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.

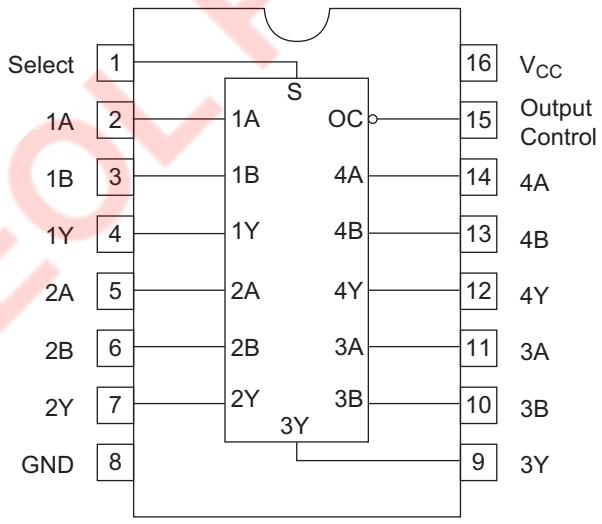
Features

- 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



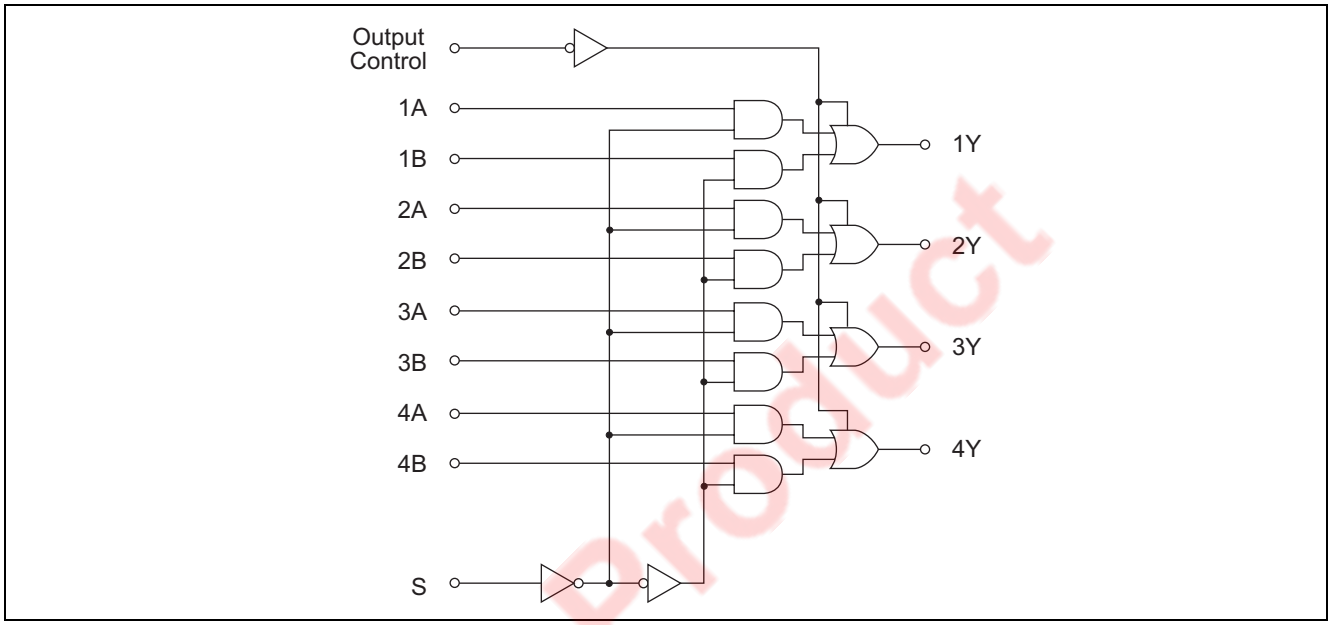
(Top view)

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	Topr	–20 to +75	°C
Power dissipation	P_T	400	mW
Storage temperature	Tstg	–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	Topr	–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}	—	—	0.5	V	I_{OL} = 8 mA, V_{CC} = 4.75 V, V_{IH} = 2 V, V_{IL} = 0.8 V
			—	—	0.4		I_{OL} = 4 mA
Input current	S	I_{IH}	—	—	40	µA	V_{CC} = 5.25 V, V_I = 2.7 V
	S except		—	—	20		
	S	I_{IL}	—	—	–0.8	mA	V_{CC} = 5.25 V, V_I = 0.4 V
	S except		—	—	–0.4		
	S	I_I	—	—	0.2	mA	V_{CC} = 5.25 V, V_I = 7 V
	S except		—	—	0.1		
Output current		I_{OZ}	—	—	20	µA	V_O = 2.4 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**	All outputs high	I_{CC}	—	5.9	10	mA	V_{CC} = 5.25 V
	All outputs low		—	9.2	16		
	All outputs off		—	10	19		
Input clamp voltage		V_{IK}	—	—	–1.5	V	V_{CC} = 4.75 V, I_{IN} = –18 mA

Notes: * V_{CC} = 5 V, Ta = 25°C

** I_{CC} is measured with all outputs open and all possible inputs grounded while achieving the stated output conditions.

