

PART NUMBER

54AC20^SDA-R

Rochester Electronics

Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All re-creations are done with the approval of the Original Component Manufacturer. (OCM)

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
 - Class Q Military
 - Class V Space Level

Qualified Suppliers List of Distributors (QSLD)

- Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.



July 1998

54AC20

Dual 4-Input NAND Gate

General Description

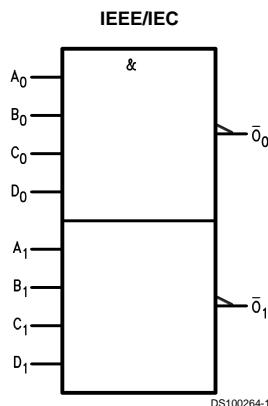
The 'AC20 contains four 4-input NAND gates.

- Outputs source/sink 24 mA
- Standard Military Drawing (SMD)
- 'AC20: 5962-87613

Features

- I_{CC} reduced by 50%

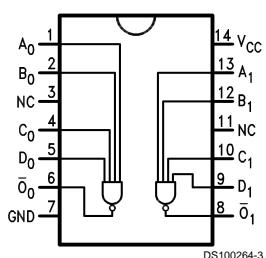
Logic Symbol



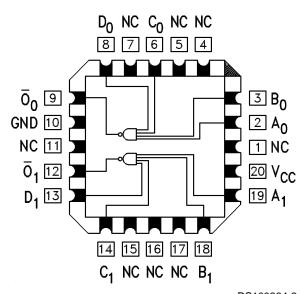
Pin Names	Description
A_n, B_n, C_n, D_n	Inputs
\bar{O}_n	Outputs

Connection Diagrams

Pin Assignment
for DIP and Flatpak



Pin Assignment
for LCC



FACT™ is a trademark 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})	
'AC	2.0V to 6.0V
Input Voltage (V_I)	0V to V_{CC}
Output Voltage (V_O)	0V to V_{CC}
Operating Temperature (T_A)	
54AC	-55°C to +125°C
Minimum Input Edge Rate ($\Delta V/\Delta t$)	
'AC Devices	
V_{IN} from 30% to 70% of V_{CC}	
V_{CC} @ 3.3V, 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 'AC Family Devices

Symbol	Parameter	V_{CC} (V)	54AC	Units	Conditions	
			$T_A =$ -55°C to +125°C			
			Guaranteed Limits			
V_{IH}	Minimum High Level Input Voltage	3.0	2.1	V	$V_{OUT} = 0.1V$ or $V_{CC} - 0.1V$	
		4.5	3.15			
V_{IL}	Maximum Low Level Input Voltage	3.0	0.9	V	$V_{OUT} = 0.1V$ or $V_{CC} - 0.1V$	
		4.5	1.35			
V_{OH}	Minimum High Level Output Voltage	3.0	2.9	V	$I_{OUT} = -50 \mu A$	
		4.5	4.4			
		5.5	5.4			
		3.0	2.4	V	(Note 2) $V_{IN} = V_{IL}$ or V_{IH} $I_{OH} = -12 mA$ $I_{OH} = -24 mA$ $I_{OH} = -24 mA$	
		4.5	3.7			
		5.5	4.7			
V_{OL}	Maximum Low Level Output Voltage	3.0	0.1	V	$I_{OUT} = 50 \mu A$	
		4.5	0.1			
		5.5	0.1			
		3.0	0.5	V	(Note 2) $V_{IN} = V_{IL}$ or V_{IH} $I_{OL} = 12 mA$ $I_{OL} = 24 mA$ $I_{OL} = 24 mA$	
		4.5	0.5			
		5.5	0.5			
I_{IN}	Maximum Input Leakage Current	5.5	± 1.0	μA	$V_I = V_{CC}, GND$	
I_{OLD}	Minimum Dynamic Output Current (Note 3)	5.5	50	mA	$V_{OLD} = 1.65V$ Max	
I_{OHD}		5.5	-50	mA	$V_{OHD} = 3.85V$ Min	

DC Characteristics for 'AC Family Devices (Continued)

Symbol	Parameter	V _{CC} (V)	54AC	Units	Conditions
			T _A = -55°C to +125°C		
			Guaranteed Limits		
I _{CC}	Maximum Quiescent Supply Current	5.5	40.0	μA	V _{IN} = V _{CC} or GND

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.

Note 4: I_{IN} and I_{CC} @ 3.0V are guaranteed to be less than or equal to the respective limit @ 5.5V V_{CC}.

I_{CC} for 54AC @ 25°C is identical to 74AC @ 25°C.

