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

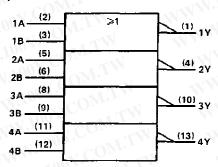
These devices contain four independent 2-input-NOR gates.

The SN5402, SN54LS02, and SN54S02 are characterized for operation over the full military temperature range of -55° C to 125°C. The SN7402, SN74LS02, and SN74S02 are characterized for operation from 0°C to 70°C.

FUNCTION TABLE (each gate)

	INP	UTS	OUTPUT
	Α	В	YWW
V	Н	X	L
1	X	Nн	L
	Ĺ	L	Н

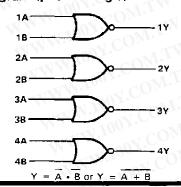
logic symbol[†]



[†]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.

logic diagram (positive logic)



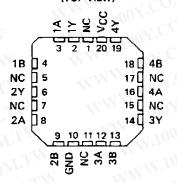
SN5402...J PACKAGE
SN54LS02, SN54S02...J OR W PACKAGE
SN7402...N PACKAGE
SN74LS02, SN74S02...D OR N PACKAGE
(TOP VIEW)

1Y	d	1	Ui	山	Vçc
1A	Ц	2	1:		4 Y
18	d	3	1;		4 B
2Y		4	1	ıμ	4 A
2A	d	5	10	þ	3 Y
2B	d	6	M. 6	Ъ	3 B
GND	П	7		3	3A

SN5402 . . . W PACKAGE (TOP VIEW)

1A 🗆	1	U	14	þ	4Y
18 [2		13	þ	4B
1 1 □	3				4A
Vcc □		10	11	ם	GND
2Y 🗆			10		3B
2A 🗀			9	ם	3A
2B 🗆	7		8		3Y

SN54LS02, SN54S02 . . . FK PACKAGE (TOP VIEW)



NC - No internal connection

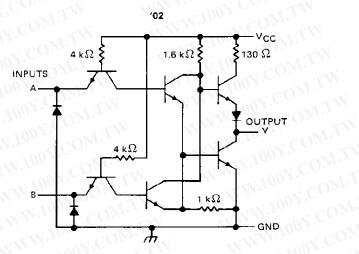
勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787 Http://www.100y.com.tw

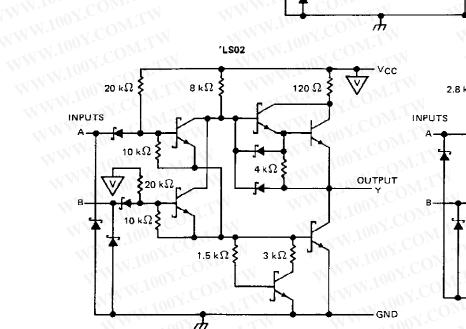
PRODUCTION DATA documents contain information current as of publication dats. Products conform to specifications per the terms of Tuxas Instruments standard warranty. Production processing does not necessarily include tasting of all parameters.

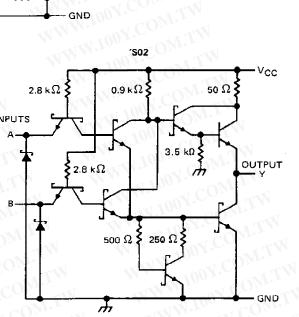


勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787 Http://www. 100y. com. tw

schematics (each gate)







VW.100Y.COM

Resistor values shown are nominal

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

Supply voltage, VCC (see Note 1)		7 V
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Off-state output voltage		
	SN54'	
	SN74'	
FE 1. Voltage values are with respect to network	ground terminal.	

NOTE 1. Voltage values are with respect to network ground terminal.



recommended operating conditions

ON COM	MM 100X CO. TH MM 10	SN5402	SN7402	
Wing COM.	W WWW.LOOV.COM. TW WWW.	MIN NOM MAX	MIN NOM MAX	UNIT
W.100 Y. COM.	V _{CC} Supply voltage	4.5 5 5.5	4.75 5 5.25	٧
W.1001.	V _{IH} High-level input voltage	2 (0)	2	V
W 1 1007.Co	VIL Low-level input voltage	0.8	0.8	٧
MAN TOON CO	IOH High-level output current	- 0.4	- 0.4	mΑ
WWW.LOW.CO	IOL Low-level output current	16	16	mA
WWW.In	TA Operating free-air temperature	55 125	0 70	°c

