

GD54/74LS251

8-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUT

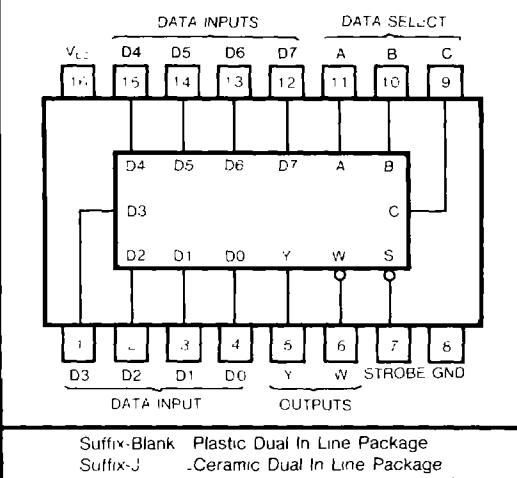
Features

- 3-State Versions of LS151
- Three-State Outputs Interface Directly with System Bus
- Performs Parallel-to-Serial Conversion
- Complementary Outputs Provide True and Inverted Data
- Fully Compatible with Most TTL Circuits

Description

These monolithic data selectors/multiplexers contain full on chip binary decoding to select one-of-eight data sources and feature a strobe controlled three state output. The strobe must be at a low logic level to enable these devices. The three-state outputs permit a number of outputs to be connected to a common bus. When the strobe input is high, both outputs are in a high impedance state in which both the upper and lower transistors of each totem-pole output are off and the output neither drives nor loads the bus significantly. When the strobe is low, the outputs are activated and operate as standard TTL

Pin Configuration



totem pole outputs.

GD54/74LS 251 has the same functions and pin connections as GD54/74LS151 but the latter is provided with active pull-up resistors outputs.

Function Table

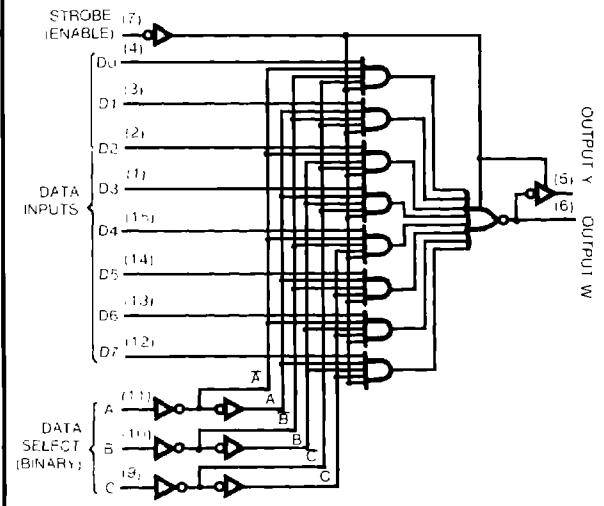
INPUTS			OUTPUTS	
SELECT		STROBE	Y	W
C	B	A		
X	X	X	H	Z
L	L	L	L	D0 $\overline{D0}$
L	L	H	L	D1 $\overline{D1}$
L	H	I	L	D2 $\overline{D2}$
L	H	H	L	D3 $\overline{D3}$
H	L	L	L	D4 $\overline{D4}$
H	L	H	L	D5 $\overline{D5}$
H	H	L	L	D6 $\overline{D6}$
H	H	H	L	D7 $\overline{D7}$

H=high logic level L=low logic level

x=not connected Z=high impedance (off)

D0 D1 D7 = the level of the respective D input

Function Block Diagram



Absolute Maximum Ratings

- Supply voltage, V_{CC} 7V
- Input voltage 7V
- Off-state output voltage 7V
- Operating free-air temperature range 54LS -55°C to 125°C
74LS 0°C to 70°C
- Storage temperature range -65°C to 150°C

