

HD74HC257

Quad. 2-to-1-line Data Selectors/Multiplexers (with noninverted 3-state outputs)

REJ03D0601-0200
(Previous ADE-205-478)
Rev.2.00
Jan 31, 2006

Description

The large output drive capability coupled with the 3-state feature make this device ideal for interfacing with bus lines in a bus organized system. When the output control input line is taken high, the outputs of all four multiplexers are sent into a high impedance state. When the output control line is low, the select input chooses whether the A or B input is used.

Features

- High Speed Operation: t_{pd} (Data to Y) = 10.5 ns typ ($C_L = 50$ pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max ($T_a = 25^\circ\text{C}$)
- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74HC257P	DILP-16 pin	PRDP0016AE-B (DP-16FV)	P	—
HD74HC257FPEL	SOP-16 pin (JEITA)	PRSP0016DH-B (FP-16DAV)	FP	EL (2,000 pcs/reel)
HD74HC257RPEL	SOP-16 pin (JEDEC)	PRSP0016DG-A (FP-16DNV)	RP	EL (2,500 pcs/reel)

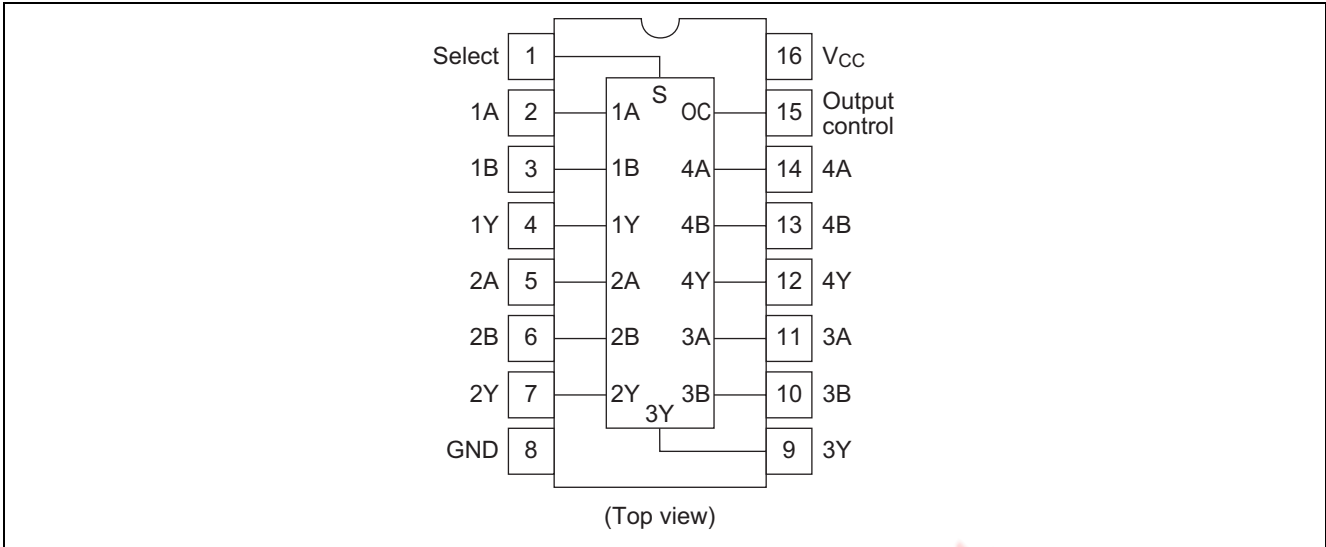
Note: Please consult the sales office for the above package availability.

