

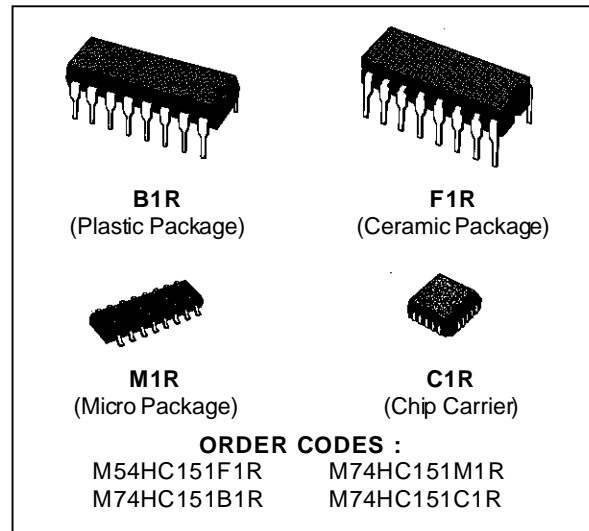
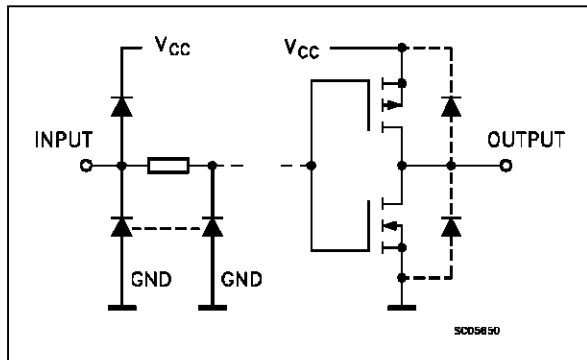
## 8 CHANNEL MULTIPLEXER

- HIGH SPEED  
 $t_{PD} = 15 \text{ ns (TYP.) AT } V_{CC} = 5 \text{ V}$
- LOW POWER DISSIPATION  
 $I_{CC} = 4 \mu\text{A (MAX.) AT } T_A = 25 \text{ }^\circ\text{C}$
- 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  
 $V_{CC} \text{ (OPR)} = 2 \text{ V TO } 6 \text{ V}$
- PIN AND FUNCTION COMPATIBLE  
 WITH 54/74LS151

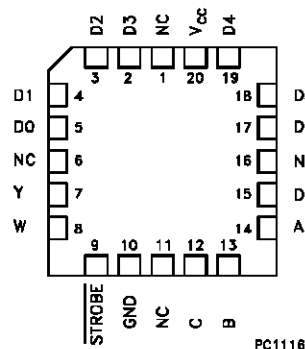
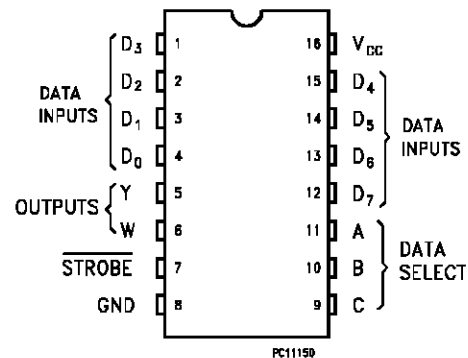
### DESCRIPTION

The M54/74HC151 is a high speed CMOS 8 CHANNEL MULTIPLEXER fabricated in silicon gate C<sup>2</sup>MOS 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.

