

Quad 2-Input NOR Gate

- Outputs Source/Sink 24 mA
- 'ACT02 Has TTL Compatible Inputs

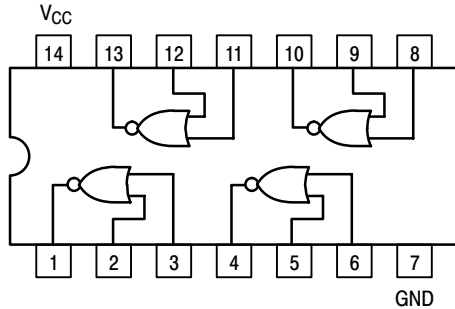


Figure 1. Pinout: 14-Lead Packages Conductors
(Top View)

MAXIMUM RATINGS*

| Symbol | Parameter | Value | Unit |
|-----------|---|--------------------------|-------------|
| V_{CC} | DC Supply Voltage (Referenced to GND) | -0.5 to +7.0 | V |
| V_{in} | DC Input Voltage (Referenced to GND) | -0.5 to V_{CC} +0.5 | V |
| V_{out} | DC Output Voltage (Referenced to GND) | -0.5 to V_{CC} +0.5 | V |
| I_{in} | DC Input Current, per Pin | ± 20 | mA |
| I_{out} | DC Output Sink/Source Current, per Pin | ± 50 | mA |
| I_{CC} | DC V_{CC} or GND Current per Output Pin | ± 50 | mA |
| T_{stg} | Storage Temperature | -65 to +150 | $^{\circ}C$ |

* Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

RECOMMENDED OPERATING CONDITIONS

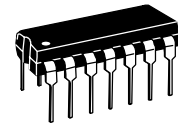
| Symbol | Parameter | Min | Typ | Max | Unit | |
|-------------------|---|------------------|-----|----------|-------------|------|
| V_{CC} | Supply Voltage | 'AC | 2.0 | 5.0 | 6.0 | V |
| | | 'ACT | 4.5 | 5.0 | 5.5 | |
| V_{in}, V_{out} | DC Input Voltage, Output Voltage (Ref. to GND) | 0 | | V_{CC} | V | |
| t_r, t_f | Input Rise and Fall Time (Note 1) 'AC Devices except Schmitt Inputs | V_{CC} @ 3.0 V | | 150 | | ns/V |
| | | V_{CC} @ 4.5 V | | 40 | | |
| | | V_{CC} @ 5.5 V | | 25 | | |
| t_r, t_f | Input Rise and Fall Time (Note 2) 'ACT Devices except Schmitt Inputs | V_{CC} @ 4.5 V | | 10 | | ns/V |
| | | V_{CC} @ 5.5 V | | 8.0 | | |
| T_J | Junction Temperature (PDIP) | | | 140 | $^{\circ}C$ | |
| T_A | Operating Ambient Temperature Range | -40 | 25 | 85 | $^{\circ}C$ | |
| I_{OH} | Output Current — High | | | -24 | mA | |
| I_{OL} | Output Current — Low | | | 24 | mA | |

1. V_{in} from 30% to 70% V_{CC} ; see individual Data Sheets for devices that differ from the typical input rise and fall times.

