

### **Rochester Electronics Manufactured Components**

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

### **Quality Overview**

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
  - Class Q Military
  - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
  - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

# 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

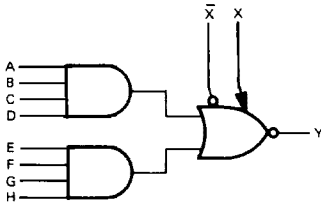
## description

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.

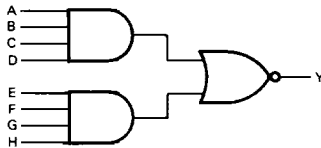
The SN54H55, SN54L55, and the SN54LS55 are characterized for operation over the full military temperature range of  $-55^{\circ}$  to  $125^{\circ}\text{C}$ . The SN74H55 and SN74LS55 are characterized for operation from  $0^{\circ}$  C to  $70^{\circ}\text{C}$ .

## logic diagrams

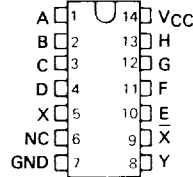
'H55, EXPANDABLE



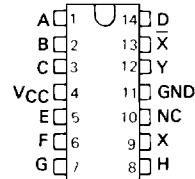
'L55, 'LS55



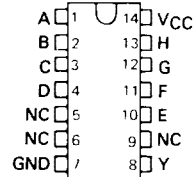
SN54H55 ... J PACKAGE  
SN74H55 ... J OR N PACKAGE  
(TOP VIEW)



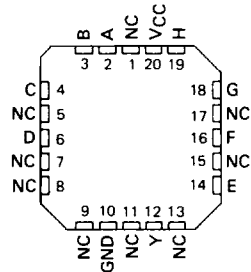
SN54H55 ... W PACKAGE  
(TOP VIEW)



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

This document contains information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

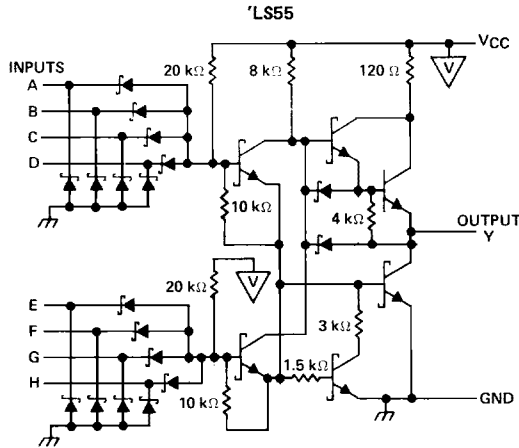
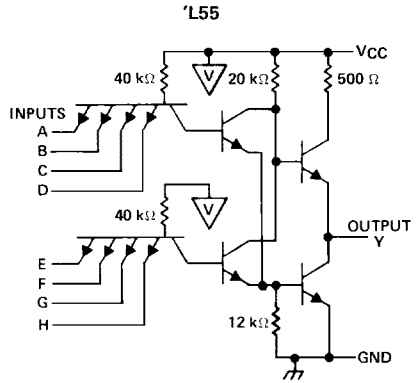
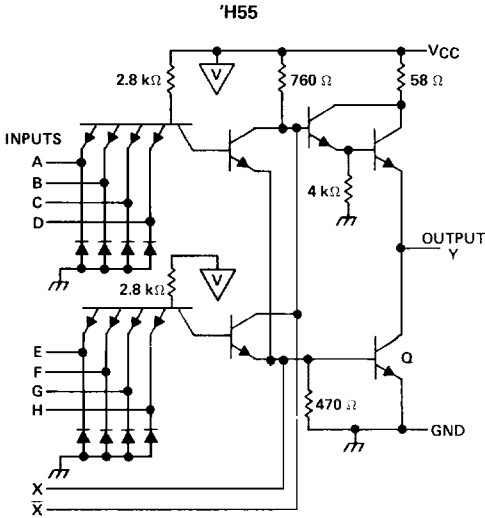
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3-237