### INPUT AND OUTPUT EQUIVALENT CIRCUIT



### PIN CONNECTIONS (top view)



NC =  
No Internal  
Connection

# M54/M74HC151

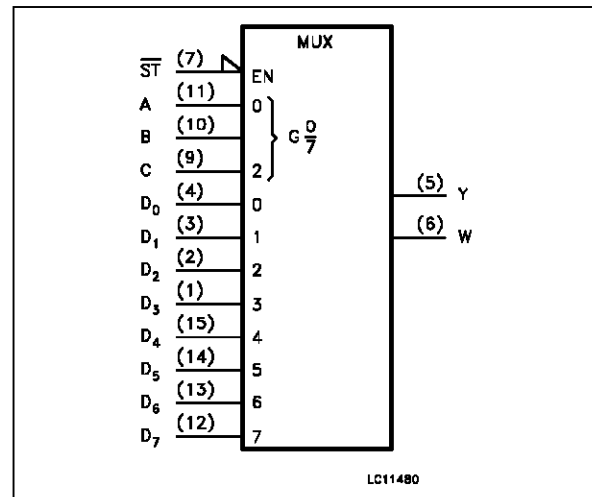
## TRUTH TABLE

INPUTS				OUTPUTS	
SELECT			STROBE	Y	W
C	B	A	$\overline{S}$		
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	$\overline{D7}$

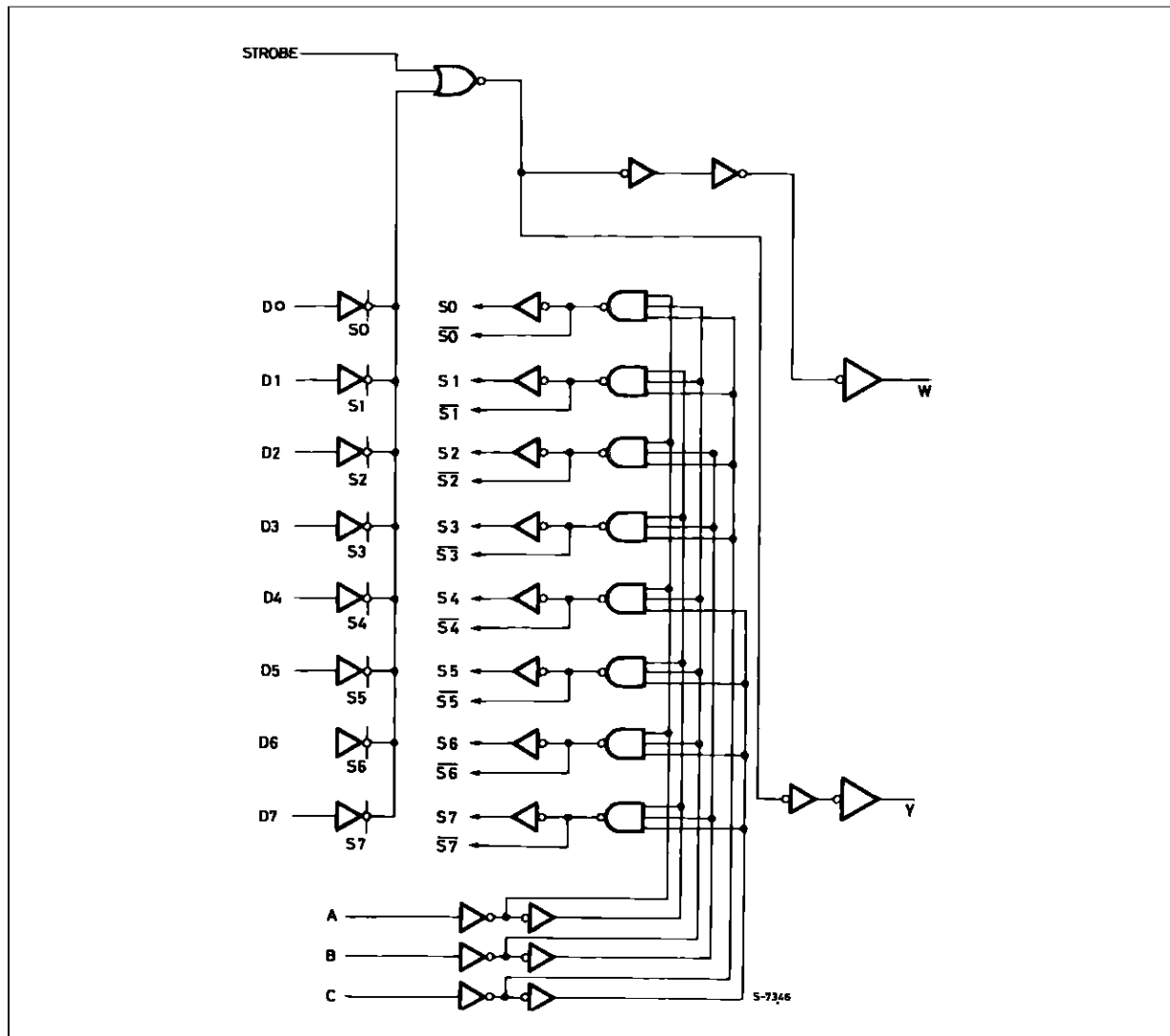
## PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
4, 3, 2, 1, 15, 14, 13, 12	D0 to D7	Multiplexer Inputs
5	y	Multiplexer Output
6	w	Complementary Multiplexer Output
7	$\overline{STROBE}$	Strobe Input
11, 10, 9	A, B, C	Select Inputs
8	GND	Ground (0V)
16	Vcc	Positive Supply Voltage