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

	$C_{O_{J_{2}}}$	W	TEST CONDITIONS †		SN5402	M.C.	- A N	SN7402		
	PARAMETER	i d	TEST CONDITIONS I	MIN	TYP#	MAX	MIN	TYP‡	MAX	UNIT
	УIK	V _{CC} = MIN,	I _I = - 12 mA		M^{1}	- 1.5	$CO_{\overline{D}}$	1.	- 1.5	>
	Voн	VCC = MIN,	V _{IL} = 0.8 V, I _{OH} = - 0.4 mA	2.4	3.4	100 -	2.4	3.4	- < 1	٧
	VOL	V _{CC} = MIN,	V _{IH} = 2 V, I _{OL} = 16 mA	1/1	0.2	0.4		0.2	0.4	V
$M_{M^{-1}}$	COM.	VCC = MAX,	V ₁ = 5.5 V		MAN	1	Y.C.	- N/	TVI	mA
W	he CO	V _{CC} = MAX,	V ₁ = 2.4 V		WW	40	N.Vo.	0	40	μΑ
XIV.	1.10hL	V _{CC} = MAX,	V ₁ = 0.4 V	*1	-311	- 1.6		$CO_{\overline{D}}$	- 1.6	mA
	los§	VCC = MAX	M. 100 . CON'T	- 20	-	- 55	- 18	1 CO	– 55	mΑ
V	Іссн	V _{CC} = MAX,	V ₁ = 0 V		8	16	100	8	16	mΑ
N	ICCL	V _{CC} = MAX,	See Note 2	TV	14	27	-110	14	27	mA

WWW.100Y.COM.T † For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

switching characteristics, VCC = 5 V, TA = 25°C (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST COM	NDITIONS	MIN	ТҮР	MAX	UNIT
tPLH (ON CON	I. J	MAN. IN.	ON	WV	12	22	ns
^t PHL	A or B	WILLA	$R_{\perp} = 400 \Omega$,	C _L = 15 pF		8	15	ns

100Y.COM.TW

WWW.100Y.COM.

W.100Y.COM

NOTE 3: Load circuits and voltage waveforms are shown in Section 1. WWW.100Y.COM.TW WWW.100Y.COM.

WWW.100

WWW.100Y.COM.T 勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787 Http://www. 100y. com. tw



[‡] All typical values are at V_{CC} = 5 V, T_A = 25°C.

[§] Not more than one output should be shorted at a time.

SN54LS02, SN74LS02 QUADRUPLE 2-INPUT POSITIVE-NOR GATES

recommended operating conditions

		10 X .	SN54LS	302		SN74LS	02	
		MIN	NOM	MAX	MIN	NOM	MAX	UNIT
VCC	Supply voltage	4.5	5	5.5	4.75	5	5.25	٧
v_{IH}	High-level input voltage	2	V CC	Mr.	2			٧
VIL	Low-level input voltage	1.100	-7 (0.7	- 1	-	8.0	٧
lон	High-level output current	N 10	Oxic	- 0.4	In		- 0.4	mΑ
IOL	Low-level output current	_ 1	001	4	TT	N	8	mA
Тд	Operating free-air temperature	- 55	. 003	125	0	W	70	°C

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

COM	W.	TEGT COURT	TOUR T TW		SN54LS	02	, J.	SN74LS	SO2	l
PARAMETER	×1 -×	TEST CONDIT	TUNS	MIN	TYP‡	MAX	MIN	TYP\$	MAX	UNIT
VIK	VCC = MIN,	I ₁ = - 18 mA	COM	- 41	NW.	– 1.5	CO	M.	_ 1.5	V
Voн	V _{CC} = MIN,	VIL = MAX,	1 _{OH} = - 0.4 mA	2.5	3.4	700,	2.7	3.4	. **	٧
100X.C	VCC - MIN,	V _{IH} = 2 V,	I _{OL} = 4 mA	V	0.25	0.4	Y	0.25	0.4	V
VOL	V _{CC} = MIN,	V _{IH} = 2 V,	IOL = 8 mA	-	WW	-110	OAIC	0.35	0.5	1
· 1 CO	V _{CC} = MAX,	V _I = 7 V	· ro COM.		WW	0.1	.Yno	Co_h	0.1	mΑ
N 1 Till	VCC = MAX,	V ₁ = 2.7 V	Ning COM.		-31	20	00	1 CO	20	MΑ
11007.	VCC = MAX,	V ₁ = 0.4 V	$^{\mathrm{M}_{100}}_{\mathrm{M}_{1}}$	-	77	- 0.4	100	-1 C(- 0.4	mΑ
I _{OS} §	V _{CC} - MAX	M.M.	1100Y. OM.TV	- 20		- 100	- 20	N.	- 100	mΑ
Іссн	V _{CC} = MAX,	V _I = 0 V	NYV. 100Y.CO	W.	1.6	3.2	116	1.6	3.2	mA
ICCL	VCC = MAX,	See Note 2	MAN . TO COM	dXX	2.8	5.4	11.5	2.8	5.4	πΑ