Function Table

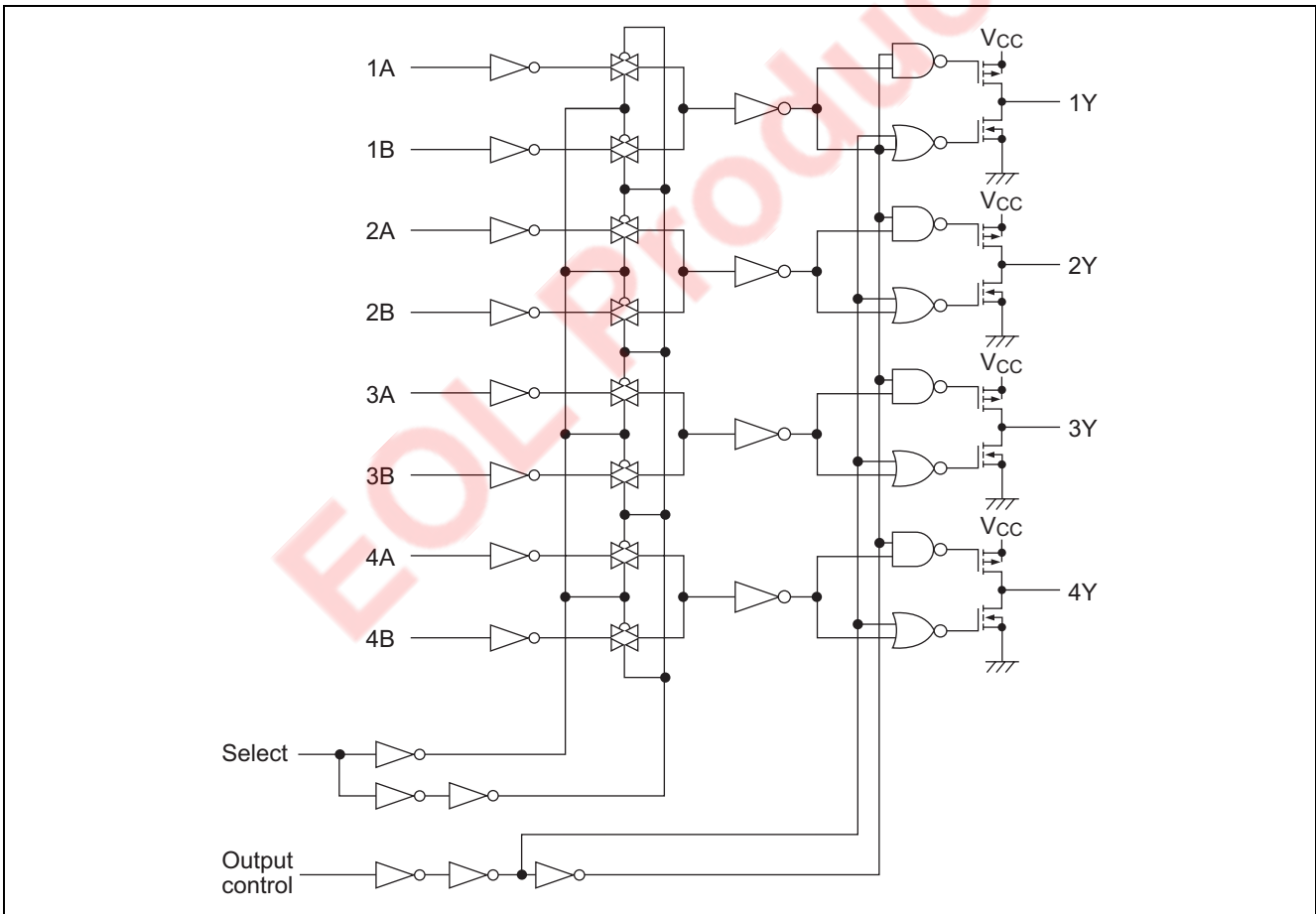
Output Control	Inputs			Output
	Select	A	B	Y
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H
H	X	X	X	High impedance

Notes H: high level, L: low level, X: irrelevant

Pin Arrangement



Logic Diagram



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage range	V_{CC}	-0.5 to 7.0	V
Input / Output voltage	V_{IN}, V_{OUT}	-0.5 to $V_{CC} + 0.5$	V
Input / Output diode current	I_{IK}, I_{OK}	± 20	mA
Output current	I_O	± 35	mA
V_{CC} , GND current	I_{CC} or I_{GND}	± 75	mA
Power dissipation	P_T	500	mW
Storage temperature	T_{stg}	-65 to +150	°C

Note: The absolute maximum ratings are values, which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V_{CC}	2 to 6	V	
Input / Output voltage	V_{IN}, V_{OUT}	0 to V_{CC}	V	
Operating temperature	T_a	-40 to 85	°C	
Input rise / fall time ^{*1}	t_r, t_f	0 to 1000	ns	$V_{CC} = 2.0$ V
		0 to 500		$V_{CC} = 4.5$ V
		0 to 400		$V_{CC} = 6.0$ V

Notes: 1. This item guarantees maximum limit when one input switches.

