REVISED DECEMBER 1983

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

description

These devices contain dual 4-input positive NOR gates with strobe. The SN5423 and SN7423 are expandable, and perform the Boolean functions:

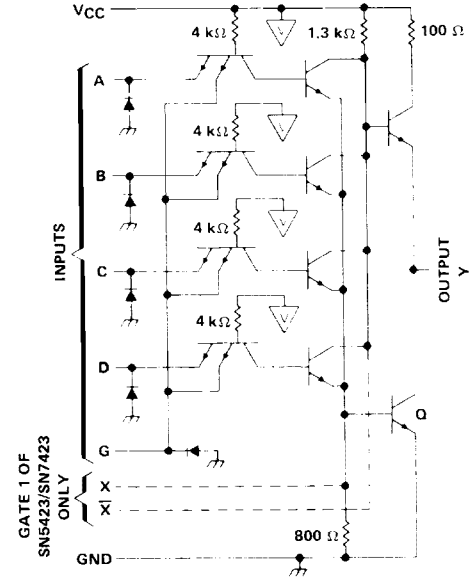
$$1Y = \overline{1G(1A + 1B + 1C + 1D) + X} \text{ and}$$
$$2Y = \overline{2G(2A + 2B + 2C + 2D)}$$

with X = output of SN5460/SN7460. The SN5425 and SN7425 perform the Boolean function:

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

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.

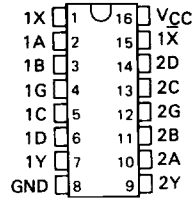
schematic (each gate)



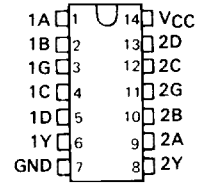
Notes:
A. Component values shown are nominal.
B. Both expander inputs are used simultaneously for expanding.
C. If expander is not used leave X and X open.
D. A total of four expander gates can be connected to the expander inputs.

▽ = V_{CC} bus

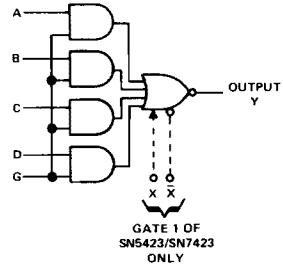
SN5423 . . . J OR W PACKAGE
SN7423 . . . J OR N PACKAGE
(TOP VIEW)



SN5425 . . . J OR W PACKAGE
SN7425 . . . J OR N PACKAGE
(TOP VIEW)



logic diagram



TRUTH 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

3 TTL DEVICES

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.

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

PARAMETER		TEST CONDITIONS†		MIN	TYP‡	MAX	UNIT
V_I		V_{CC} = MIN, I_I = −12 mA				−1.5	V
V_{OH}		V_{CC} = MIN, V_{IL} = 0.8 V, I_{OH} = −0.8 mA		2.4	3.4		V
V_{OL}		V_{CC} = MIN, V_{IH} = 2 V, I_{OL} = 16 mA			0.2	0.4	V
I_I		V_{CC} = MAX, V_I = 5.5 V				1	mA
I_{IH}	data inputs	V_{CC} = MAX, V_I = 2.4 V				40	μA
	strobe inputs					160	
I_{IL}	data inputs	V_{CC} = MAX, V_I = 0.4 V				−1.6	mA
	strobe inputs					−6.4	
I_{OS}§		V_{CC} = MAX	54 Family	−20		−55	mA
			74 Family	−18		−55	
I_{CCH}		V_{CC} = MAX, All inputs at 0 V			8	16	mA
I_{CCL}		V_{CC} = 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 $\overline{X}$ are open.
‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.
§ Not more than one output should be shorted at a time.

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electrical characteristics (SN5423 circuits) using expander inputs, V_{CC} = 4.5 V, T_A = – 55°C

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

electrical characteristics (SN7423 circuits) using expander inputs, V_{CC} = 4.75 V, T_A = 0°C

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

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

switching characteristics, V_{CC} = 5 V, T_A = 25°C, N = 10, (see note 3)

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

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