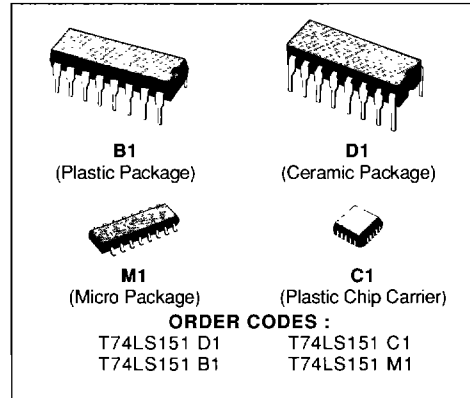


## 8-INPUT MULTIPLEXER

- SCHOTTKY PROCESS FOR HIGH SPEED
- MULTIFUNCTION CAPABILITY
- ON-CHIP SELECT LOGIC DECODING
- FULLY BUFFERED COMPLEMENTARY OUTPUTS
- INPUT CLAMP DIODES LIMIT HIGH SPEED TERMINATION EFFECTS
- FULLY TTL AND CMOS COMPATIBLE

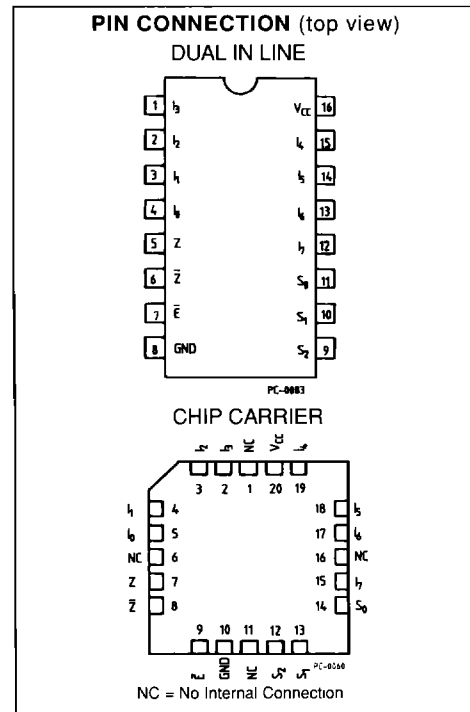
### DESCRIPTION

The T74LS151 is a high speed 8-input Digital Multiplexer. It provides in one package, the ability to select one bit of data from up to eight sources. The LS151 can be a universal function generator to generate any logic function of four variables. Both assertion and negation outputs are provided.

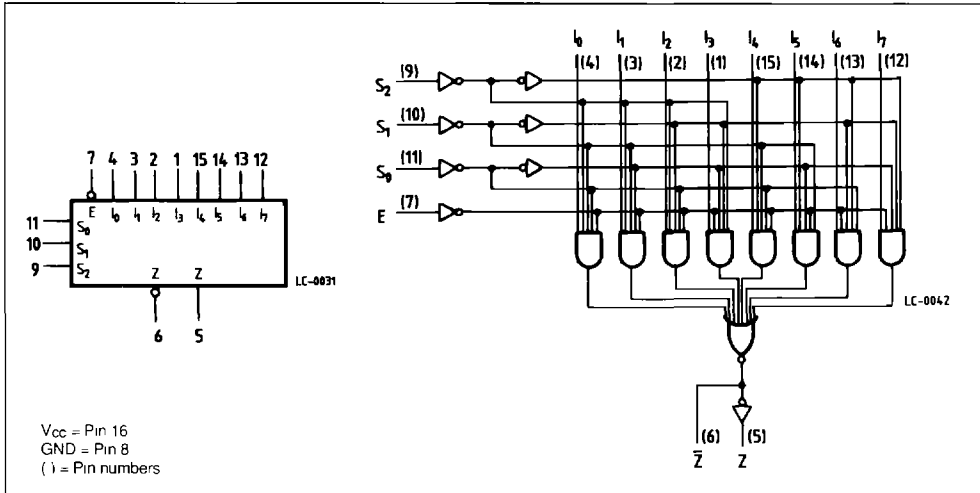


### PIN NAMES

$S_0 - S_2$	SELECT INPUT
$E$	ENABLE (active LOW) INPUT
$I_0 - I_7$	MULTIPLEXER INPUTS
$Z$	MULTIPLEXER OUTPUT
$\bar{Z}$	COMPLEMENTARY MULTIPLEXER OUTPUT



LOGIC SYMBOL AND LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	- 0.5 to 7	V
V <sub>I</sub>	Input Voltage. Applied to Input	- 0.5 to 15	V
V <sub>O</sub>	Output Voltage. Applied to Output	- 0.6 to 5.5	V
I <sub>I</sub>	Input Current. into Inputs	- 0.5 to 5	mA
I <sub>O</sub>	Output Current. into Outputs	50	mA

Stresses in excess of those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions in excess of those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

GUARANTEED OPERATING RANGE

Part Numbers	Supply Voltage			Temperature
	Min.	Typ.	Max.	
T74LS151XX	4.75 V	5.0 V	5.25 V	0 °C to + 70 °C

XX = package type

FUNCTIONAL DESCRIPTION

The LS151 is a logical implementation of a single pole, 8-position switch with the switch position controlled by the state of three Select inputs S<sub>0</sub>, S<sub>1</sub>, S<sub>2</sub>. Both assertion and negation outputs are provided.