Recommended Operating Conditions

SYMBOL	PARAMETER		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	54	4.5	4	5.5	V
		74	4.75	5	5.25	
I_{OH}	High-level output current	54			-1	mA
		74			-2.6	
I_{OL}	Low-level output current	54			12	mA
		74			24	
T_A	Operating free-air temperature	54	-55		125	°C
		74	0		70	

Electrical Characteristics over recommended operating free-air temperature range (unless otherwise noted)

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP (Note 1)	MAX	UNIT
V_{IH}	High-level input voltage			2		V
V_{IL}	Low-level input voltage		54		0.7	V
			74		0.8	
V_{IK}	Input clamp voltage	$V_{CC} = \text{Min}$, $I_I = -18\text{mA}$			-1.5	V
V_{OH}	High-level output voltage	$V_{CC} = \text{Min}$, $V_{IL} = \text{Max}$ $I_{OH} = \text{Max}$, $V_{IH} = \text{Min}$	54	2.4	3.4	V
			74	2.4	3.1	
V_{OL}	Low-level output voltage	$V_{CC} = \text{Min}$, $I_{OL} = 12\text{mA}$ $V_{IL} = \text{Max}$, $V_{IH} = \text{Min}$ $I_{OL} = 24\text{mA}$	54, 74	0.25	0.4	V
			74	0.35	0.5	
I_{OZH}	Off-state output current high-level voltage applied	$V_{CC} = \text{Max}$, $V_O = 2.7\text{V}$ $V_{IH} = \text{Min}$, $V_{IL} = \text{Max}$			20	μA
I_{OZL}	Off-state output current low-level voltage applied	$V_{CC} = \text{Max}$, $V_O = 0.4\text{V}$ $V_{IH} = \text{Min}$, $V_{IL} = \text{Max}$			-20	μA
I_I	Input current at maximum input voltage	$V_{CC} = \text{Max}$, $V_I = 7\text{V}$			0.1	mA
I_{IH}	High-level input current	$V_{CC} = \text{Max}$, $V_I = 2.7\text{V}$			20	μA
I_{IL}	Low-level input current	$V_{CC} = \text{Max}$, $V_I = 0.4\text{V}$			-0.4	mA
I_{OS}	Short-circuit output current	$V_{CC} = \text{Max}$ (Note 2)		-20	-100	mA
I_{CC}	Supply current	$V_{CC} = \text{Max}$	Condition A	6.1	10	mA
		(Note 3)	Condition B	7.1	12	

Note 1: All typical values are at $V_{CC} = 5\text{V}$, $T_A = 25^{\circ}\text{C}$

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 3: Condition A: I_{CC} is measured with the outputs open, strobe grounded, and all other inputs at 4.5V

Condition B: I_{CC} is measured with the outputs open, and all inputs at 4.5V

Switching Characteristics, $V_{CC} = 5V$, $T_A = 25^\circ C$

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITION#	MIN	TYP	MAX	UNIT	
t_{PLH}	A,B or C(4 levels)	Y	$C_L=15pF$ $R_L=2k\Omega$	29	45		ns	
t_{PHL}				28	45			
t_{PLH}				20	33		ns	
t_{PHL}				21	33			
t_{PLH}				17	28		ns	
t_{PHL}				18	28			
t_{PLH}				10	15		ns	
t_{PHL}				9	15			
t_{PZH}	Strobe	Y		30	45		ns	
t_{PZL}				26	40			
t_{PZH}		$C_L=5pF$ $R_L=2k\Omega$	17	27		ns		
t_{PZL}			24	40				
t_{PHZ}	Strobe		W		30	45		ns
t_{PLZ}					15	25		
t_{PHZ}					37	55		ns
t_{PLZ}					15	25		

- t_{PLH} =propagation delay time low-to-high-level output
- t_{PHL} =propagation delay time high-to-low-level output
- t_{PZH} =output enable time to high level
- t_{PZL} =output enable time to low level
- t_{PHZ} =output disable time from high level
- t_{PLZ} =output disable time from low level

*For load circuit and voltage waveforms, see page 3-11