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.

- **Package Options Include Plastic and Ceramic DIPs**

- **Dependable Texas Instruments Quality and Reliability**

description

These devices contain expandable 4-wide AND-OR-INVERT gates. The '53 perform the Boolean function $Y = \overline{AB + CD + EF + GH + X}$ and the 'H53 perform $Y = \overline{AB + CD + EFG + HI + X}$ with X = output of SN5460/SN7460, SN54H60/SN74H60 or SN54H62/SN74H62 respectively.

The SN5453 and SN54H53 are characterized for operation over the full military temperature range of −55°C to 125°C. The SN7453 and SN74H53 are characterized for operation from 0°C to 70°C.

logic diagrams

'53

'H53
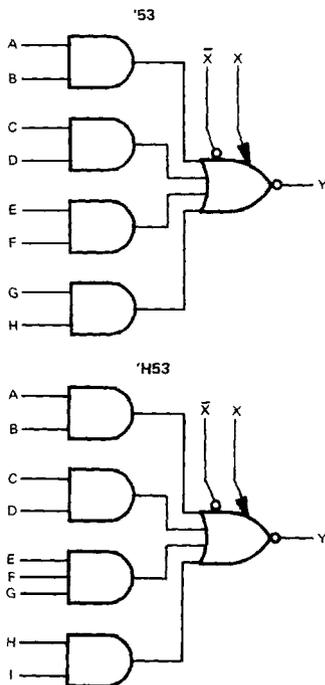
SN5453 . . . J PACKAGE
SN7453 . . . J OR N PACKAGE
(TOP VIEW)


```
A  [ 1    14 ] VCC
C  [ 2    13 ] B
D  [ 3    12 ] X̄
E  [ 4    11 ] X
F  [ 5    10 ] H
NC [ 6     9 ] G
GND[ 7     8 ] Y
```

SN5453 . . . W PACKAGE
(TOP VIEW)

```
X   [ 1    14 ] H
X̄   [ 2    13 ] G
A   [ 3    12 ] Y
VCC [ 4    11 ] GND
B   [ 5    10 ] NC
C   [ 6     9 ] F
D   [ 7     8 ] E
```
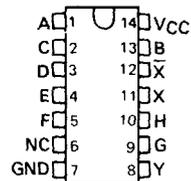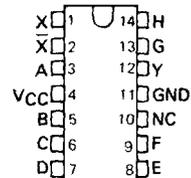
SN54H53 . . . J PACKAGE
SN74H53 . . . J OR N PACKAGE
(TOP VIEW)

```
A  [ 1    14 ] VCC
C  [ 2    13 ] B
D  [ 3    12 ] X̄
E  [ 4    11 ] X
F  [ 5    10 ] I
G  [ 6     9 ] H
GND[ 7     8 ] Y
```

SN54H53 . . . W PACKAGE
(TOP VIEW)

```
X   [ 1    14 ] I
X̄   [ 2    13 ] H
A   [ 3    12 ] Y
VCC [ 4    11 ] GND
B   [ 5    10 ] G
C   [ 6     9 ] F
D   [ 7     8 ] E
```
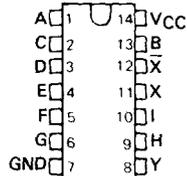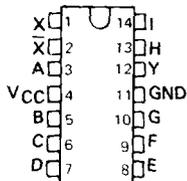
NC - No internal connection

3
TTL DEVICES

schematics

'53

'H53

Resistor values shown are nominal.
If expander is not used, leave X and X̄ open.

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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage	5.5 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.

3

TTL DEVICES

recommended operating conditions

		SN5453			SN7453			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
I_{OH}	High-level output current			−0.4			−0.4	mA
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[†]			SN5453			SN7453			UNIT
				MIN	TYP[‡]	MAX	MIN	TYP[‡]	MAX	
V_{IK}	V_{CC} = MIN,	I_I = −12 mA				−1.5			−1.5	V
V_{OH}	V_{CC} = MIN,	V_{IL} = 0.8 V,	I_{OH} = −0.4 mA	2.4	3.4		2.4	3.4		V
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_{IH} = 2.4 V				40			40	μA
I_{IL}	V_{CC} = MAX,	V_{IL} = 0.4 V				−1.6			−1.6	mA
I_{OS}§	V_{CC} = MAX			−20		−55	−18		−55	mA
I_{CCH}	V_{CC} = MAX,	V_I = 0 V			4	8		4	8	mA
I_{CCL}	V_{CC} = MAX,	See Note 2			5.1	9.5		5.1	9.5	mA
$I_{\overline{X}}$▲	$V_{\overline{X}X}$ = 0.4 V,	I_{OL} = 16 mA				−2.9			−3.1	mA
$V_{BE(Q)}$▲	$I_X + I_{\overline{X}}$ = 0.41 mA,	$R_{\overline{X}X}$ = 0,	I_{OL} = 16 mA			1.1				V
	$I_X + I_{\overline{X}}$ = 0.62 mA,	$R_{\overline{X}X}$ = 0,	I_{OL} = 16 mA						1	
V_{OH}▲	I_X = 0.15 mA,	$I_{\overline{X}}$ = −0.15 mA,	I_{OH} = −0.4 mA	2.4	3.4					V
	I_X = 0.27 mA,	$I_{\overline{X}}$ = −0.27 mA,	I_{OH} = −0.4 mA				2.4	3.4		
V_{OL}▲	$I_X + I_{\overline{X}}$ = 0.3 mA,	$R_{\overline{X}X}$ = 138 Ω,	I_{OL} = 16 mA		0.2	0.4				V
	$I_X + I_{\overline{X}}$ = 0.43 mA,	$R_{\overline{X}X}$ = 130 Ω,	I_{OL} = 16 mA					0.2	0.4	

