

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.

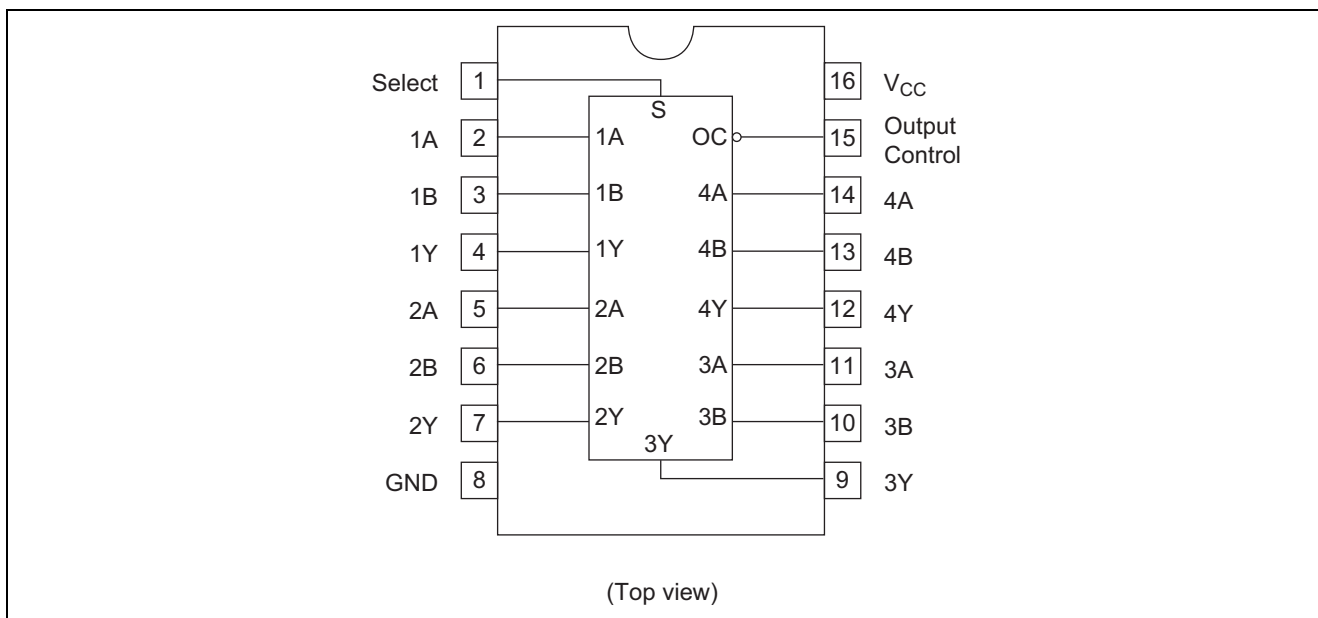
Features

- 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

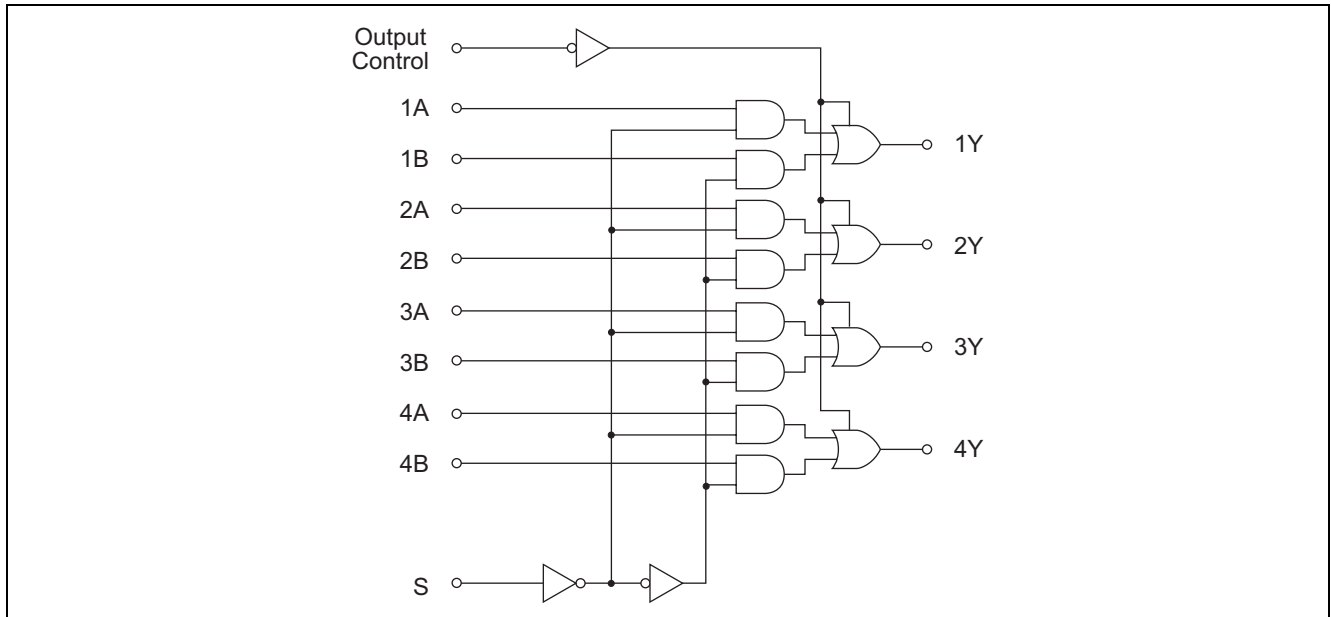


Function Table

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 _{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.

