

## PART NUMBER SN5403J-ROC

# 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.

### 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

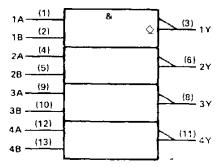
These devices contain four independent 2-input-NAND gates. The open-collector outputs require pull-up resistors to perform correctly. They may be connected to other open-collector outputs to implement active-low wired-OR or active-high wired-AND functions. Open-collector devices are often used to generate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

The SN5403, SN54LS03 and SN54S03 are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to 125°C. The SN7403, SN74LS03 and SN74S03 are characterized for operation from 0°C to 70°C.

#### FUNCTION TABLE (each gate)

INF	UTS	OUTPUT
A	В	Y
н	н	L
L.	×	н
Х	L	н

#### logic symbol†

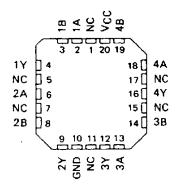


<sup>&</sup>lt;sup>†</sup> This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

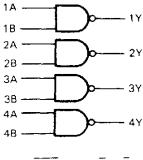
	_	<del></del>		
1A	П٦	U14	3	Vcc
18		13	]	48
1Y	□3	12	3	4A
2A	ď₄.	11	]	4Y
2B	₫5	10	]	3B
2Y	□6	9	3	3A
GND	d <sub>7</sub>	8	כ	3Y

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



NC - No internal connection

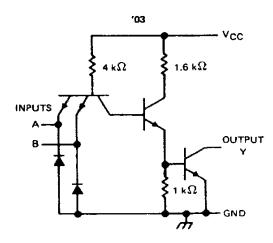
#### logic diagram (positive logic)



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

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

#### schematics (each gate)

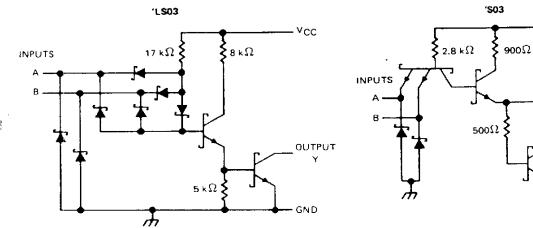


- Vcc

**\$** 250Ω

m

OUTPUT



Resistor values shown are nominal.

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

Supply voltage, Vcc (see Note 1)		7 V
Input voltage: '03, 'S03		5.5 V
′LS03		7 V
Operating free-air temperature range:	SN54'	– 55°C to 125°C
operating free all competatore range.	SN74'	0°C to 70°C
Storage temperature range		85 °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			
	MIN	NOM	MAX	MIN	NOM	MAX	UNIT	
V <sub>CC</sub> Supply voltage	4,5	5	5.5	4.75	5	5,25	٧	
V <sub>1H</sub> High-level input voltage	2			2			٧	
VIL Low-level input voltage			0.8			0,8	V	
VOH High-level output voltage			5.5			5.5	V	
IOL Low-level output current			16			16	mA	
T <sub>A</sub> Operating free-air temperature	- 55		125	0		70	°C	

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

040445750	TOT CONDITIONS!	SN5403	SN7403	UNIT
PARAMETER	ER TEST CONDITIONS <sup>†</sup>	MIN TYP# MAX	MIN TYP‡ MAX	UNIT
VIK	$V_{CC} = MIN$ , $I_{\parallel} = -12 \text{ mA}$	- 1.5	-1.5	V
	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, V <sub>OH</sub> = 5.5 V		0.25	mA
юн	$V_{CC} = MIN$ , $V_{IL} = 0.7 \text{ V}$ , $V_{OH} = 5.5 \text{ V}$	0.25		mA.
V <sub>OL</sub>	VCC = MIN, VIH = 2 V, IQL = 16 mA	0.2 0.4	0.2 0.4	
i <sub>l</sub>	$V_{CC} = MAX$ , $V_I = 5.5 V$	1	111	mA
I <sub>tH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V	40	40	μΑ
IIL	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V	- 1.6	- 1.6	mA
<sup>ј</sup> ссн	$V_{CC} = MAX, V_I = 0$	4 8	4 8	mΑ
lccr	$V_{CC} = MAX$ , $V_1 = 4.5 V$	12 22	12 22	mA

