

SN54F02, SN74F02 QUADRUPLE 2-INPUT POSITIVE-NOR GATES

D2932, MARCH 1987

- 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

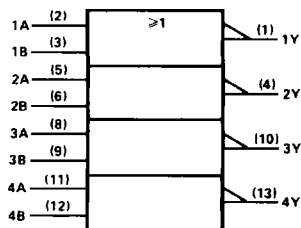
These devices contain four independent 2-input NOR gates. They perform the Boolean functions $Y = A + B$ or $Y = \bar{A} \cdot \bar{B}$ in positive logic.

The SN54F02 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74F02 is characterized for operation from 0°C to 70°C .

FUNCTION TABLE (each gate)

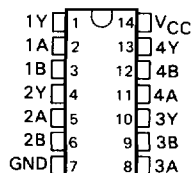
INPUTS		OUTPUT
A	B	Y
H	X	L
X	H	L
L	L	H

logic symbol†

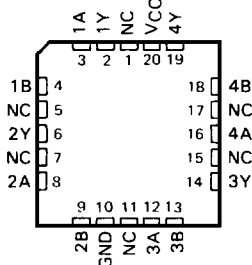


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12. Pin numbers shown are for D, J, and N packages.

SN54F02 . . . J PACKAGE
SN74F02 . . . D OR N PACKAGE
(TOP VIEW)

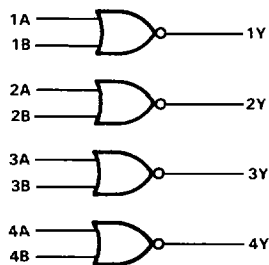


SN54F02 . . . FK PACKAGE
(TOP VIEW)



NC-- No internal connection

logic diagram (positive logic)



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Data Sheets

SN54F02, SN74F02

QUADRUPLE 2-INPUT POSITIVE-NOR GATES

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

Supply voltage, V_{CC}	-0.5 V to 7 V
Input voltage [†]	-1.2 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	40 mA
Operating free-air temperature range: SN54F02	-55°C to 125°C
SN74F02	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

	SN54F02			SN74F02			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			0			°C

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

PARAMETER	TEST CONDITIONS	SN54F02		SN74F02		UNIT
		MIN	TYP [§] MAX	MIN	TYP [§] MAX	
V_{IK}	$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$	-1.2		-1.2		V
$V_{OH}^{\#}$	$V_{CC} = 4.5\text{ V}$, $I_{OH} = -1\text{ mA}$	2.5	3.4	2.5	3.4	V
V_{OL}	$V_{CC} = 4.5\text{ V}$, $I_{OL} = 20\text{ mA}$	0.30	0.5	0.30	0.5	V
I_I	$V_{CC} = 5.5\text{ V}$, $V_I = 7\text{ V}$	0.1		0.1		mA
I_{IH}	$V_{CC} = 5.5\text{ V}$, $V_I = 2.7\text{ V}$	20		20		μA
I_{IL}	$V_{CC} = 5.5\text{ V}$, $V_I = 0.5\text{ V}$	-0.6		-0.6		mA
I_{OS}^{\dagger}	$V_{CC} = 5.5\text{ V}$, $V_O = 0$	-60	-150	-60	-150	mA
I_{CCH}	$V_{CC} = 5.5\text{ V}$, $V_I = 0$	3.7 5.6		3.7 5.6		mA
I_{CCL}	$V_{CC} = 5.5\text{ V}$, See Note 1	8.7 13		8.7 13		mA

switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5\text{ V}$, $C_L = 50\text{ pF}$, $R_L = 500\ \Omega$, $T_A = 25^\circ\text{C}$			$V_{CC} = 4.5\text{ V to } 5.5\text{ V}$, $C_L = 50\text{ pF}$, $R_L = 500\ \Omega$, $T_A = \text{MIN to MAX}^{\ddagger}$			UNIT	
			'F02			SN54F02		SN74F02		
			MIN	TYP	MAX	MIN	MAX	MIN		MAX
t_{PLH}	A or B	Y	1.7	4	5.5	1.7	7.5	1.7	6.5	ns
t_{PHL}	A or B	Y	1	2.8	4.3	1	6.5	1	5.3	ns

[‡]For conditions shown as MIN or MAX, use the appropriate value specified under Recommended Operating Conditions.

[§]All typical values are at $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$.

[†]Not more than one output should be shorted at a time and the duration of the short circuit should not exceed one second.

[#]For the SN74F02 at $V_{CC} = 4.75\text{ V}$ and $I_{OH} = -1\text{ mA}$, $V_{OH\text{ min}} = 2.7\text{ V}$.

NOTES: 1. I_{CCL} is measured with one input per gate at 4.5 V and all others are grounded.

2. See General Information for load circuits and waveforms.

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Data Sheets