

## 54ACTQ32 Quiet Series Quad 2-Input OR Gate

### General Description

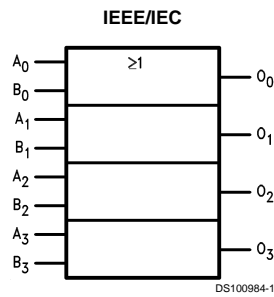
The 'ACTQ32 contains four, 2-input OR gates and utilizes NSC Quiet Series technology to guarantee quiet output switching and improved dynamic threshold performance. FACT Quiet Series™ features GTO™ output control and undershoot corrector in addition to a split ground bus for superior AC MOS performance.

- Guaranteed simultaneous switching noise level and dynamic threshold performance
- Improved latch-up immunity
- Outputs source/sink 24 mA
- 'ACTQ32 has TTL-compatible inputs
- Standard Microcircuit Drawing (SMD) 5962-8973601

### Features

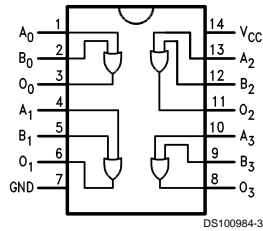
- I<sub>CC</sub> reduced by 50%

### Logic Symbol

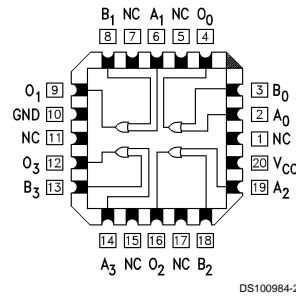


### Connection Diagrams

Pin Assignment for DIP and Flatpak



Pin Assignment for LCC



Pin Names	Description
A <sub>n</sub> , B <sub>n</sub>	Inputs
O <sub>n</sub>	Outputs

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FACT™ and FACT Quiet Series™ are trademarks of Fairchild Semiconductor Corporation.

### 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

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	(Note 2) $V_{IN} = V_{IL}$ or $V_{IH}$ $I_{OH} = -24 \text{ mA}$ $I_{OH} = -24 \text{ mA}$
		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	(Note 2) $V_{IN} = V_{IL}$ or $V_{IH}$ $I_{OL} = 24 \text{ mA}$ $I_{OL} = 24 \text{ mA}$
		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 3)	5.5	-50	mA	$V_{OHD} = 3.85V$ Min
$I_{CC}$	Maximum Quiescent Supply Current	5.5	80.0	μA	$V_{IN} = V_{CC}$ or GND (Note 3)

**Note 2:** All outputs loaded; thresholds on input associated with output under test.

**Note 3:** Maximum test duration 2.0 ms, one output loaded at a time.

## AC Electrical Characteristics

Symbol	Parameter	V <sub>CC</sub> (V) (Note 4)	54ACTQ		Units	Fig. No.
			T <sub>A</sub> = -55°C to +125°C C <sub>L</sub> = 50 pF			
			Min	Max		
t <sub>PLH</sub>	Propagation Delay	5.0	1.5	7.5	ns	
t <sub>PHL</sub>	Propagation Delay	5.0	1.5	7.5	ns	

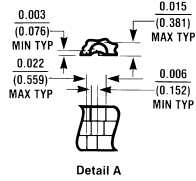
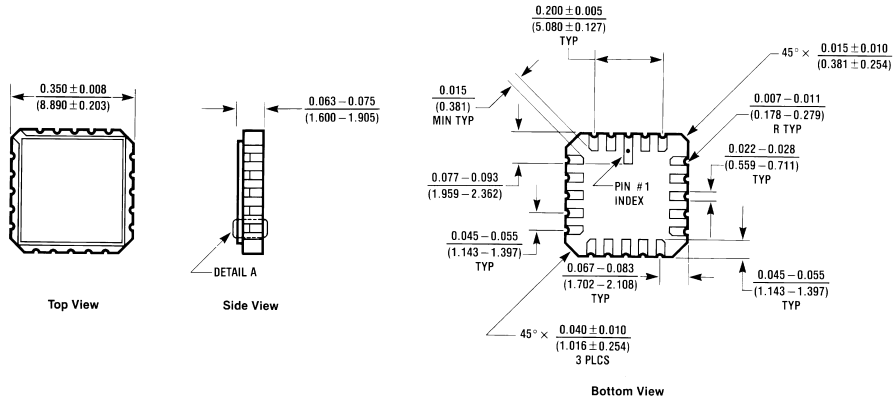
**Note 4:** Voltage Range 5.0 is 5.0V ±0.5V