AC Electrical Characteristics

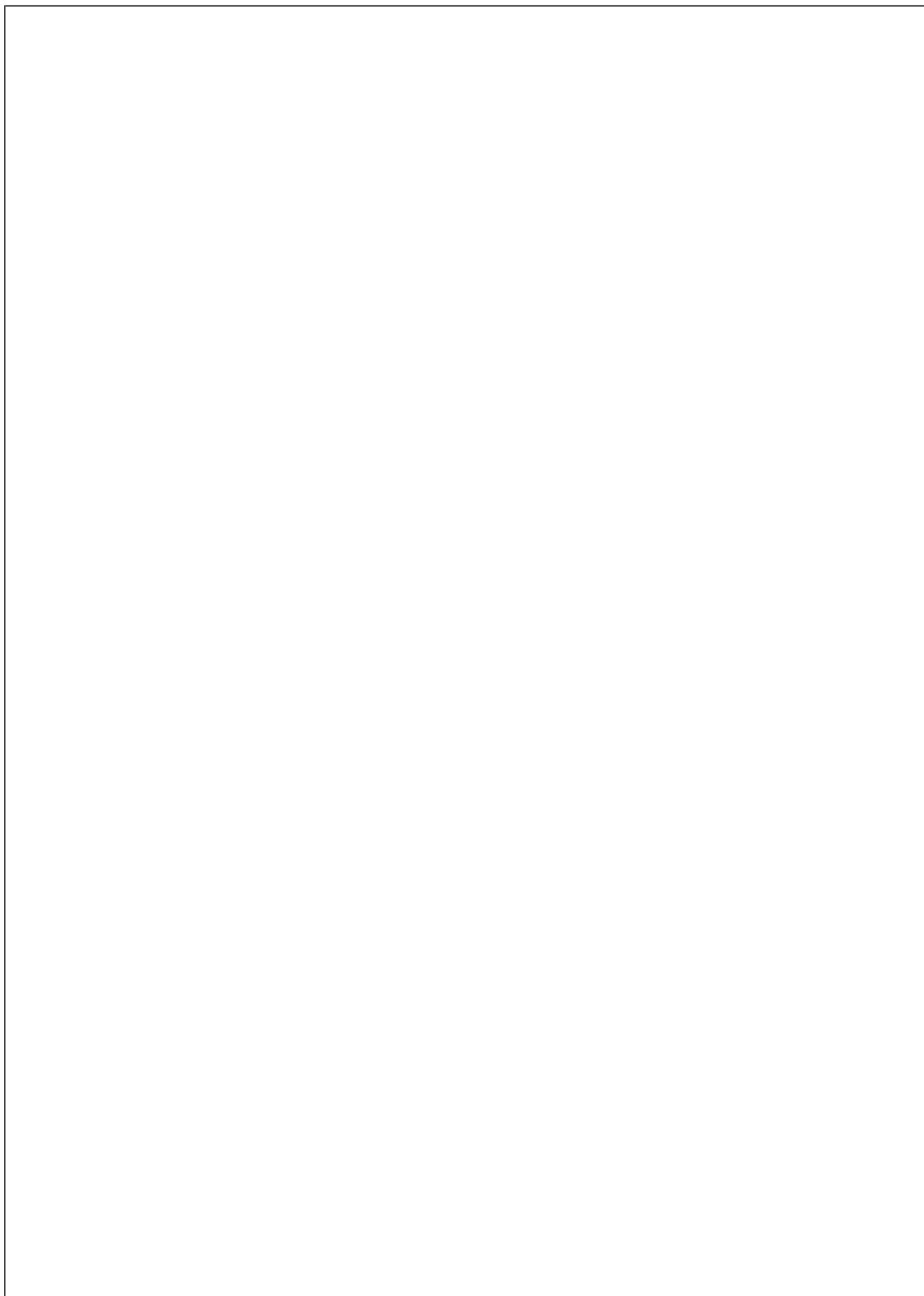
Symbol	Parameter	V _{CC} (V) (Note 5)	54AC	Units
			T _A = -55°C to +125°C	
			C _L = 50 pF	
t _{PLH}	Propagation Delay	3.3 5.0	1.0 1.0	11.0 8.5
t _{PHL}	Propagation Delay	3.3 5.0	1.0 1.0	10.0 7.0