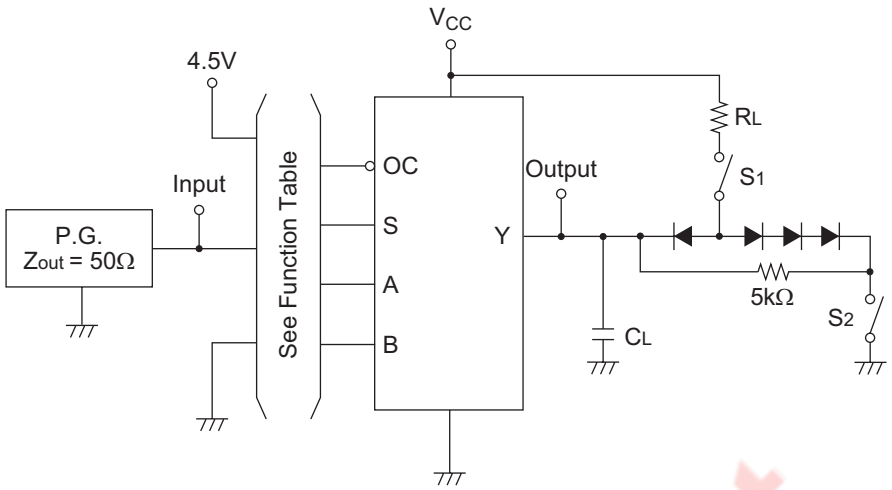
Switching Characteristics

(V_{CC} = 5 V, Ta = 25°C)

Item	Symbol	Inputs	Output	min.	typ.	max.	Unit	Condition
Propagation delay time	t_{PLH}	A, B	Y	—	12	18	ns	C_L = 15 pF, R_L = 2 kΩ
	t_{PHL}			—	12	18		
	t_{PLH}	S	Y	—	14	21	ns	
	t_{PHL}			—	14	21		
Output enable time	t_{ZH}	OC	Y	—	20	30	ns	
	t_{ZL}			—	20	30		
Output disable time	t_{HZ}	OC	Y	—	18	30	ns	C_L = 5 pF, R_L = 2 kΩ
	t_{LZ}			—	16	25		

