

8-INPUT MULTIPLEXER

FEATURES

- True and complement outputs
- Multifunction capability
- Permits multiplexing from n lines to 1 line
- Non-inverting data path
- See the "251" for the 3-state version
- Output capability: standard
- I_{CC} category: MSI

GENERAL DESCRIPTION

The 74HC/HCT151 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LSTTL). They are specified in compliance with JEDEC standard no. 7A.

SYMBOL	PARAMETER	CONDITIONS	TYPICAL		UNIT
			HC	HCT	
t _{PHL} / t _{PLH}	propagation delay I _n to Y, \bar{Y}	C _L = 15 pF V _{CC} = 5 V	17	19	ns
	S _n to Y, \bar{Y}		19	20	ns
	\bar{E} to Y		12	13	ns
	\bar{E} to \bar{Y}		14	18	ns
C _I	input capacitance		3.5	3.5	pF
C _{PD}	power dissipation capacitance per package	notes 1 and 2	40	40	pF

GND = 0 V; T_{amb} = 25 °C; t_r = t_f = 6 ns

Notes

1. C_{PD} is used to determine the dynamic power dissipation (P_D in μW):

$$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

f_i = input frequency in MHz C_L = output load capacitance in pF
 f_o = output frequency in MHz V_{CC} = supply voltage in V
 Σ (C_L × V_{CC}² × f_o) = sum of outputs

2. For HC the condition is V_I = GND to V_{CC}
 For HCT the condition is V_I = GND to V_{CC} - 1.5 V

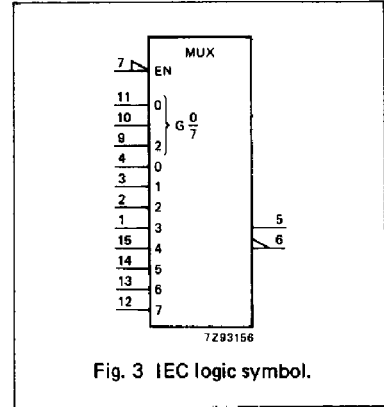
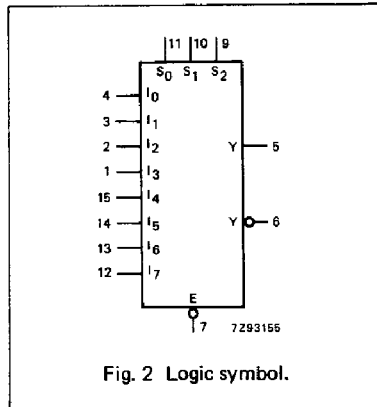
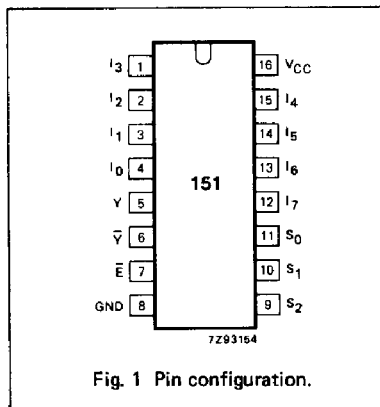
PACKAGE OUTLINES

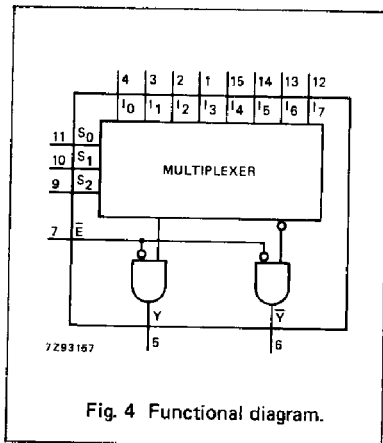
16-lead DIL; plastic (SOT38Z).

16-lead mini-pack; plastic (SO16; SOT109A).

PIN DESCRIPTION

PIN NO.	SYMBOL	NAME AND FUNCTION
4, 3, 2, 1, 15, 14, 13, 12	I ₀ to I ₇	multiplexer inputs
5	Y	multiplexer output
6	\bar{Y}	complementary multiplexer output
7	\bar{E}	enable input (active LOW)
8	GND	ground (0 V)
11, 10, 9	S ₀ , S ₁ , S ₂	select inputs
16	V _{CC}	positive supply voltage

