

# HD74LS257

## Quadruple 2-line-to-1-line Data Selectors / Multiplexers (with not inverted 3-state outputs)

REJ03D0469-0300

Rev.3.00

Jul.15.2005

This multiplexer features three-state outputs that can interface directly with and drive data lines of bus-organized systems. With all but one of the common outputs disabled (at a high-impedance state) the low impedance of the single enabled output will drive the bus line to a high or low logic level.

To minimize the possibility that two outputs will attempt to take a common bus to opposite logic levels, the output-enable circuitry is designed such that the output disable times are shorter than the output enable times.

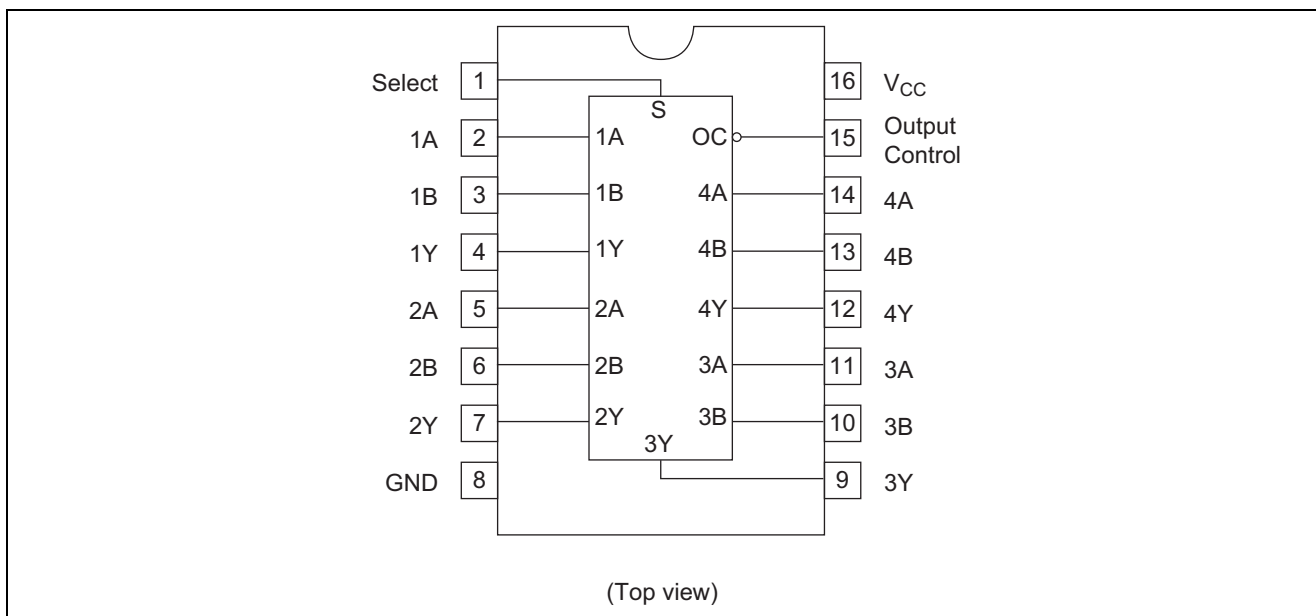
### Features

- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LS257P	DILP-16 pin	PRDP0016AE-B (DP-16FV)	P	—
HD74LS257FPEL	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