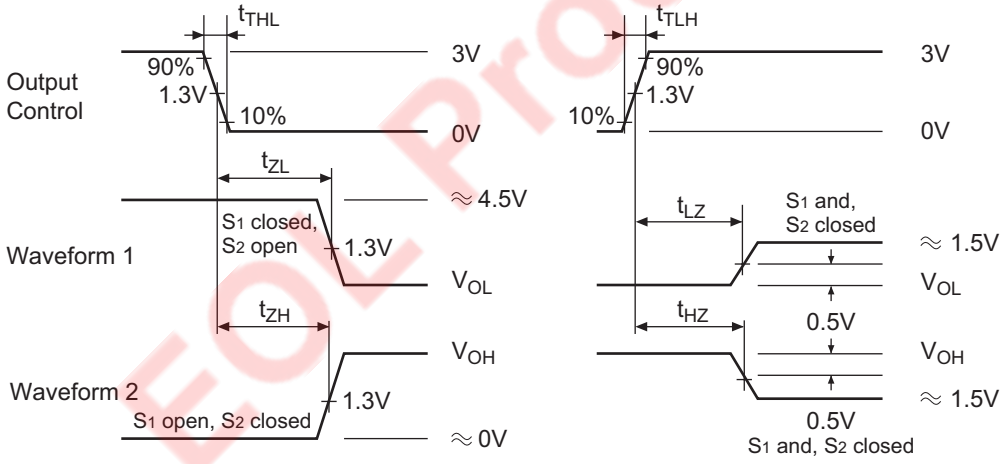
Testing Method

Test Circuit



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

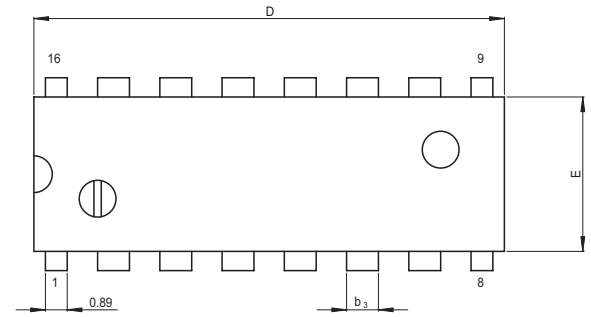
Waveform

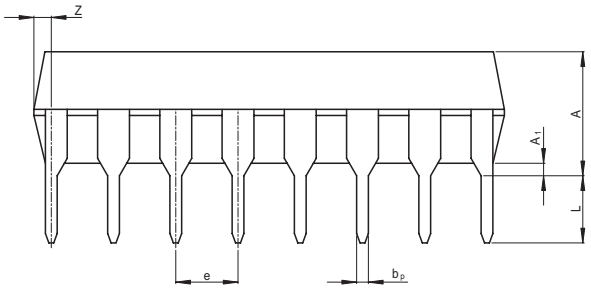


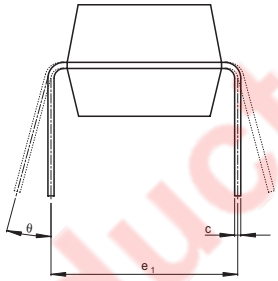
Notes: 1. Input pulse; $t_{TLH} \leq 15$ ns, $t_{THL} \leq 6$ ns, PRR = 1 MHz, duty cycle = 50%
2. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
3. Waveform 2 is for an output with internal conditions such that the output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



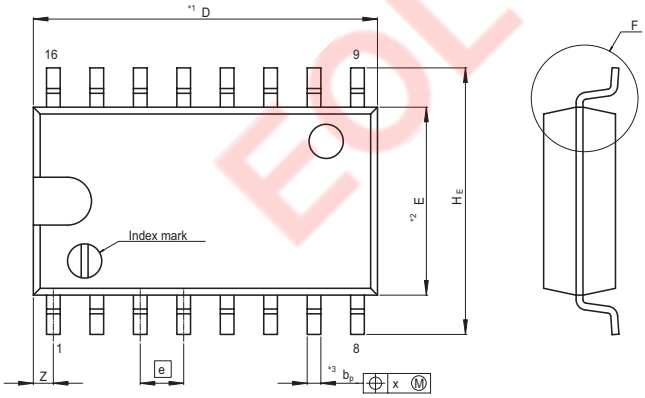


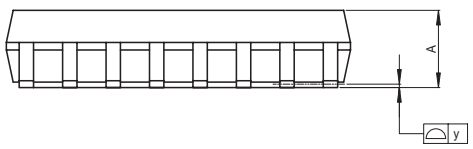


(Ni/Pd/Au plating)

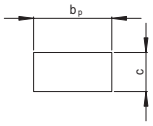
Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e 1	——	7.62	——
D	——	19.2	20.32
E	——	6.3	7.4
A	——	——	5.06
A 1	0.51	——	——
b p	0.40	0.48	0.56
b 3	——	1.30	——
c	0.19	0.25	0.31
θ	0°	——	15°
e	2.29	2.54	2.79
Z	——	——	1.12
L	2.54	——	——

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

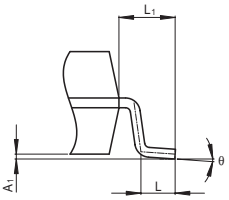




NOTE)
1. DIMENSIONS"*1 (Nom)"AND"*2"
   DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT
   INCLUDE TRIM OFFSET.



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 2	——	——	——
A 1	0.00	0.10	0.20
A	——	——	2.20
b p	0.34	0.40	0.46
b 1	——	——	——
c	0.15	0.20	0.25
c 1	——	——	——
θ	0°	——	8°
H E	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 1	——	1.15	——

Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

RENESAS SALES OFFICES

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Renesas Technology America, Inc.
450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology Hong Kong Ltd.
7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2730-6071

Renesas Technology Taiwan Co., Ltd.
10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

Renesas Technology (Shanghai) Co., Ltd.
Unit2607 Ruijing Building, No.205 Maoming Road (S), Shanghai 200020, China
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

Renesas Technology Singapore Pte. Ltd.
1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.
Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> 2-796-3115, Fax: <82> 2-796-2145

Renesas Technology Malaysia Sdn. Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510

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