

SN5423, SN5425, SN7423, SN7425 DUAL 4-INPUT NOR GATES WITH STROBE

SDLS082

DECEMBER 1983—REVISED MARCH 1988

- Package Options Include Plastic and Ceramic DIPs and Ceramic Flat Packages
- Dependable Texas Instruments Quality and Reliability

description

These devices contain dual 4-input positive NOR gates with strobe. They perform the Boolean function:

$$Y = \overline{G(A+B+C+D)}$$

(with 1X and 1X̄ of '23 left open).

The SN5423 and the SN5425 are characterized for operation over the full military temperature range of -55°C to 125°C. The SN7423 and the SN7425 are characterized for operation from 0°C to 70°C.

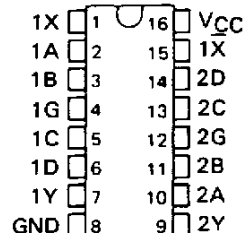
FUNCTION TABLE

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

Expander inputs are open,
H = high level, L = low level, X = irrelevant

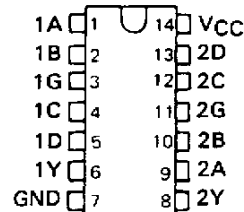
SN5423 . . . J OR W PACKAGE
SN7423 . . . N PACKAGE

(TOP VIEW)

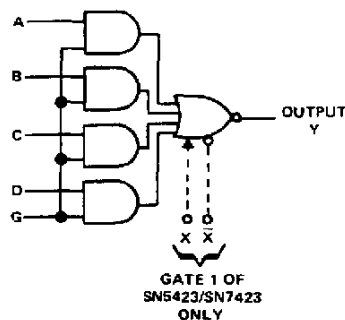


SN5425 . . . J OR W PACKAGE
SN7425 . . . N PACKAGE

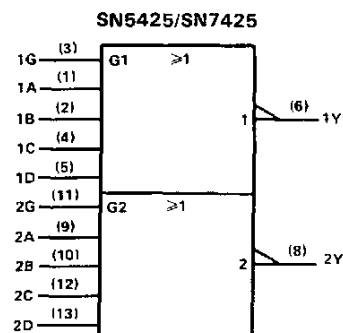
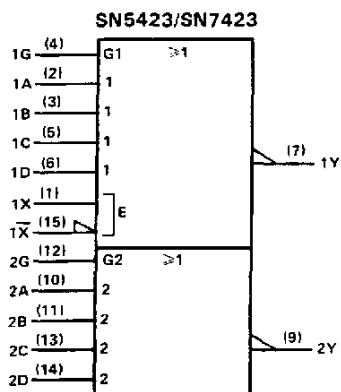
(TOP VIEW)



logic diagram



logic symbols†



†These symbols are in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12. Pin numbers are for J, N, or W packages.

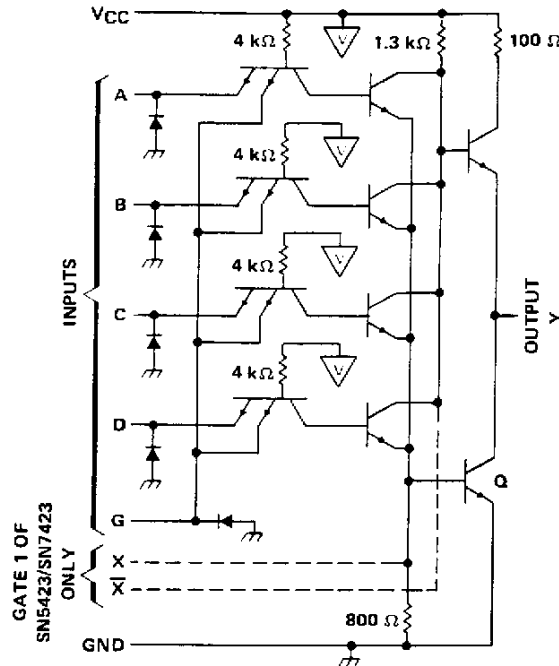
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SN5423, SN5425, SN7423, SNSN7425 DUAL 4-INPUT NOR GATES WITH STROBE

schematic (each gate)



- NOTES: A. Component values shown are nominal.
 B. Both expander inputs are used simultaneously for expanding.
 C. If expander is not used leave X and X' open.
 D. A total of four expander gates can be connected to the expander inputs.

