

54ACTQ02

Quad 2-Input NOR Gate

General Description

The 'ACTQ02 contains four, 2-input NOR gates.

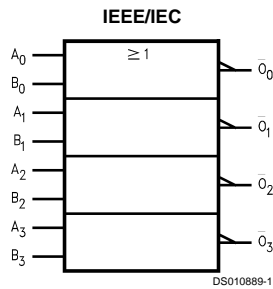
The 'ACTQ utilize NSC Quiet Series technology to guarantee quiet output switching and improved dynamic threshold performance. FACT Quiet Series® features GTO® output control and undershoot corrector in addition to a split ground bus for superior AC MOS performance.

- Guaranteed simultaneous switching noise level and dynamic threshold performance
- Improved latch-up immunity
- Minimum 4 kV ESD protection
- Outputs source/sink 24 mA
- 'ACTQ02 has TTL-compatible inputs
- Standard Microcircuit Drawing (SMD) 5962-9218101

Features

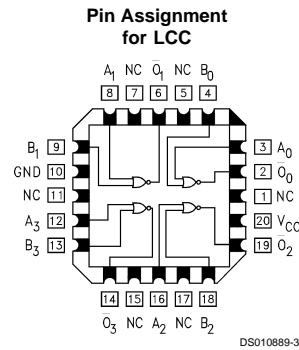
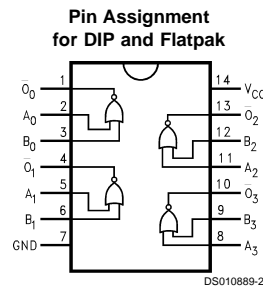
- I_{CC} reduced by 50%

Logic Symbol



| Pin Names | Description |
|-------------|-------------|
| A_n, B_n | Inputs |
| \bar{O}_n | Outputs |

Connection Diagrams



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Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

| | |
|--|--------------------------|
| Supply Voltage (V_{CC}) | -0.5V to +7.0V |
| DC Input Diode Current (I_{IK}) | |
| $V_I = -0.5V$ | -20 mA |
| $V_I = V_{CC} + 0.5V$ | +20 mA |
| DC Input Voltage (V_I) | -0.5V to $V_{CC} + 0.5V$ |
| DC Output Diode Current (I_{OK}) | |
| $V_O = -0.5V$ | -20 mA |
| $V_O = V_{CC} + 0.5V$ | +20 mA |
| DC Output Voltage (V_O) | -0.5V to $V_{CC} + 0.5V$ |
| DC Output Source | |
| or Sink Current (I_O) | ±50 mA |
| DC V_{CC} or Ground Current | |
| per Output Pin (I_{CC} or I_{GND}) | ±50 mA |
| Storage Temperature (T_{STG}) | -65°C to +150°C |
| DC Latch-Up Source or | |
| Sink Current | ±300 mA |

Junction Temperature (T_J)

CDIP 175°C

Recommended Operating Conditions

| | |
|---|-----------------|
| Supply Voltage (V_{CC}) | |
| 'ACTQ | 4.5V to 5.5V |
| Input Voltage (V_I) | 0V to V_{CC} |
| Output Voltage (V_O) | 0V to V_{CC} |
| Operating Temperature (T_A) | |
| 54ACTQ | -55°C to +125°C |
| Minimum Input Edge Rate ($\Delta V/\Delta t$) | |
| 'ACTQ Devices | |
| V_{IN} from 0.8V to 2.0V | |
| V_{CC} @ 4.5V, 5.5V | 125 mV/ns |

Note 1: Absolute maximum ratings are those values beyond which damage to the device may occur. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. National does not recommend operation of FACT™ circuits outside databook specifications.