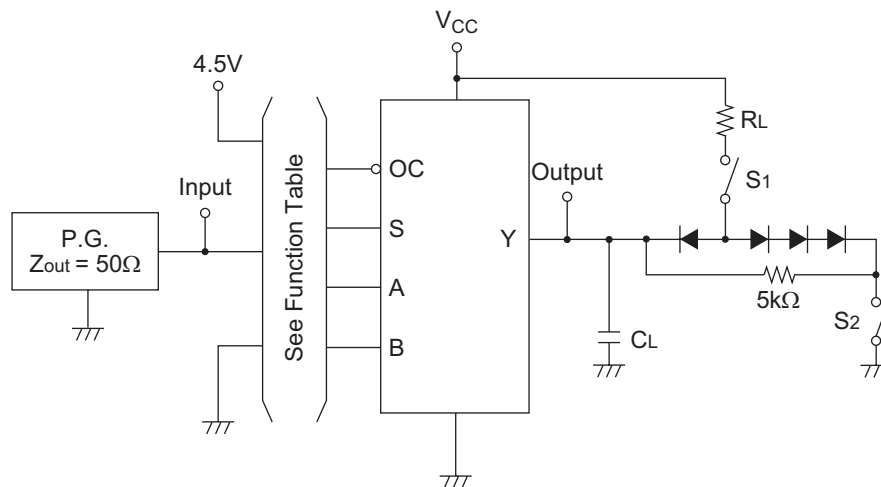
Switching Characteristics

(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		

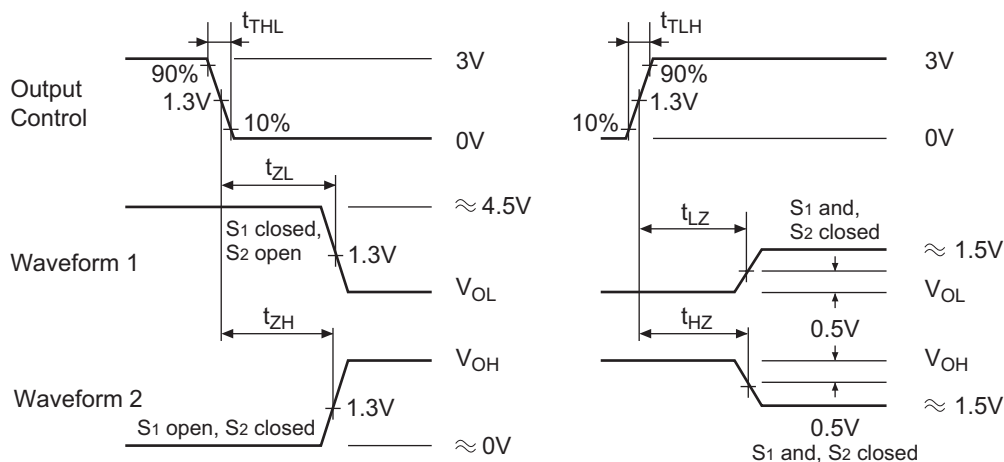