 - VCC bus

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

Supply voltage V_{CC} (see Note 1)	7 V
Input voltage (see Note 1)	5.5 V
Interemitter voltage (see Note 2)	5.5 V
Operating free-air temperature range: SN5423, SN5425 Circuits	-55°C to 125°C
SN7423, SN7425 Circuits	0°C to 70°C
Storage temperature range	-65°C to 150°C

- NOTES: 1. Voltage values, except interemitter voltage, are with respect to network ground terminal.
 2. This is the voltage between two emitters of a multiple-emitter transistor.

recommended operating conditions

		'23, '25			UNIT
		MIN	NOM	MAX	
V_{CC} Supply voltage	54 Family	4.5	5	5.5	V
	74 Family	4.75	5	5.25	
V_{IH} High-level input voltage		2			V
V_{IL} Low-level input voltage		0.8			V
I_{OH} High-level output current		-0.8			mA
I_{OL} Low-level output current	54 Family	16			mA
	74 Family	16			
T_A Operating free-air temperature range	54 Family	-55	125		°C
	74 Family	0	70		

The '23 is designed for use with up to four '60 expanders.

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SN5423, SN5425, SN7423, SN7425 DUAL 4-INPUT NOR GATES WITH STROBE

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

PARAMETER		TEST CONDITIONS†	MIN	TYP‡	MAX	UNIT	
V_I		$V_{CC} = \text{MIN}$, $I_I = -12 \text{ mA}$			-1.5	V	
V_{OH}		$V_{CC} = \text{MIN}$, $V_{IL} = 0.8 \text{ V}$, $I_{OH} = -0.8 \text{ mA}$	2.4	3.4		V	
V_{OL}		$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $I_{OL} = 16 \text{ mA}$		0.2	0.4	V	
I_I		$V_{CC} = \text{MAX}$, $V_I = 5.5 \text{ V}$			1	mA	
I_{IH}	data inputs	$V_{CC} = \text{MAX}$, $V_I = 2.4 \text{ V}$			40	μA	
	strobe inputs				160		
I_{IL}	data inputs	$V_{CC} = \text{MAX}$, $V_I = 0.4 \text{ V}$			-1.6	mA	
	strobe inputs				-6.4		
$I_{OS}\S$		$V_{CC} = \text{MAX}$	54 Family		-20	-55	mA
			74 Family		-18	-55	
I_{CCH}		$V_{CC} = \text{MAX}$, All inputs at 0 V		8	16	mA	
I_{CCL}		$V_{CC} = \text{MAX}$, All inputs at 5 V		10	19	mA	

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type. Expander inputs X and \bar{X} are open.

‡ 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.

electrical characteristics (SN5423 circuits) using expander inputs, $V_{CC} = 4.5 \text{ V}$, $T_A = -55^\circ\text{C}$

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
$I_{\bar{X}}$	Expander current	$V_{X\bar{X}} = 0.4 \text{ V}$, $I_{OL} = 16 \text{ mA}$			-3.5	mA
$V_{BE(Q)}$	Base-Emitter voltage of output transistor (Q)	$I_{OL} = 16 \text{ mA}$, $I_X + I_{\bar{X}} = 0.41 \text{ mA}$, $R_{X\bar{X}} = 0$			1.1	V
V_{OH}	High-level output voltage	$I_{OH} = -0.4 \text{ mA}$, $I_X = 0.15 \text{ mA}$, $I_{\bar{X}} = -0.15 \text{ mA}$	2.4	3.4		V
V_{OL}	Low-level output voltage	$I_{OL} = 16 \text{ mA}$, $I_X + I_{\bar{X}} = 0.3 \text{ mA}$, $R_{X\bar{X}} = 114 \Omega$		0.2	0.4	V

electrical characteristics (SN7423 circuits) using expander inputs, $V_{CC} = 4.75 \text{ V}$, $T_A = 0^\circ\text{C}$

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
$I_{\bar{X}}$	Expander current	$V_{X\bar{X}} = 0.4 \text{ V}$, $I_{OL} = 16 \text{ mA}$			-3.8	mA
$V_{BE(Q)}$	Base-Emitter voltage of output transistor (Q)	$I_{OL} = 16 \text{ mA}$, $I_X + I_{\bar{X}} = 0.62 \text{ mA}$, $R_{X\bar{X}} = 0$			1	V
V_{OH}	High-level output voltage	$I_{OH} = -0.4 \text{ mA}$, $I_X = 0.27 \text{ mA}$, $I_{\bar{X}} = -0.27 \text{ mA}$	2.4	3.4		V
V_{OL}	Low-level output voltage	$I_{OL} = 16 \text{ mA}$, $I_X + I_{\bar{X}} = 0.43 \text{ mA}$, $R_{X\bar{X}} = 130 \Omega$		0.2	0.4	V

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

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$, $N = 10$, (see note 3)

PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	$R_L = 400 \Omega$,	$C_L = 15 \text{ pF}$		13	22	ns
t_{PHL}	$R_L = 400 \Omega$,	$C_L = 15 \text{ pF}$		8	15	ns

NOTE 3: Switching characteristics of the SN5423 and SN7424 are tested with the expander pins open.