Note 5: Voltage Range 3.3 is 3.3V ±0.3V

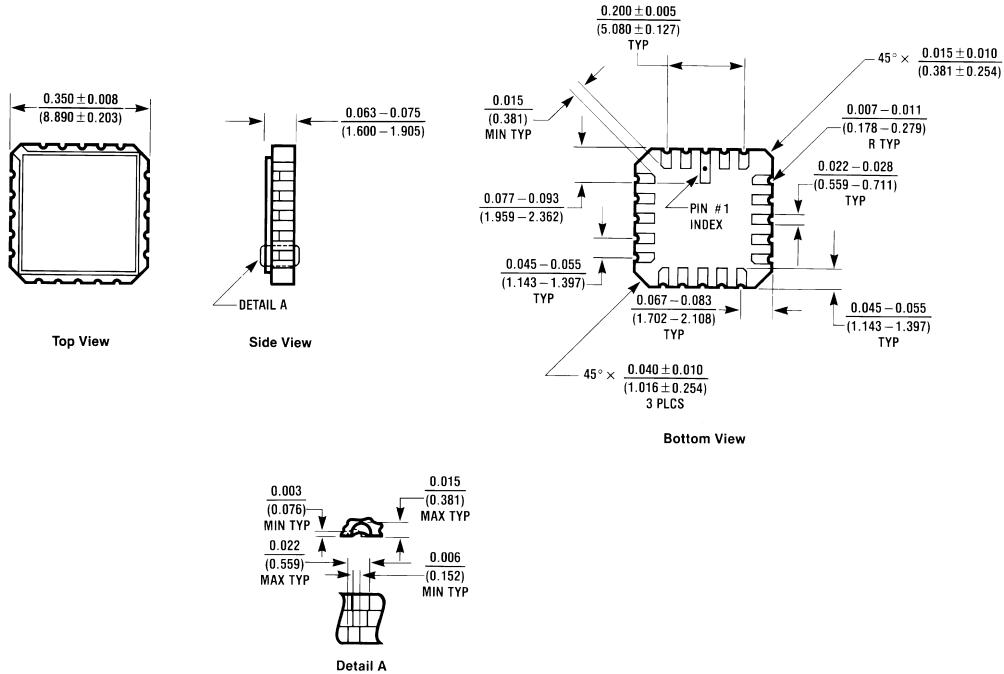
Voltage Range 5.0 is 5.0V ±0.5V

Capacitance

Symbol	Parameter	Typ	Units	Conditions
C _{IN}	Input Capacitance	4.5	pF	V _{CC} = OPEN
C _{PD}	Power Dissipation Capacitance	40.0	pF	V _{CC} = 5.0V

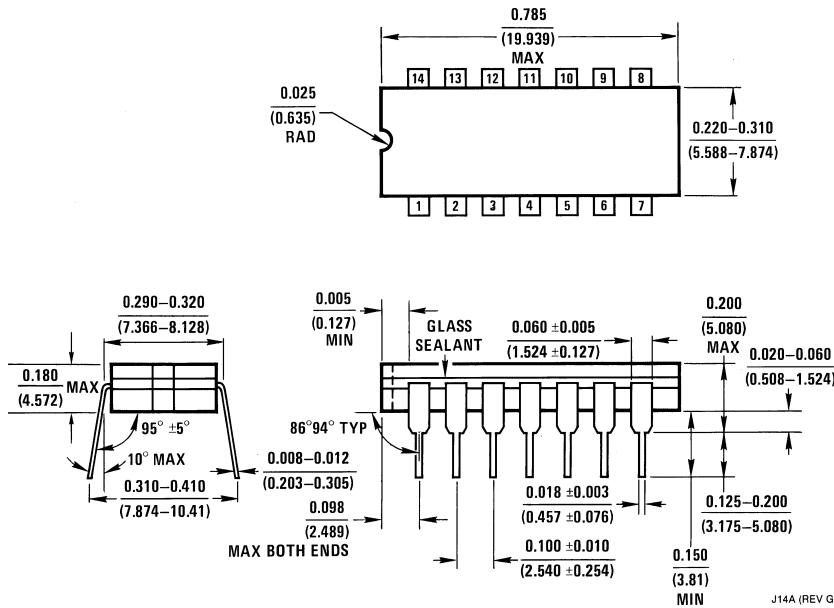


Physical Dimensions inches (millimeters) unless otherwise noted



E20A (REV D)

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

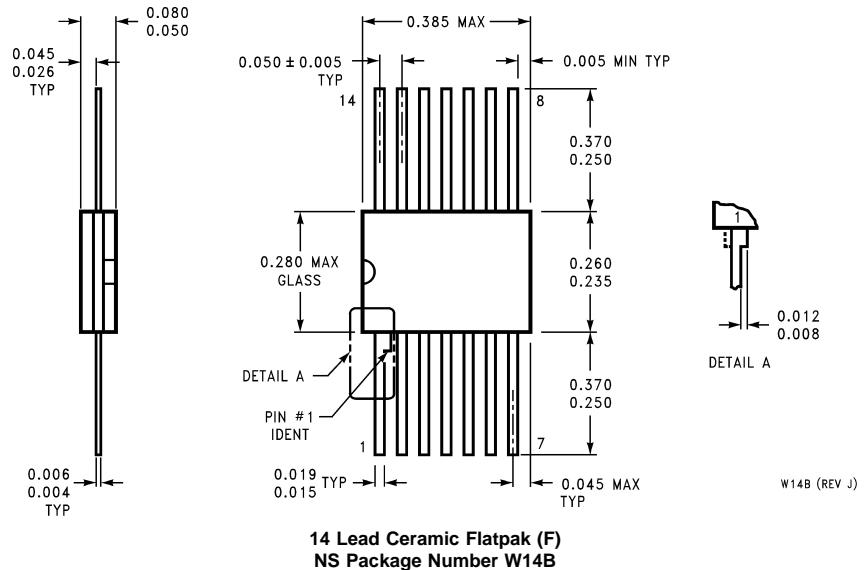


J14A (REV G)

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

54AC20 Dual 4-Input NAND Gate

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



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