

# SN5450, SN7450

## DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATES (ONE GATE EXPANDABLE)

SDLS112 – DECEMBER 1983 – REVISED MARCH 1988

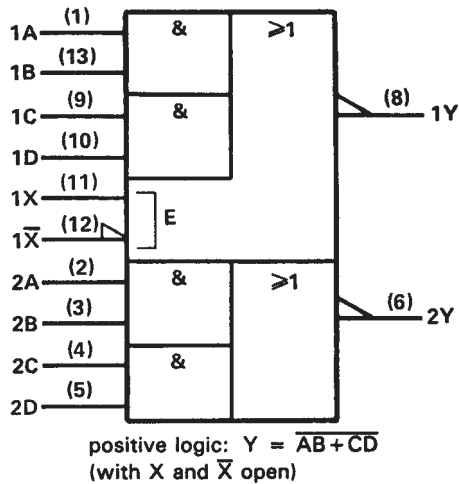
- Package Options Include Plastic and Ceramic DIPs and Ceramic Flat Packages
- Dependable Texas Instruments Quality and Reliability

### description

These devices contain two independent 2-wide 2-input AND-OR-INVERT gates with one gate expandable. They perform the Boolean function  $Y = \overline{AB} + \overline{CD}$  with X and  $\overline{X}$  left open.

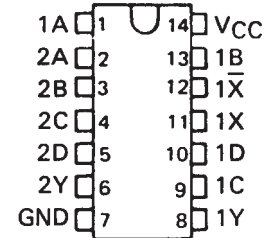
The SN5450 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN7450 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

### logic symbol†

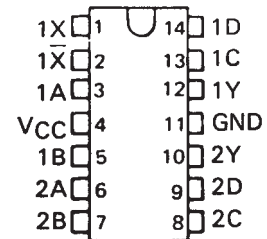


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.  
Pin numbers shown are for J and N packages.

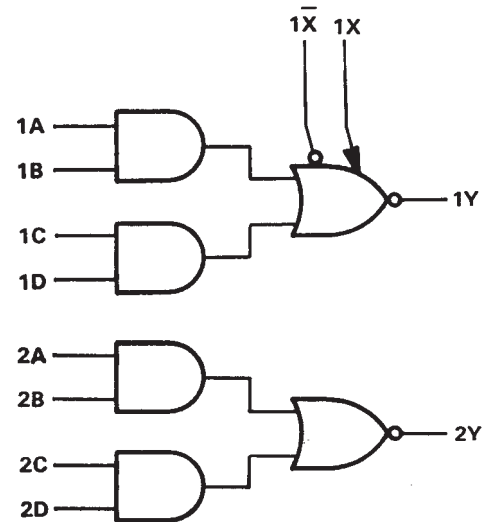
SN5450 . . . J PACKAGE  
SN7450 . . . N PACKAGE  
(TOP VIEW)



SN5450 . . . W PACKAGE  
(TOP VIEW)



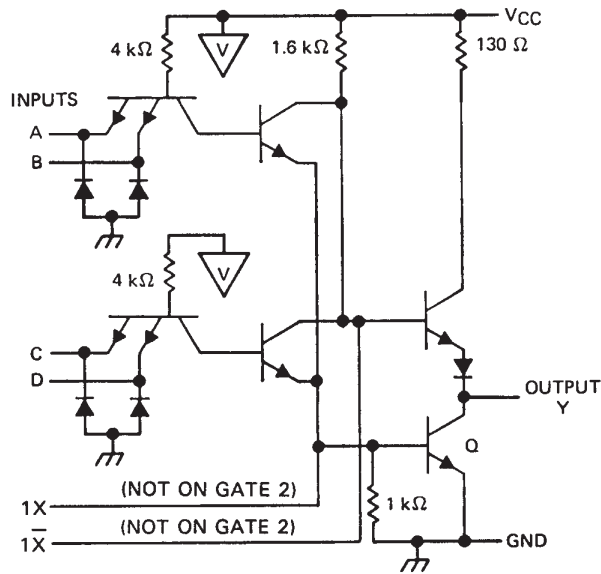
### logic diagram (positive logic)



# SN5450, SN7450 DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATES (ONE GATE EXPANDABLE)

SDLS112 – DECEMBER 1983 – REVISED MARCH 1988

## schematic (each AND-OR-INVERT gate)



Resistor values shown are nominal.  
If expander is not used, leave X and  $\bar{X}$  open.

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

Supply voltage, $V_{CC}$ (see Note 1)	7 V
Input voltage	5.5 V
Operating free-air temperature range: SN5450	-55 °C to 125 °C
SN7450	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

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



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

# SN5450, SN7450

## DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATES (ONE GATE EXPANDABLE)

SDLS112 – DECEMBER 1983 – REVISED MARCH 1988

### recommended operating conditions

		SN5450			SN7450			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub>	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub>	High-level input voltage	2			2			V
V <sub>IL</sub>	Low-level input voltage				0.8			V
I <sub>OH</sub>	High-level output current				-0.4			mA
I <sub>OL</sub>	Low-level output current				16			mA
T <sub>A</sub>	Operating free-air temperature	-55			125			°C

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

PARAMETER	TEST CONDITIONS†	SN5450			SN7450			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -12 mA	-1.5			-1.5			V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = -0.4 mA	2.4	3.4		2.4	3.4	V	
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 16 mA	0.2		0.4	0.2		0.4	V
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V	1			1			mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2.4 V	40			40			μA
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>IL</sub> = 0.4 V	-1.6			-1.6			mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-20		-55	-18		-55	mA
I <sub>CCH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V	4		8	4		8	mA
I <sub>CCL</sub>	V <sub>CC</sub> = MAX, See Note 2	7.4		14	7.4		14	mA
I <sub>X</sub> ¶	V <sub>X</sub> = 0.4 V, I <sub>OL</sub> = 16 mA	-2.9			-3.1			mA
V <sub>BE(Q)</sub> ¶	I <sub>X</sub> + I <sub>X</sub> = 0.41 mA, R <sub>X</sub> = 0, I <sub>OL</sub> = 16 mA	1.1						V
	I <sub>X</sub> + I <sub>X</sub> = 0.62 mA, R <sub>X</sub> = 0, I <sub>OL</sub> = 16 mA				1			
V <sub>OH</sub> ¶	I <sub>X</sub> = 0.15 mA, I <sub>X</sub> = -0.15 mA, I <sub>OH</sub> = -0.4 mA	2.4	3.4					V
	I <sub>X</sub> = 0.27 mA, I <sub>X</sub> = -0.27 mA, I <sub>OH</sub> = -0.4 mA				2.4	3.4		
V <sub>OL</sub> ¶	I <sub>X</sub> + I <sub>X</sub> = 0.3 mA, R <sub>X</sub> = 138 Ω, I <sub>OL</sub> = 16 mA	0.2		0.4				V
	I <sub>X</sub> + I <sub>X</sub> = 0.43 mA, R <sub>X</sub> = 130 Ω, I <sub>OL</sub> = 16 mA				0.2	0.4		

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

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

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

¶ Using expander inputs, V<sub>CC</sub> = MIN, T<sub>A</sub> = MIN, except typical values.

NOTE 2: All inputs of one AND gate at 4.5 V, all others at GND.

### switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PLH</sub>	Any	Y	R <sub>L</sub> = 400 Ω, C <sub>L</sub> = 15 pF Expander pins open		13	22	ns
t <sub>PHL</sub>					8	15	ns

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.



## **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.