

HD74LS251

1 of 8 Data Selector / Multiplexer (with strobe and three-state outputs)

REJ03D0467-0300

Rev.3.00

Jul.15.2005

This data selector / multiplexer contains full on-chip binary decoding to select one-of-eight data sources and features a strobe-controlled 3-state output.

The strobe must be at a low logic level to enable this device. The 3-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 totem-pole outputs.

To minimize the possibility that two outputs will attempt to take a common bus to opposite logic levels, the output control circuitry is designed so that the average output disable time is shorter than the average output enable time.

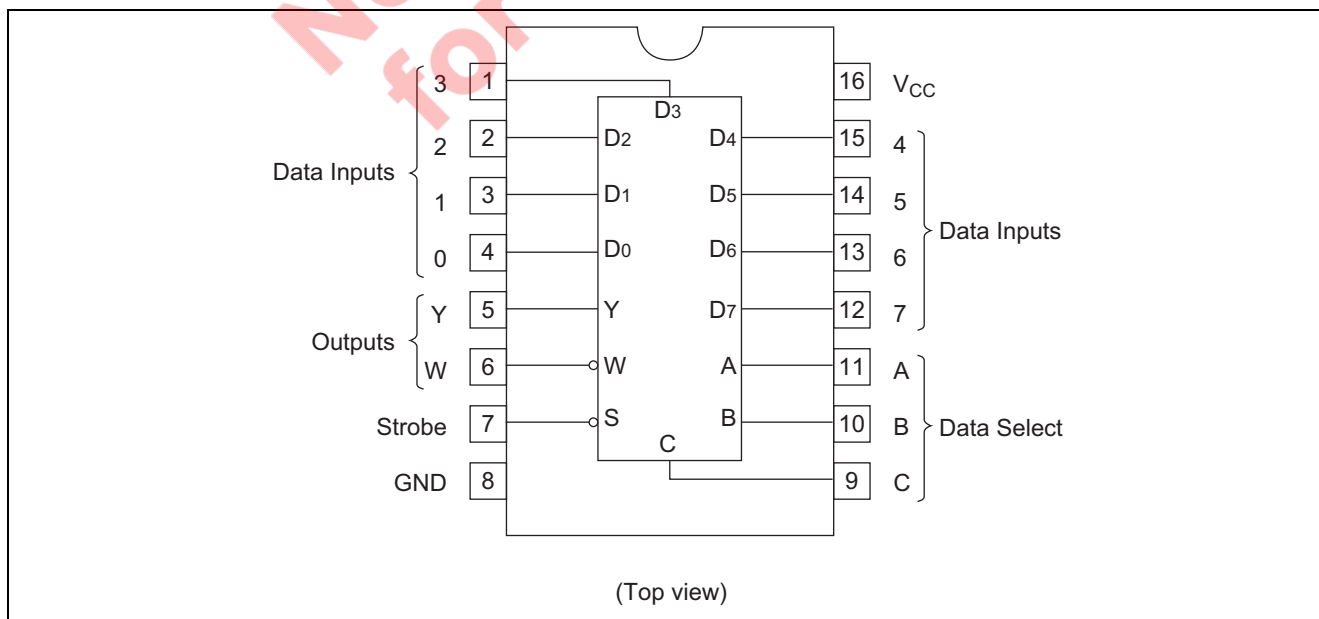
Features

- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LS251P	DILP-16 pin	PRDP0016AE-B (DP-16FV)	P	—
HD74LS251FPEL	SOP-16 pin (JEITA)	PRSP0016DH-B (FP-16DAV)	FP	EL (2,000 pcs/reel)

Note: Please consult the sales office for the above package availability.

