

SN5401, SN54H01, SN54LS01, SN7401, SN74H01, SN74LS01

Quadruple 2-Input Positive-NAND Gates with Open-Collector Outputs

These devices contain four independent 2-input-NAND gates. The open-collector outputs require pull-up resistors to perform correctly. They may be connected to other open-collector outputs to implement active-low wired-OR or active-high wired-AND functions. Open-collector devices are often used to generate higher V_{OH} levels.

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 recreations are done with the approval of the 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 OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

TYPES SN5401, SN54H01, SN54LS01, SN7401, SN74H01, SN74LS01

QUADRUPLE 2-INPUT POSITIVE-NAND GATES WITH OPEN-COLLECTOR OUTPUTS

REVISED APRIL 1985

- Package Options Include both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPS
- Dependable Texas Instruments Quality and Reliability

description

These devices contain four independent 2-input-NAND gates. The open-collector outputs require pull-up resistors to perform correctly. They may be connected to other open-collector outputs to implement active-low wired-OR or active-high wired-AND functions. Open-collector devices are often used to generate higher V_{OH} levels.

The SN5401, SN54H01, and SN54LS01 are characterized for operation over the full military temperature ranges of -55°C to 125°C . The SN7401, SN74H01, and SN74LS01 are characterized for operation from 0°C to 70°C .

FUNCTION TABLE (each gate)

INPUTS		OUTPUT
A	B	Y
H	H	L
L	X	H
X	L	H

logic diagram (each gate)

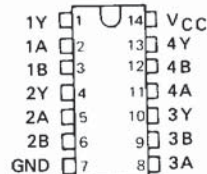


positive logic

$$Y = \overline{A \cdot B} \text{ or } Y = \overline{A} + \overline{B}$$

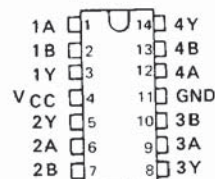
SN5401 ... J PACKAGE
SN54LS01 ... J OR W PACKAGE
SN7401 ... J OR N PACKAGE
SN74LS01 ... D, J OR N PACKAGE

(TOP VIEW)



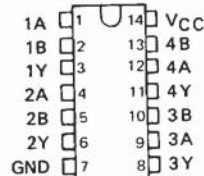
SN5401, SN54H01 ... W PACKAGE

(TOP VIEW)



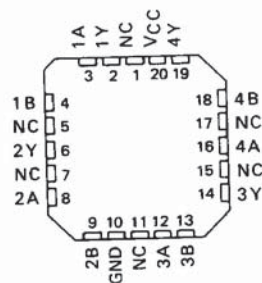
SN54H01 ... J PACKAGE
SN74H01 ... J OR N PACKAGE

(TOP VIEW)



SN54LS01 ... FK PACKAGE
SN74LS01 ... FN PACKAGE

(TOP VIEW)



NC - No internal connection

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PRODUCTION DATA

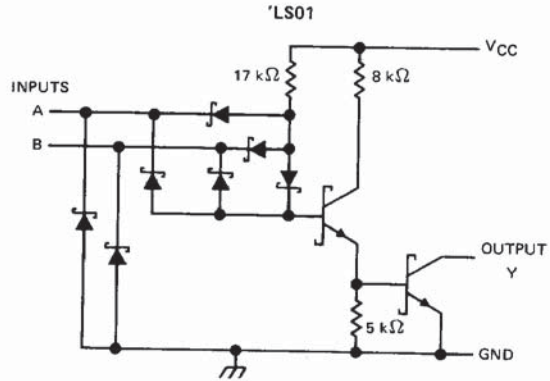
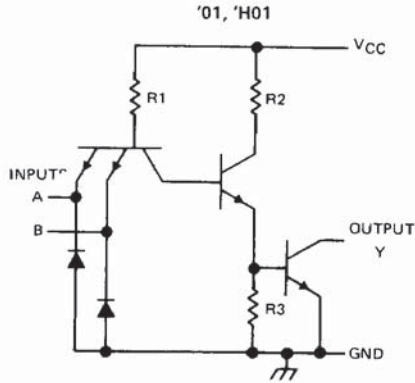
This document contains information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

TEXAS INSTRUMENTS

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**TYPES SN5401, SN54H01, SN54LS01,
SN7401, SN74H01, SN74LS01
QUADRUPLE 2-INPUT POSITIVE-NAND GATES WITH OPEN-COLLECTOR OUTPUTS**

schematics (each gate)



CIRCUITS	R1	R2	R3
'01	4 kΩ	1.6 kΩ	1 kΩ
'H01	2.8 kΩ	760 Ω	470 Ω

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Resistor values shown are nominal.

