



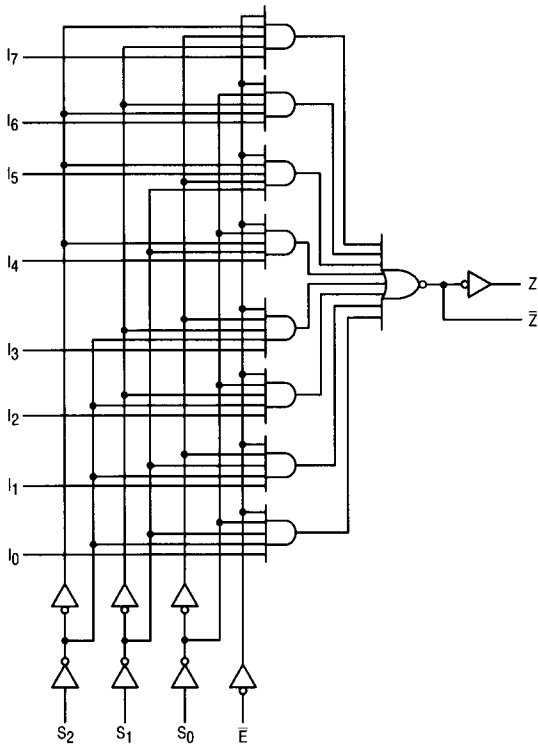
# 8-Input Data Selector/ Multiplexer with Enable

**ELECTRICALLY TESTED PER:**  
MIL-M-38510/30901

The 54LS151 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 used as a universal function generator to generate any logic function of four variables. Both assertion and negation outputs are provided.

- Schottky Process For High-Speed
- Multifunction Capability
- On-Chip Select Logic Decoding
- Fully Buffered Complementary Outputs
- Input Clamp Diodes Limit High-Speed Termination Effects

**LOGIC DIAGRAM**



**Military 54LS151**



**AVAILABLE AS:**

- 1) JAN: JM38510/30901BXA
- 2) SMD: 7601001
- 3) 883: 54LS151/BXAJC

**X = CASE OUTLINE AS FOLLOWS:**  
PACKAGE: CERDIP: E  
CERFLAT: F  
LCC: 2

**THE LETTER "M" APPEARS  
BEFORE THE / ON LCC.**

**PIN ASSIGNMENTS**

FUNCT.	DIL 620-09	FLATS 650-05	LCC 756A-02	BURN-IN (COND. A)
I <sub>3</sub>	1	1	2	VCC
I <sub>2</sub>	2	2	3	VCC
I <sub>1</sub>	3	3	4	VCC
I <sub>0</sub>	4	4	5	VCC
Z	5	5	7	OPEN
Z̄	6	6	8	VCC
E	7	7	9	VCC
GND	8	8	10	GND
S <sub>2</sub>	9	9	12	VCC
S <sub>1</sub>	10	10	13	VCC
S <sub>0</sub>	11	11	14	VCC
I <sub>7</sub>	12	12	15	VCC
I <sub>6</sub>	13	13	17	VCC
I <sub>5</sub>	14	14	18	VCC
I <sub>4</sub>	15	15	19	VCC
VCC	16	16	20	VCC

**BURN-IN CONDITIONS:**  
VCC = 5.0 V MIN/6.0 V MAX

## 54LS151

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	L	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	H	L	H

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

### FUNCTIONAL DESCRIPTION

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

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

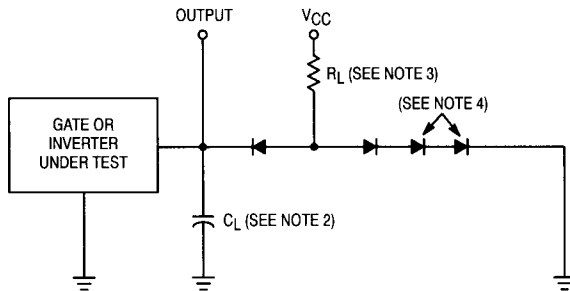
The 'LS151 provides the ability, in one package, to select from eight sources of data or control information. By proper manipulation of the inputs, the 'LS151 can provide any logic function of four variables and its negation.