## IEC LOGIC SYMBOL



## LOGIC DIAGRAM



## 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	$\pm 20$	mA
$I_{OK}$	DC Output Diode Current	$\pm 20$	mA
$I_O$	DC Output Source Sink Current Per Output Pin	$\pm 25$	mA
$I_{CC}$ or $I_{GND}$	DC $V_{CC}$ or Ground Current	$\pm 50$	mA
$P_D$	Power Dissipation	500 (*)	mW
$T_{stg}$	Storage Temperature	-65 to +150	$^{\circ}C$
$T_L$	Lead Temperature (10 sec)	300	$^{\circ}C$

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

(\*) 500 mW:  $\pm 65^{\circ}C$  derate to 300 mW by 10mW/ $^{\circ}C$ :  $65^{\circ}C$  to  $85^{\circ}C$

## M54/M74HC151

### 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
$T_{op}$	Operating Temperature: <b>M54HC Series</b> <b>M74HC Series</b>	-55 to +125 -40 to +85	$^{\circ}\text{C}$ $^{\circ}\text{C}$
$t_r, t_f$	Input Rise and Fall Time	$V_{CC} = 2\text{ V}$	0 to 1000
		$V_{CC} = 4.5\text{ V}$	0 to 500
		$V_{CC} = 6\text{ V}$	0 to 400