Waveform: Refer to test circuit of switching characteristics.

Electrical Characteristics

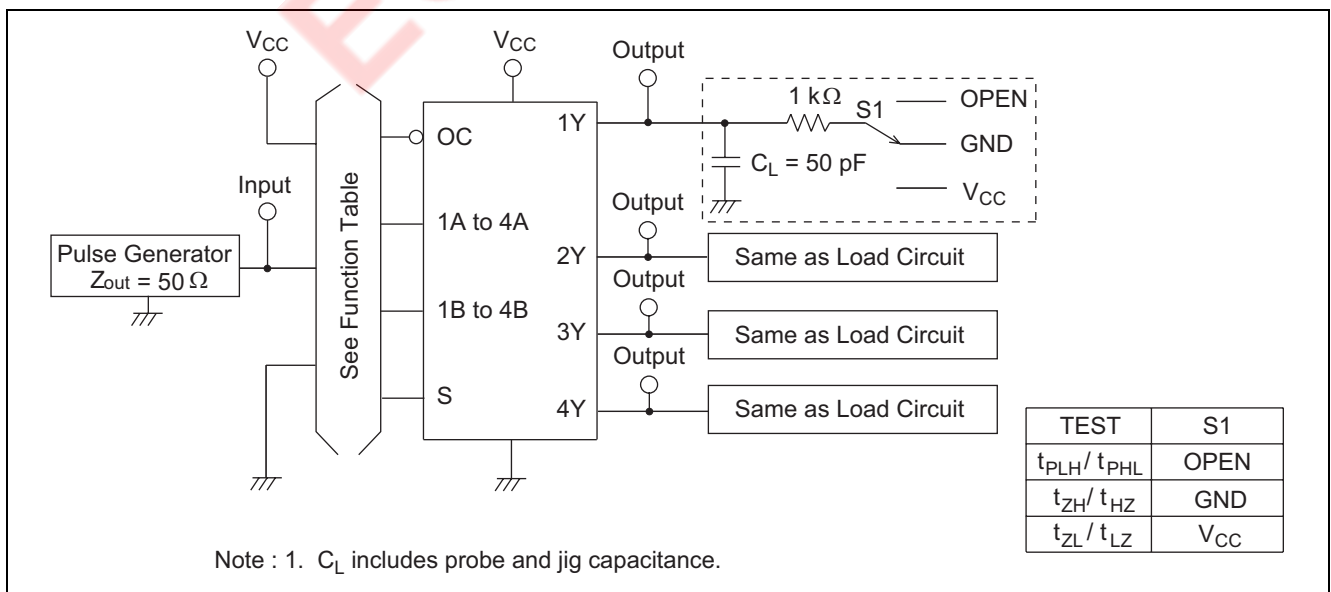
Item	Symbol	V_{CC} (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } +85^\circ\text{C}$		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V_{IH}	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V_{IL}	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V_{OH}	2.0	1.9	2.0	—	1.9	—	V	$V_{in} = V_{IH}$ or V_{IL}	$I_{OH} = -20 \mu\text{A}$
		4.5	4.4	4.5	—	4.4	—			$I_{OH} = -6 \text{ mA}$
		6.0	5.9	6.0	—	5.9	—			$I_{OH} = -7.8 \text{ mA}$
		4.5	4.18	—	—	4.13	—			
		6.0	5.68	—	—	5.63	—			
	V_{OL}	2.0	—	0.0	0.1	—	0.1	V	$V_{in} = V_{IH}$ or V_{IL}	$I_{OL} = 20 \mu\text{A}$
		4.5	—	0.0	0.1	—	0.1			
		6.0	—	0.0	0.1	—	0.1			
		4.5	—	—	0.26	—	0.33			$I_{OL} = 6 \text{ mA}$
		6.0	—	—	0.26	—	0.33			$I_{OL} = 7.8 \text{ mA}$
Off-state output current	I_{OZ}	6.0	—	—	± 0.5	—	± 5.0	μA	$V_{in} = V_{IH}$ or V_{IL} , $V_{out} = V_{CC}$ or GND	
Input current	I_{in}	6.0	—	—	± 0.1	—	± 1.0	μA	$V_{in} = V_{CC}$ or GND	
Quiescent supply current	I_{CC}	6.0	—	—	4.0	—	40	μA	$V_{in} = V_{CC}$ or GND, $I_{out} = 0 \mu\text{A}$	