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

switching characteristics, VCC = 5 V, TA = 25°C (see note 3)

RAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CON	IDITIONS	MIN TYP	MAX	UNIT
tPLH	A or B	W.T.V.		COX - 15-5	10	15	ns
tPHL	AOLP	TW	$R_L = 2 k\Omega$,	C _L = 15 pF	10	15	ns

勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787 Http://www. 100y. com. tw



[‡] 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.

NOTE 2: One input at 4.5 V, all others at GND.

W.100Y.COM

recommended operating conditions

100Y.			$0_{0,i}$.	SN54S	02		SN74S0	2	UNIT
TO V.COM.	V_	MMM. OUN.CO. TM MMM.	MIN	NOM	MAX	MIN	мом	MAX	UNII
1.100 COM	CC	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
N.1003.	iН	High-level input voltage	2	V.C	0_{Mr} .	2			٧
100y.	IL	Low-level input voltage	41.10	-7 (8.0	- 1		0.8	V
I to	ЭН	High-level output current	-T(N.1	n_{x}	CON	7.7	-4	– 1	mΑ
W. C. C. T.)L	Low-level output current	VV 1	1001	20	LT.		20	mA
W.Lo. OG	A	Operating free-air temperature	- 55	. 00	125	0	W	70	°C

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

PARAMETER		TEST CONDIT	rigue t		SN54S0	2		SN74S0	2	רומט
PANAMETER		TEST CONDIT	TONS I	MIN	TYP‡	MAX	MIN	TYP‡	MAX	UNII
VIK	V _{CC} = MIN,	I _I = -18 mA	COM.	- 1	WW.	-1.2	CO_{I}	Mr.	-1,2	V
V _{ОН}	V _{CC} = MIN,	V _{1L} = 0.8 V,	I _{OH} = -1 mA	2.5	3.4	700.	2.7	3.4	×1	٧
VOL	VCC = MIN,	V _{IH} = 2 V,	IOL = 20 mA		111	0.5		M	0.5	٧
ody.Com	VCC = MAX,	V ₁ = 5.5 V	100Y.Co.		MM	1.10	DA'C		1	mA
I _{IH} , CO	V _{CC} = MAX,	V ₁ = 2.7 V	To VA COLAR	W.	WV	50	M.	Cor	50	μА
11 ₁₁	V _{CC} = MAX,	V = 0.5 V	N.In. COM.	-11		-2	0		-2	mA
I _{OS} §	V _{CC} = MAX	M	M.1001.	-40	N.	-100	_40	-1 CC	-100	mΑ
^І ссн	V _{CC} = MAX,	VI = 0 Λ	1007.	IN	17	29	1.100	17	29	mΑ
CCL	V _{CC} = MAX,	See Note 2	MAN. TOOX.CO.	VT	26	45	-110	26	45	mA

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

NOTE 2: One input at 4.5 V, all others at GND.

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$ (see note 3)

PARAMETER	FROM (INPUT)	TO (QUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
^t PLH	A or B	Marw	n - 200 o	C _L = 15 pF	-318	3.5	5,5	ns
tPHL .			$R_L = 280 \Omega$,		NY.	3.5	5,5	ns
tPLH			$R_1 = 280 \Omega$,	C _L = 50 pF		5	N.100	ns
tPHL 1			RL = 280 12,			5	-110	ns

勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787

Http://www.100y.com.tw



[‡] 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.

IMPORTANT NOTICE

Texas Instruments (TI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

TI warrants performance of its semiconductor products and related software to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

Certain applications using semiconductor products may involve potential risks of death, personal injury, or severe property or environmental damage ("Critical Applications").

TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS.

Inclusion of TI products in such applications is understood to be fully at the risk of the customer. Use of TI products in such applications requires the written approval of an appropriate TI officer. Questions concerning potential risk applications should be directed to TI through a local SC sales office.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards should be provided by the customer to minimize inherent or procedural hazards.

勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787 Http://www.100y.com.tw

Copyright © 1996, Texas Instruments Incorporated

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.

勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787 Http://www.100y.com.tw

Copyright © 1998, Texas Instruments Incorporated