Pin Names	Loading (Note a)	
	HIGH	LOW
S <sub>0</sub> -S <sub>2</sub> Select Inputs	0.5 U.L.	0.25 U.L.
$\bar{E}$ Enable (active LOW) Input	0.5 U.L.	0.25 U.L.
I <sub>0</sub> -I <sub>7</sub> Multiplexer Inputs	0.5 U.L.	0.25 U.L.
Z Multiplexer Output (Note b)	10 U.L.	5(2.5) U.L.
$\bar{Z}$ Complementary Multiplexer Output (Note b)	10 U.L.	5(2.5) U.L.

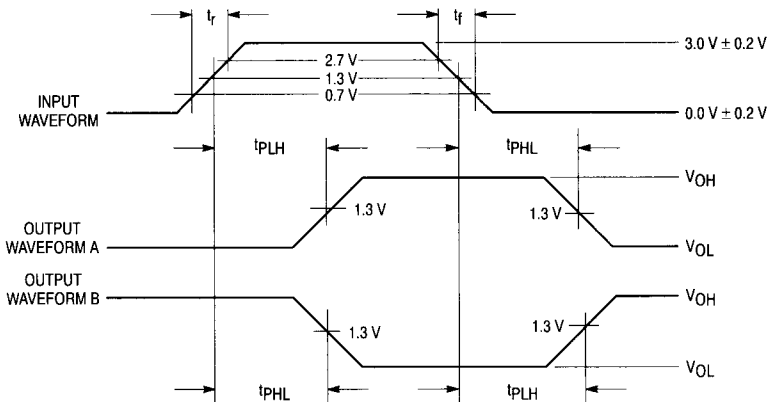
**NOTES:**  
 a. One TTL Unit Load (U.L.) = 40 μA HIGH/1.6 mA LOW.  
 b. The Output LOW drive factor is 2.5 U.L. for Military (54) Temperature Ranges.

54LS151

LOAD FOR OUTPUT UNDER TEST



WAVEFORMS



NOTES:

1. Input pulse characteristics: PRR ≤ 1.0 MHz, tr = 15 ns, tf ≤ 6.0 ns.
2. CL = 50 pF ± 10%, including scope probe, wiring and stray capacitance without package in test fixture.
3. RL = 2.0 kΩ ± 5.0%.
4. All diodes are 1N3064 or 1N916.
5. The limits specified for CL = 15 pF are guaranteed but not tested.

5

54LS151

Symbol	Parameter	Limits						Unit	Test Condition (Unless Otherwise Specified)
		+ 25°C		+ 125°C		- 55°C			
		Subgroup 1		Subgroup 2		Subgroup 3			
		Min	Max	Min	Max	Min	Max		
V <sub>OH</sub>	Logical "1" Output Voltage	2.5		2.5		2.5		V	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -0.4 mA, V <sub>IH</sub> = 2.0 V, all inputs, S = 0.7 V or 2.0 V, $\bar{E}$ = 0.7 V or 2.0 V.
V <sub>OL</sub>	Logical "0" Output Voltage		0.4		0.4		0.4	V	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 4.0 mA, V <sub>IL</sub> = 0.7 V or 2.0 V all inputs, $\bar{E}$ = 0.7 V or 2.0 V, S = 0.7 V or 2.0 V.
V <sub>IC</sub>	Input Clamping Voltage		-1.5					V	V <sub>CC</sub> = 4.5 V, I <sub>IN</sub> = -18 mA, other inputs are open.
I <sub>IH</sub>	Logical "1" Input Current		20		20		20	μA	V <sub>CC</sub> = 5.5 V, V <sub>IH</sub> = 2.7 V, other inputs are GND, $\bar{E}$ = 2.7 V, 5.5 V or GND, S = 2.7 V, 5.5 V or GND.
I <sub>IHH</sub>	Logical "1" Input Current		100		100		100	μA	V <sub>CC</sub> = 5.5 V, V <sub>IHH</sub> = 5.5 V, other inputs are GND, $\bar{E}$ = 5.5 V, S = 5.5 V or GND.
I <sub>IL(I)</sub>	Logical "0" Input Current	-0.16	-0.4	-0.16	-0.4	-0.16	-0.4	mA	V <sub>CC</sub> = 5.5 V, $\bar{E}$ = GND, S = 5.5 V or GND, V <sub>IN</sub> = 0.4 V, all other inputs = 5.5 V.
I <sub>IL(E)</sub>	Logical "0" Input Current	-0.16	-0.4	-0.16	-0.4	-0.16	-0.4	mA	V <sub>CC</sub> = 5.5 V, $\bar{E}$ = 0.4 V, V <sub>IN</sub> = 5.5 V.
I <sub>IL(S)</sub>	Logical "0" Input Current	-0.1	-0.34	-0.1	-0.34	-0.1	-0.34	mA	V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0.4 V, other inputs = 5.5 V, $\bar{E}$ = 5.5 V.
I <sub>OS</sub>	Output Short Circuit Current	-15	-100	-15	-100	-15	-100	mA	V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 5.5 V, all other inputs are GND, V <sub>OUT</sub> = GND.
I <sub>CC</sub>	Power Supply Current		10		10		10	mA	V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 5.5 V all inputs.
V <sub>IH</sub>	Logical "1" Input Voltage	2.0		2.0		2.0		V	V <sub>CC</sub> = 4.5 V.
V <sub>IL</sub>	Logical "0" Input Voltage		0.7		0.7		0.7	V	V <sub>CC</sub> = 4.5 V.
	Functional Tests	Subgroup 7		Subgroup 8A		Subgroup 8B			per Truth Table with V <sub>CC</sub> = 5.0 V, V <sub>INL</sub> = 0.4 V, and V <sub>INH</sub> = 2.5 V.