2. V_{in} from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

MC74AC02
MC74ACT02

QUAD 2-INPUT
NOR GATE



N SUFFIX
CASE 646-06
PLASTIC



D SUFFIX
CASE 751A-03
PLASTIC

MC74AC02 MC74ACT02

DC CHARACTERISTICS

| Symbol | Parameter | V _{CC} (V) | 74AC | | 74AC | | Unit | Conditions |
|------------------|-----------------------------------|---------------------|------------------------|-------------------|---------------------------------|--|------|---|
| | | | T _A = +25°C | | T _A = -40°C to +85°C | | | |
| | | | Typ | Guaranteed Limits | | | | |
| V _{IH} | Minimum High Level Input Voltage | 3.0 | 1.5 | 2.1 | 2.1 | | V | V _{OUT} = 0.1 V or V _{CC} - 0.1 V |
| | | 4.5 | 2.25 | 3.15 | 3.15 | | | |
| | | 5.5 | 2.75 | 3.85 | 3.85 | | | |
| V _{IL} | Maximum Low Level Input Voltage | 3.0 | 1.5 | 0.9 | 0.9 | | V | V _{OUT} = 0.1 V or V _{CC} - 0.1 V |
| | | 4.5 | 2.25 | 1.35 | 1.35 | | | |
| | | 5.5 | 2.75 | 1.65 | 1.65 | | | |
| V _{OH} | Minimum High Level Output Voltage | 3.0 | 2.99 | 2.9 | 2.9 | | V | I _{OUT} = -50 μA |
| | | 4.5 | 4.49 | 4.4 | 4.4 | | | |
| | | 5.5 | 5.49 | 5.4 | 5.4 | | | |
| | | 3.0 | | 2.56 | 2.46 | | V | *V _{IN} = V _{IL} or V _{IH} -12 mA I _{OH} -24 mA -24 mA |
| | | 4.5 | | 3.86 | 3.76 | | | |
| | | 5.5 | | 4.86 | 4.76 | | | |
| V _{OL} | Maximum Low Level Output Voltage | 3.0 | 0.002 | 0.1 | 0.1 | | V | I _{OUT} = 50 μA |
| | | 4.5 | 0.001 | 0.1 | 0.1 | | | |
| | | 5.5 | 0.001 | 0.1 | 0.1 | | | |
| | | 3.0 | | 0.36 | 0.44 | | V | *V _{IN} = V _{IL} or V _{IH} 12 mA I _{OL} 24 mA 24 mA |
| | | 4.5 | | 0.36 | 0.44 | | | |
| | | 5.5 | | 0.36 | 0.44 | | | |
| I _{IN} | Maximum Input Leakage Current | 5.5 | | ±0.1 | ±1.0 | | μA | V _I = V _{CC} , GND |
| I _{OLD} | †Minimum Dynamic Output Current | 5.5 | | | 75 | | mA | V _{OLD} = 1.65 V Max |
| I _{OHD} | | 5.5 | | | -75 | | mA | V _{OHD} = 3.85 V Min |
| I _{CC} | Maximum Quiescent Supply Current | 5.5 | | 4.0 | 40 | | μA | V _{IN} = V _{CC} or GND |

* All outputs loaded; thresholds on input associated with output under test.

† Maximum test duration 2.0 ms, one output loaded at a time.

Note: I_{IN} and I_{CC} @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V_{CC}.

AC CHARACTERISTICS (For Figures and Waveforms — See Section 3 of the ON Semiconductor FACT Data Book, DL138/D)

| Symbol | Parameter | V _{CC} * (V) | 74AC | | | 74AC | | Unit | Fig. No. |
|------------------|-------------------|-----------------------|--|-----|-----|---|-----|------|----------|
| | | | T _A = +25°C C _L = 50 pF | | | T _A = -40°C to +85°C C _L = 50 pF | | | |
| | | | Min | Typ | Max | Min | Max | | |
| t _{PLH} | Propagation Delay | 3.3 | 1.5 | 5.0 | 7.5 | 1.0 | 8.0 | ns | 3-5 |
| | | 5.0 | 1.5 | 4.0 | 6.0 | 1.0 | 6.5 | | |
| t _{PHL} | Propagation Delay | 3.3 | 1.5 | 5.0 | 7.5 | 1.0 | 8.0 | ns | 3-5 |
| | | 5.0 | 1.5 | 4.5 | 6.5 | 1.0 | 7.0 | | |

* Voltage Range 3.3 V is 3.3 V ±0.3 V.

Voltage Range 5.0 V is 5.0 V ±0.5 V.