Pin Arrangement

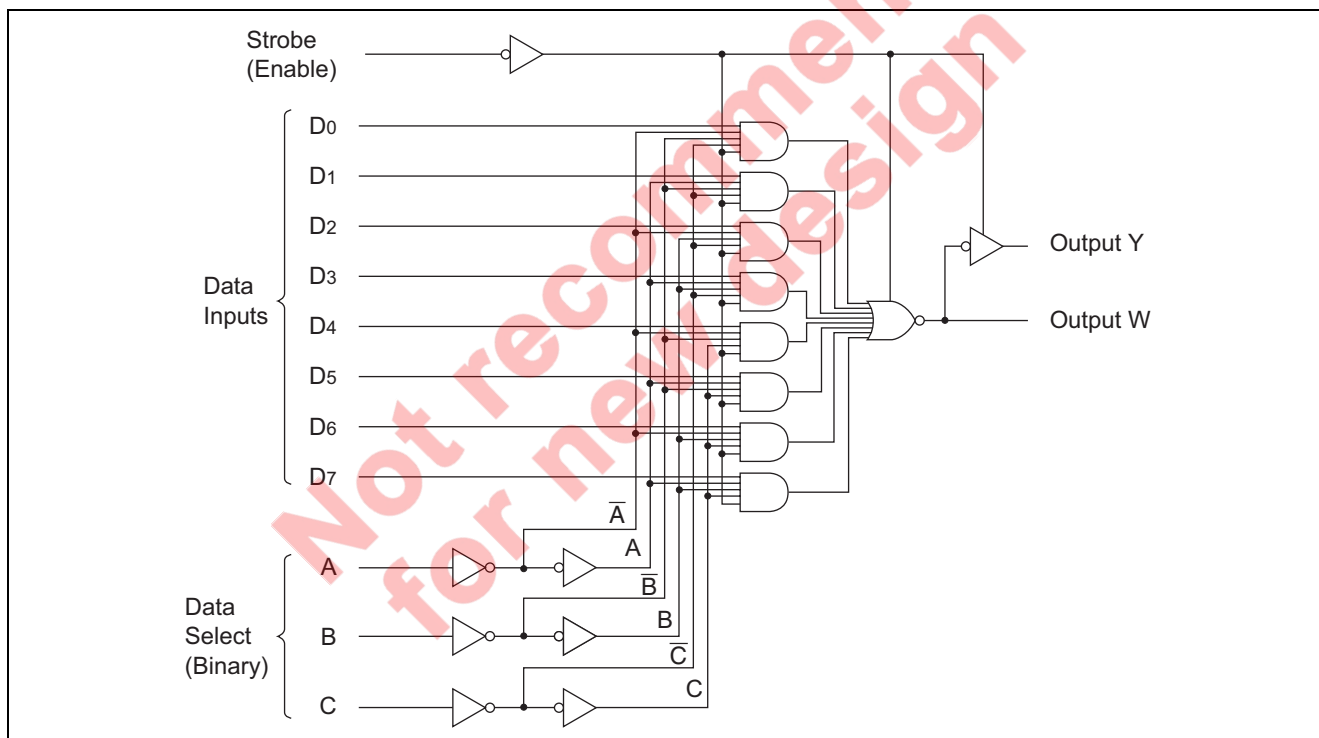


Function Table

Inputs				Outputs	
Select			Strobe	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 level, L; low level, X; irrelevant
 2. Z; high impedance (off-state)
 3. D₀ through D₇; the level of the respective D input.

Block Diagram



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage	V _{CC}	7	V
Input voltage	V _{IN}	7	V
Output voltage (off-state)	V _{O (off)}	5.5	V
Operating temperature	T _{opr}	-20 to +75	°C
Power dissipation	P _T	400	mW
Storage temperature	T _{stg}	-65 to +150	°C

Note: Voltage value, unless otherwise noted, are with respect to network ground terminal.

Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{CC}	4.75	5.00	5.25	V
Output current	I_{OH}	—	—	-2.6	mA
	I_{OL}	—	—	8	mA
Operating temperature	T_{opr}	-20	25	75	°C

Electrical Characteristics

(Ta = -20 to +75 °C)

Item	Symbol	min.	typ.*	max.	Unit	Condition	
Input voltage	V _{IH}	2.0	—	—	V		
	V _{IL}	—	—	0.8	V		
Output voltage	V _{OH}	2.4	—	—	V	V _{CC} = 4.75 V, V _{IH} = 2 V, V _{IL} = 0.8 V, I _{OH} = −2.6 mA	
	V _{OL}	—	—	0.4	V	I _{OL} = 4 mA	V _{CC} = 4.75 V, V _{IH} = 2 V, V _{IL} = 0.8 V
		—	—	0.5		I _{OL} = 8 mA	
Input current	I _{IH}	—	—	20	μA	V _{CC} = 5.25 V, V _I = 2.7 V	
	I _{IL}	—	—	−0.4	mA	V _{CC} = 5.25 V, V _I = 0.4 V	
	I _I	—	—	0.1	mA	V _{CC} = 5.25 V, V _I = 7 V	
Output current	I _{OZ}	—	—	20	μA	V _O = 2.7 V	V _{CC} = 5.25 V, V _{IH} = 2 V
		—	—	−20		V _O = 0.4 V	
Short-circuit output current	I _{OS}	−30	—	−130	mA	V _{CC} = 5.25 V	
Supply current**	I _{CC}	—	6.1	10	mA	Condition A	V _{CC} = 5.25 V
		—	7.1	12		Condition B	
Input clamp voltage	V _{IK}	—	—	−1.5	V	V _{CC} = 4.75 V, I _{IN} = −18 mA	

