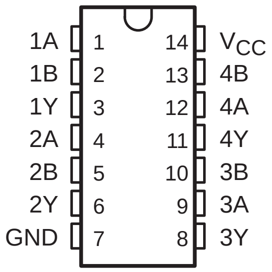
SN54F00, SN74F00
QUADRUPLE 2-INPUT POSITIVE-NAND GATES

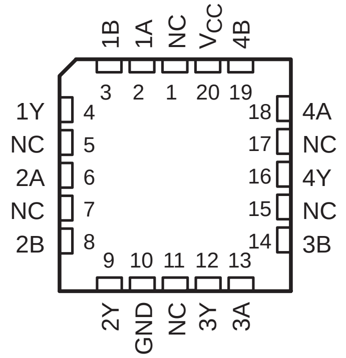
SDFS035A – MARCH 1987 – REVISED OCTOBER 1993

- **Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs**

SN54F00 . . . J PACKAGE
SN74F00 . . . D OR N PACKAGE
(TOP VIEW)



SN54F00 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

description

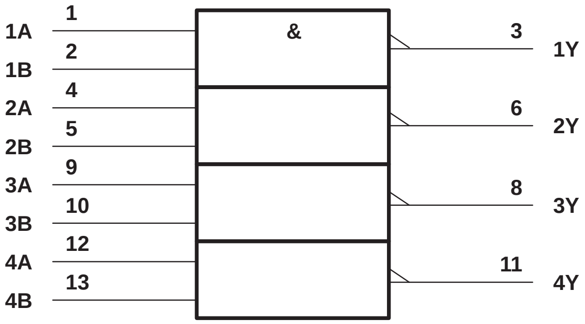
These devices contain four independent 2-input NAND gates. They perform the Boolean functions $Y = \overline{A \bullet B}$ or $Y = \overline{A} + \overline{B}$ in positive logic.

The SN54F00 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74F00 is characterized for operation from 0°C to 70°C.

FUNCTION TABLE
(each gate)

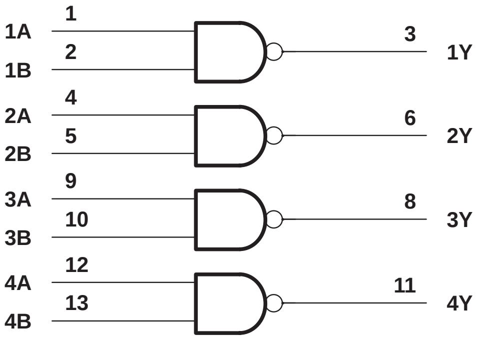
INPUTS		OUTPUT
A	**B**	**Y**
H	H	L
L	X	H
X	L	H

logic symbol[†]



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

logic diagram (positive logic)



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

TEXAS INSTRUMENTS

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

Supply voltage range, V_{CC}	–0.5 V to 7 V
Input voltage range, V_I (see Note 1)	–1.2 V to 7 V
Input current range	–30 mA to 5 mA
Voltage range applied to any output in the high state	–0.5 V to V_{CC}
Current into any output in the low state	40 mA
Operating free-air temperature range: SN54F00	–55°C to 125°C
SN74F00	0°C to 70°C
Storage temperature range	–65°C to 150°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The input voltage ratings may be exceeded provided the input current ratings are observed.

recommended operating conditions

		SN54F00			SN74F00			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			– 1			– 1	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		SN54F00			SN74F00			UNIT
			MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IK}	V_{CC} = 4.5 V,	I_I = –18 mA			–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} = 4.75 V,	I_{OH} = – 1 mA				2.7			
V_{OL}	V_{CC} = 4.5 V,	I_{OL} = 20 mA		0.3	0.5		0.3	0.5	V
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	–60		–150	–60		–150	mA
I_{CCH}	V_{CC} = 5.5 V,	V_I = 0		1.9	2.8		1.9	2.8	mA
I_{CCL}	V_{CC} = 5.5 V,	V_I = 4.5 V		6.8	10.2		6.8	10.2	mA

‡ 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.

switching characteristics (see Note 2)

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
			′F00			SN54F00		SN74F00		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	1.6	3.3	5	2	7	1.6	6	ns
t_{PHL}			1	2.8	4.3	1.5	6.5	1	5.3	

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

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

PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
5962-9757701Q2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
5962-9757701QCA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
5962-9757701QDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
JM38510/33001B2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
JM38510/33001BCA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
JM38510/33001BDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
JM38510/33301B2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
SN54F00J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SN74F00D	ACTIVE	SOIC	D	14	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74F00DR	ACTIVE	SOIC	D	14	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74F00N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74F00N3	OBSOLETE	PDIP	N	14		None	Call TI	Call TI
SN74F00NSR	ACTIVE	SO	NS	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SNJ54F00FK	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
SNJ54F00J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SNJ54F00W	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC

[1] The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

[2] Eco Plan - May not be currently available - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
None: Not yet available Lead (Pb-Free).
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

[3] MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDECindustry standard classifications, and peak solder temperature.

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Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265

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