<sup>&</sup>lt;sup>†</sup>For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

#### switching characteristics, VCC = 5 V, TA = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONI	DITIONS	MIN TYP	MAX	UNIT
<sup>†</sup> PLH	A or B	_	R <sub>L</sub> = 4 kΩ,	Cլ = 15 pF	35	45	ns
†PHL	7016		R <sub>L</sub> = 400 Ω,	C <sub>L</sub> = 15 pF	8	15	ns

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



<sup>&</sup>lt;sup>1</sup>All typical values are at  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25 ^{\circ}\text{C}$ .

## SN54LS03, SN74LS03 QUADRUPLE 2-INPUT POSITIVE-NAND GATES WITH OPEN-COLLECTOR OUTPUTS

#### recommended operating conditions

•	1	SN54LS03		SN74LS03			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	ONI
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	٧
V <sub> H</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage			0.7			0.8	V
V <sub>OH</sub> High-level output voltage			5.5			5.5	٧
IOL Law-level output current			4			8	mΑ
TA Operating free-air temperature	- 55		125	0		70	°C

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

	-		SN54LS	03	SN74LS	UNIT	
PARAMETER		TEST CONDITIONS†	MIN TYP\$	MAX	MIN TYP	MAX	UNII
VIK	VCC = MIN,	I <sub>I</sub> ≈ 18 mA		- 1.5		- 1.5	٧
'он	VCC = MIN.	V <sub>IL</sub> = MAX, V <sub>OH</sub> = 5.5 V		0.1		0.1	mA
	VCC = MIN,	V <sub>IH</sub> = 2 V, 1 <sub>OL</sub> = 4 mA	0.25	0.4	0.25	0.4	V
VOL	V <sub>CC</sub> = MIN,	V <sub>IH</sub> = 2 V, f <sub>OL</sub> = 8 mA			0.35	0.5	
11	V <sub>CC</sub> = MAX,	V <sub>1</sub> = 7 V		0.1		0.1	mA
<sup>1</sup> ін	V <sub>CC</sub> = MAX,	V <sub>I</sub> = 2.7 V		20		20	μΑ
IIL	V <sub>CC</sub> = MAX.	V <sub>1</sub> = 0.4 V		- 0.4		- 0.4	mA
Гссн	V <sub>CC</sub> = MAX,	V <sub>1</sub> = 0	0.8	1.6	0.8	1.6	mΑ
CCL	V <sub>CC</sub> = MAX,	V <sub>1</sub> = 4,5 V	2.4	4.4	2.4	4.4	mA

<sup>†</sup> For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

#### switching characteristics, VCC = 5 V, TA = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONI	DITIONS	MIN	TYP	MAX	UNIT
tPLH	A or B		D 21.0	C 15 of		17	32	ns
tPHL.	A Of B	1	AL = 2 kΩ,	C <sub>L</sub> = 15 pF		15	28	пs

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

<sup>1</sup> All typical values are at  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^{\circ}\text{C}$ .

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

#### recommended operating conditions

		SN54S03			SN74S03		
	MIN	NOM	MAX	MIN	NOM	MAX	UNIT
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	٧
V <sub>IH</sub> High-level input voltage	2			2			٧
VIL Lov-level input voltage			8.0			0.8	٧
VOH High-level output voltage			5.5			5.5	٧
OL Lovelevel output current			20			20	mA
TA Operating free-air temperature	- 55		125	0		70	°c

