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.

SDLS028

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**

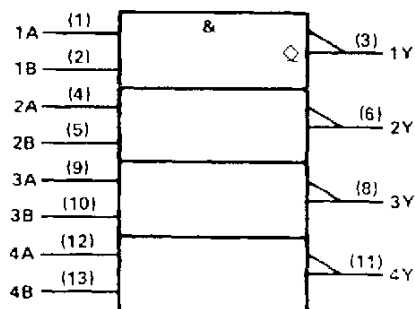- **Dependable Texas Instruments Quality and Reliability**

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

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

```
        ___  ___
1A  [ 1   U  14]  VCC
1B  [ 2      13]  4B
1Y  [ 3      12]  4A
2A  [ 4      11]  4Y
2B  [ 5      10]  3B
2Y  [ 6       9]  3A
GND [ 7       8]  3Y
```

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

```
        1B  1A  NC  VCC  4B

         3   2   1  20  19
1Y  [ 4              18 ]  4A
NC  [ 5              17 ]  NC
2A  [ 6              16 ]  4Y
NC  [ 7              15 ]  NC
2B  [ 8              14 ]  3B
         9  10  11  12  13

        2Y  GND  NC  3Y  3A
```

NC - No internal connection

logic symbol[†]

```
1A  (1) ──┐ ┌───── &
1B  (2) ──┤ │        ◇>── (3) 1Y
2A  (4) ──┤ │
2B  (5) ──┤ │        ───── (6) 2Y
3A  (9) ──┤ │
3B  (10)──┤ │        ───── (8) 3Y
4A  (12)──┤ │
4B  (13)──┘ └─       ───── (11) 4Y
```
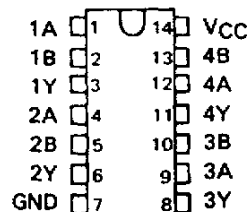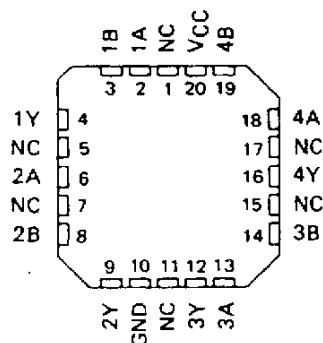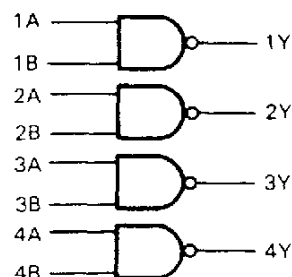
[†] This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for D, J, N, and W packages.

logic diagram (positive logic)

```
1A ──┐
     │>o── 1Y
1B ──┘

2A ──┐
     │>o── 2Y
2B ──┘

3A ──┐
     │>o── 3Y
3B ──┘

4A ──┐
     │>o── 4Y
4B ──┘
```

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

TEXAS
INSTRUMENTS

POST OFFICE BOX 055012 • DALLAS, TEXAS 75265

schematics (each gate)