### DC SPECIFICATIONS

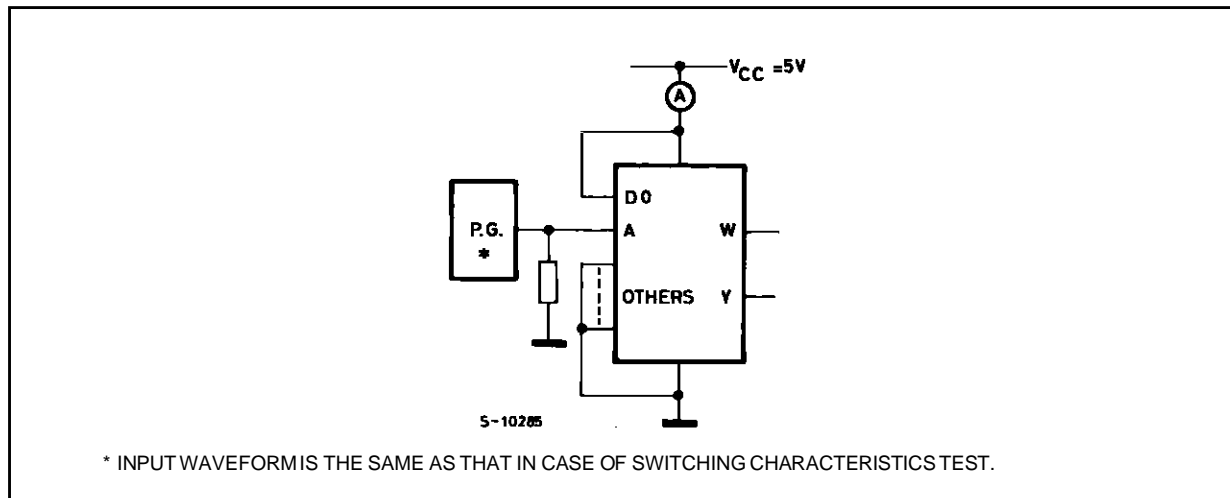
Symbol	Parameter	Test Conditions		Value						Unit		
				$T_A = 25\text{ }^{\circ}\text{C}$ 54HC and 74HC			$-40\text{ to }85\text{ }^{\circ}\text{C}$ 74HC		$-55\text{ to }125\text{ }^{\circ}\text{C}$ 54HC			
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.	
$V_{IH}$	High Level Input Voltage	$V_{CC}$ (V)		1.5			1.5		1.5		V	
				3.15			3.15		3.15			
				4.2			4.2		4.2			
$V_{IL}$	Low Level Input Voltage	$V_{CC}$ (V)				0.5		0.5		0.5	V	
						1.35		1.35		1.35		
						1.8		1.8		1.8		
$V_{OH}$	High Level Output Voltage	$V_{CC}$ (V)	$V_I = V_{IH}$ or $V_{IL}$	$I_O = -20\text{ }\mu\text{A}$	1.9	2.0		1.9		1.9		V
					4.4	4.5		4.4		4.4		
					5.9	6.0		5.9		5.9		
				$I_O = -4.0\text{ mA}$	4.18	4.31		4.13		4.10		
					$I_O = -5.2\text{ mA}$	5.68	5.8		5.63		5.60	
$V_{OL}$	Low Level Output Voltage	$V_{CC}$ (V)	$V_I = V_{IH}$ or $V_{IL}$	$I_O = 20\text{ }\mu\text{A}$			0.0	0.1		0.1		0.1
						0.0	0.1		0.1		0.1	
						0.0	0.1		0.1		0.1	
				$I_O = 4.0\text{ mA}$		0.17	0.26		0.33		0.40	
					$I_O = 5.2\text{ mA}$		0.18	0.26		0.33		0.40
$I_I$	Input Leakage Current	6.0	$V_I = V_{CC}$ or GND				$\pm 0.1$		$\pm 1$		$\pm 1$	$\mu\text{A}$
$I_{CC}$	Quiescent Supply Current	6.0	$V_I = V_{CC}$ or GND			4		40		80	$\mu\text{A}$	

AC ELECTRICAL CHARACTERISTICS (C<sub>L</sub> = 50 pF, Input t<sub>r</sub> = t<sub>f</sub> = 6 ns)