5

54LS151

Symbol	Parameter	Limits						Unit	Test Condition (Unless Otherwise Specified)
		+ 25°C		+ 125°C		- 55°C			
		Subgroup 9		Subgroup 10		Subgroup 11			
		Min	Max	Min	Max	Min	Max		
t <sub>PHL1</sub> t <sub>PHL1</sub>	Propagation Delay /Data-Output I <sub>n</sub> to Z	3.0 —	31 26	3.0 —	47 42	3.0 —	47 42	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.
t <sub>PLH1</sub> t <sub>PLH1</sub>	Propagation Delay /Data-Output I <sub>n</sub> to Z	3.0 —	37 32	3.0 —	56 51	3.0 —	56 51	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.
t <sub>PHL2</sub> t <sub>PHL2</sub>	Propagation Delay /Data-Output I <sub>n</sub> to Z	3.0 —	25 20	3.0 —	38 33	3.0 —	38 33	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.
t <sub>PLH2</sub> t <sub>PLH2</sub>	Propagation Delay /Data-Output I <sub>n</sub> to Z	3.0 —	26 21	3.0 —	39 34	3.0 —	39 34	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.
t <sub>PHL3</sub> t <sub>PHL3</sub>	Propagation Delay /Data-Output E to Z	3.0 —	37 32	3.0 —	56 51	3.0 —	56 51	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.
t <sub>PLH3</sub> t <sub>PLH3</sub>	Propagation Delay /Data-Output E to Z	3.0 —	47 42	3.0 —	71 66	3.0 —	71 66	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.
t <sub>PHL4</sub> t <sub>PHL4</sub>	Propagation Delay /Data-Output E to Z̄	3.0 —	35 30	3.0 —	53 48	3.0 —	53 48	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.
t <sub>PLH4</sub> t <sub>PLH4</sub>	Propagation Delay /Data-Output E to Z̄	3.0 —	29 24	3.0 —	44 39	3.0 —	44 39	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.
t <sub>PHL5</sub> t <sub>PHL5</sub>	Propagation Delay /Data-Output S <sub>n</sub> to Z	3.0 —	35 30	3.0 —	53 48	3.0 —	53 48	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.
t <sub>PLH5</sub> t <sub>PLH5</sub>	Propagation Delay /Data-Output S <sub>n</sub> to Z	3.0 —	48 43	3.0 —	72 67	3.0 —	72 67	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.
t <sub>PHL6</sub> t <sub>PHL6</sub>	Propagation Delay /Data-Output S <sub>n</sub> to Z̄	3.0 —	37 32	3.0 —	56 51	3.0 —	56 51	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.
t <sub>PLH6</sub> t <sub>PLH6</sub>	Propagation Delay /Data-Output S <sub>n</sub> to Z̄	3.0 —	28 23	3.0 —	42 37	3.0 —	42 37	ns	V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 2.0 kΩ. V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF.

5