

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 exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
 - 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.

SN5403, SN54LS03, SN54S03, SN7403, SN74LS03, SN74S03

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

DECEMBER 1983—REVISED MARCH 1988

- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers and Flat Packages, and Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

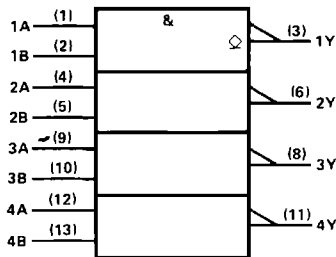
These devices contain four independent 2-input-NAND gates. The open-collector outputs require pull-up resistors to perform correctly. They may be connected to other open-collector outputs to implement active-low wired-OR or active-high wired-AND functions. Open-collector devices are often used to generate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

The SN5403, SN54LS03 and SN54S03 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN7403, SN74LS03 and SN74S03 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

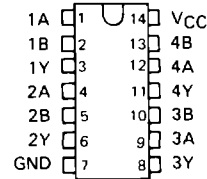
logic symbol†



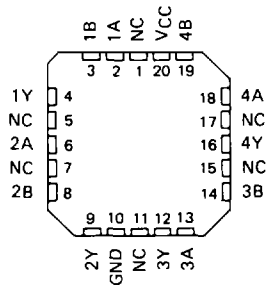
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12

Pin numbers shown are for D, J, N, and W packages

SN5403 . . . J OR W PACKAGE
SN54LS03, SN54S03 . . . J OR W PACKAGE
SN7403 . . . N PACKAGE
SN74LS03, SN74S03 . . . D OR N PACKAGE
(TOP VIEW)

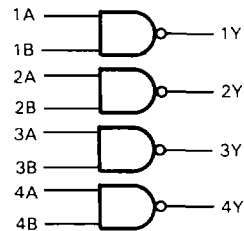


SN54LS03, SN54S03 . . . FK PACKAGE
(TOP VIEW)



NC - No internal connection

logic diagram (positive logic)



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

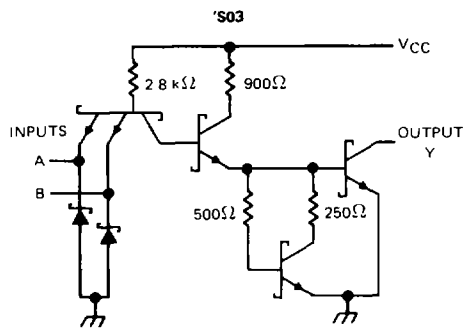
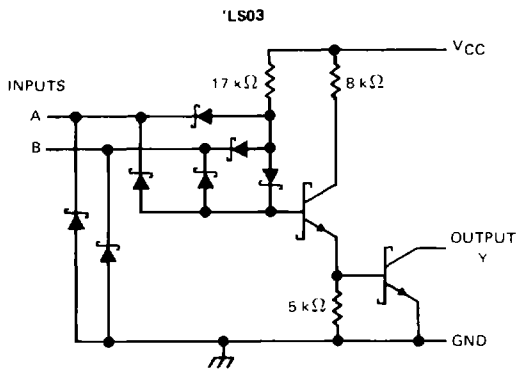
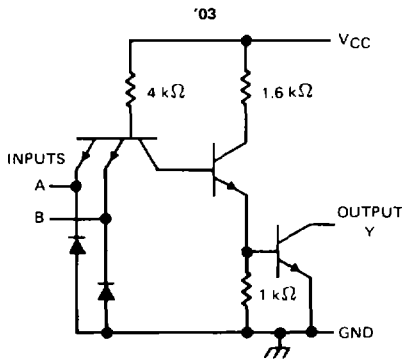
2

TTL Devices

**SN5403, SN54LS03, SN54S03,
SN7403, SN74LS03, SN74S03**
QUADRUPLE 2-INPUT POSITIVE-NAND GATES WITH OPEN-COLLECTOR OUTPUTS

schematics (each gate)

2
TTL Devices



Resistor values shown are nominal

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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage: '03, 'S03	5.5 V
'LS03	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

SN5403, SN7403 QUADRUPLE 2-INPUT POSITIVE-NAND GATES WITH OPEN-COLLECTOR OUTPUTS

recommended operating conditions

	SN5403			SN7403			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		0	70		°C

