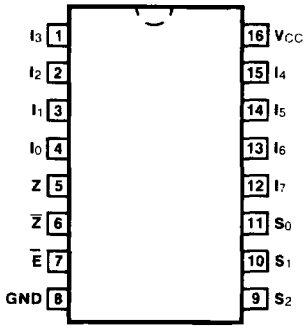
54F/74F151A

8-Input Multiplexer

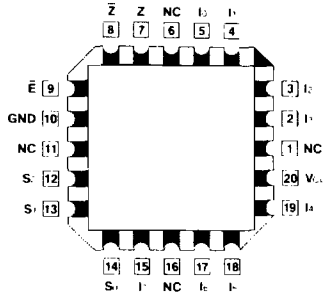
Description

The 'F151A is a high-speed 8-input digital multiplexer. It provides in one package the ability to select one line of data from up to eight sources. The 'F151A can be used as a universal function generator to generate any logic function of four variables. Both assertion and negation outputs are provided.

Connection Diagrams



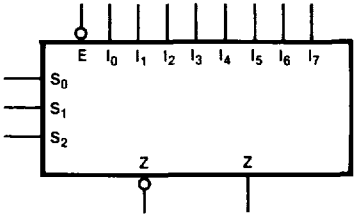
Pin Assignment for DIP and SOIC



Pin Assignment for LCC and PCC

Ordering Code: See Section 5

Logic Symbol



Input Loading/Fan-Out: See Section 3 for U.L. definitions

Pin Names	Description	54F/74F(U.L.) HIGH/LOW
I_0-I_7	Data Inputs	0.5/0.375
S_0-S_2	Select Inputs	0.5/0.375
$\overline{E}$	Enable Input (Active LOW)	0.5/0.375
Z	Data Output	25/12.5
$\overline{Z}$	Inverted Data Output	25/12.5

Functional Description

The 'F151A is a logic implementation of a single pole, 8-position switch with the switch position controlled by the state of three Select inputs, S_0, S_1, S_2. Both assertion and negation outputs are provided. The Enable input ($\overline{E}$) 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 function provided at the output is:

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

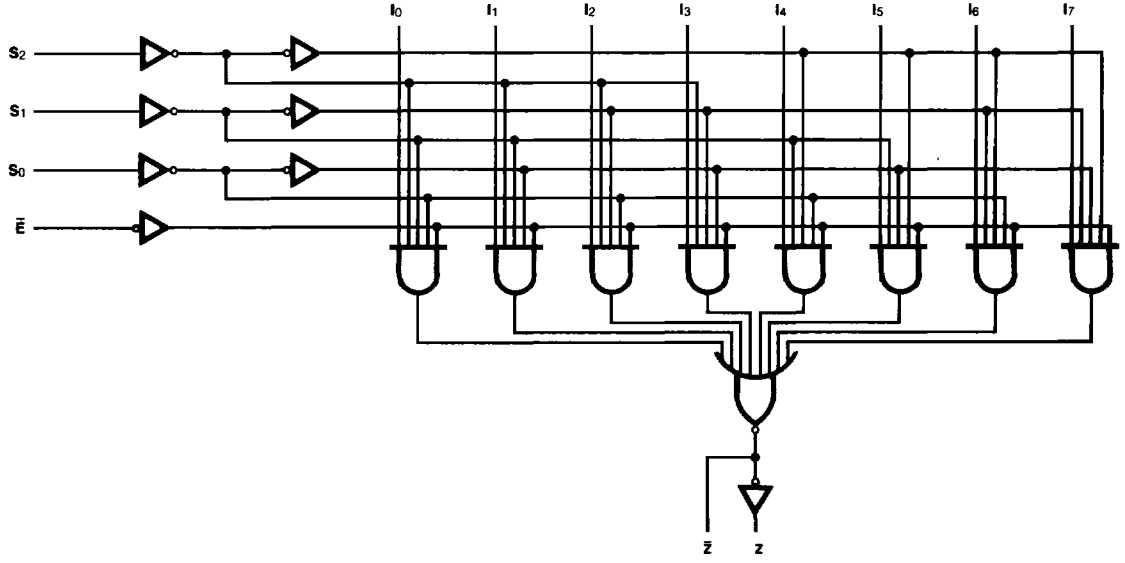
The 'F151A provides the ability, in one package, to select from eight sources of data or control information. By proper manipulation of the inputs, the 'F151A can provide any logic function of four variables and its negation.

Truth Table

Inputs				Outputs	
$\overline{E}$	S_2	S_1	S_0	$\overline{Z}$	Z
H	X	X	X	H	L
L	L	L	L	$\overline{I}_0$	I_0
L	L	L	H	$\overline{I}_1$	I_1
L	L	H	L	$\overline{I}_2$	I_2
L	L	H	H	$\overline{I}_3$	I_3
L	H	L	L	$\overline{I}_4$	I_4
L	H	L	H	$\overline{I}_5$	I_5
L	H	H	L	$\overline{I}_6$	I_6
L	H	H	H	$\overline{I}_7$	I_7

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

Logic Diagram



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

DC Characteristics over Operating Temperature Range (unless otherwise specified)

Symbol	Parameter	54F/74F			Units	Conditions
		Min	Typ	Max		
I_{CC}	Power Supply Current		13.5	21.0	mA	V_{CC} = Max, V_{IN} = HIGH

AC Characteristics: See Section 3 for waveforms and load configurations

Symbol	Parameter	54F/74F T_A = +25°C V_{CC} = +5.0 V C_L = 50 pF			54F T_A, V_{CC} = Mil C_L = 50 pF		74F T_A, V_{CC} = Com C_L = 50 pF		Units	Fig. No.
		Min	Typ	Max	Min	Max	Min	Max		
t_{PLH} t_{PHL}	Propagation Delay S_n to $\overline{Z}$	4.0 3.2	6.2 5.2	9.0 7.5	3.5 3.0	11.5 8.0	3.5 3.2	9.5 7.5	ns	3-1 3-10
t_{PLH} t_{PHL}	Propagation Delay S_n to Z	4.5 4.0	7.5 6.2	10.5 9.0	4.5 4.0	13.5 9.5	4.5 4.0	12.0 9.0	ns	3-1 3-10
t_{PLH} t_{PHL}	Propagation Delay $\overline{E}$ to $\overline{Z}$	3.0 3.0	4.7 4.4	6.1 6.0	3.0 2.5	7.5 6.5	3.0 2.5	7.0 6.0	ns	3-1 3-4
t_{PLH} t_{PHL}	Propagation Delay $\overline{E}$ to Z	5.0 3.5	7.0 5.3	9.5 7.0	4.0 3.0	12.0 8.0	4.0 3.0	10.5 7.5	ns	3-1 3-3
t_{PLH} t_{PHL}	Propagation Delay I_n to $\overline{Z}$	3.0 1.5	4.8 2.5	6.5 4.0	2.5 1.5	7.5 6.0	3.0 1.5	7.0 5.0	ns	3-1 3-3
t_{PLH} t_{PHL}	Propagation Delay I_n to Z	3.0 3.7	4.8 5.5	6.5 7.0	2.5 3.5	8.5 9.0	2.5 3.7	7.5 7.5	ns	3-1 3-4