

DN74LS251

8-line to 1-line Data Selectors / Multiplexers (with 3-state Outputs)

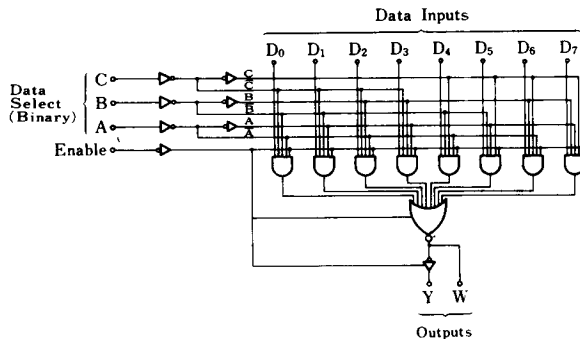
Description

DN74LS251 is an 8-line to 1-line data selector/multiplexer with 3-state outputs.

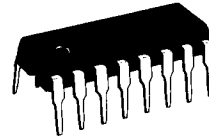
Features

- 3-state outputs
- Complementary outputs
- Wide operating temperature range ($T_a = -20$ to $+75^{\circ}\text{C}$)

Logic diagram (1/2)



P-2



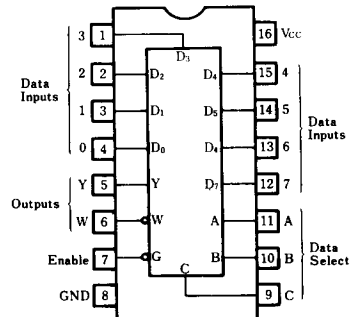
16-pin plastic DIL package

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16-pin Panaflat package (SO-16D)

Pin configuration (top view)



Recommended operating conditions

Parameter	Sym	Min	Typ	Max	Unit
Supply voltage	V_{CC}	4.75	5.00	5.25	V
Output current	I_{OH}			-2.6	mA
	I_{OL}			24	mA
Operating temperature range	T_{opr}	-20	25	75	$^{\circ}\text{C}$

■ DC characteristics ($T_a = -20 \sim +75^\circ\text{C}$)

Parameter	Sym	Test conditions	Min	Typ*	Max	Unit
Input voltage	V_{IH}		2.0			V
	V_{IL}				0.8	V
Output voltage	V_{OH}	$V_{CC} = 4.75\text{V}$, $V_{IH} = 2\text{V}$ $V_{IL} = 0.8\text{V}$, $I_{OH} = -2.6\text{mA}$	2.7	3.1		V
	V_{OL1}	$V_{CC} = 4.75\text{V}$ $V_{IH} = 2\text{V}$, $I_{OL} = 12\text{mA}$		0.25	0.4	V
	V_{OL2}	$V_{CC} = 4.75\text{V}$ $V_{IH} = 2\text{V}$, $I_{OL} = 24\text{mA}$		0.35	0.5	V
Input current	I_{IH}	$V_{CC} = 5.25\text{V}$, $V_I = 2.7\text{V}$			20	μA
	I_{IL}	$V_{CC} = 5.25\text{V}$, $V_I = 0.4\text{V}$			-0.4	mA
	I_I	$V_{CC} = 5.25\text{V}$, $V_I = 7\text{V}$			0.1	mA
Output current	I_{OZ1}	$V_{CC} = 5.25\text{V}$, $V_O = 2.7\text{V}$			20	μA
	I_{OZ2}	$V_{CC} = 5.25\text{V}$, $V_O = 0.4\text{V}$			-20	μA
Output short circuit current**	I_{OS}	$V_{CC} = 5.25\text{V}$, $V_O = 0\text{V}$	-15		-130	mA
Input clamp voltage	V_{IK}	$V_{CC} = 4.75\text{V}$, $I_I = -18\text{mA}$			-1.5	V
Supply current***	I_{CC}	$V_{CC} = 5.25\text{V}$		7	12	mA
				8.5	15	mA

* When constant at $V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$.

** Only one output at a time short circuited to GND. Also, short circuit time to GND within 1 second.

*** I_{CC} is measured with all outputs open, 4.5V applied to all data and select inputs, and the following conditions:

A: enable grounded.

