                  | Unit |
|--------------------|---------------------------------------|---|------------------------|------------------------|-------------------|----------------------------------|------|
|                    |                                       |   |                        | T <sub>A</sub> = +25°C |                   | T <sub>A</sub> = -40<br>to +85°C |      |
|                    |                                       |   |                        | Typ                    | Guaranteed Limits |                                  |      |
| V <sub>IH</sub>    | Minimum High Level Input Voltage      | V <sub>OUT</sub> = 0.1V<br>or V <sub>CC</sub> - 0.1 V                                   | 4.5<br>5.5             | 1.5<br>1.5             | 2.0<br>2.0        | 2.0<br>2.0                       | V    |
| V <sub>IL</sub>    | Maximum Low Level Input Voltage       | V <sub>OUT</sub> = 0.1V<br>or V <sub>CC</sub> - 0.1 V                                   | 4.5<br>5.5             | 1.5<br>1.5             | 0.8<br>0.8        | 0.8<br>0.8                       | V    |
| V <sub>OH</sub>    | Minimum High Level Output Voltage     | I <sub>OUT</sub> = -50 μA   | 4.5<br>5.5             | 4.49<br>5.49           | 4.4<br>5.4        | 4.4<br>5.4                       | V    |
|                    |                                       | V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>I <sub>OH</sub> -24mA<br>-24 mA | 4.5<br>5.5             |                        | 3.86<br>4.86      | 3.76<br>4.76                     | V    |
| V <sub>OL</sub>    | Maximum Low Level Output Voltage      | I <sub>OUT</sub> = 50 μA  | 4.5<br>5.5             | 0.001<br>0.001         | 0.1<br>0.1        | 0.1<br>0.1                       | V    |
|                    |                                       | V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>I <sub>OL</sub> 24mA<br>24 mA   | 4.5<br>5.5             |                        | 0.36<br>0.36      | 0.44<br>0.44                     | V    |
| I <sub>IN</sub>    | Maximum Input Leakage Current         | V <sub>IN</sub> = V <sub>CC</sub> or GND  | 5.5                    |                        | ±0.1              | ±1.0                             | μA   |
| ΔI <sub>CCCT</sub> | Additional Max I <sub>CC</sub> /Input | V <sub>IN</sub> = V <sub>CC</sub> - 2.1 V   | 5.5                    | 0.6                    |                   | 1.5                              | mA   |
| I <sub>CC</sub>    | Maximum Quiescent Supply Current      | V <sub>IN</sub> = V <sub>CC</sub> or GND  | 5.5                    |                        | 4.0               | 40                               | μA   |

**AC CHARACTERISTICS** over full operating conditions

| Symbol           | Parameter         | V <sub>CC</sub><br>±10%<br>(V) | ACT00  |     |   |     | Unit |
|------------------|-------------------|--------------------------------|--|-----|---|-----|------|
|                  |                   |                                | T <sub>A</sub> = +25°C<br>C <sub>L</sub> = 50 pF |     | T <sub>A</sub> = -40°C to +85°C<br>C <sub>L</sub> = 50 pF |     |      |
|                  |                   |                                | Min  | Max | Min   | Max |      |
| t <sub>PLH</sub> | Propagation Delay | 5.0                            | 1.5  | 9.0 | 1.0   | 9.5 | ns   |
| t <sub>PHL</sub> | Propagation Delay | 5.0                            | 1.5  | 7.0 | 1.0   | 8.0 | ns   |

**SWITCHING WAVEFORMS**



Input and output threshold voltage:  
 V<sub>T</sub> = 50% V<sub>CC</sub> for AC; 1.5V for ACT  
 V<sub>H</sub> = V<sub>CC</sub> for AC, 3V for ACT