Switching Characteristics

($C_L = 50 \text{ pF}$, Input $t_r = t_f = 6 \text{ ns}$)

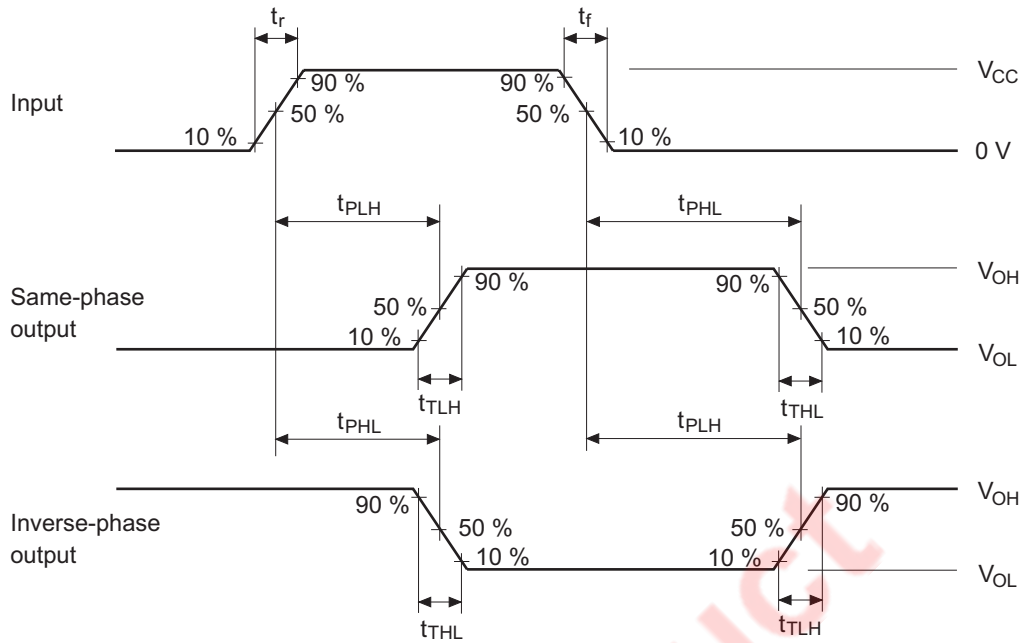
Item	Symbol	V_{CC} (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } +85^\circ\text{C}$		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Propagation delay time	t_{PHL}	2.0	—	—	115	—	145	ns	Data to Y	
		4.5	—	11	23	—	29			
		6.0	—	—	20	—	25			
	t_{PLH}	2.0	—	—	115	—	145	ns		
		4.5	—	10	23	—	29			
		6.0	—	—	20	—	25			
	t_{PHL}	2.0	—	—	115	—	145	ns	Select to Y	
			4.5	—	14	23	—			29
			6.0	—	—	20	—			25
		t_{PLH}	2.0	—	—	115	—	145		ns
			4.5	—	14	23	—	29		
			6.0	—	—	20	—	25		
Output enable time	t_{ZL}	2.0	—	—	150	—	190	ns	Output control to Y	
		4.5	—	11	30	—	38			
		6.0	—	—	26	—	33			
	t_{ZH}	2.0	—	—	150	—	190	ns		
		4.5	—	13	30	—	38			
		6.0	—	—	26	—	33			
Output disable time	t_{LZ}	2.0	—	—	150	—	190	ns	Output control to Y	
		4.5	—	14	30	—	38			
		6.0	—	—	26	—	33			
	t_{HZ}	2.0	—	—	150	—	190	ns		
		4.5	—	18	30	—	38			
		6.0	—	—	26	—	33			
Output rise/fall time	t_{TLH}	2.0	—	—	60	—	75	ns		
	t_{THL}	4.5	—	4	12	—	15			
		6.0	—	—	10	—	13			
Input capacitance	C_{in}	—	—	5	10	—	10	pF		