Notes: * $V_{CC} = 5\text{ V}$, $T_a = 25^\circ\text{C}$

** I_{CC} is measured with the outputs open and all data and select inputs at 4.5 V under the following conditions.
A; Strobe grounded, B; Strobe at 4.5 V

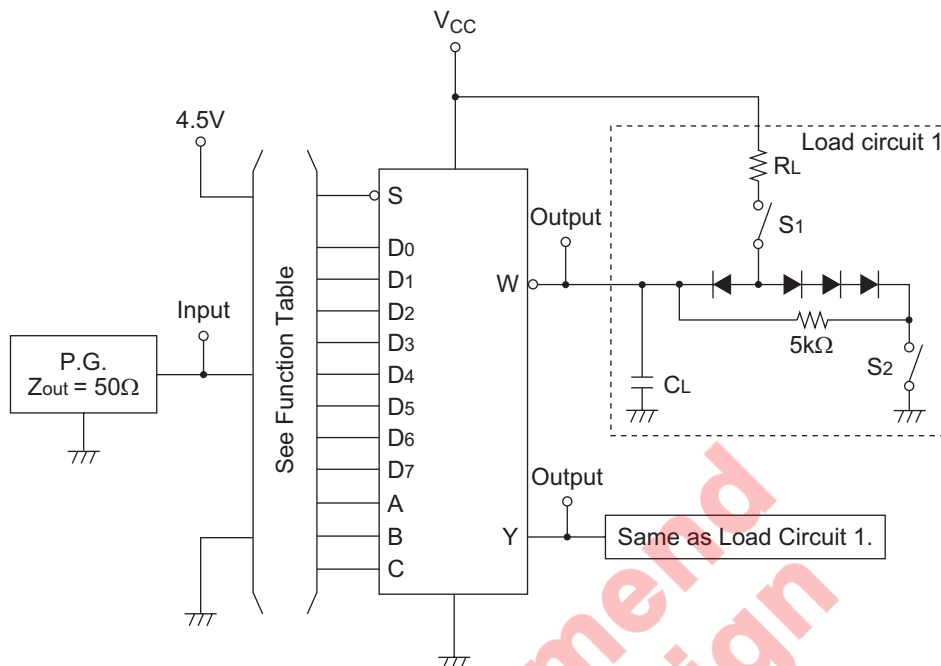
Switching Characteristics

(V_{CC} = 5 V, Ta = 25°C)

Item	Symbol	Inputs	Outputs	min.	typ.	max.	Unit	Condition
Propagation delay time	t _{PLH}	A, B, C (4 level)	Y	—	29	45	ns	C _L = 15 pF, R _L = 2 kΩ
	t _{PHL}			—	28	45		
	t _{PLH}	A, B, C (3 level)	W	—	20	33		
	t _{PHL}			—	21	33		
	t _{PLH}	Data	Y	—	17	28		
	t _{PHL}			—	18	28		
	t _{PLH}	Data	W	—	10	15		
	t _{PHL}			—	9	15		
Output enable time	t _{ZH}	Strobe	Y	—	30	45	ns	C _L = 5 pF, R _L = 2 kΩ
	t _{ZL}			—	26	40		
	t _{ZH}	Strobe	W	—	17	27		
	t _{ZL}			—	24	40		
Output disable time	t _{HZ}	Strobe	Y	—	30	45	ns	
	t _{LZ}			—	15	25		
	t _{HZ}	Strobe	W	—	37	55		
	t _{LZ}			—	15	25		