Testing Method

Test Circuit



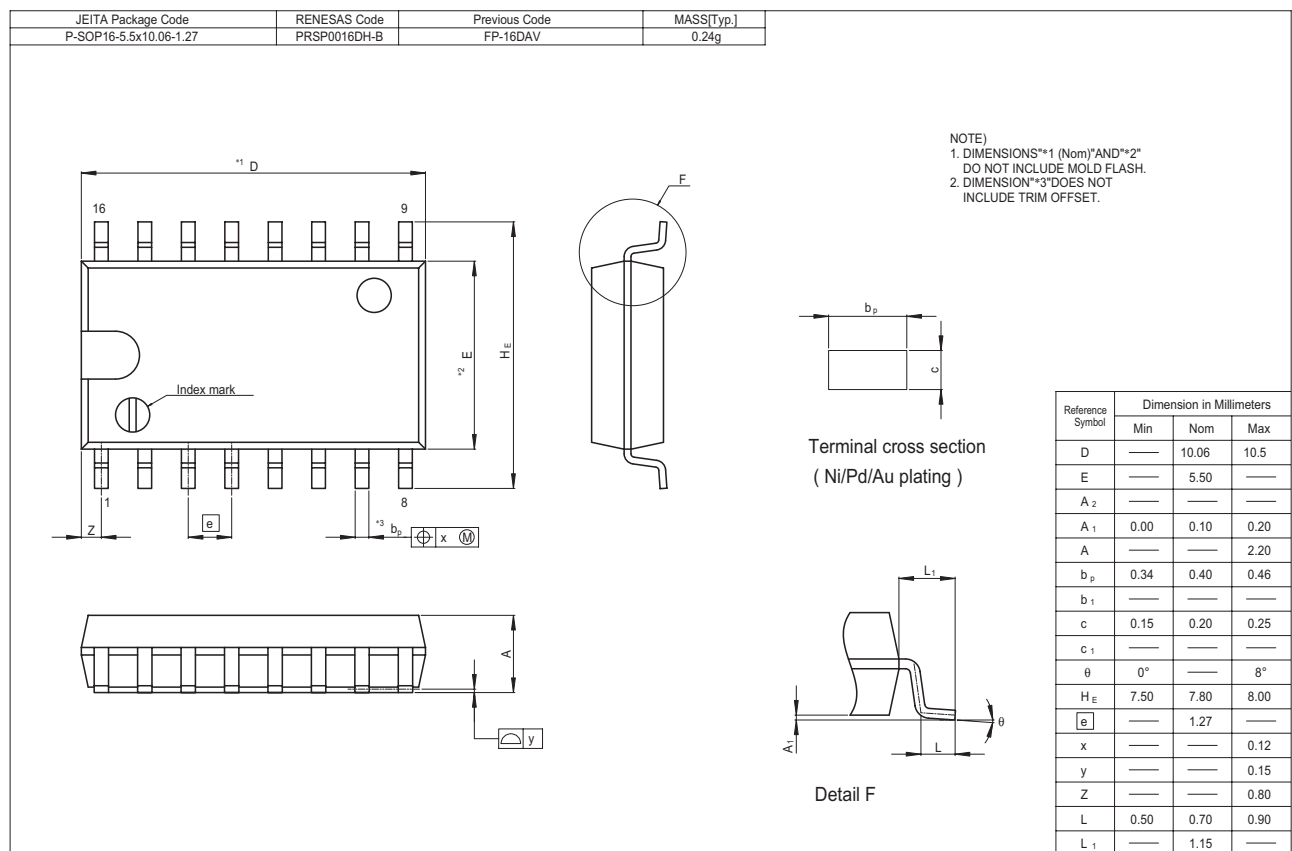
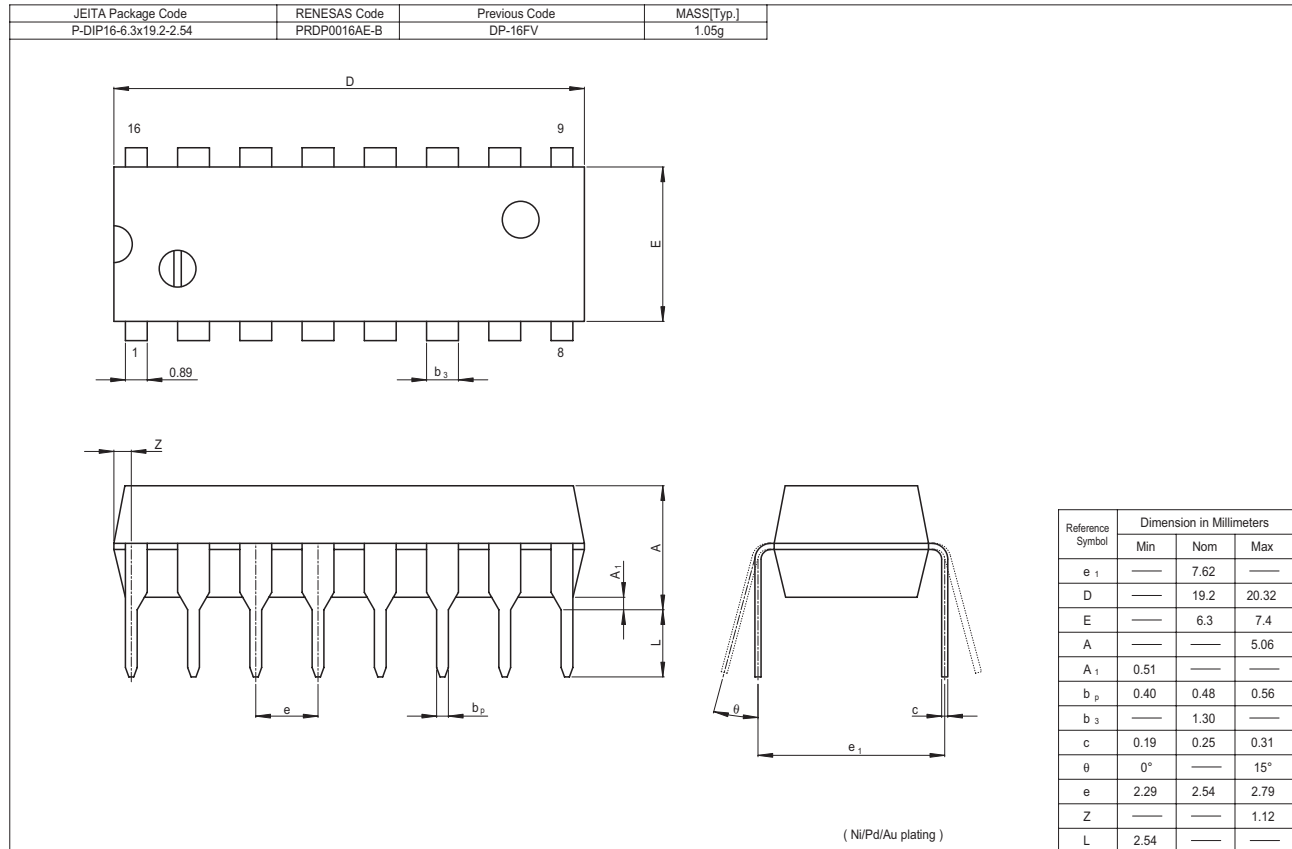
- Notes:
1. C_L includes probe and jig capacitance.
 2. All diodes are 1S2074(H).

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



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