

**Triple Three-Input NOR Gate**

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (Total)
7427	9ns	13mA
74LS27	10ns	2.7mA

**ORDERING CODE**

PACKAGES	COMMERCIAL RANGES	MILITARY RANGES
	$V_{CC} = 5V \pm 5\%$ ; $T_A = 0^\circ C$ to $+70^\circ C$	$V_{CC} = 5V \pm 10\%$ ; $T_A = -55^\circ C$ to $+125^\circ C$
Plastic DIP	N7427N • N74LS27N	
Plastic SO	N74LS27D	

**FUNCTION TABLE**

INPUTS			OUTPUT
A	B	C	Y
L	L	L	H
X	X	H	L
X	H	X	L
H	X	X	L

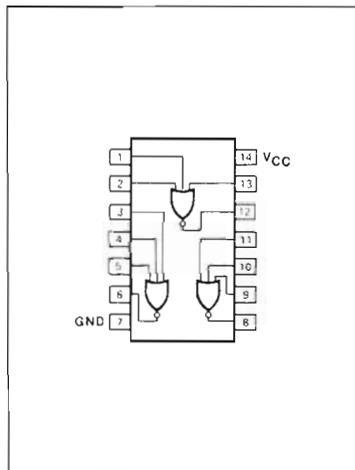
H = HIGH voltage level  
L = LOW voltage level  
X = Don't care

**INPUT AND OUTPUT LOADING AND FAN-OUT TABLE**

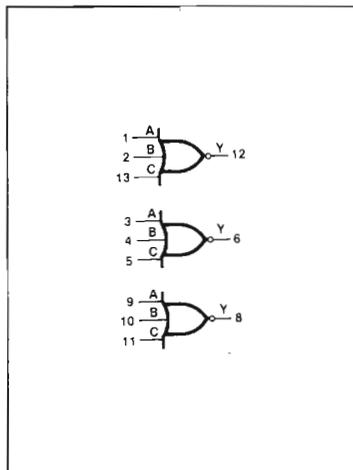
PINS	DESCRIPTION	54/74	54/74LS
A-C	Inputs	1uI	1LSuI
Y	Output	10uI	10LSuI

NOTE  
Where a 54/74 unit load (uI) is understood to be 40µA  $I_{IH}$  and -1.6mA  $I_{IL}$ , a 54/74LS unit load (LSuI) is 20µA  $I_{IH}$  and -0.4mA  $I_{IL}$

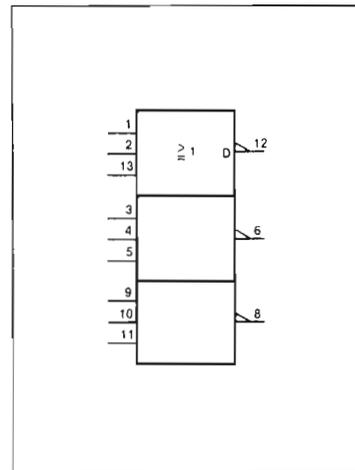
**PIN CONFIGURATION**



**LOGIC SYMBOL**



**LOGIC SYMBOL (IEEE/IEC)**



**ABSOLUTE MAXIMUM RATINGS** (Over operating free-air temperature range unless otherwise noted.)

PARAMETER	54	54LS	74	74LS	UNIT
V <sub>CC</sub> Supply voltage	7.0	7.0	7.0	7.0	V
V <sub>IN</sub> Input voltage	-0.5 to +5.5	-0.5 to +7.0	-0.5 to -5.5	-0.5 to +7.0	V
I <sub>IN</sub> Input current	-30 to +5	-30 to +1	-30 to +5	-30 to +1	mA
V <sub>OUT</sub> Voltage applied to output in HIGH output state	-0.5 to +V <sub>CC</sub>	V			
T <sub>A</sub> Operating free-air temperature range	-55 to +125			0 to 70	°C

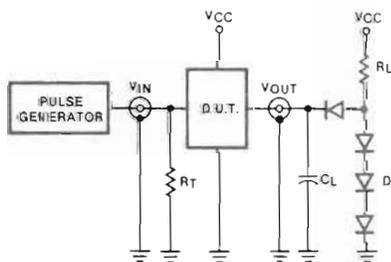
**RECOMMENDED OPERATING CONDITIONS**

PARAMETER	54/74			54/74LS			UNIT	
	Min	Nom	Max	Min	Nom	Max		
V <sub>CC</sub> Supply voltage	Mil	4.5	5.0	5.5	4.5	5.0	5.5	V
	Com'l	4.75	5.0	5.25	4.75	5.0	5.25	V
V <sub>IH</sub> HIGH-level input voltage	2.0			2.0			V	
V <sub>IL</sub> LOW-level input voltage	Mil				+0.7			V
	Com'l				+0.8			V
I <sub>IK</sub> Input clamp current				-12			mA	
I <sub>OH</sub> HIGH-level output current				-800			μA	
I <sub>OL</sub> LOW-level output current	Mil				16			mA
	Com'l				16			mA
T <sub>A</sub> Operating free-air temperature	Mil	-55	+125		-55	+125		°C
	Com'l	0	70		0	70		°C