Test Circuit

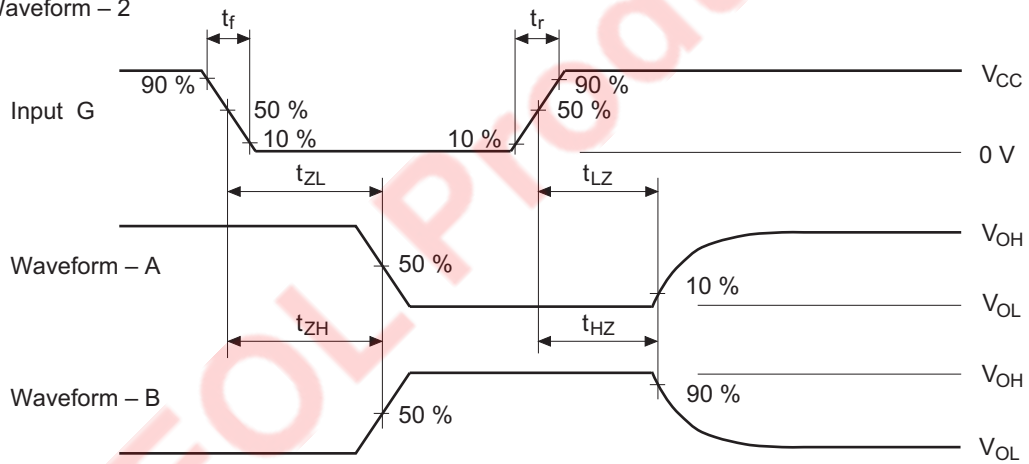


Waveforms

• Waveform – 1

