

TYPES SN54H55, SN54L55, SN54LS55, SN74H55, SN74LS55 2-WIDE 4-INPUT AND-OR-INVERT GATES

REVISED DECEMBER 1983

- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

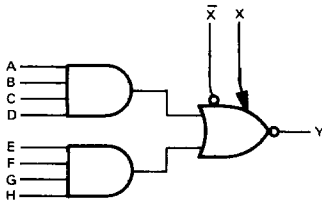
description

These devices contain 2-wide 4-input AND-OR-INVERT gates. The 'L55 and 'LS55 perform the Boolean function $Y = ABCD + EFGH$. The 'H55 is expandable and performs the Boolean function $Y = ABCD + EFGH + X$ with X = output of SN54H60/SN74H60 or SN54H62/SN74H62.

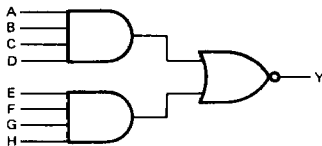
The SN54H55, SN54L55, and the SN54LS55 are characterized for operation over the full military temperature range of -55° to 125°C . The SN74H55 and SN74LS55 are characterized for operation from 0°C to 70°C .

logic diagrams

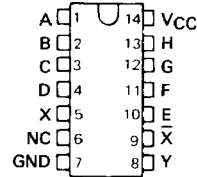
'H55, EXPANDABLE



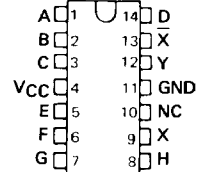
'L55, 'LS55



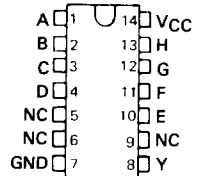
SN54H55 ... J PACKAGE
SN74H55 ... J OR N PACKAGE
(TOP VIEW)



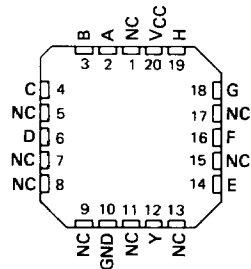
SN54H55 ... W PACKAGE
(TOP VIEW)



SN54L55 ... J PACKAGE
SN54LS55 ... J OR W PACKAGE
SN74LS55 ... D, J OR N PACKAGE
(TOP VIEW)



SN54LS55 ... FK PACKAGE
SN74LS55 ... FN PACKAGE
(TOP VIEW)



NC - No internal connection

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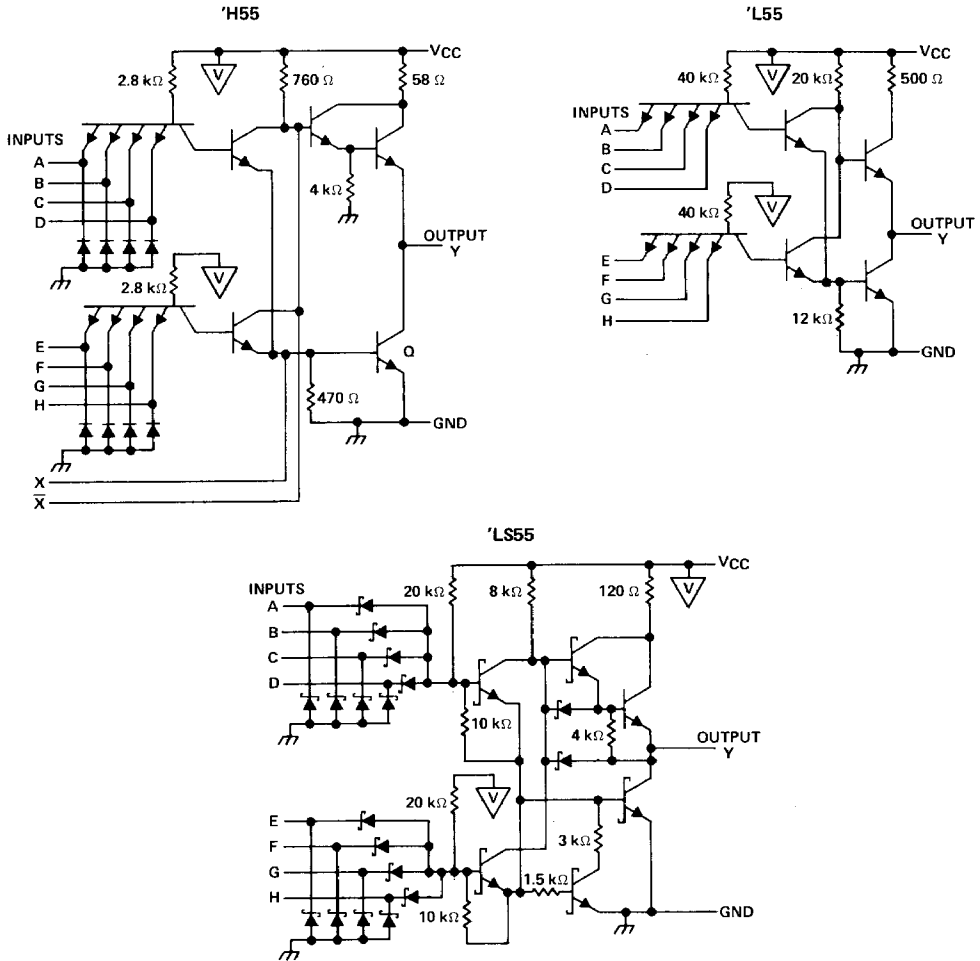
PRODUCTION DATA
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**TYPES SN54H55, SN54L55, SN54LS55,
SN74H55, SN74LS55
2-WIDE 4-INPUT AND-OR-INVERT GATES**

schematics



Resistor values shown are nominal.