**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 <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			0.8	V
I <sub>OH</sub> High-level output current			-0.5			-0.5	mA
I <sub>OL</sub> Low-level output current			20			20	mA
T <sub>A</sub> 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 <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -8 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> = -0.5 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> = 20 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			50			50	µA
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>IL</sub> = 0.4 V			-2			-2	mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-40		-100	-40		-100	mA
I <sub>CCH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V		4.5	6.4		4.5	6.4	mA
I <sub>CCL</sub>	V <sub>CC</sub> = MAX, See Note 2		7.5	12		7.5	12	mA
I <sub>X</sub> ▲	V <sub>X</sub> = 1.4 V, I <sub>X</sub> = 0, I <sub>OL</sub> = 0			-5.85			-6.3	mA
V <sub>BE(IQ)</sub> ▲	I <sub>X</sub> + I <sub>X</sub> = 0.7 mA, R <sub>X</sub> = 0, I <sub>OL</sub> = 20 mA			1.1				V
	I <sub>X</sub> + I <sub>X</sub> = 1.1 mA, R <sub>X</sub> = 0, I <sub>OL</sub> = 20 mA						1	V
V <sub>OH</sub> ▲	I <sub>X</sub> = 0.32 mA, I <sub>X</sub> = -0.32 mA, I <sub>OH</sub> = -0.5 mA	2.4	3.4					V
	I <sub>X</sub> = 0.57 mA, I <sub>X</sub> = -0.57 mA, I <sub>OH</sub> = -0.5 mA				2.4	3.4		V
V <sub>OL</sub> ▲	I <sub>X</sub> + I <sub>X</sub> = 0.47 mA, R <sub>X</sub> = 68 Ω, I <sub>OL</sub> = 20 mA		0.2	0.4				V
	I <sub>X</sub> + I <sub>X</sub> = 0.6 mA, R <sub>X</sub> = 63 Ω, I <sub>OL</sub> = 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<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> = 280 Ω, C <sub>L</sub> = 25 pF ¶	7	11		ns	
t <sub>PHL</sub>				6.5	11		ns	
t <sub>PLH</sub>			R <sub>L</sub> = 280 Ω, C <sub>L</sub> = 25 pF, C = 15 pF #	11.4				ns
t <sub>PHL</sub>				7.7				ns

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

¶ Expander pins open.

# GND to X.

# 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	MAX	
$V_{OH}$	$V_{CC} = \text{MIN.}$	$V_{IL} = 0.7 \text{ V.}$	$I_{OH} = -0.1 \text{ mA}$	2.4	3.3	V
$V_{OL}$	$V_{CC} = \text{MIN.}$	$V_{IH} = 2 \text{ V.}$	$I_{OL} = 2 \text{ mA}$	0.15	0.33	V
$I_I$	$V_{CC} = \text{MAX.}$	$V_I = 5.5 \text{ V}$		0.1		mA
$I_{IH}$	$V_{CC} = \text{MAX.}$	$V_I = 2.4 \text{ V}$		10		μA
$I_{IL}$	$V_{CC} = \text{MAX.}$	$V_I = 0.3 \text{ V}$		-0.18		mA
$I_{OS}§$	$V_{CC} = \text{MAX}$			-3	-15	mA
$I_{CCH}$	$V_{CC} = \text{MAX.}$	$V_I = 0 \text{ V}$		0.22	0.4	mA
$I_{CCL}$	$V_{CC} = \text{MAX.}$	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  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ \text{C}$ .

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH}$	Any	Y	$R_L = 4 \text{ k}\Omega$ , $C_L = 50 \text{ pF}$	50	90	ns	
$t_{PHL}$				35	60	ns	

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

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# TYPES SN54LS55, SN74LS55

## 2-WIDE 4-INPUT AND-OR-INVERT GATES

### recommended operating conditions

	SN54LS55			SN74LS55			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	0.7			0.8			V
I <sub>OH</sub> High-level output current	-0.4			-0.4			mA
I <sub>OL</sub> Low-level output current	4			8			mA
T <sub>A</sub> Operating free-air temperature	-55			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 <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA	-1.5		-1.5		V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, I <sub>OH</sub> = -0.4 mA	2.5	3.4	2.7	3.4	V
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 4 mA	0.25 0.4		0.25 0.4		V
	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 8 mA			0.35 0.5		
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V	0.1		0.1		mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V	20		20		μA
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V	-0.4		-0.4		mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-20	-100	-20	-100	mA
I <sub>CCH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V	0.4 0.8		0.4 0.8		mA
I <sub>CCL</sub>	V <sub>CC</sub> = 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<sub>CC</sub> = 5 V, T<sub>A</sub> = 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<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> = 2 kΩ, C <sub>L</sub> = 15 pF	12		20	ns
t <sub>PHL</sub>				12.5		20	ns

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

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