$$Z = \bar{E} \cdot (I_0 \cdot \bar{S}_0 \cdot \bar{S}_1 \cdot \bar{S}_2 + I_1 \cdot S_0 \cdot \bar{S}_1 \cdot \bar{S}_2 + I_2 \cdot \bar{S}_0 \cdot S_1 \cdot \bar{S}_2 + I_3 \cdot S_0 \cdot S_1 \cdot \bar{S}_2 + I_4 \cdot \bar{S}_0 \cdot \bar{S}_1 \cdot S_2 + I_5 \cdot S_0 \cdot \bar{S}_1 \cdot S_2 + I_6 \cdot \bar{S}_0 \cdot S_1 \cdot S_2 + I_7 \cdot S_0 \cdot S_1 \cdot S_2)$$

The LS151 provides the ability, in one package, to select from eight sources of data or control information. By proper manipulation of the inputs, the LS51

The Enable input (E) is active LOW. When it is not activated, the negation output is HIGH and the assertion output is LOW regardless of all other inputs. The logic functions provided at the output is:

can provide any logic function of four variables and its negation.

## TRUTH TABLE

$\bar{E}$	S <sub>2</sub>	S <sub>1</sub>	S <sub>0</sub>	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	I <sub>7</sub>	$\bar{Z}$	Z
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	H	X	X	X	X	X	X	X	L	H
L	L	L	H	X	L	X	X	X	X	X	X	H	L
L	L	L	H	X	H	X	X	X	X	X	X	L	H
L	L	H	L	X	X	L	X	X	X	X	X	H	L
L	L	H	L	X	X	H	X	X	X	X	X	L	H
L	L	H	H	X	X	X	L	X	X	X	X	H	L
L	L	H	H	X	X	X	H	X	X	X	X	L	H
L	H	L	L	X	X	X	X	L	X	X	X	H	L
L	H	L	L	X	X	X	X	H	X	X	X	L	H
L	H	L	H	X	X	X	X	X	L	X	X	H	L
L	H	L	H	X	X	X	X	X	H	X	X	L	H
L	H	H	L	X	X	X	X	X	X	H	X	L	H
L	H	H	H	X	X	X	X	X	X	X	L	H	L
L	H	H	H	X	X	X	X	X	X	X	H	L	H
L	H	H	H	X	X	X	X	X	X	X	L	H	L
L	H	H	H	X	X	X	X	X	X	X	H	L	H

H = HIGH Voltage Level

L = LOW Voltage Level

X = Don't Care

## DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

Symbol	Parameter	Limits			Test Condition (note 1)	Unit	
		Min.	Typ. (*)	Max.			
V <sub>IH</sub>	Input HIGH Voltage	2.0			Guaranteed Input HIGH Threshold Voltage for All Inputs	V	
V <sub>IL</sub>	Input LOW Voltage			0.8	Guaranteed Input LOW Threshold Voltage for All Inputs	V	
V <sub>CD</sub>	Input Clamp Diode Voltage		-0.65	-1.5	V <sub>CC</sub> = MIN. I <sub>IN</sub> = -18 mA	V	
V <sub>OH</sub>	Output HIGH Voltage	2.7	3.4		V <sub>CC</sub> = MIN. I <sub>OH</sub> = -400 μA V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> per Truth Table	V	
V <sub>OL</sub>	Output LOW Voltage		0.25	0.4	I <sub>OL</sub> = 4.0 mA	V <sub>CC</sub> = MIN. V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> per Truth Table	V
			0.35	0.5	I <sub>OL</sub> = 8.0 mA		V
I <sub>IH</sub>	Input HIGH Current		1.0	20 0.1	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7 V V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0 V	μA mA	
I <sub>IL</sub>	Input LOW Current			-0.4	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.4 V	mA	
I <sub>OS</sub>	Output Short Circuit Current (note 2)	-20		-100	V <sub>CC</sub> = MAX, V <sub>OUT</sub> = 0 V	mA	
I <sub>CC</sub>	Power Supply Current		6.0	10	V <sub>CC</sub> = MAX	mA	

Notes : 1. Conditions for testing, not shown in the table, are chosen to guarantee under "worst case" conditions.

2. Not more than one output should be shorted at a time.

(\*) Typical values are at V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = 25 °C.

AC CHARACTERISTICS :  $T_A = 25\text{ }^\circ\text{C}$ 

Symbol	Parameter	Limits			Tests Conditions	Unit
		Min.	Typ.	Max.		
$t_{PLH}$ $t_{PHL}$	Propagation Delay, Select to $\bar{Z}$ Output		14 20	33 32	Fig. 1	$V_{CC} = 5.0\text{ V}$ $C_L = 15\text{ pF}$
$t_{PLH}$ $t_{PHL}$	Propagation Delay, Select to Z Output		27 18	43 30	Fig. 2	
$t_{PLH}$ $t_{PHL}$	Propagation Delay, Enable to $\bar{Z}$ Output		15 18	24 30	Fig. 2	
$t_{PLH}$ $t_{PHL}$	Propagation Delay, Enable to Z Output		26 20	42 32	Fig. 1	
$t_{PLH}$ $t_{PHL}$	Propagation Delay, Data to $\bar{Z}$ Output		13 12	21 20	Fig. 1	
$t_{PLH}$ $t_{PHL}$	Propagation Delay, Data to Z Output		20 16	32 26	Fig. 2	

## AC WAVEFORMS

Figure 1.

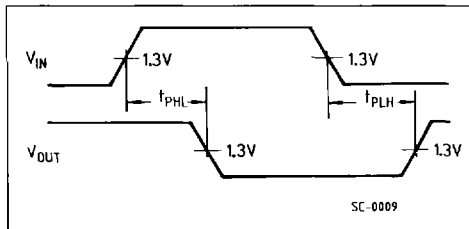


Figure 2.