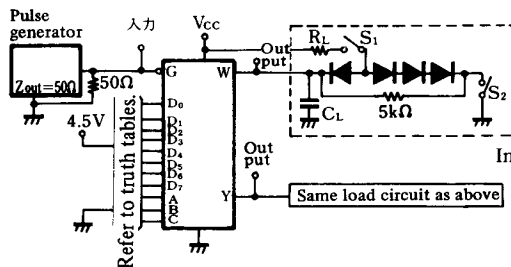
B: 4.5V applied.

■ Switching characteristics ($V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$)

Parameter	Sym	Inputs	Outputs	Test conditions	Min	Typ	Max	Unit
Propagation delay time	t _{PLH}	A, B, C (4 levels)	Y	C _L =15pF R _L =2kΩ		29	45	ns
	t _{PHL}					28	45	ns
	t _{PLH}	A, B, C (3 levels)	W			20	33	ns
	t _{PHL}					21	33	ns
	t _{PLH}	Data	Y			17	28	ns
	t _{PHL}					18	28	ns
	t _{PLH}	Data	W			10	15	ns
	t _{PHL}					9	15	ns
Output enable time	t _{PZH}	Enable	Y		30	45	ns	
	t _{PZL}				26	40	ns	
	t _{PZH}	Enable	W		17	27	ns	
	t _{PZL}				24	40	ns	
Output disable time	t _{PHz}	Enable	Y	C _L =5pF R _L =2kΩ		30	45	ns
	t _{PLZ}					15	25	ns
	t _{PHZ}	Enable	W			37	55	ns
	t _{PLZ}					15	25	ns

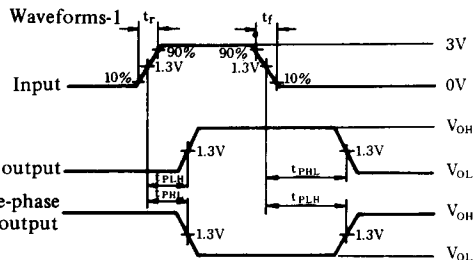
※ Switching parameter measurement information

1. Measurement circuit



1. C_L includes probe and tool floating capacitance.
2. Diodes are all MA161.

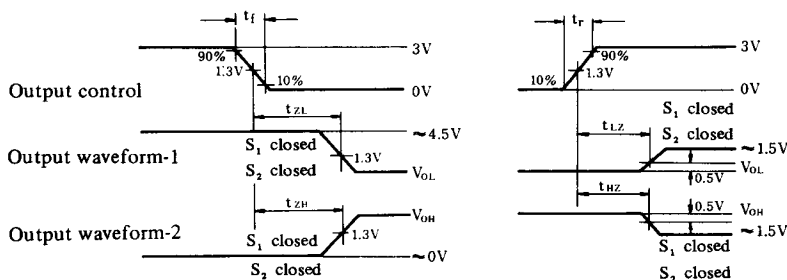
2. Waveforms



Notes

1. Input waveform: $t_r \leq 15\text{ns}$, $t_f \leq 6\text{ns}$, $\text{PRR} = 1\text{MHz}$, duty cycle = 50%.

Waveforms-2



Notes

1. Input waveform: $t_r \leq 15\text{ns}$, $t_f \leq 6\text{ns}$, $\text{PRR} = 1\text{MHz}$, duty cycle = 50%.
2. Except when the output is disabled by the output control, output waveform-1 occurs as a result of internal conditions such as a LOW voltage level.
3. Except when the output is disabled by the output control, output waveform-2 occurs as a result of internal conditions such as a HIGH voltage level.
4. When measuring t_{PLH} and t_{PHL} , S_1 and S_2 are closed.

■ Truth tables

Inputs				Outputs	
Select			Enable	Y	W
C	B	A	S		
X	X	X	H	Z	Z
L	L	L	L	D_0	\bar{D}_0
L	L	H	L	D_1	\bar{D}_1
L	H	L	L	D_2	\bar{D}_2
L	H	H	L	D_3	\bar{D}_3
H	L	L	L	D_4	\bar{D}_4
H	L	H	L	D_5	\bar{D}_5
H	H	L	L	D_6	\bar{D}_6
H	H	H	L	D_7	\bar{D}_7

Notes

1. H: HIGH voltage level.
2. L: LOW voltage level.
3. X: Either HIGH or LOW; doesn't matter.
4. Z: High impedance (OFF).
5. $D_0 \sim D_7$: Levels of related D inputs.