## Capacitance

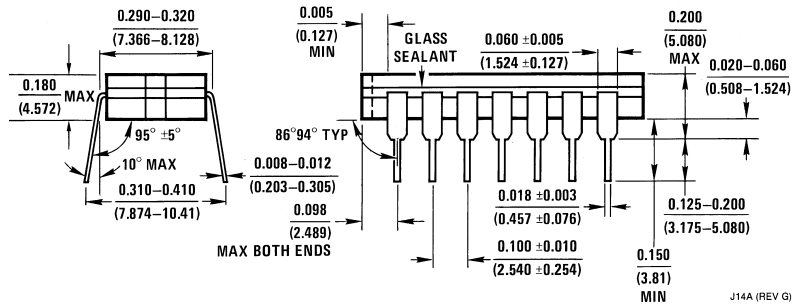
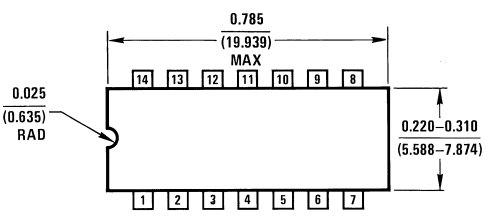
Symbol	Parameter	Max	Units	Conditions
C <sub>IN</sub>	Input Capacitance	10.0	pF	V <sub>CC</sub> = OPEN
C <sub>PD</sub>	Power Dissipation Capacitance	72.0	pF	V <sub>CC</sub> = 5.0V



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

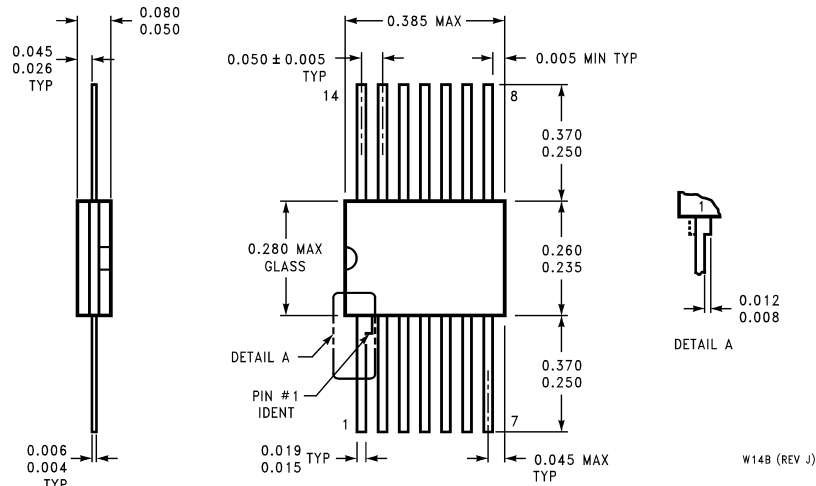


**20 Terminal Ceramic Leadless Chip Carrier (L)**  
NS Package Number E20A



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

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



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

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**National Semiconductor Corporation**  
Americas  
Tel: 1-800-272-9959  
Fax: 1-800-737-7018  
Email: support@nsc.com

**National Semiconductor Europe**  
Fax: +49 (0) 1 80-530 85 86  
Email: europe.support@nsc.com  
Deutsch Tel: +49 (0) 1 80-530 85 85  
English Tel: +49 (0) 1 80-532 78 32  
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Italiano Tel: +49 (0) 1 80-534 16 80

**National Semiconductor Asia Pacific Customer Response Group**  
Tel: 65-2544466  
Fax: 65-2504466  
Email: sea.support@nsc.com

**National Semiconductor Japan Ltd.**  
Tel: 81-3-5620-6175  
Fax: 81-3-5620-6179

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