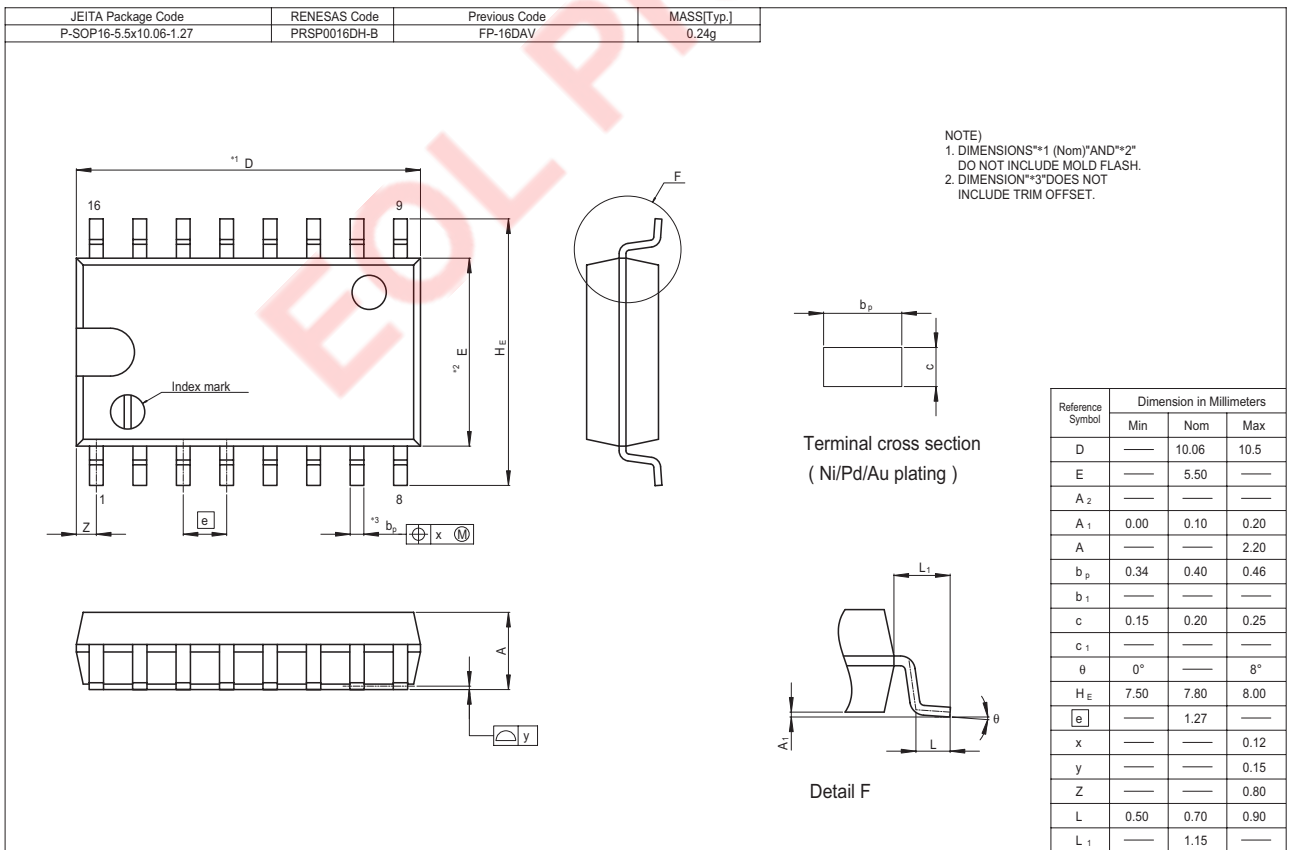
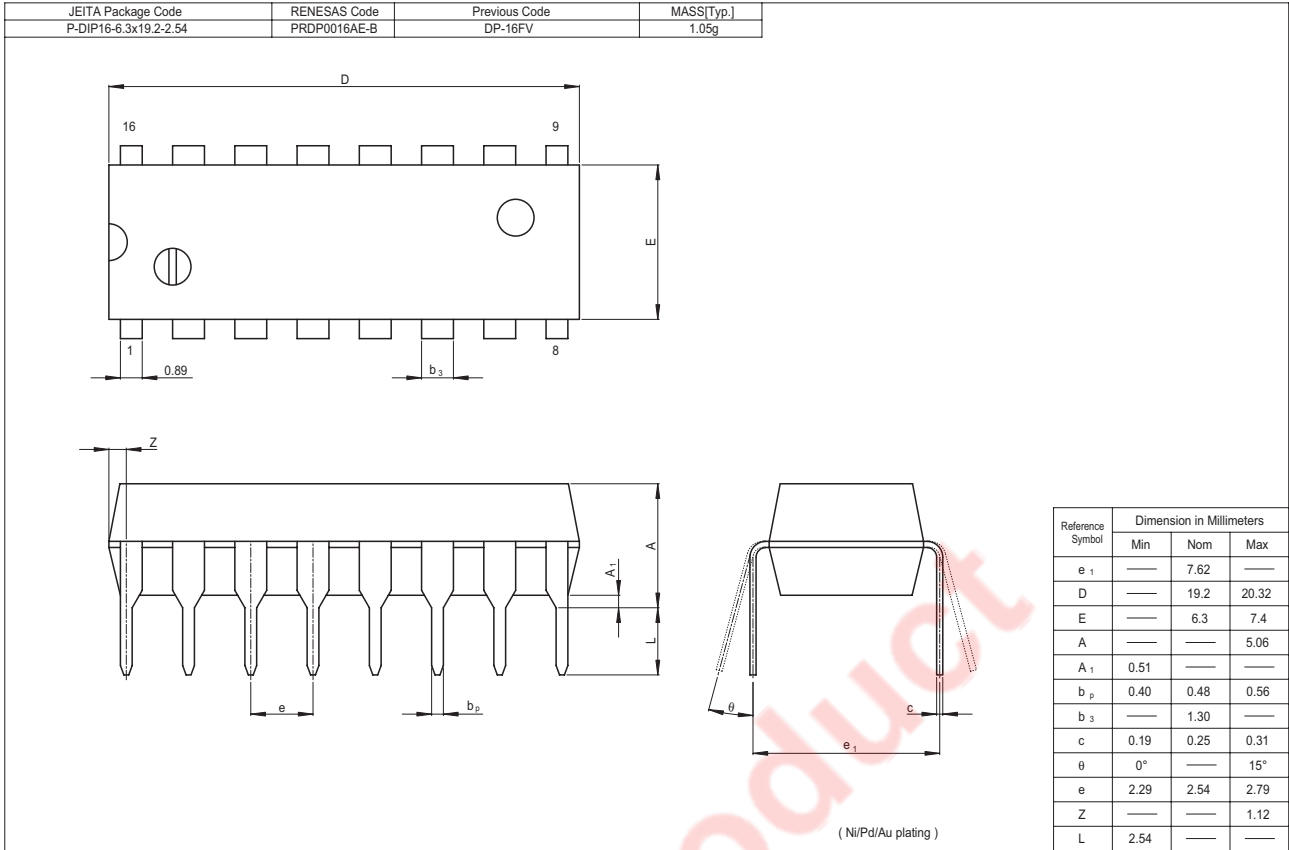


