

**TRIPLE 3-INPUT NOR GATE**

**FEATURES**

- Output capability: standard
- I<sub>CC</sub> category: SSI

**GENERAL DESCRIPTION**

The 74HC/HCT27 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LSSTTL). They are specified in compliance with JEDEC standard no. 7A. The 74HC/HCT27 provide the 3-input NOR function.

SYMBOL	PARAMETER	CONDITIONS	TYPICAL		UNIT
			HC	HCT	
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay nA, nB, nC to nY	C <sub>L</sub> = 15 pF V <sub>CC</sub> = 5 V	8	10	ns
C <sub>I</sub>	input capacitance		3.5	3.5	pF
C <sub>PD</sub>	power dissipation capacitance per gate	notes 1 and 2	24	30	pF

GND = 0 V; T<sub>amb</sub> = 25 °C; t<sub>r</sub> = t<sub>f</sub> = 6 ns

**Notes**

1. C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW):  

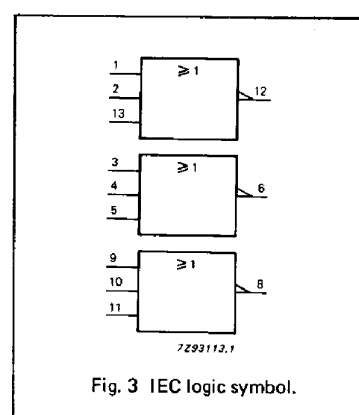
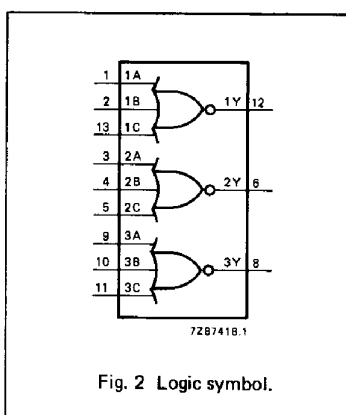
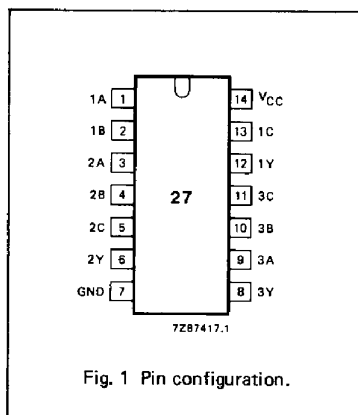
$$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o)$$
 where:  
 f<sub>i</sub> = input frequency in MHz                      C<sub>L</sub> = output load capacitance in pF  
 f<sub>o</sub> = output frequency in MHz                      V<sub>CC</sub> = supply voltage in V  
 $\sum (C_L \times V_{CC}^2 \times f_o)$  = sum of outputs
2. For HC the condition is V<sub>I</sub> = GND to V<sub>CC</sub>  
 For HCT the condition is V<sub>I</sub> = GND to V<sub>CC</sub> - 1.5 V

**PACKAGE OUTLINES**

14-lead DIL; plastic (SOT27).  
 14-lead mini-pack; plastic (SO14; SOT108A).

**PIN DESCRIPTION**

PIN NO.	SYMBOL	NAME AND FUNCTION
1, 3, 9	1A to 3A	data inputs
2, 4, 10	1B to 3B	data inputs
13, 5, 11	1C to 3C	data inputs
7	GND	ground (0 V)
12, 6, 8	1Y to 3Y	data outputs
14	V <sub>CC</sub>	positive supply voltage



**74HC/HCT27**  
SSI

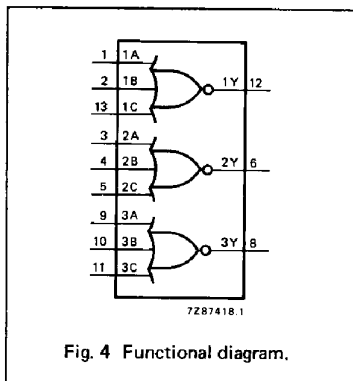


Fig. 4 Functional diagram.