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absolute maximum ratings over operating free-air temperature range(unless otherwise noted)

Supply voltage, V_{CC} (see Note 1): '01, 'H01, 'LS01	7 V
Input voltage: '01, 'H01	5.5 V
'LS01	7 V
Off-state output voltage	7 V
Operating free-air temperature range: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

TYPES SN5401, SN7401

QUADRUPLE 2-INPUT POSITIVE-NAND GATES WITH OPEN-COLLECTOR OUTPUTS

recommended operating conditions

	SN5401			SN7401			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage	0.8			0.8			V
V _{OH} High-level output voltage	5.5			5.5			V
I _{OL} Low-level output current	16			16			mA
T _A Operating free-air temperature	-55			125			°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	MIN	TYP‡	MAX	UNIT	
V _{IK}	V _{CC} = MIN, I _I = -12 mA			-1.5	V	
I _{OH}	V _{CC} = MIN, V _{IL} = 0.8 V, V _{OH} = 5.5 V			0.25	mA	
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 16 mA	0.2	0.4		V	
I _I	V _{CC} = MAX, V _I = 5.5 V			1	mA	
I _{IH}	V _{CC} = MAX, V _I = 2.4 V			40	μA	
I _{IL}	V _{CC} = MAX, V _I = 0.4 V			-1.6	mA	
I _{CCH}	V _{CC} = MAX, V _I = 0 V			4	8	mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5 V			12	22	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
 ‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	A or B	Y	R _L = 4 kΩ, C _L = 15 pF	35	55		ns
t _{PHL}			R _L = 400 Ω, C _L = 15 pF	8	15		ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

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TTL DEVICES

TYPES SN54H01, SN74H01
QUADRUPLE 2-INPUT POSITIVE-NAND GATES WITH OPEN-COLLECTOR OUTPUTS

recommended operating conditions

	SN54H01			SN74H01			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage			0.8			0.8	V
V _{OH} High-level output voltage			5.5			5.5	V
I _{OL} Low-level output current			20			20	mA
T _A Operating free-air temperature	-55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS†				UNIT
		MIN	TYP‡	MAX	
V _{IK}	V _{CC} = MIN, I _I = -8 mA			-1.5	V
I _{OH}	V _{CC} = MIN, V _{IL} = 0.8 V, V _{OH} = 5.5 V			0.25	mA
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 20 mA		0.2	0.4	V
I _I	V _{CC} = MAX, V _I = 5.5 V			1	mA
I _{IH}	V _{CC} = MAX, V _I = 2.4 V			50	μA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V			-2	mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V		10	16.8	mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5 V		26	40	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
 ‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS				UNIT
				MIN	TYP	MAX	
t _{PLH}	A or B	Y	R _L = 280 Ω, C _L = 25 pF	10	15		ns
t _{PHL}				7.5	12		ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

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TYPES SN54LS01, SN74LS01

QUADRUPLE 2-INPUT POSITIVE-NAND GATES WITH OPEN-COLLECTOR OUTPUTS

recommended operating conditions

	SN54LS01			SN74LS01			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage	0.7			0.8			V
V _{OH} High-level output voltage	5.5			5.5			V
I _{OL} Low-level output current	4			8			mA
T _A Operating free-air temperature	-55 125			0 70			°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	SN54LS01			SN74LS01			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V _{IK}	V _{CC} = MIN, I _I = -18 mA	-1.5			-1.5			V
I _{OH}	V _{CC} = MIN, V _{IL} = MAX, V _{OH} = 5.5 V	0.1			0.1			mA
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 4 mA	0.25 0.4			0.25 0.4			V
	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 8 mA				0.35 0.5			
I _I	V _{CC} = MAX, V _I = 7 V	0.1			0.1			mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V	20			20			μA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V	-0.4			-0.4			mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V	0.8 1.6			0.8 1.6			mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5 V	2.4 4.4			2.4 4.4			mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
¹ PLH	A or B	Y	R _L = 2 kΩ, C _L = 15 pF	17	32		ns
¹ PHL				15	28		ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

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