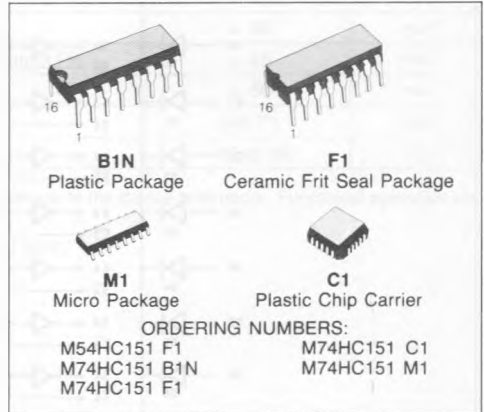


8 CHANNEL MULTIPLEXER

- **HIGH SPEED**
 $t_{PD} = 20 \text{ ns (TYP.)}$ at $V_{CC} = 5V$
- **LOW POWER DISSIPATION**
 $I_{CC} = 4 \mu A \text{ (MAX.)}$ at $T_A = 25^\circ C$
- **HIGH NOISE IMMUNITY**
 $V_{NIH} = V_{NIL} = 28\% V_{CC} \text{ (MIN.)}$
- **OUTPUT DRIVE CAPABILITY**
 10 LSTTL LOADS
- **SYMMETRICAL OUTPUT IMPEDANCE**
 $|I_{OH}| = |I_{OL}| = 4 \text{ mA (MIN.)}$
- **BALANCED PROPAGATION DELAYS**
 $t_{PLH} = t_{PHL}$
- **WIDE OPERATING VOLTAGE RANGE**
 $V_{CC} \text{ (OPR)} = 2 \text{ to } 6V$
- **PIN AND FUNCTION COMPATIBLE**
 WITH 54/74LS151

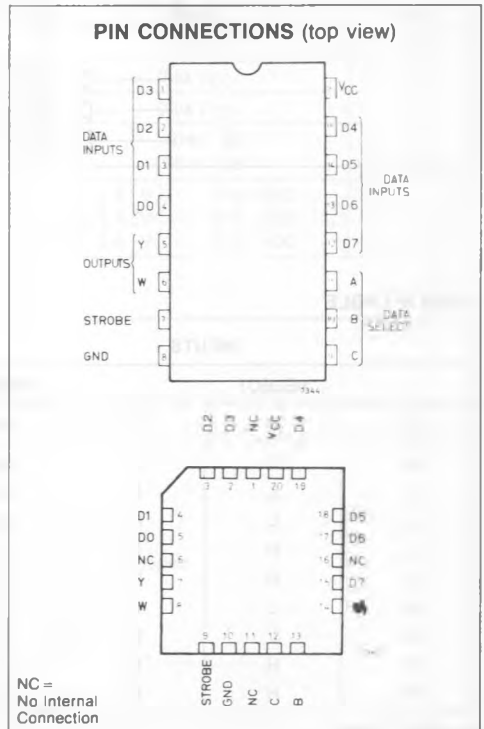


DESCRIPTION

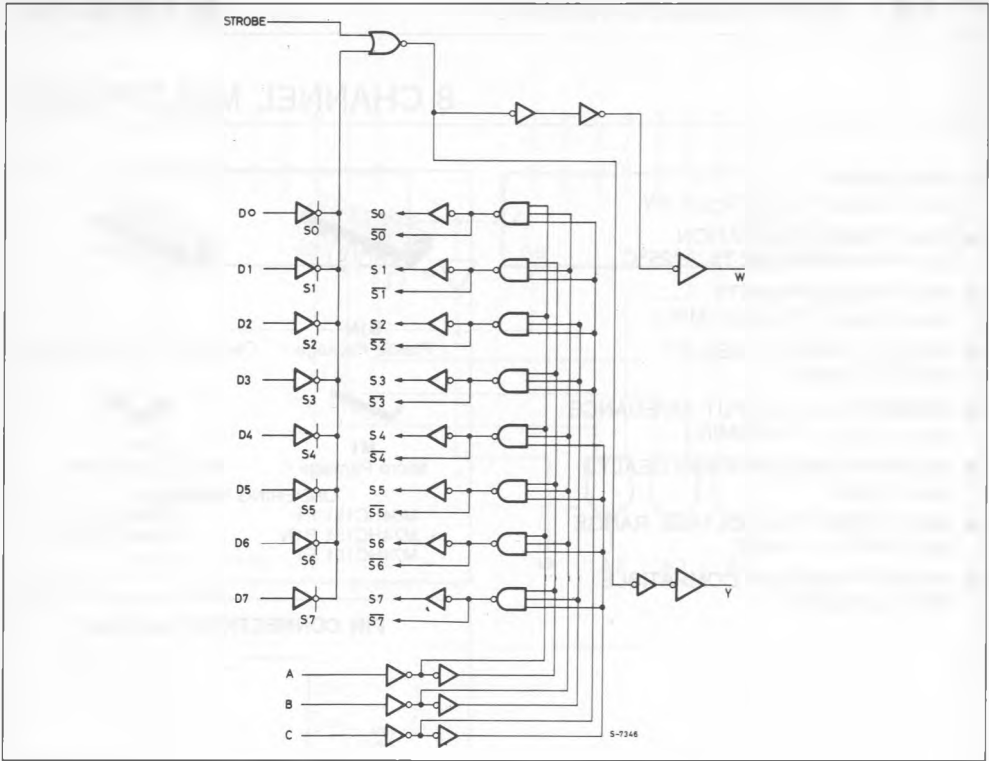
The M54/74HC151 is a high speed CMOS 8 CHANNEL MULTIPLEXER fabricated in silicon gate C²MOS technology.