† 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.
§ Not more than one output should be shorted at a time.
▲ Using expander inputs, V_{CC} = MIN, T_A = MIN, except typical values
NOTE 2: All inputs of one AND gate at 4.5 V, all others at GND.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	Any	Y	R_L = 400 Ω,	C_L = 15 pF ¶		13	22	ns
t_{PHL}						8	15	ns

¶ Expander pins open.
NOTE 3: See General Information Section for load circuits and voltage waveforms.

TEXAS
INSTRUMENTS

POST OFFICE BOX 225012 • DALLAS, TEXAS 75265

recommended operating conditions

		SN54H53			SN74H53			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
I_{OH}	High-level output current			-0.5			-0.5	mA
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[†]			SN54H53			SN74H53			UNIT
				MIN	TYP[‡]	MAX	MIN	TYP[‡]	MAX	
V_{IK}	V_{CC} = MIN,	$I_I = -8$ mA				-1.5			-1.5	V
V_{OH}	V_{CC} = MIN,	V_{IL} = 0.8 V	$I_{OH} = -0.5$ mA	2.4	3.4		2.4	3.4		V
V_{OL}	V_{CC} = MIN,	V_{IH} = 2 V,	I_{OL} = 20 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_{IH} = 2.4 V				50			50	µA
I_{IL}	V_{CC} = MAX,	V_{IL} = 0.4 V				-2			-2	mA
$I_{OS}§$	V_{CC} = MAX			-40		-100	-40		-100	mA
I_{CCH}	V_{CC} = MAX,	V_I = 0 V			7.1	11		7.1	11	mA
I_{CCL}	V_{CC} = MAX,	See Note 2			9.4	14		9.4	14	mA
$I_{\overline{X}}$▲	$V_{\overline{X}}$ = 1.4 V,	I_X = 0,	I_{OL} = 0			-5.85			-6.3	mA
$V_{BE(Q)}$▲	$I_X + I_{\overline{X}}$ = 0.7 mA,	$R_{\overline{X}X}$ = 0,	I_{OL} = 20 mA		1.1					V
	$I_X + I_{\overline{X}}$ = 1.1 mA,	$R_{\overline{X}X}$ = 0,	I_{OL} = 20 mA						1	
V_{OH}▲	I_X = 0.32 mA,	$I_{\overline{X}} = -0.32$ mA,	$I_{OH} = -0.5$ mA	2.4	3.4					V
	I_X = 0.57 mA,	$I_{\overline{X}} = -0.57$ mA,	$I_{OH} = -0.5$ mA				2.4	3.4		
V_{OL}▲	$I_X + I_{\overline{X}}$ = 0.47 mA,	$R_{\overline{X}X}$ = 68 Ω,	I_{OL} = 20 mA		0.2	0.4				V
	$I_X + I_{\overline{X}}$ = 0.6 mA,	$R_{\overline{X}X}$ = 63 Ω,	I_{OL} = 20 mA					0.2	0.4	

[†] 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.
§ Not more than one output should be shorted at a time.
▲Using expander inputs, V_{CC} = MIN, T_A = MIN, except typical values.
NOTE 2: All inputs of one AND gate at 4.5 V, all others at GND.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}			R_L = 280 Ω,	C_L = 25 pF ¶		7	11	ns
t_{PHL}						6.2	11	ns
t_{PLH}	Any	Y	R_L = 280 Ω,	C_L = 25 pF ¶ C = 15 pF #		11.4		ns
t_{PHL}						7.4		ns

¶ Expander pins open.
# GND to $\overline{X}$.
NOTE 3: See General Information Section for load circuits and voltage waveforms.

3

TTL DEVICES

3

TTL DEVICES