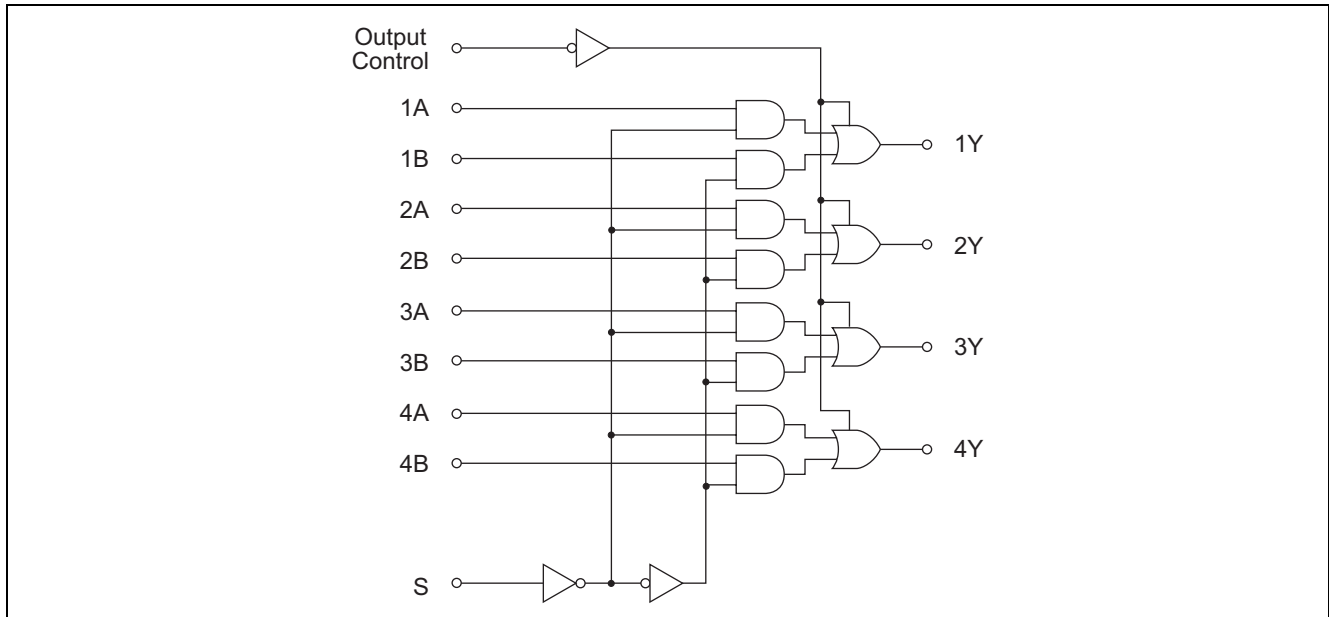


**Function Table**

Inputs				Output
OC	S	A	B	
H	X	X	X	Z
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H

Note: H; high level, L; low level, X; irrelevant, Z; off (high-impedance) state of a 3-state output

**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 <sub>IH</sub>	2.0	—	—	V		
	V <sub>IL</sub>	—	—	0.8	V		
Output voltage	V <sub>OH</sub>	2.4	—	—	V	V <sub>CC</sub> = 4.75 V, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = -2.6 mA	
	V <sub>OL</sub>	—	—	0.5	V	V <sub>CC</sub> = 4.75 V, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V	
—		—	0.4				
Input current	S	I <sub>IH</sub>	—	—	40	μA	V <sub>CC</sub> = 5.25 V, V <sub>I</sub> = 2.7 V
	S except		—	—	20		
	S	I <sub>IL</sub>	—	—	-0.8	mA	V <sub>CC</sub> = 5.25 V, V <sub>I</sub> = 0.4 V
	S except		—	—	-0.4		
S	I <sub>I</sub>	—	—	0.2	mA	V <sub>CC</sub> = 5.25 V, V <sub>I</sub> = 7 V	
S except		—	—	0.1			
Output current	I <sub>OZ</sub>	—	—	20	μA	V <sub>O</sub> = 2.4 V	V <sub>CC</sub> = 5.25 V, V <sub>IH</sub> = 2 V
		—	—	-20			
Short-circuit output current	I <sub>OS</sub>	-30	—	-130	mA	V <sub>CC</sub> = 5.25 V	
Supply current**	All outputs high	I <sub>CC</sub>	—	5.9	10	mA	V <sub>CC</sub> = 5.25 V
	All outputs low		—	9.2	16		
	All outputs off		—	10	19		
Input clamp voltage	V <sub>IK</sub>	—	—	-1.5	V	V <sub>CC</sub> = 4.75 V, I <sub>IN</sub> = -18 mA	

Notes: \* V<sub>CC</sub> = 5 V, Ta = 25°C

\*\* I<sub>CC</sub> is measured with all outputs open and all possible inputs grounded while achieving the stated output conditions.