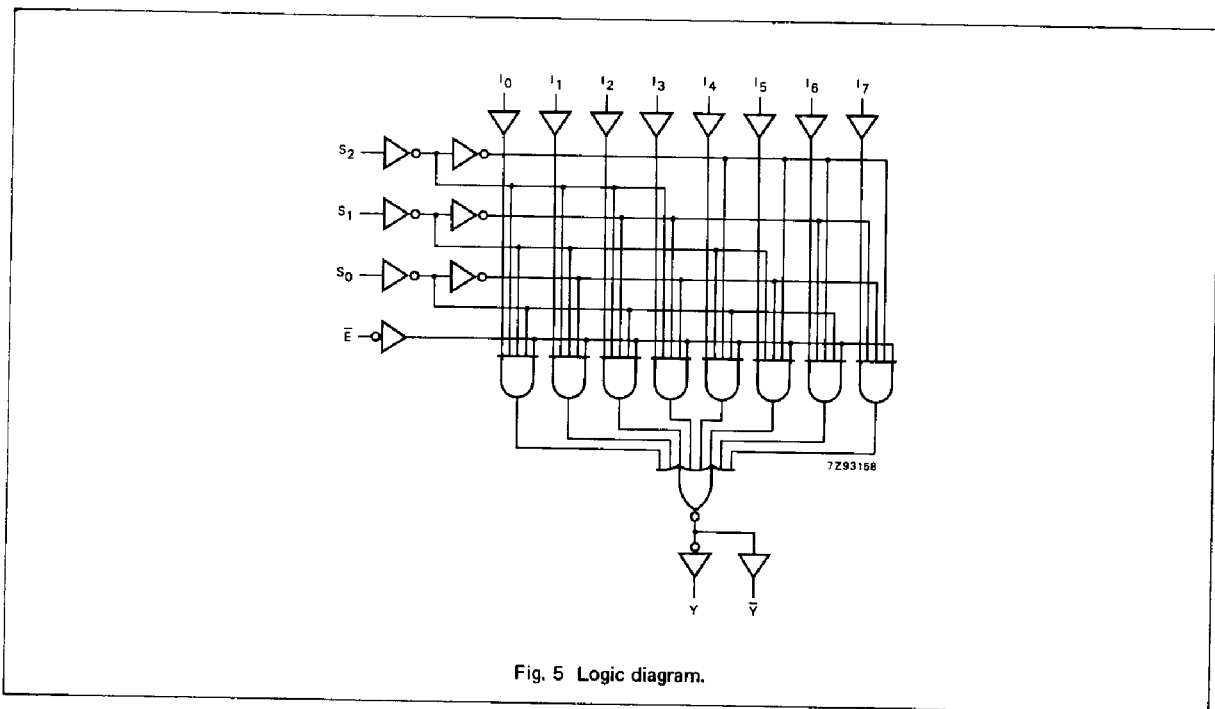




FUNCTION TABLE

INPUTS												OUTPUTS	
\bar{E}	S ₂	S ₁	S ₀	I ₀	I ₁	I ₂	I ₃	I ₄	I ₅	I ₆	I ₇	\bar{Y}	Y
H	X	X	X	X	X	X	X	X	X	X	X	H	L
L	L	L	L	L	X	X	X	X	X	X	X	H	L
L	L	L	L	L	H	X	X	X	X	X	X	L	H
L	L	L	L	L	X	H	X	X	X	X	X	L	H
L	L	L	L	L	X	X	H	X	X	X	X	L	H
L	L	L	L	L	X	X	X	L	X	X	X	L	H
L	L	L	L	L	X	X	X	X	L	X	X	L	H
L	L	L	L	L	X	X	X	X	X	L	X	L	H
L	L	L	L	L	X	X	X	X	X	X	L	H	L
L	L	L	L	L	X	X	X	X	X	X	X	L	H
L	L	L	L	L	X	X	X	X	X	X	X	L	H
L	L	L	L	L	X	X	X	X	X	X	X	L	H
L	L	L	L	L	X	X	X	X	X	X	X	L	H
L	L	L	L	L	X	X	X	X	X	X	X	L	H
L	L	L	L	L	X	X	X	X	X	X	X	L	H
L	L	L	L	L	X	X	X	X	X	X	X	L	H
L	L	L	L	L	X	X	X	X	X	X	X	L	H
L	L	L	L	L	X	X	X	X	X	X	X	L	H

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_{CC} category: MSI**AC CHARACTERISTICS FOR 74HC**GND = 0 V; t_r = t_f = 6 ns; C_L = 50 pF