It has the same high speed performance of LSTTL combined with true CMOS low power consumption. It provides, in one package, the ability to select one bit of data from up to eight sources. The HC151 can be used as a universal function generator to generate any logic function of four variables. Outputs Y and W are complementary selection depends on the address inputs A, B and C. The strobe input must be taken low to enable this device, when the strobe is high W output is forced high and consequently Y output goes low.

All inputs are equipped with protection circuits against static discharge and transient excess voltage.



LOGIC DIAGRAM



TRUTH TABLE

INPUTS				OUTPUTS	
SELECT			STROBE	Y	W
C	B	A	S		
X	X	X	H	L	H
L	L	L	L	D0	$\overline{D0}$
L	L	H	L	D1	$\overline{D1}$
L	H	L	L	D2	$\overline{D2}$
L	H	H	L	D3	$\overline{D3}$
H	L	L	L	D4	$\overline{D4}$
H	L	H	L	D5	$\overline{D5}$
H	H	L	L	D6	$\overline{D6}$
H	H	H	L	D7	$\overline{D7}$

X: DON'T CARE

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	- 0.5 to 7	V
V_I	DC Input Voltage	- 0.5 to $V_{CC} + 0.5$	V
V_O	DC Output Voltage	- 0.5 to $V_{CC} + 0.5$	V
I_{IK}	DC Input Diode Current	± 20	mA
I_{OK}	DC Output Diode Current	± 20	mA
I_O	DC Output Source Sink Current Per Output Pin	± 25	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 50	mA
P_D	Power Dissipation	500 (*)	mW
T_{stg}	Storage Temperature	- 65 to 150	$^{\circ}C$

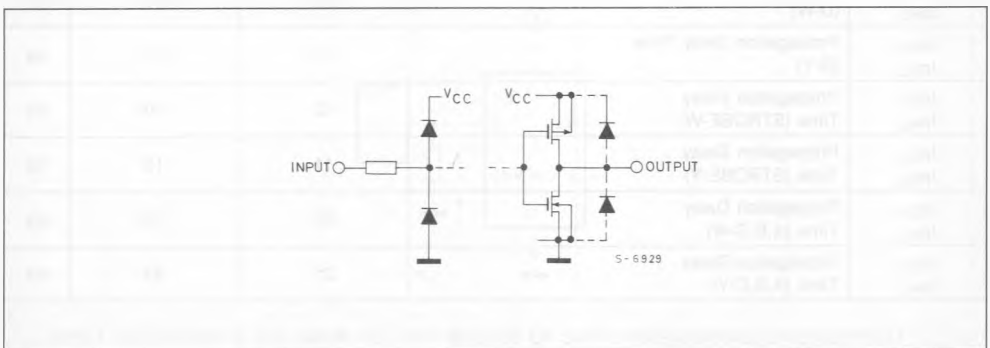
Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

(*) 500 mW: $\cong 65^{\circ}C$ derate to 300 mW by mW/ $^{\circ}C$: $65^{\circ}C$ to $85^{\circ}C$.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	2 to 6	V
V_I	Input Voltage	0 to V_{CC}	V
V_O	Output Voltage	0 to V_{CC}	V
T_A	Operating Temperature	74HC Series 54HC Series	$^{\circ}C$
		- 40 to 85 - 55 to 125	
t_r, t_f	Input Rise and Fall Time	$V_{CC} \begin{cases} 2 \text{ V} & 0 \text{ to } 1000 \\ 4.5 \text{ V} & 0 \text{ to } 500 \\ 6 \text{ V} & 0 \text{ to } 400 \end{cases}$	ns