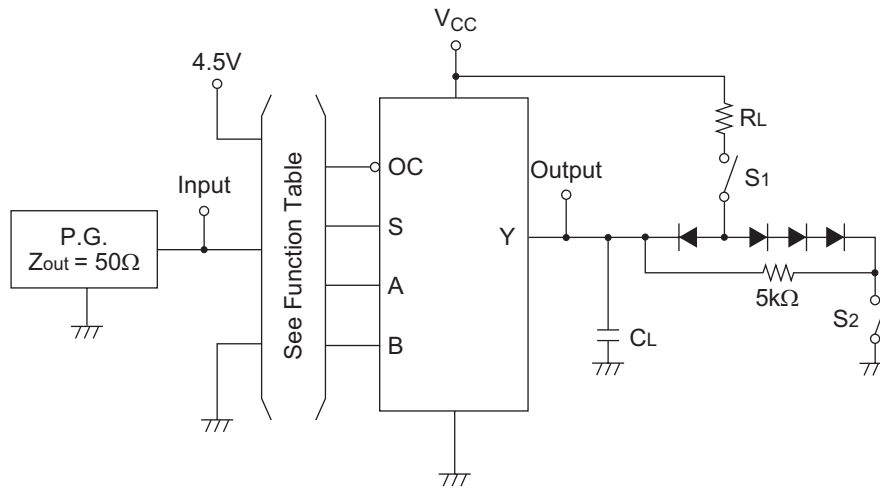
**Switching Characteristics**

(V<sub>CC</sub> = 5 V, Ta = 25°C)

Item	Symbol	Inputs	Output	min.	typ.	max.	Unit	Condition
Propagation delay time	t <sub>PLH</sub>	A, B	Y	—	12	18	ns	C <sub>L</sub> = 15 pF, R <sub>L</sub> = 2 kΩ
	t <sub>PHL</sub>			—	12	18		
	t <sub>PLH</sub>	S	Y	—	14	21	ns	
	t <sub>PHL</sub>			—	14	21		
Output enable time	t <sub>ZH</sub>	OC	Y	—	20	30	ns	
	t <sub>ZL</sub>			—	20	30		
Output disable time	t <sub>HZ</sub>	OC	Y	—	18	30	ns	C <sub>L</sub> = 5 pF, R <sub>L</sub> = 2 kΩ
	t <sub>LZ</sub>			—	16	25		

