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 "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs

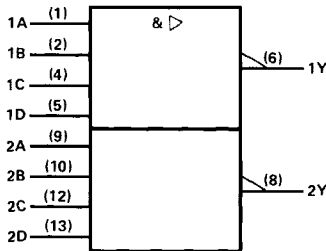- Dependable Texas Instruments Quality and Reliability

description

These devices contain two independent 4-input NAND buffer gates. They perform the Boolean functions $Y = \overline{A \cdot B \cdot C \cdot D}$ or $Y = \overline{A} + \overline{B} + \overline{C} + \overline{D}$ in positive logic.

The SN54F40 is characterized for operation over the full military temperature range of $-55\,°C$ to $125\,°C$. The SN74F40 is characterized for operation from $0\,°C$ to $70\,°C$.

FUNCTION TABLE (each gate)

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

SN54F40 . . . J PACKAGE
SN74F40 . . . D OR N PACKAGE
(TOP VIEW)

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

SN54F40 . . . FK PACKAGE
(TOP VIEW)

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

NC—No internal connection

logic symbol†

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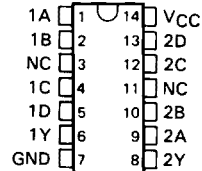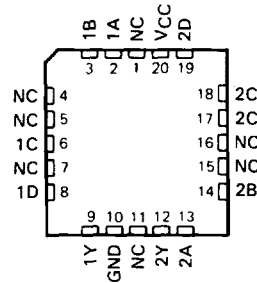
†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for D, J, and N packages.

logic diagram (positive logic)

```
    1A ——┐
    1B ——┤ )o—— 1Y
    1C ——┤
    1D ——┘

    2A ——┐
    2B ——┤ )o—— 2Y
    2C ——┤
    2D ——┘
```

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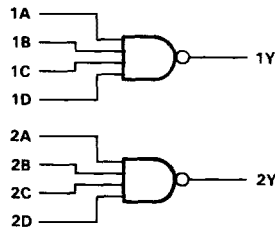
Data Sheets

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

Supply voltage, V_{CC} . . . . −0.5 V to 7 V
Input voltage[†] . . . . −0.5 V to 7 V
Input current . . . . −30 mA to 5 mA
Voltage applied to any output in the high state . . . . −0.5 V to V_{CC}
Current into any output in the low state . . . . 128 mA
Operating free-air temperature range: SN54F40 . . . . −55 °C to 125 °C
                                       SN74F40 . . . . 0 °C to 70 °C
Storage temperature range . . . . −65 °C to 150 °C

[†]The input voltage ratings may be exceeded provided the input current ratings are observed.

recommended operating conditions

		SN54F40			SN74F40			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{IK}	Input clamp current			−18			−18	mA
I_{OH}	High-level output current			−15			−15	mA
I_{OL}	Low-level output current			48			64	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		SN54F40			SN74F40			UNIT
			MIN	TYP[‡]	MAX	MIN	TYP[‡]	MAX	
V_{IK}	V_{CC} = 4.5 V,	I_I = −18 mA		−0.73	−1.2			−1.2	V
V_{OH}	V_{CC} = 4.5 V,	I_{OH} = −1 mA	2.5	3.4		2.5	3.4		V
	V_{CC} = 4.5 V,	I_{OH} = −15 mA	2			2			
	V_{CC} = 4.75 V,	I_{OH} = −1 mA				2.7			
V_{OL}	V_{CC} = 4.5 V	I_{OL} = 48 mA		0.35	0.5				V
		I_{OL} = 64 mA					0.4	0.55	
I_I	V_{CC} = 5.5 V,	V_I = 7 V			0.1			0.1	mA
I_{IH}	V_{CC} = 5.5 V,	V_I = 2.7 V			20			20	µA
I_{IL}	V_{CC} = 5.5 V,	V_I = 0.5 V			−0.6			−0.6	mA
I_{OS}[§]	V_{CC} = 5.5 V,	V_O = 0	−100		−225	−100		−225	mA
I_{CCH}	V_{CC} = 5.5 V,	V_I = 0		1.75	4		1.75	4	mA
I_{CCL}	V_{CC} = 5.5 V,	V_I = 4.5 V		11	17		11	17	mA

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, C_L = 50 pF, R_L = 500 Ω, T_A = 25 °C			V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX[¶]				UNIT
			'F40			SN54F40		SN74F40		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	1.5	3.6	6			1.5	7	ns
t_{PHL}			1	2.6	5			1	5.5	

[‡]All typical values are at V_{CC} = 5 V, T_A = 25 °C.
[§]Not more than one output should be shorted at a time and the duration of the short circuit should not exceed one second.
[¶]For conditions as MIN or MAX, use the appropriate value specified under Recommended Operating Conditions.
NOTE 1: Load circuits and waveforms are shown in Section 1.

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