DC Characteristics for 'ACTQ Family Devices

| Symbol | Parameter | V_{CC} (V) | 54ACTQ | Units | Conditions |
|-----------|--|-----------------|----------------------------|-------|---|
| | | | $T_A =$ -55°C to +125°C | | |
| | | | Guaranteed Limits | | |
| V_{IH} | Minimum High Level Input Voltage | 4.5 | 2.0 | V | $V_{OUT} = 0.1V$ or $V_{CC} - 0.1V$ |
| | | 5.5 | 2.0 | | |
| V_{IL} | Maximum Low Level Input Voltage | 4.5 | 0.8 | V | $V_{OUT} = 0.1V$ or $V_{CC} - 0.1V$ |
| | | 5.5 | 0.8 | | |
| V_{OH} | Minimum High Level Output Voltage | 4.5 | 4.4 | V | $I_{OUT} = -50 \mu A$ |
| | | 5.5 | 5.4 | | |
| | | 4.5 | 3.70 | V | $V_{IN} = V_{IL}$ or V_{IH} $I_{OH} = -24$ mA $I_{OH} = -24$ mA |
| | | 5.5 | 4.70 | | |
| V_{OL} | Maximum Low Level Output Voltage | 4.5 | 0.1 | V | $I_{OUT} = 50 \mu A$ |
| | | 5.5 | 0.1 | | |
| | | 4.5 | 0.50 | V | $V_{IN} = V_{IL}$ or V_{IH} $I_{OL} = 24$ mA $I_{OL} = 24$ mA |
| | | 5.5 | 0.50 | | |
| I_{IN} | Maximum Input Leakage Current | 5.5 | ±1.0 | μA | $V_I = V_{CC}, GND$ |
| I_{CCT} | Maximum I_{CC} /Input | 5.5 | 1.6 | mA | $V_I = V_{CC} - 2.1V$ |
| I_{OLD} | Minimum Dynamic | 5.5 | 50 | mA | $V_{OLD} = 1.65V$ Max |
| I_{OHD} | Output Current (Note 2) | 5.5 | -50 | mA | $V_{OHD} = 3.85V$ Min |
| I_{CC} | Maximum Quiescent Supply Current | 5.5 | 40.0 | μA | $V_{IN} = V_{CC}$ or GND (Note 3) |
| V_{OLP} | Quiet Output Maximum Dynamic V_{OL} | 5.0 | 1.5 | V | (Note 4) |
| V_{OLV} | Quiet Output Minimum Dynamic V_{OL} | 5.0 | -1.2 | V | (Note 4) |

Note 2: Maximum test duration 2.0 ms, one output loaded at a time.

Note 3: I_{CC} for 54ACTQ @ 25°C is identical to 74ACTQ @ 25°C.

Note 4: Max number of outputs defined as (n). Data inputs are 0V to 3V. One output @ GND.

AC Electrical Characteristics

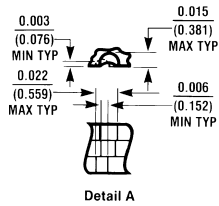
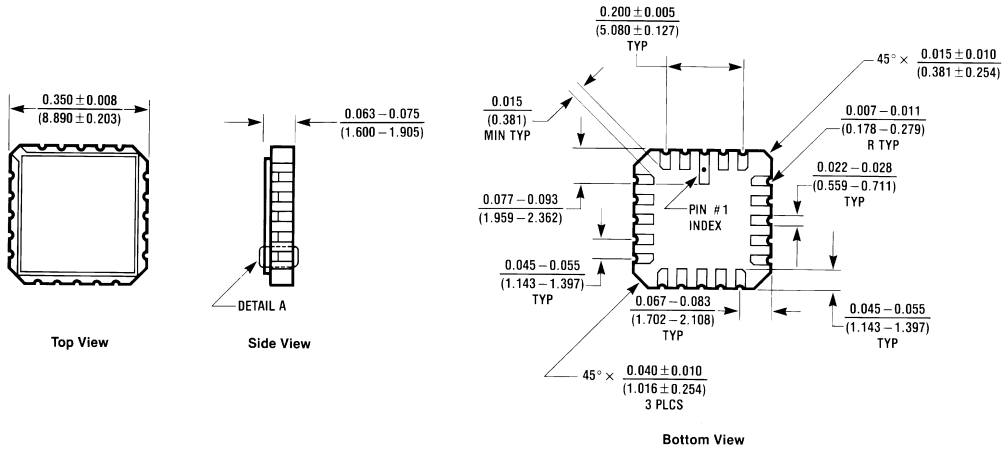
| Symbol | Parameter | V _{CC} (V) (Note 5) | 54ACTQ | | Units | Fig. No. |
|------------------|-------------------------------------|------------------------------------|---|-----|-------|-------------|
| | | | T _A = -55°C to +125°C C _L = 50 pF | | | |
| | | | Min | Max | | |
| t _{PLH} | Propagation Delay Data to Output | 5.0 | 1.5 | 9.5 | ns | |
| t _{PHL} | Propagation Delay Data to Output | 5.0 | 1.5 | 9.5 | ns | |