'03

'LS03

'S03
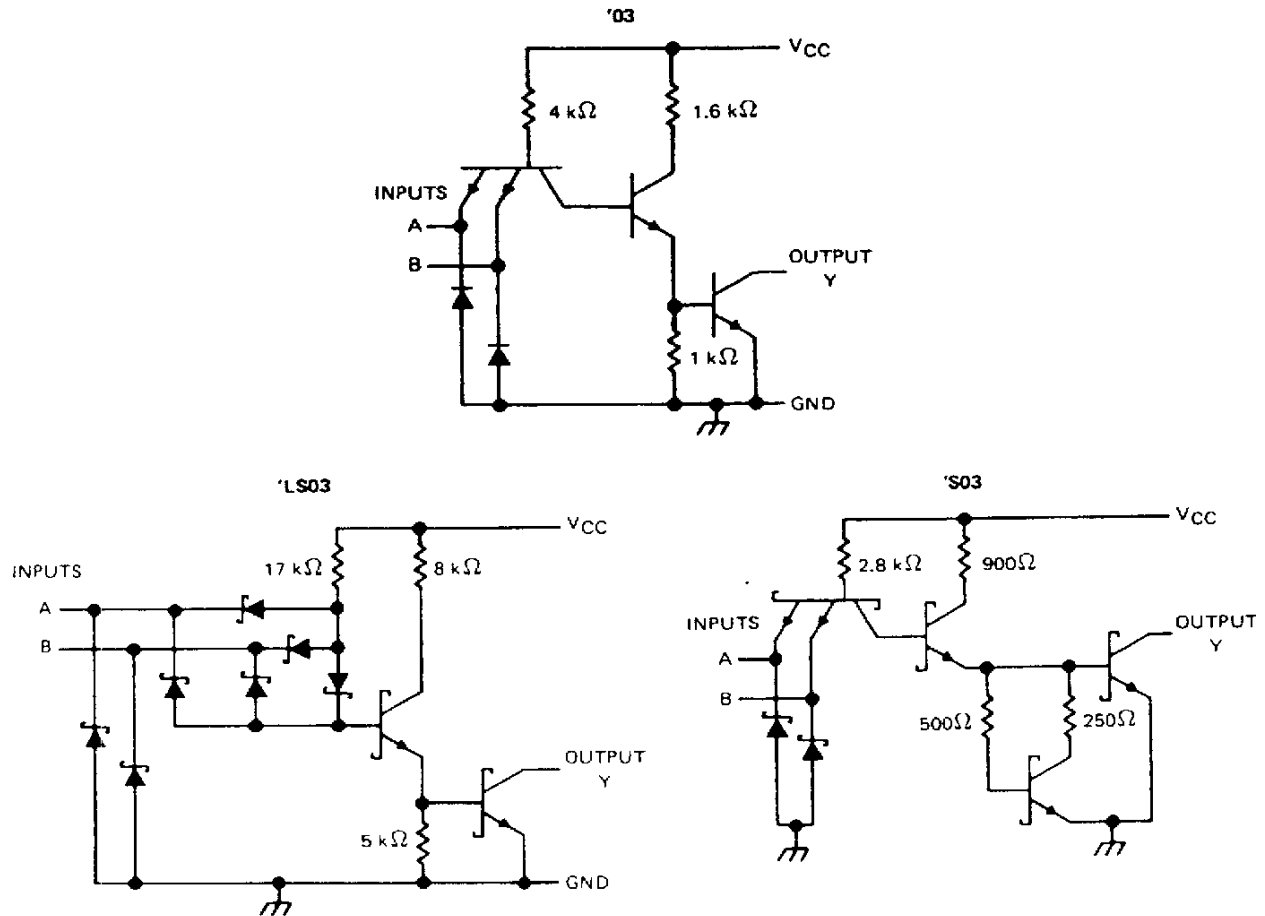
Resistor values shown are nominal.

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.

TEXAS
INSTRUMENTS

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[†]			SN5403			SN7403			UNIT
				MIN	TYP[‡]	MAX	MIN	TYP[‡]	MAX	
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

[†]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	45	ns
t_{PHL}			R_L = 400 Ω,	C_L = 15 pF		8	15	ns

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

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			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†			SN54LS03			SN74LS03		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		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
t_{PLH}	A or B	Y	R_L = 2 kΩ,	C_L = 15 pF		17	32	ns
t_{PHL}						15	28	ns

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

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[‡]	MAX	
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.

PACKAGE MATERIALS INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS

TAPE DIMENSIONS

A0	Dimension designed to accommodate the component width
B0	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 Type	Package Drawing	Pins	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

TAPE AND REEL BOX DIMENSIONS

*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

TUBE

T - Tube height

L - Tube length

W - Tube width

B - Alignment groove width

*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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