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

Supply voltage, V _{CC} (see Note 1)	7 V
Input voltage: 'H55, 'L55	5.5 V
'LS55	7 V
Operating free-air temperature range: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

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

TYPES SN54H55, SN74H55
2-WIDE 4-INPUT AND-OR-INVERT GATES

recommended operating conditions

	SN54H55			SN74H55			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			0.8			0.8	V
I _{OH} High-level output current			-0.5			-0.5	mA
I _{OL} Low-level output current			20			20	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†	SN54H55		SN74H55		UNIT		
		MIN	TYP‡	MAX	MIN		TYP‡	MAX
V _{IK}	V _{CC} = MIN, I _I = -8 mA			-1.5		-1.5	V	
V _{OH}	V _{CC} = MIN, V _{IL} = 0.8 V, I _{OH} = -0.5 mA	2.4	3.4		2.4	3.4	V	
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 20 mA		0.2	0.4		0.2	0.4	V
I _I	V _{CC} = MAX, V _I = 5.5 V			1		1	mA	
I _{IH}	V _{CC} = MAX, V _{IH} = 2.4 V			50		50	μA	
I _{IL}	V _{CC} = MAX, V _{IL} = 0.4 V			-2		-2	mA	
I _{OS} §	V _{CC} = MAX	-40		-100	-40	-100	mA	
I _{CCH}	V _{CC} = MAX, V _I = 0 V		4.5	6.4		4.5	6.4	mA
I _{CCL}	V _{CC} = MAX, See Note 2		7.5	12		7.5	12	mA
I _X ▲	V _X = 1.4 V, I _X = 0, I _{OL} = 0			-5.85		-6.3	mA	
V _{BEI(Q)} ▲	I _X + I _X = 0.7 mA, R _X = 0, I _{OL} = 20 mA			1.1				
	I _X + I _X = 1.1 mA, R _X = 0, I _{OL} = 20 mA					1	V	
V _{OH} ▲	I _X = 0.32 mA, I _X = -0.32 mA, I _{OH} = -0.5 mA	2.4	3.4					
	I _X = 0.57 mA, I _X = -0.57 mA, I _{OH} = -0.5 mA				2.4	3.4	V	
V _{OL} ▲	I _X + I _X = 0.47 mA, R _X = 68 Ω, I _{OL} = 20 mA	0.2	0.4					
	I _X + I _X = 0.6 mA, R _X = 63 Ω, I _{OL} = 20 mA				0.2	0.4	V	

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

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

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

▲ Using expander inputs, V_{CC} = MIN, T_A = MIN, except typical values.

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

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
t _{PLH}	Any	Y	R _L = 280 Ω, C _L = 25 pF †		7	11	ns	
t _{PHL}					6.5	11	ns	
t _{PLH}			R _L = 280 Ω, C _L = 25 pF, C = 15 pF ‡			11.4		ns
t _{PHL}						7.7		ns

NOTE 3: See General Information Section for load circuits and voltage waveforms.

† Expander pins open.

‡ GND to X.

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TYPE SN54L55 2-WIDE 4-INPUT AND-OR-INVERT GATES

recommended operating conditions

	SN54L55			UNIT
	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	V
V _{IH} High-level input voltage	2			V
V _{IL} Low-level input voltage	0.7			V
I _{OH} High-level output current	-0.1			mA
I _{OL} Low-level output current	2			mA
T _A Operating free-air temperature	-55	125		°C

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

PARAMETER	TEST CONDITIONS†			SN54L55			UNIT
	MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V _{OH}	V _{CC} = MIN, V _{IL} = 0.7 V, I _{OH} = -0.1 mA	2.4	3.3				V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 2 mA		0.15	0.33			V
I _I	V _{CC} = MAX, V _I = 5.5 V					0.1	mA
I _{IH}	V _{CC} = MAX, V _I = 2.4 V					10	μA
I _{IL}	V _{CC} = MAX, V _I = 0.3 V					-0.18	mA
I _{OS} §	V _{CC} = MAX			-3		-15	mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V				0.22	0.4	mA
I _{CCL}	V _{CC} = MAX, See Note 2				0.38	0.65	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 V, T_A = 25° C.

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

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

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	Any	Y	R _L = 4 kΩ, C _L = 50 pF	50		90	ns
t _{PHL}				35		60	ns

NOTE 3: See General Information Section for load circuits and voltage waveforms.

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TTL DEVICES

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

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			°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} = MIN, I _I = -18 mA	-1.5			-1.5			V
V _{OH}	V _{CC} = MIN, V _{IL} = MAX, I _{OH} = -0.4 mA	2.5	3.4		2.7	3.4		V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 4 mA	0.25		0.4	0.25		0.4	V
	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 8 mA				0.35		0.5	
I _I	V _{CC} = MAX, V _I = 7 V	0.1			0.1			mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V	20			20			μA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V	-0.4			-0.4			mA
I _{OS} §	V _{CC} = MAX	-20		-100	-20		-100	mA
I _{CC}	V _{CC} = MAX, V _I = 0 V	0.4		0.8	0.4		0.8	mA
I _{CCL}	V _{CC} = MAX, 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 V, T_A = 25°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 V, T_A = 25°C (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	Any	Y	R _L = 2 kΩ, C _L = 15 pF	12		20	ns
t _{PHL}				12.5		20	ns

NOTE 3: See General Information Section for load circuits and voltage waveforms.

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