• Waveform – 2



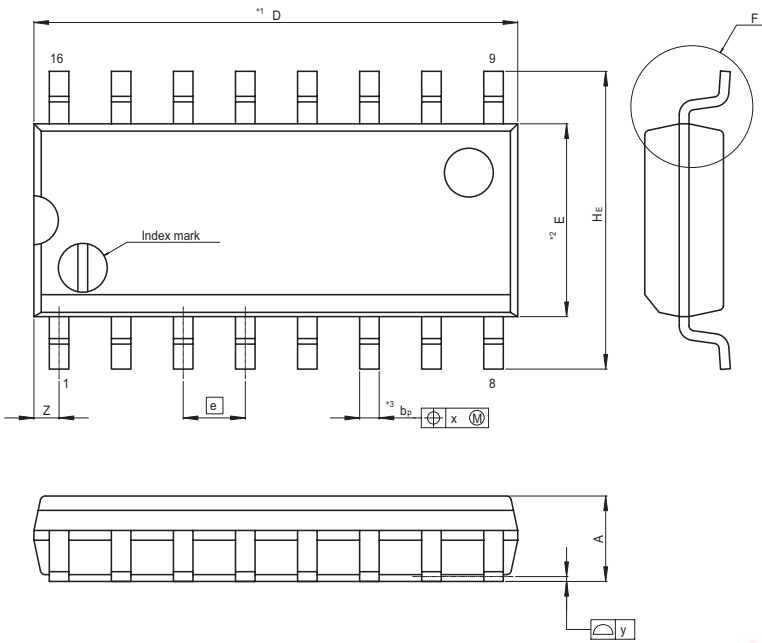
- Notes :
1. Input waveform : PRR \leq 1 MHz, duty cycle 50%, $t_r \leq$ 6 ns, $t_f \leq$ 6 ns
 2. Waveform– A is for an output with internal conditions such that the output is low except when disabled by the output control.
 3. Waveform– B is for an output with internal conditions such that the output is high except when disabled by the output control.
 4. The output are measured one at a time with one transition per measurement.

Package Dimensions



HD74HC257

JEITA Package Code P-SOP16-3.95x9.9-1.27	RENESAS Code PRSP0016DG-A	Previous Code FP-16DNV	MASS[Typ.] 0.15g
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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)

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	9.90	10.30
E	—	3.95	—
A _z	—	—	—
A ₁	0.10	0.14	0.25
A	—	—	1.75
b _p	0.34	0.40	0.46
b ₁	—	—	—
c	0.15	0.20	0.25
c ₁	—	—	—
θ	0°	—	8°
H _E	5.80	6.10	6.20
e	—	1.27	—
x	—	—	0.25
y	—	—	0.15
Z	—	—	0.635
L	0.40	0.60	1.27
L ₁	—	1.08	—

EOL Product

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