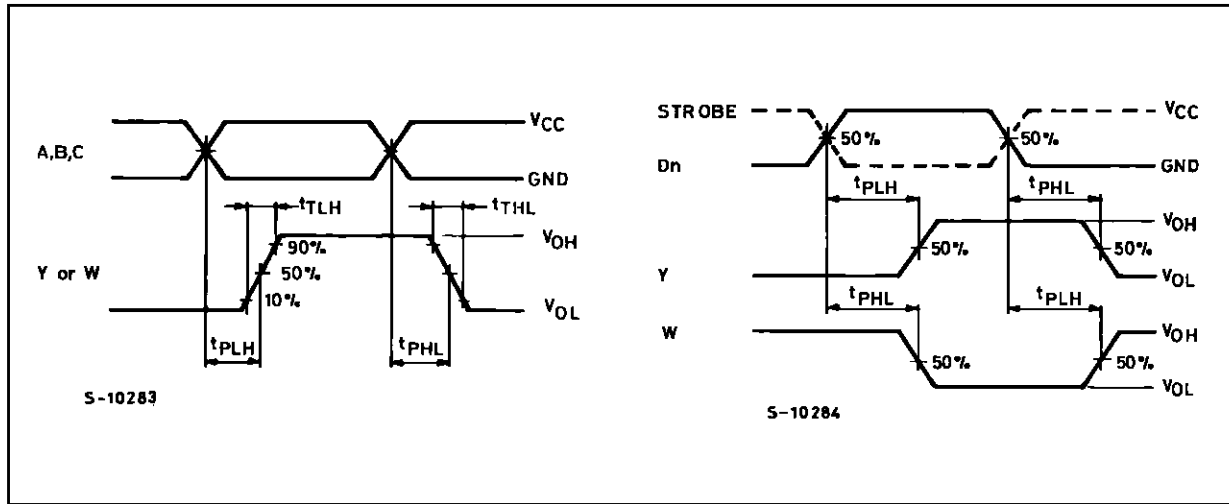
Symbol	Parameter	Test Conditions		Value						Unit	
		V <sub>CC</sub> (V)		T <sub>A</sub> = 25 °C 54HC and 74HC			-40 to 85 °C 74HC		-55 to 125 °C 54HC		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
t <sub>TLH</sub> t <sub>THL</sub>	Output Transition Time	2.0			30	75		95		110	ns
		4.5			8	15		19		22	
		6.0			7	13		16		19	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time (D - W)	2.0			56	130		165		190	ns
		4.5			16	26		33		38	
		6.0			14	22		28		32	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time (D - Y)	2.0			56	130		165		190	ns
		4.5			16	26		33		38	
		6.0			14	22		28		32	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time (STROBE - W)	2.0			30	85		105		125	ns
		4.5			10	17		21		25	
		6.0			9	14		18		21	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time (STROBE - Y)	2.0			30	85		105		125	ns
		4.5			10	17		21		25	
		6.0			9	14		18		21	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time (A, B, C - W)	2.0			72	160		200		235	ns
		4.5			20	32		40		47	
		6.0			17	27		34		40	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time (A, B, C - Y)	2.0			72	160		200		235	ns
		4.5			20	32		40		47	
		6.0			17	27		34		40	
C <sub>IN</sub>	Input Capacitance				5	10		10		10	pF
C <sub>PD</sub> (*)	Power Dissipation Capacitance				63						pF

(\*) C<sub>PD</sub> 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). Average operating current can be obtained by the following equation. I<sub>CC(OPR)</sub> = C<sub>PD</sub> • V<sub>CC</sub> • f<sub>IN</sub> + I<sub>CC</sub>

TEST CIRCUIT I<sub>CC</sub> (Opr.)



SWITCHING CHARACTERISTICS TEST WAVEFORM



## Plastic DIP16 (0.25) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050



**Ceramic DIP16/1 MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			20			0.787
B			7			0.276
D		3.3			0.130	
E	0.38			0.015		
e3		17.78			0.700	
F	2.29		2.79	0.090		0.110
G	0.4		0.55	0.016		0.022
H	1.17		1.52	0.046		0.060
L	0.22		0.31	0.009		0.012
M	0.51		1.27	0.020		0.050
N			10.3			0.406
P	7.8		8.05	0.307		0.317
Q			5.08			0.200



P053D



## SO16 (Narrow) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.004		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.62			0.024
S	8° (max.)					



P013H

PLCC20 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	9.78		10.03	0.385		0.395
B	8.89		9.04	0.350		0.356
D	4.2		4.57	0.165		0.180
d1		2.54			0.100	
d2		0.56			0.022	
E	7.37		8.38	0.290		0.330
e		1.27			0.050	
e3		5.08			0.200	
F		0.38			0.015	
G			0.101			0.004
M		1.27			0.050	
M1		1.14			0.045	



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