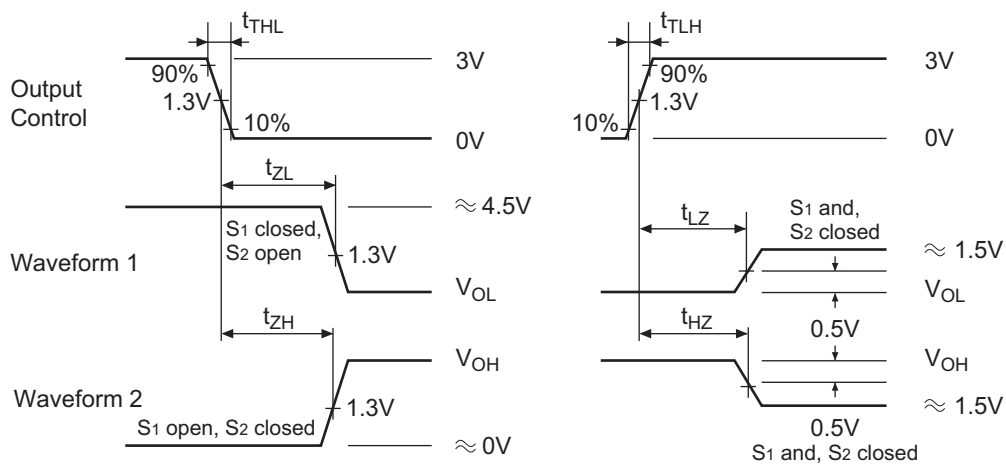
## Testing Method

### Test Circuit



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

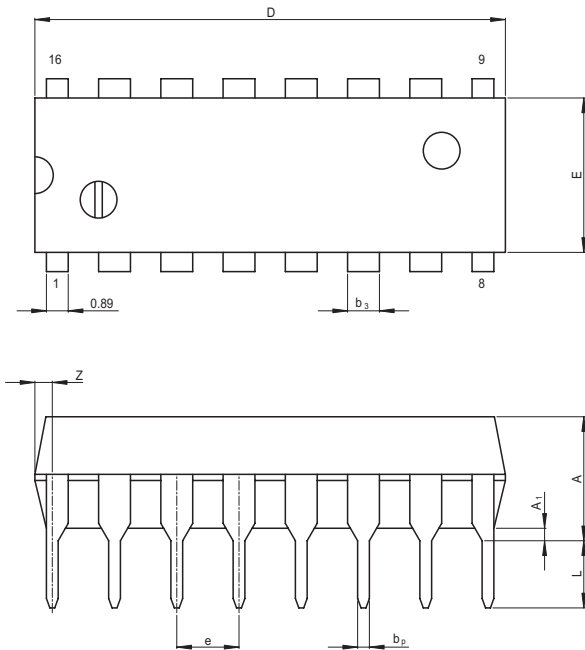
### Waveform



- 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

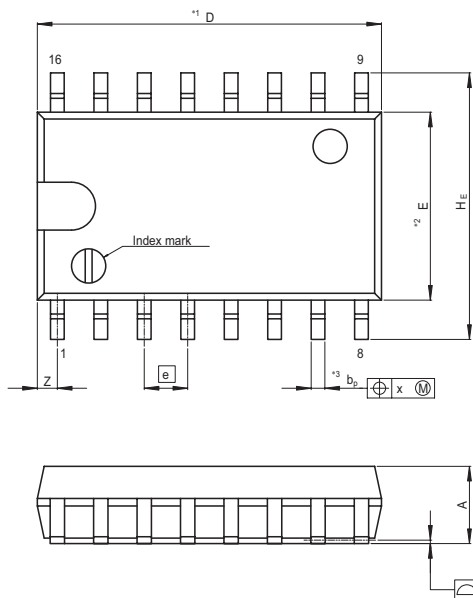
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP16-6.3x19.2-2.54	PRDP0016AE-B	DP-16FV	1.05g



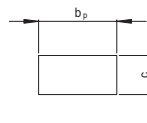
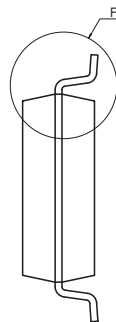
Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e <sub>1</sub>	—	7.62	—
D	—	19.2	20.32
E	—	6.3	7.4
A	—	—	5.06
A <sub>1</sub>	0.51	—	—
b <sub>p</sub>	0.40	0.48	0.56
b <sub>3</sub>	—	1.30	—
c	0.19	0.25	0.31
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	1.12
L	2.54	—	—

( Ni/Pd/Au plating )

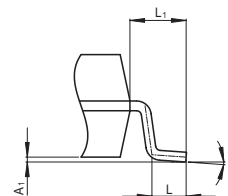
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP16-5.5x10.06-1.27	PRSP0016DH-B	FP-16DAV	0.24g



NOTE)  
 1. DIMENSIONS\*1 (Nom)\*AND\*2\*  
 DO NOT INCLUDE MOLD FLASH.  
 2. DIMENSION\*3\*DOES NOT  
 INCLUDE TRIM OFFSET.



Terminal cross section  
( Ni/Pd/Au plating )



Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	10.06	10.5
E	—	5.50	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.00	0.10	0.20
A	—	—	2.20
b <sub>p</sub>	0.34	0.40	0.46
b <sub>1</sub>	—	—	—
c	0.15	0.20	0.25
c <sub>1</sub>	—	—	—
θ	0°	—	8°
H <sub>E</sub>	7.50	7.80	8.00
e	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.80
L	0.50	0.70	0.90
L <sub>1</sub>	—	1.15	—

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