

# SN54LS55, SN74LS55 2-WIDE 4-INPUT AND-OR-INVERT GATES

SDLS181 – DECEMBER 1983 – REVISED MARCH 1988

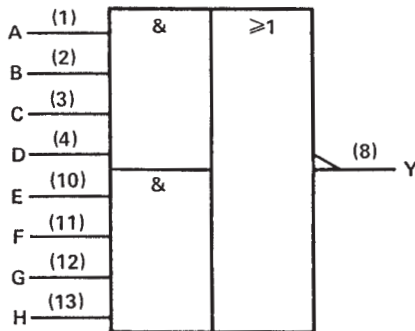
- Package Options Include "Small Outline" Packages, Ceramic Chip Carriers and Flat Packages, and Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

## description

These devices contain 2-wide 4-input AND-OR-INVERT gates. They perform the Boolean function  $Y = \overline{ABCD + EFGH}$ .

The SN54LS55 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74LS55 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

## logic symbol†

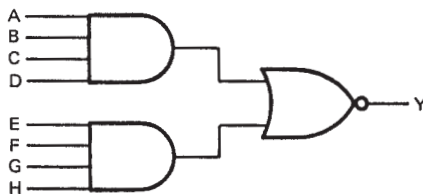


positive logic:  $Y = \overline{ABCD + EFGH}$

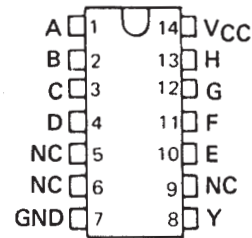
†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.

Pin numbers shown are for D, J, N, and W packages.

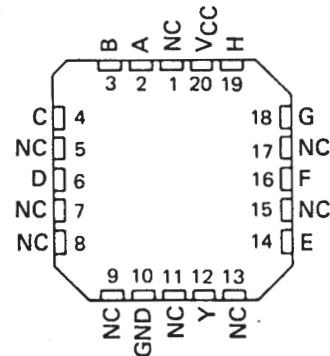
## logic diagram



SN54LS55 . . . J OR W PACKAGE  
SN74LS55 . . . D OR N PACKAGE  
(TOP VIEW)

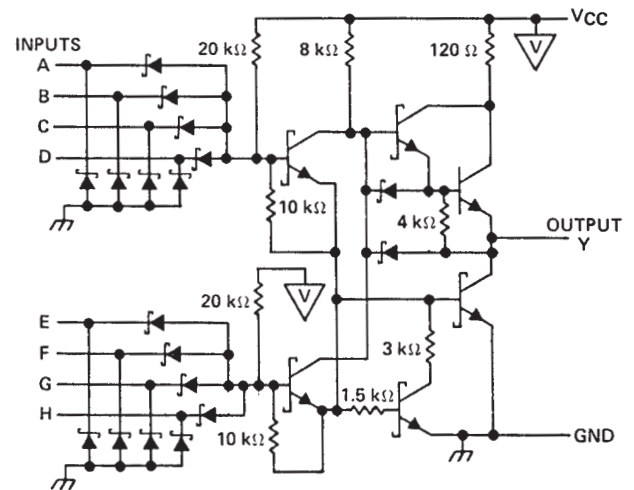


SN54LS55 . . . FK PACKAGE  
(TOP VIEW)



NC - No internal connection

## schematic



Resistor values shown are nominal.

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

Supply voltage, $V_{CC}$ (see Note 1)	7 V
Input voltage	7 V
Operating free-air temperature: SN54LS55	–55°C to 125°C
SN74LS55	0°C to 70°C
Storage temperature range	–65°C to 150°C

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

## recommended operating conditions

	SN54LS55			SN74LS55			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
$V_{CC}$ Supply voltage	4.5	5	5.5	4.75	5	5.25	V
$V_{IH}$ High-level input voltage	2			2			V
$V_{IL}$ Low-level input voltage			0.7			0.8	V
$I_{OH}$ High-level output current			–0.4			–0.4	mA
$I_{OL}$ Low-level output current			4			8	mA
$T_A$ Operating free-air temperature	–55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS†	SN54LS55			SN74LS55			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
$V_{IK}$	$V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$			–1.5			–1.5	V
$V_{OH}$	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}, I_{OH} = -0.4 \text{ mA}$	2.5	3.4		2.7	3.4		V
$V_{OL}$	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 4 \text{ mA}$		0.25	0.4		0.25	0.4	V
	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 8 \text{ mA}$					0.35	0.5	
$I_I$	$V_{CC} = \text{MAX}, V_I = 7 \text{ V}$			0.1			0.1	mA
$I_{IH}$	$V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$			20			20	μA
$I_{IL}$	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$			–0.4			–0.4	mA
$I_{OS}§$	$V_{CC} = \text{MAX}$	–20		–100	–20		–100	mA
$I_{CCH}$	$V_{CC} = \text{MAX}, V_I = 0 \text{ V}$		0.4	0.8		0.4	0.8	mA
$I_{CCL}$	$V_{CC} = \text{MAX}, \text{ See Note 2}$		0.7	1.3		0.7	1.3	mA

† 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.

NOTE 2: All outputs of one AND gate 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 (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH}$	Any	Y	$R_L = 2 \text{ k}\Omega, C_L = 15 \text{ pF}$		12	20	ns
$t_{PHL}$					12.5	20	ns

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



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