MC74AC02 MC74ACT02

DC CHARACTERISTICS

| Symbol | Parameter | V _{CC} (V) | 74ACT | | 74ACT | | Unit | Conditions |
|------------------|--|------------------------|------------------------|-------------------|---------------------------------------|--|------|---|
| | | | T _A = +25°C | | T _A = -40°C to +85°C | | | |
| | | | Typ | Guaranteed Limits | | | | |
| V _{IH} | Minimum High Level Input Voltage | 4.5 | 1.5 | 2.0 | 2.0 | | V | V _{OUT} = 0.1 V or V _{CC} - 0.1 V |
| | | 5.5 | 1.5 | 2.0 | 2.0 | | | |
| V _{IL} | Maximum Low Level Input Voltage | 4.5 | 1.5 | 0.8 | 0.8 | | V | V _{OUT} = 0.1 V or V _{CC} - 0.1 V |
| | | 5.5 | 1.5 | 0.8 | 0.8 | | | |
| V _{OH} | Minimum High Level Output Voltage | 4.5 | 4.49 | 4.4 | 4.4 | | V | I _{OUT} = -50 μA |
| | | 5.5 | 5.49 | 5.4 | 5.4 | | | |
| | | 4.5 | | 3.86 | 3.76 | | V | *V _{IN} = V _{IL} or V _{IH} -24 mA |
| | | 5.5 | | 4.86 | 4.76 | | | |
| V _{OL} | Maximum Low Level Output Voltage | 4.5 | 0.001 | 0.1 | 0.1 | | V | I _{OUT} = 50 μA |
| | | 5.5 | 0.001 | 0.1 | 0.1 | | | |
| | | 4.5 | | 0.36 | 0.44 | | V | *V _{IN} = V _{IL} or V _{IH} 24 mA |
| | | 5.5 | | 0.36 | 0.44 | | | |
| I _{IN} | Maximum Input Leakage Current | 5.5 | | ±0.1 | ±1.0 | | μA | V _I = V _{CC} , GND |
| ΔI _{CC} | Additional Max. I _{CC} /Input | 5.5 | 0.6 | | 1.5 | | mA | V _I = V _{CC} - 2.1 V |
| I _{OLD} | †Minimum Dynamic Output Current | 5.5 | | | 75 | | mA | V _{OLD} = 1.65 V Max |
| I _{OHD} | | 5.5 | | | -75 | | mA | V _{OHD} = 3.85 V Min |
| I _{CC} | Maximum Quiescent Supply Current | 5.5 | | 4.0 | 40 | | μA | V _{IN} = V _{CC} or GND |

* All outputs loaded; thresholds on input associated with output under test.

† Maximum test duration 2.0 ms, one output loaded at a time.

AC CHARACTERISTICS (For Figures and Waveforms — See Section 3 of the ON Semiconductor FACT Data Book, DL138/D)

| Symbol | Parameter | V _{CC} * (V) | 74ACT | | | 74ACT | | Unit | Fig. No. |
|------------------|-------------------|--------------------------|--|-----|-----|--|-----|------|-------------|
| | | | T _A = +25°C C _L = 50 pF | | | T _A = -40°C to +85°C C _L = 50 pF | | | |
| | | | Min | Typ | Max | Min | Max | | |
| t _{PLH} | Propagation Delay | 5.0 | 1.5 | | 8.5 | 1.0 | 9.0 | ns | 3-6 |
| t _{PHL} | Propagation Delay | 5.0 | 1.5 | | 9.5 | 1.0 | 10 | ns | 3-6 |

* Voltage Range 5.0 V is 5.0 V ±0.5 V.