INPUT AND OUTPUT EQUIVALENT CIRCUIT



DC SPECIFICATIONS

Symbol	Parameter	V _{CC}	Test Condition	T _A = 25°C 54HC and 74HC			-40 to 85°C 74HC		-55 to 125°C 54HC		Unit	
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.		
V _{IH}	High Level Input Voltage	2.0 4.5 6.0		1.5 3.15 4.2	— — —	— — —	1.5 3.15 4.2	— — —	1.5 3.15 4.2	— — —	V	
V _{IL}	Low Level Input Voltage	2.0 4.5 6.0		— — —	— — —	0.5 1.35 1.8	— — —	0.5 1.35 1.8	— — —	0.5 1.35 1.8	V	
V _{OH}	High Level Output Voltage	2.0 4.5 6.0	V _I	I _O	1.9	2.0	—	1.9	—	1.9	—	V
			V _{IH} or V _{IL}	-20 μA	4.4	4.5	—	4.4	—	4.4	—	
		4.5 6.0	V _{IH} or V _{IL}	-4.0 mA	4.18	4.31	—	4.13	—	4.10	—	
				-5.2 mA	5.68	5.8	—	5.63	—	5.60	—	
V _{OL}	Low Level Output Voltage	2.0 4.5 6.0	V _{IH} or V _{IL}	20 μA	—	0.0	0.1	—	0.1	—	0.1	V
					—	0.0	0.1	—	0.1	—	0.1	
		4.5 6.0	V _{IH} or V _{IL}	4.0 mA 5.2 mA	—	0.17	0.26	—	0.33	—	0.40	
					—	0.18	0.26	—	0.33	—	0.40	
I _I	Input Leakage Current	6.0	V _I = V _{CC} or GND	—	—	±0.1	—	±1.0	—	±1.0	μA	
I _{CC}	Quiescent Supply Current	6.0	V _I = V _{CC} or GND	—	—	4	—	40	—	80	μA	

AC ELECTRICAL CHARACTERISTICS (V_{CC} = 5V, T_A = 25°C, C_L = 15pF, Input t_r = t_f = 6ns)

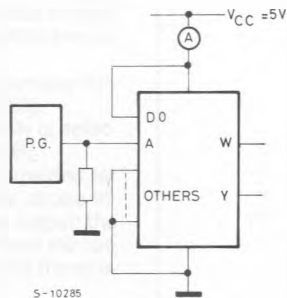
Symbol	Parameter	54HC and 74HC			Unit
		Min.	Typ.	Max.	
t _{TLH} t _{THL}	Output Transition Time		4	8	ns
t _{PLH} t _{PHL}	Propagation Delay Time (D-W)		18	29	ns
t _{PLH} t _{PHL}	Propagation Delay Time (D-Y)		17	27	ns
t _{PLH} t _{PHL}	Propagation Delay Time (STROBE-W)		12	20	ns
t _{PLH} t _{PHL}	Propagation Delay Time (STROBE-Y)		11	18	ns
t _{PLH} t _{PHL}	Propagation Delay Time (A,B,C-W)		22	35	ns
t _{PLH} t _{PHL}	Propagation Delay Time (A,B,C-Y)		21	33	ns

AC ELECTRICAL CHARACTERISTICS ($C_L = 50\text{pF}$, Input $t_r = t_f = 6\text{ns}$)

Symbol	Parameter	V_{CC}	Test Condition	$T_A = 25^\circ\text{C}$ 54HC and 74HC			-40 to 85°C 74HC		-55 to 125°C 54HC		Unit
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t_{LH} t_{THL}	Output Transition Time	2.0 4.5 6.0		—	30 8 7	75 15 13	—	95 19 16	—	110 22 19	ns
t_{PLH} t_{PHL}	Propagation Delay Time (D-W)	2.0 4.5 6.0		—	84 21 18	165 33 28	—	205 41 35	—	250 50 43	ns
t_{PLH} t_{PHL}	Propagation Delay Time (D-Y)	2.0 4.5 6.0		—	80 20 17	160 32 27	—	200 40 34	—	240 48 41	ns
t_{PLH} t_{PHL}	Propagation Delay Time (STROBE-W)	2.0 4.5 6.0		—	56 14 12	115 23 20	—	145 29 25	—	175 35 30	ns
t_{PLH} t_{PHL}	Propagation Delay Time (STROBE-Y)	2.0 4.5 6.0		—	52 13 11	105 21 18	—	130 26 22	—	160 32 27	ns
t_{PLH} t_{PHL}	Propagation Delay Time (A,B,C - W)	2.0 4.5 6.0		—	104 26 22	205 41 35	—	255 51 43	—	310 62 53	ns
t_{PLH} t_{PHL}	Propagation Delay Time (A,B,C,-Y)	2.0 4.5 6.0		—	100 25 21	195 39 33	—	245 49 42	—	295 59 50	ns
C_{IN}	Input Capacitance			—	5	10	—	10	—	—	pF
$C_{PD} (*)$	Power Dissipation Capacitance			—	75	—	—	—	—	—	pF

Note (*) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load (refer to Test Circuit).

$$\text{Average operating current is: } I_{CC(\text{opr})} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

TEST CIRCUIT I_{CC} (Opr.)

INPUT WAVEFORM IS THE SAME AS THAT IN CASE OF SWITCHING CHARACTERISTICS TEST

SWITCHING CHARACTERISTICS TEST WAVEFORM