SYMBOL	PARAMETER	T _{amb} (°C)						UNIT	TEST CONDITIONS		
		74HC							V _{CC} V	WAVEFORMS	
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.				max.
t _{PHL} / t _{PLH}	propagation delay I _n to Y		52 19 15	170 34 29		215 43 37		255 51 43	ns	2.0 4.5 6.0	Fig. 6
t _{PHL} / t _{PLH}	propagation delay I _n to \bar{Y}		58 21 17	185 37 31		230 46 39		280 56 48	ns	2.0 4.5 6.0	Fig. 6
t _{PHL} / t _{PLH}	propagation delay S _n to Y		61 22 18	185 37 31		230 46 39		280 56 48	ns	2.0 4.5 6.0	Fig. 7
t _{PHL} / t _{PLH}	propagation delay S _n to \bar{Y}		61 22 18	205 41 35		255 51 43		310 62 53	ns	2.0 4.5 6.0	Fig. 7
t _{PHL} / t _{PLH}	propagation delay E to Y		41 15 12	125 25 21		155 31 26		190 38 32	ns	2.0 4.5 6.0	Fig. 7
t _{PHL} / t _{PLH}	propagation delay E to \bar{Y}		47 17 14	145 29 25		180 36 31		220 44 38	ns	2.0 4.5 6.0	Fig. 7
t _{THL} / t _{TLH}	output transition time		19 7 6	75 15 13		95 19 16		110 22 19	ns	2.0 4.5 6.0	Figs 6 and 7

74HC/HCT151
MSI

DC CHARACTERISTICS FOR 74HCT

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

Output capability: standard

I_{CC} category: MSI

Note to HCT types

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

INPUT	UNIT LOAD COEFFICIENT
I _n	0.45
S _n	1.50
\bar{E}	0.30

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 I _n to Y		22	38		48		57	ns	4.5	Fig. 6
t _{PHL} / t _{PLH}	propagation delay I _n to \bar{Y}		22	38		48		57	ns	4.5	Fig. 6
t _{PHL} / t _{PLH}	propagation delay S _n to Y		23	41		51		62	ns	4.5	Fig. 7
t _{PHL} / t _{PLH}	propagation delay S _n to \bar{Y}		25	43		54		65	ns	4.5	Fig. 7
t _{PHL} / t _{PLH}	propagation delay \bar{E} to Y		16	29		36		44	ns	4.5	Fig. 7
t _{PHL} / t _{PLH}	propagation delay \bar{E} to \bar{Y}		21	36		45		54	ns	4.5	Fig. 7
t _{THL} / t _{TLH}	output transition time		7	15		19		22	ns	4.5	Figs 6 and 7

AC WAVEFORMS

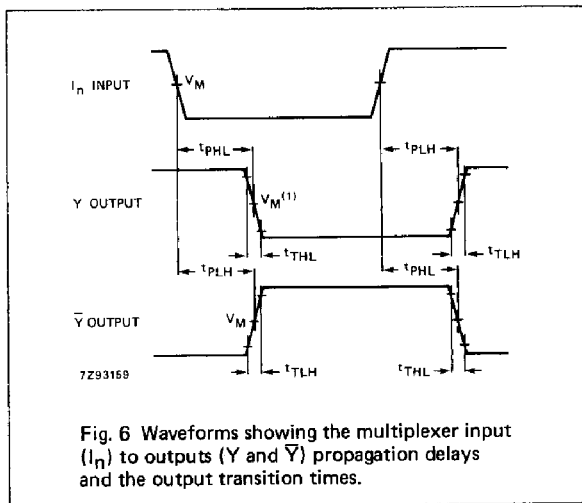


Fig. 6 Waveforms showing the multiplexer input (I_n) to outputs (Y and \bar{Y}) propagation delays and the output transition times.

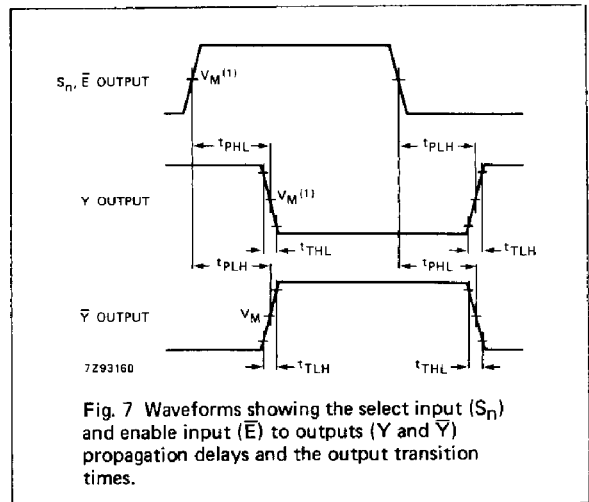


Fig. 7 Waveforms showing the select input (S_n) and enable input (\bar{E}) to outputs (Y and \bar{Y}) propagation delays and the output transition times.

Note to AC waveforms

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