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

PARAMETER	TEST CONDITIONS <sup>†</sup>	SN54S03	SN74\$03	MAX UNIT
FARAMETER	TEST CONDITIONS	MIN TYPI MAX	MIN TYPI MAX	
VIK	V <sub>CC</sub> = MIN, I <sub>1</sub> = -18 mA	- 1.2	-1.2	V
le.	$V_{CC} = MIN$ , $V_{IL} = 0.8 \text{ V}$ , $V_{OH} = 5.5 \text{ V}$		0.25	4
юн	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.7 V, V <sub>OH</sub> = 5.5 V	0.25		mA
Vol	$V_{CC} = MIN$ , $V_{IH} = 2 V$ , $I_{OL} = 20 mA$	0.5	0.5	٧
lį	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V	1	1	mA
<sup>I</sup> IH	$V_{CC} = MAX$ , $V_1 = 2.7 V$	50	50	μА
lΙΓ	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5 V	- 2	-2	mΑ
Іссн	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0	6 13.2	6 13.2	mA
CCL	V <sub>CC</sub> = MAX, V <sub>I</sub> = 4.5 V	20 36	20 36	mA

 $<sup>^{\</sup>dagger}$ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.  $^{\ddagger}$ All typical values are at  $V_{CC}=5$  V,  $T_{A}=25$  °C.

#### switching characteristics, VCC = 5 V, TA = 25°C (see note 2)

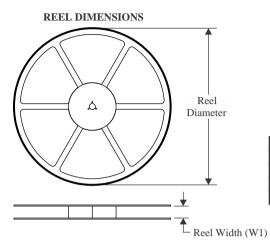
PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<sup>3</sup> PLH			D = 200 ()	_ 2	. 5	7.5	ns.
lPHL	A or B		$R_L = 280 \Omega$ , $C_L \sim 15 pF$	2	4.5	7	ns
трын	nui b	'			7.5		ns
tpHL tpHL			R <sub>L</sub> = 280 Ω,		7		ns

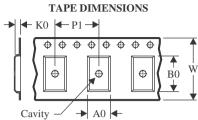
NOTE 2. Load circuits and voltage waveforms are shown in Section 1.

### **PACKAGE MATERIALS INFORMATION**

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#### TAPE AND REEL INFORMATION





A0	Dimension designed to accommodate the component width
В0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

#### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

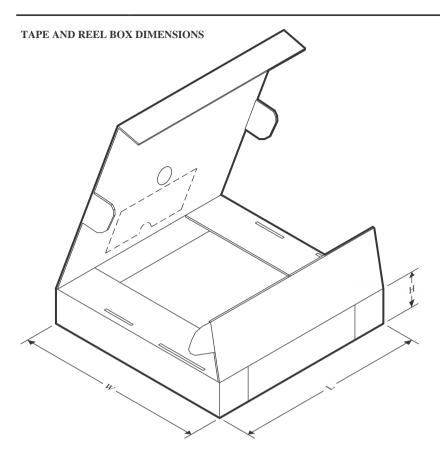


#### \*All dimensions are nominal

Device		Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LS03DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74LS03NSR	so	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1

## **PACKAGE MATERIALS INFORMATION**

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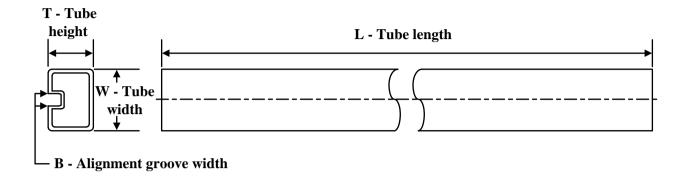
#### \*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LS03DR	SOIC	D	14	2500	356.0	356.0	35.0
SN74LS03NSR	SO	NS	14	2000	356.0	356.0	35.0

## **PACKAGE MATERIALS INFORMATION**

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#### **TUBE**



#### \*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
SN74LS03D	D	SOIC	14	50	506.6	8	3940	4.32
SN74LS03N	N	PDIP	14	25	506	13.97	11230	4.32
SN74LS03N	N	PDIP	14	25	506	13.97	11230	4.32
SNJ54LS03W	W	CFP	14	1	506.98	26.16	6220	NA

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