

DN74LS251 *74LS251*

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

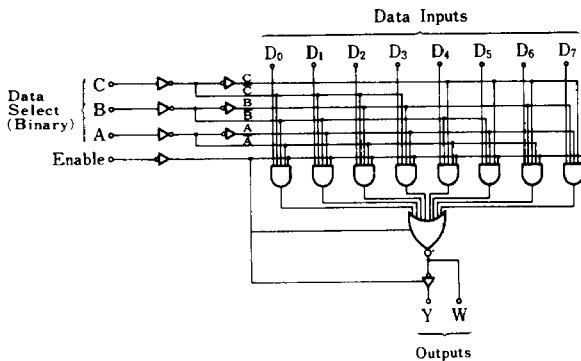
■ Description

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

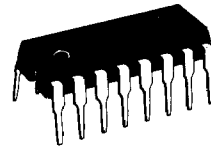
■ Features

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

■ Logic diagram (1/2)



P-2



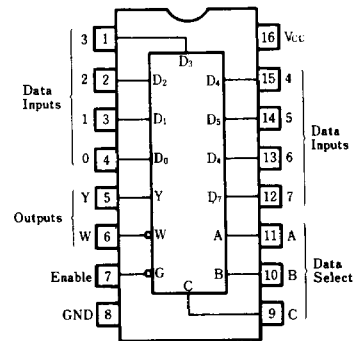
16-pin plastic DIL package

P-5



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	$^\circ\text{C}$

14R

■ DC characteristics (Ta = -20 ~ +75 °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 V, V _{IH} = 2 V V _{IL} = 0.8 V, I _{OH} = -2.6 mA	2.7	3.1		V
	V _{OL1}	V _{CC} = 4.75 V V _{IH} = 2 V		0.25	0.4	V
	V _{OL2}	V _{IL} = 0.8 V I _{OL} = 24 mA		0.35	0.5	V
Input current	I _{IH}	V _{CC} = 5.25 V, V _I = 2.7 V			20	μA
	I _{IL}	V _{CC} = 5.25 V, V _I = 0.4 V			-0.4	mA
	I _I	V _{CC} = 5.25 V, V _I = 7 V			0.1	mA
Output current	I _{OZ1}	V _{CC} = 5.25 V V _{IH} = 2 V			20	μA
	I _{OZ2}	V _O = 2.7 V V _O = 0.4 V			-20	μA
Output short circuit current**	I _{OS}	V _{CC} = 5.25 V, V _O = 0 V	-15		-130	mA
Input clamp voltage	V _{IK}	V _{CC} = 4.75 V, I _I = -18 mA			-1.5	V
Supply current***	I _{CC}	V _{CC} = 5.25 V	Measurement condition A	7	12	mA
			Measurement condition B	8.5	15	mA

* When constant at V_{CC} = 5V, Ta = 25 °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.

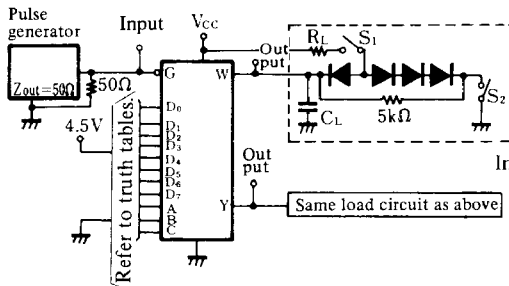
■ Switching characteristics (V_{CC} = 5V, Ta = 25 °C)

15R

Parameter	Sym	Inputs	Outputs	Test conditions	Min	Typ	Max	Unit
Propagation delay time	t _{PLH}	A, B, C (4 levels)	Y	C _L = 15 pF R _L = 2 kΩ		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 = 5 pF R _L = 2 kΩ		30	45	ns
	t _{PLZ}					15	25	ns
	t _{PHZ}	Enable	W			37	55	ns
	t _{PLZ}					15	25	ns

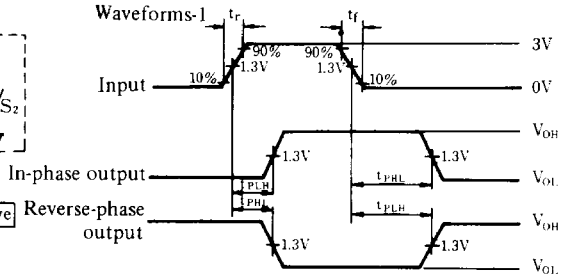
※ Switching parameter measurement information

1. Measurement circuit



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

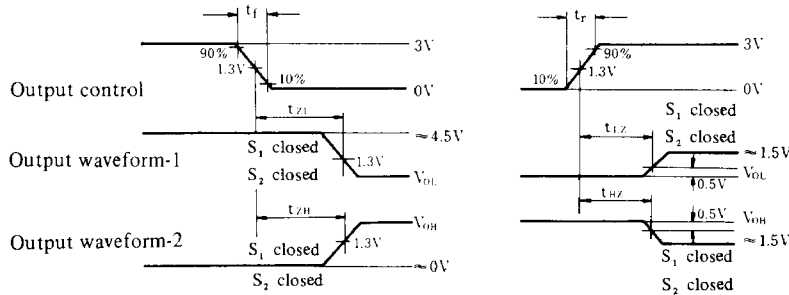
2. Waveforms



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	$\overline{D_0}$
L	L	H	L	D_1	$\overline{D_1}$
L	H	L	L	D_2	$\overline{D_2}$
L	H	H	L	D_3	$\overline{D_3}$
H	L	L	L	D_4	$\overline{D_4}$
H	L	H	L	D_5	$\overline{D_5}$
H	H	L	L	D_6	$\overline{D_6}$
H	H	H	L	D_7	$\overline{D_7}$

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.