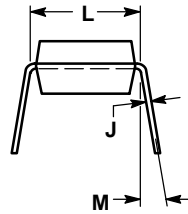
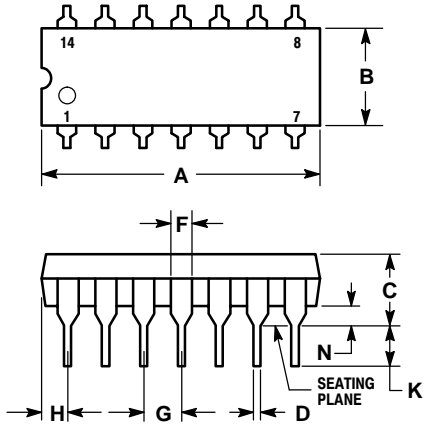
CAPACITANCE

| Symbol | Parameter | Value Typ | Unit | Test Conditions |
|-----------------|-------------------------------|--------------|------|-------------------------|
| C _{IN} | Input Capacitance | 4.5 | pF | V _{CC} = 5.0 V |
| C _{PD} | Power Dissipation Capacitance | 30 | pF | V _{CC} = 5.0 V |

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OUTLINE DIMENSIONS

N SUFFIX
 PLASTIC DIP PACKAGE
 CASE 646-06
 ISSUE L



NOTES:

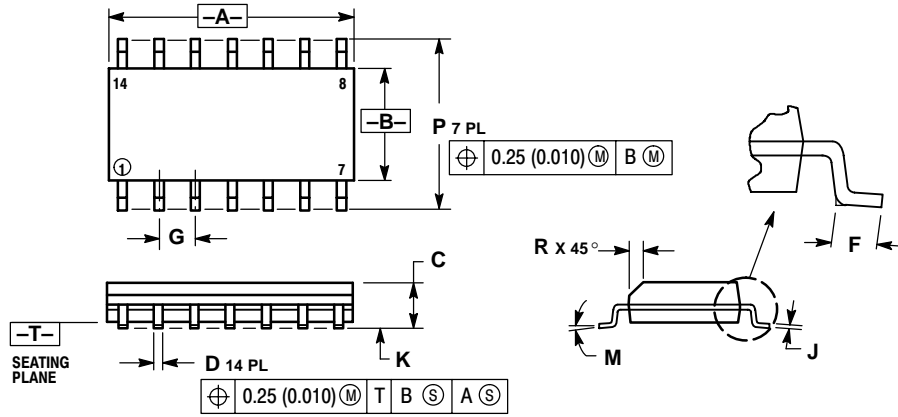
- LEADS WITHIN 0.13 (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
- DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
- DIMENSION B DOES NOT INCLUDE MOLD FLASH.
- ROUNDED CORNERS OPTIONAL.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.715 | 0.770 | 18.16 | 19.56 |
| B | 0.240 | 0.260 | 6.10 | 6.60 |
| C | 0.145 | 0.185 | 3.69 | 4.69 |
| D | 0.015 | 0.021 | 0.38 | 0.53 |
| F | 0.040 | 0.070 | 1.02 | 1.78 |
| G | 0.100 BSC | | 2.54 BSC | |
| H | 0.052 | 0.095 | 1.32 | 2.41 |
| J | 0.008 | 0.015 | 0.20 | 0.38 |
| K | 0.115 | 0.135 | 2.92 | 3.43 |
| L | 0.300 BSC | | 7.62 BSC | |
| M | 0° | 10° | 0° | 10° |
| N | 0.015 | 0.039 | 0.39 | 1.01 |

MC74AC02 MC74ACT02

OUTLINE DIMENSIONS

D SUFFIX
 PLASTIC SOIC PACKAGE
 CASE 751A-03
 ISSUE F




NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 8.55 | 8.75 | 0.337 | 0.344 |
| B | 3.80 | 4.00 | 0.150 | 0.157 |
| C | 1.35 | 1.75 | 0.054 | 0.068 |
| D | 0.35 | 0.49 | 0.014 | 0.019 |
| F | 0.40 | 1.25 | 0.016 | 0.049 |
| G | 1.27 BSC | | 0.050 BSC | |
| J | 0.19 | 0.25 | 0.008 | 0.009 |
| K | 0.10 | 0.25 | 0.004 | 0.009 |
| M | 0° | 7° | 0° | 7° |
| P | 5.80 | 6.20 | 0.228 | 0.244 |
| R | 0.25 | 0.50 | 0.010 | 0.019 |

Notes

Notes

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