National Semiconductor

DM54S151/DM74S151 1-of-8 Data Selector/Multiplexer with Complementary Outputs

General Description

These data selectors/multiplexers contain full on-chip decoding to select the desired data source. The 'S151 selects one-of-eight data sources. The 'S151 has a strobe input which must be at a low logic level to enable these devices. A high level at the strobe forces the W output high and the Y output low.

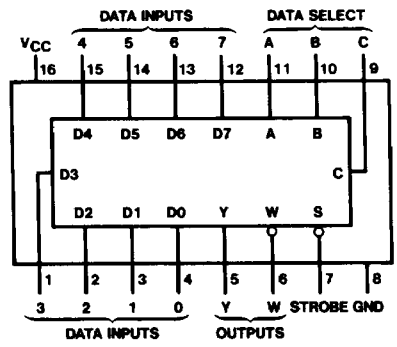
The 'S151 features complementary W and Y outputs.

Features

- Select one-of-eight data lines
- Performs parallel-to-serial conversion
- Permits multiplexing from N lines to one line
- Also for use as Boolean function generator
- Typical average propagation delay time, data input to W output 4.5 ns
- Typical power dissipation 225 mW

Connection Diagram

Dual-In-Line Package



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Order Number DM54S151J, DM54S151W or DM74S151N
See NS Package Number J16A, N16E or W16A

Function Table

Inputs				Outputs	
Select			Strobe S	Y	W
C	B	A			
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	$\overline{D7}$

H = high level, L = low level, X = don't care

D0, D1 . . . D7 = the level of the respective D input

Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	5.5V
Operating Free Air Temperature Range	
DM54S	−55°C to +125°C
DM74S	0°C to +70°C
Storage Temperature Range	−65°C to +150°C

Note: *The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.*

Recommended Operating Conditions

Symbol	Parameter	DM54S151			DM74S151			Units
		Min	Nom	Max	Min	Nom	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High Level Input Voltage	2			2			V
V_{IL}	Low Level Input Voltage			0.8			0.8	V
I_{OH}	High Level Output Current			−1			−1	mA
I_{OL}	Low Level Output Current			20			20	mA
T_A	Free Air Operating Temperature	−55		125	0		70	°C

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

Symbol	Parameter	Conditions		Min	Typ (Note 1)	Max	Units
V_I	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA				−1.2	V
V_{OH}	High Level Output Voltage	V_{CC} = Min, I_{OH} = Max, V_{IL} = Max, V_{IH} = Min	DM54	2.5	3.4		
			DM74	2.7	3.4		
V_{OL}	Low Level Output Voltage	V_{CC} = Min, I_{OL} = Max V_{IH} = Min, V_{IL} = Max				0.5	V
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, V_I = 5.5V				1	mA
I_{IH}	High Level Input Current	V_{CC} = Max, V_I = 2.7V				50	μA
I_{IL}	Low Level Input Current	V_{CC} = Max, V_I = 0.5V				−2	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 2)	DM54	−40		−100	mA
			DM74	−40		−100	
I_{CC}	Supply Current	V_{CC} = Max (Note 3)			45	70	mA

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

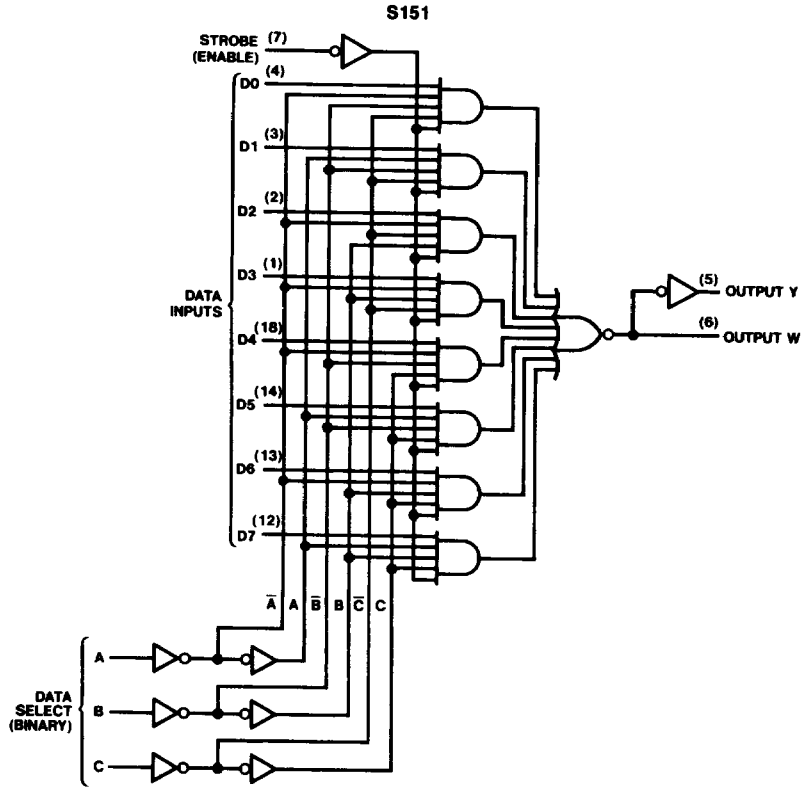
Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 3: I_{CC} is measured with the strobe and data select inputs at 4.5V, all other inputs and outputs open.

Switching Characteristics at V_{CC} = 5V and T_A = 25°C (See Section 1 for Test Waveforms and Output Load)

Symbol	Parameter	From (Input) To (Output)	R_L = 280Ω				Units
			C_L = 15 pF		C_L = 50 pF		
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output	Select to Y (4 Levels)		18		21	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Select to Y (4 Levels)		18		21	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	Select to W (3 Levels)		15		18	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Select to W (3 Levels)		13.5		17	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	Strobe to Y		16.5		19	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Strobe to Y		18		21	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	Strobe to W		13		16	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Strobe to W		12		16	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	D0 thru D7 to Y		12		15	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	D0 thru D7 to Y		12		15	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	D0 thru D7 to W		7		9	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	D0 thru D7 to W		7		10	ns

Logic Diagram



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