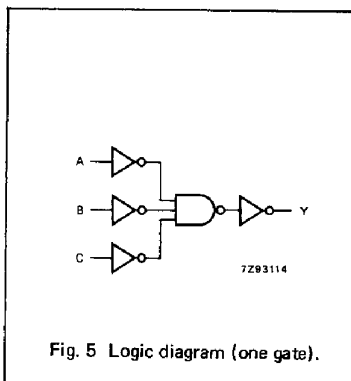


Fig. 5 Logic diagram (one gate).

**FUNCTION TABLE**

INPUTS			OUTPUT
nA	nB	nC	nY
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

**DC CHARACTERISTICS FOR 74HC**

For the DC characteristics see chapter "HCMOS family characteristics", section "Family specifications".

Output capability: standard

I<sub>CC</sub> category: SSI

**AC CHARACTERISTICS FOR 74HC**

GND = 0 V; t<sub>r</sub> = t<sub>f</sub> = 6 ns; C<sub>L</sub> = 50 pF

SYMBOL	PARAMETER	T <sub>amb</sub> (°C)						UNIT	TEST CONDITIONS		
		74HC							V <sub>CC</sub> V	WAVEFORMS	
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.				max.
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay nA, nB, nC to nY		28 10 8	90 18 15		115 23 20		135 27 23	ns	2.0 4.5 6.0	Fig. 6
t <sub>THL</sub> / t <sub>TLH</sub>	output transition time		19 7 6	75 15 13		95 19 16		110 22 19	ns	2.0 4.5 6.0	Fig. 6

**DC CHARACTERISTICS FOR 74HCT**

For the DC characteristics see chapter "HCMOS family characteristics", section "Family specifications".

Output capability: standard

$I_{CC}$  category: SSI

**Note to HCT types**

The value of additional quiescent supply current ( $\Delta I_{CC}$ ) for a unit load of 1 is given in the family specifications. To determine  $\Delta I_{CC}$  per input, multiply this value by the unit load coefficient shown in the table below.

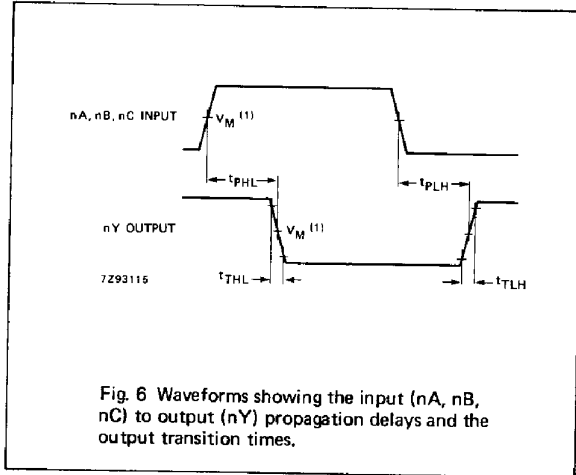
INPUT	UNIT LOAD COEFFICIENT
nA, nB, nC	1.50

**AC CHARACTERISTICS FOR 74HCT**

GND = 0 V;  $t_r = t_f = 6$  ns;  $C_L = 50$  pF

SYMBOL	PARAMETER	$T_{amb}$ (°C)						UNIT	TEST CONDITIONS		
		74HCT							$V_{CC}$ V	WAVEFORMS	
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.		max.		
$t_{PHL}/t_{PLH}$	propagation delay nA, nB, nC to nY		12	21		26		32	ns	4.5	Fig. 6
$t_{THL}/t_{TLH}$	output transition time		7	15		19		22	ns	4.5	Fig. 6

AC WAVEFORMS



Note to AC waveforms

(1) HC :  $V_M = 50\%$ ;  $V_I = \text{GND to } V_{CC}$ .  
HCT:  $V_M = 1.3 \text{ V}$ ;  $V_I = \text{GND to } 3 \text{ V}$ .