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**TEST CIRCUITS AND WAVEFORMS**

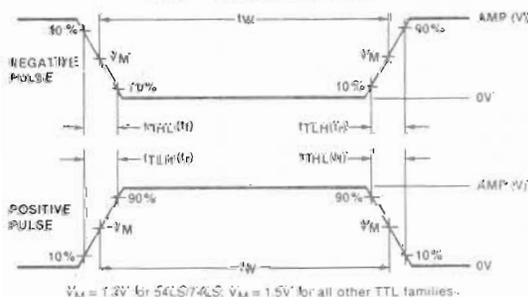
TEST CIRCUIT FOR 54/74 TOTEM-POLE OUTPUTS



DEFINITIONS

- R<sub>L</sub> = Load resistor to V<sub>CC</sub>; see AC CHARACTERISTICS for value.
- C<sub>L</sub> = Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.
- R<sub>T</sub> = Termination resistance should be equal to Z<sub>OUT</sub> of Pulse Generators.
- D = Diodes are 1N916, 1N3064, or equivalent.
- t<sub>TLH</sub>, t<sub>TLL</sub> Values should be less than or equal to the table entries.

INPUT PULSE DEFINITIONS



FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	Pulse Width	t <sub>TLH</sub>	t <sub>TLL</sub>
54/74	3.0V	1MHz	500ns	7ns	7ns
54LS/74LS	3.0V	1MHz	500ns	15ns	6ns
54S/74S	3.0V	1MHz	500ns	2.5ns	2.5ns

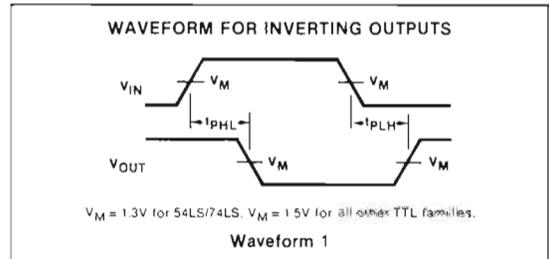
**DC ELECTRICAL CHARACTERISTICS** (Over recommended operating free-air temperature range unless otherwise noted.)

PARAMETER	TEST CONDITIONS <sup>1</sup>	54/7427			54/74LS27			UNIT	
		Min	Typ <sup>2</sup>	Max	Min	Typ <sup>2</sup>	Max		
V <sub>OH</sub> HIGH-level output voltage	V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, I <sub>OH</sub> = MAX	Mil	2.4	3.4		2.5	3.4	V	
		Com'l	2.4	3.4		2.7	3.4	V	
V <sub>OL</sub> LOW-level output voltage	V <sub>CC</sub> = MIN, V <sub>IH</sub> = MIN, I <sub>OL</sub> = MAX	Mil		0.2	0.4		0.25	0.4	V
		Com'l		0.2	0.4		0.35	0.5	V
		74LS					0.25	0.4	V
V <sub>IK</sub> Input clamp voltage	V <sub>CC</sub> = MIN, I <sub>I</sub> = I <sub>IK</sub>			-1.5			-1.5	V	
I <sub>I</sub> Input current at maximum input voltage	V <sub>CC</sub> = MAX	V <sub>I</sub> = 5.5V			1.0			mA	
		V <sub>I</sub> = 7.0V					0.1	mA	
I <sub>IH</sub> HIGH-level input current	V <sub>CC</sub> = MAX	V <sub>I</sub> = 2.4V			40			μA	
		V <sub>I</sub> = 2.7V					20	μA	
I <sub>IL</sub> LOW-level input current <sup>3</sup>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4V			-1.6			-0.4	mA	
I <sub>OS</sub> Short-circuit output current <sup>3</sup>	V <sub>CC</sub> = MAX	Mil	-20		-55	-20		-100	mA
		Com'l	-18		-55	-20		-100	mA
I <sub>CC</sub> Supply current (total)	V <sub>CC</sub> = MAX	I <sub>CC</sub> H Outputs HIGH		10	16		2.0	4	mA
		I <sub>CC</sub> L Outputs LOW		16	26		3.4	6.8	mA

**NOTES**

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the appropriate type.
- All typical values are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.
- I<sub>OS</sub> is tested with V<sub>OL</sub> = +0.5V and V<sub>CC</sub> = V<sub>CC</sub> MAX + 0.5V. Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.

**AC WAVEFORM**



**AC CHARACTERISTICS** T<sub>A</sub> = 25°C, V<sub>CC</sub> = 5.0V

PARAMETER	TEST CONDITIONS	54/74		54/74LS		UNIT
		C <sub>L</sub> = 15pF, R <sub>L</sub> = 400Ω		C <sub>L</sub> = 15pF, R <sub>L</sub> = 2kΩ		
		Min	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay Waveform 1		15 11		15 15	ns