Note 5: Voltage Range 5.0 is 5.0V ±0.5V

Capacitance

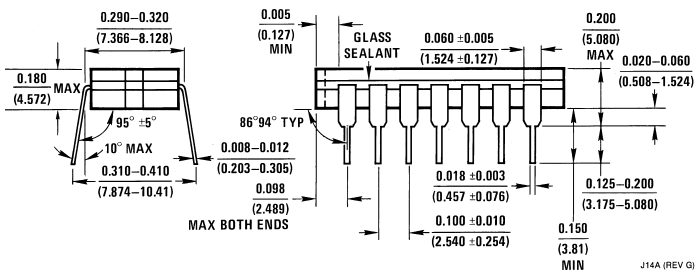
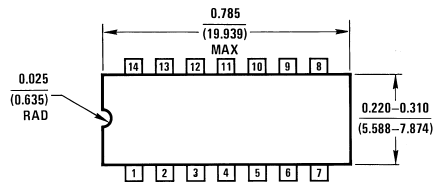
| Symbol | Parameter | Typ | Units | Conditions |
|-----------------|----------------------------------|-----|-------|------------------------|
| C _{IN} | Input Capacitance | 4.5 | pF | V _{CC} = OPEN |
| C _{PD} | Power Dissipation Capacitance | 75 | pF | V _{CC} = 5.0V |

Physical Dimensions inches (millimeters) unless otherwise noted



**20-Terminal Ceramic Leadless Chip Carrier (L)
 NS Package Number E20A**

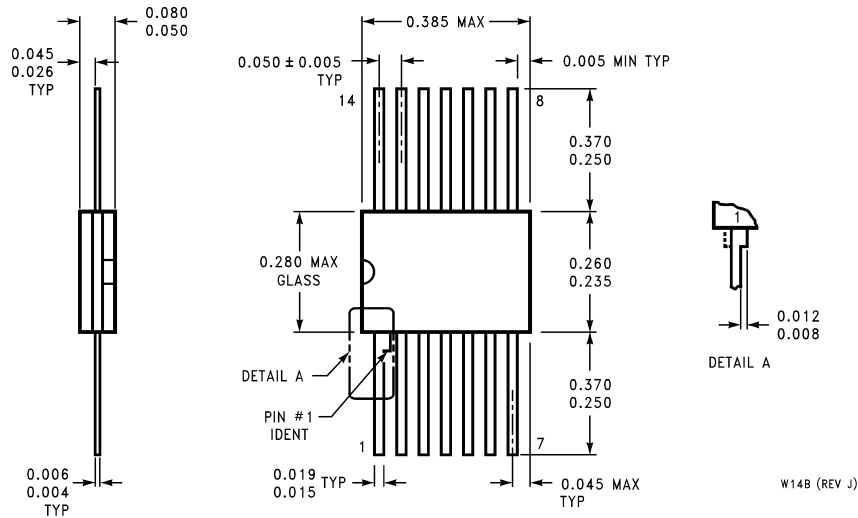
E20A (REV D)



**14-Lead Ceramic Dual-In-Line Package (D)
 NS Package Number J14A**

J14A (REV G)

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



**14-Lead Ceramic Flatpak (F)
NS Package Number W14B**

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