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

PARAMETER	TEST CONDITIONS ¹	SN5403		SN7403		UNIT
		MIN	TYP ²	MAX	MIN	
V _{IK}	V _{CC} = MIN, I _I = -12 mA	-1.5		-1.5		V
I _{OH}	V _{CC} = MIN, V _{IL} = 0.8 V, V _{OH} = 5.5 V			0.25		mA
	V _{CC} = MIN, V _{IL} = 0.7 V, V _{OH} = 5.5 V	0.25				
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 16 mA	0.2	0.4	0.2	0.4	V
I _I	V _{CC} = MAX, V _I = 5.5 V	1		1		mA
I _{IH}	V _{CC} = MAX, V _I = 2.4 V	40		40		μA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V	-1.6		-1.6		mA
I _{CCH}	V _{CC} = MAX, V _I = 0	4 8		4 8		mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5 V	12 22		12 22		mA

¹For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions

²All 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 = 4 kΩ,	C _L = 15 pF	35	45	ns	
¹ PHL			R _L = 400 Ω,	C _L = 15 pF	8	15	ns	

NOTE 2 Load circuits and voltage waveforms are shown in Section 1

2

TTL Devices

SN54LS03, SN74LS03

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

recommended operating conditions

	SN54LS03			SN74LS03			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			V
V_{OH} High-level output voltage				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)

2

TTL Devices

PARAMETER	TEST CONDITIONS†	SN54LS03		SN74LS03		UNIT
		MIN	TYP‡	MAX	MIN	
V_{IK}	$V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$	-1.5		-1.5		V
I_{OH}	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}, V_{OH} = 5.5 \text{ V}$	0.1		0.1		mA
V_{OL}	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 4 \text{ mA}$	0.25	0.4	0.25	0.4	V
	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 8 \text{ mA}$			0.35	0.5	
I_I	$V_{CC} = \text{MAX}, V_I = 7 \text{ V}$	0.1		0.1		mA
I_{IH}	$V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$	20		20		µA
I_{IL}	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$	-0.4		-0.4		mA
I_{CCH}	$V_{CC} = \text{MAX}, V_I = 0$	0.8	1.6	0.8	1.6	mA
I_{CCL}	$V_{CC} = \text{MAX}, V_I = 4.5 \text{ V}$	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 $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$ (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	A or B	Y	$R_L = 2 \text{ k}\Omega, C_L = 15 \text{ pF}$	17	32		ns
t_{PHL}				15	28		ns

NOTE 2 Load circuits and voltage waveforms are shown in Section 1

SN54S03, SN74S03 QUADRUPLE 2-INPUT POSITIVE-NAND GATES WITH OPEN-COLLECTOR OUTPUTS

recommended operating conditions

	SN54S03			SN74S03			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 [†]	SN54S03		SN74S03		UNIT	
		MIN	TYP [‡]	MAX	MIN		TYP [‡]
V _{IK}	V _{CC} = MIN, I _I = -18 mA		-1.2		-1.2	V	
I _{OH}	V _{CC} = MIN, V _{IL} = 0.8 V, V _{OH} = 5.5 V				0.25	mA	
	V _{CC} = MIN, V _{IL} = 0.7 V, V _{OH} = 5.5 V		0.25				
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 20 mA		0.5		0.5	V	
I _I	V _{CC} = MAX, V _I = 5.5 V		1		1	mA	
I _{IH}	V _{CC} = MAX, V _I = 2.7 V		50		50	μA	
I _{IL}	V _{CC} = MAX, V _I = 0.5 V		-2		-2	mA	
I _{CCH}	V _{CC} = MAX, V _I = 0		6	13.2	6	13.2	mA
I _{CCL}	V _{CC} = MAX, V _I = 4.5 V		20	36	20	36	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 = 280 Ω,	C _L = 15 pF	2	5	7.5	ns
^t PHL					2	4.5	7	ns
^t PLH			R _L = 280 Ω,	C _L = 50 pF	7.5		ns	
^t PHL					7		ns	

NOTE 2 Load circuits and voltage waveforms are shown in Section 1

2

TTL Devices