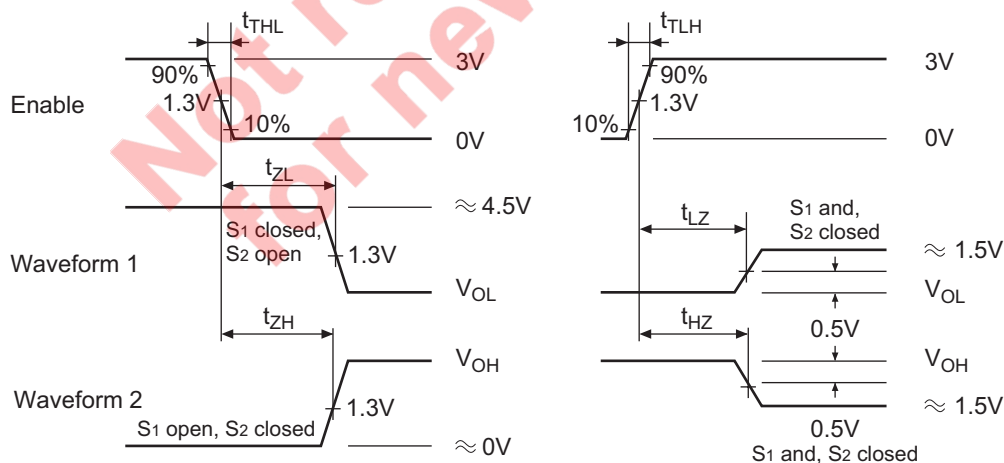
Testing Method

Test Circuit



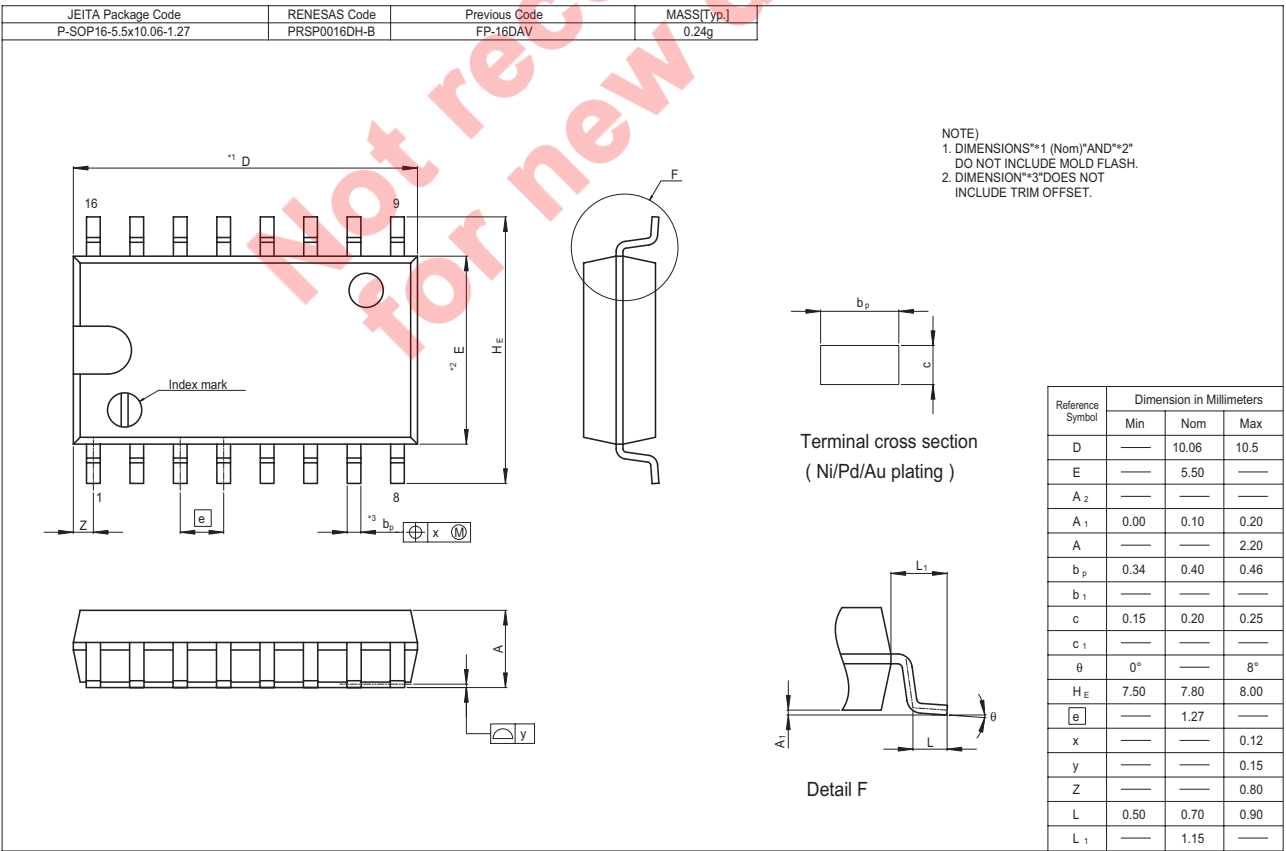
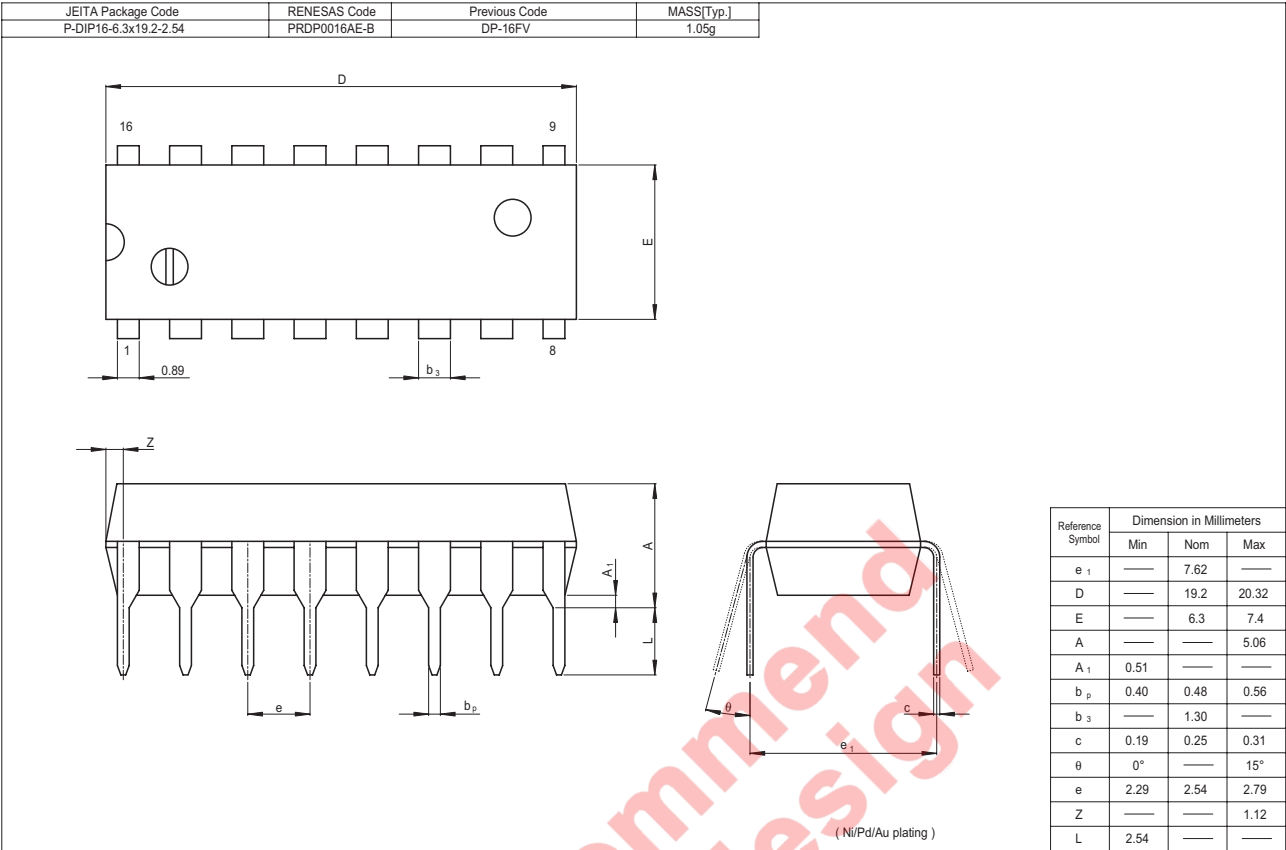
- Notes:
1. C_L includes probe and jig capacitance.
 2. All diodes are 1S2074(H).

Waveform



- Notes:
1. Input pulse; $t_{TLH} \leq 15$ ns, $t_{THL} \leq 6$ ns, PRR = 1 MHz, duty cycle = 50%
 2. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
 3. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.

Package Dimensions



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