

HD74HC258

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

REJ03D0602-0200
(Previous ADE-205-479)
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) = 11 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) |
|---------------|--------------------|---------------------------------|-------------------------|-----------------------------------|
| HD74HC258P | DILP-16 pin | PRDP0016AE-B (DP-16FV) | P | — |
| HD74HC258FPEL | SOP-16 pin (JEITA) | PRSP0016DH-B (FP-16DAV) | FP | EL (2,000 pcs/reel) |
| HD74HC258RPEL | 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 |
| H | X | X | X | Z |
| L | L | L | X | H |
| L | L | H | X | L |
| L | H | X | L | H |
| L | H | X | H | L |

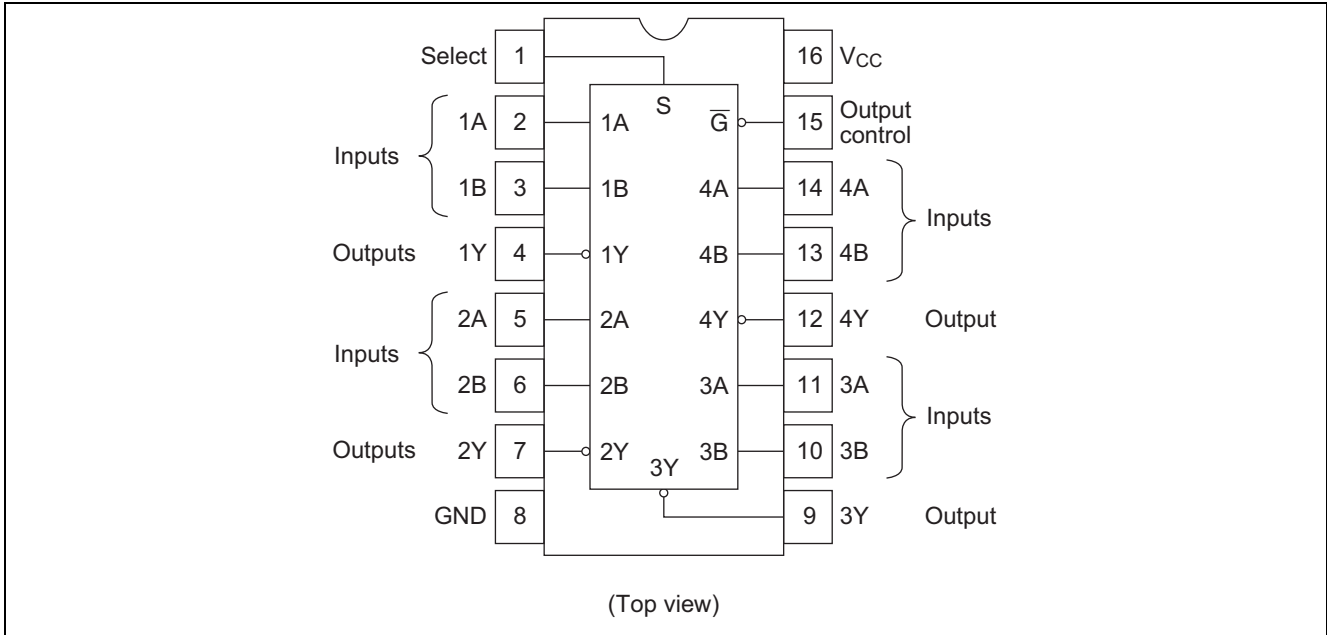
Notes H: high level

L: low level

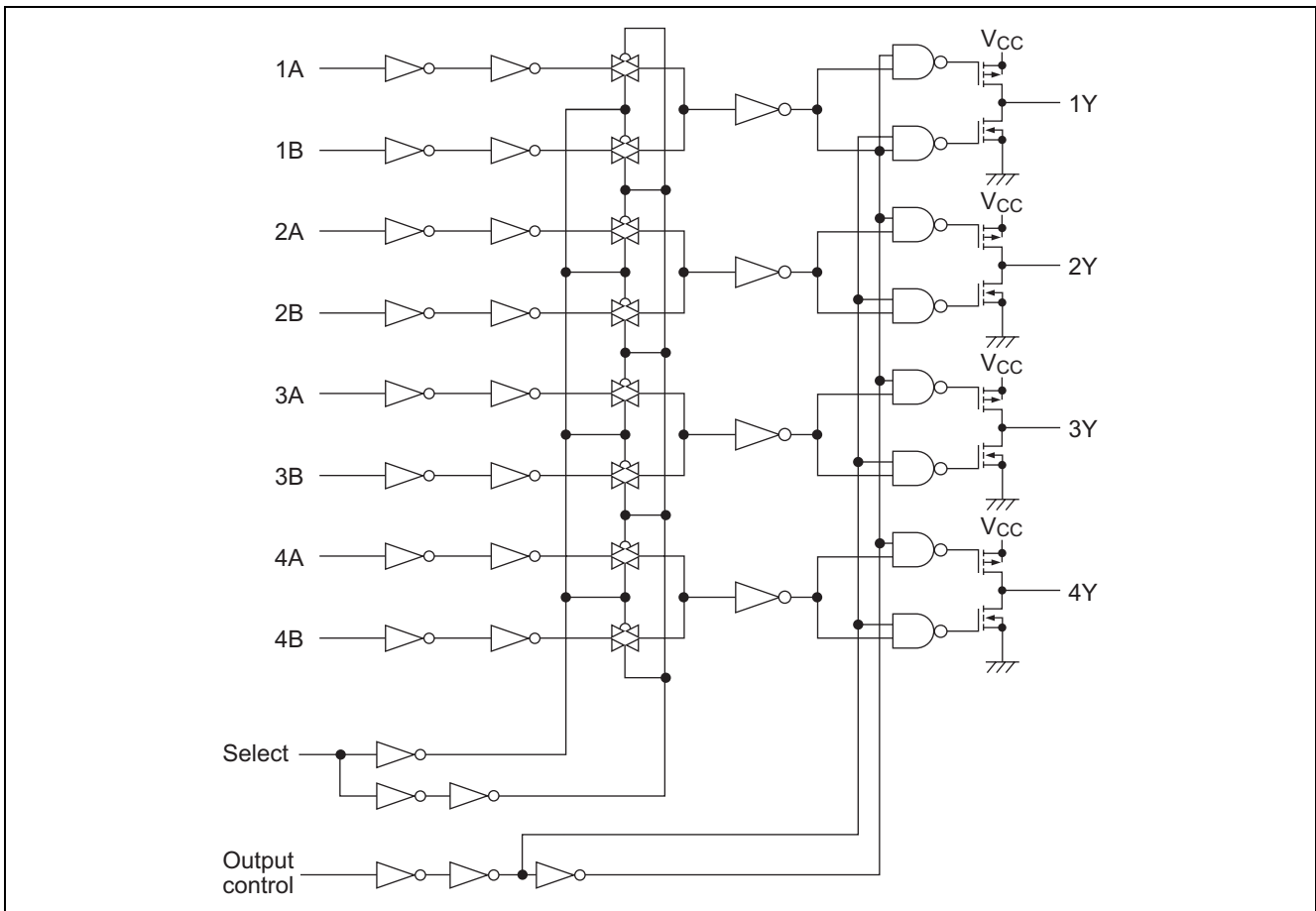
X: irrelevant

Z: off (high-impedance) state of a 3-state output

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

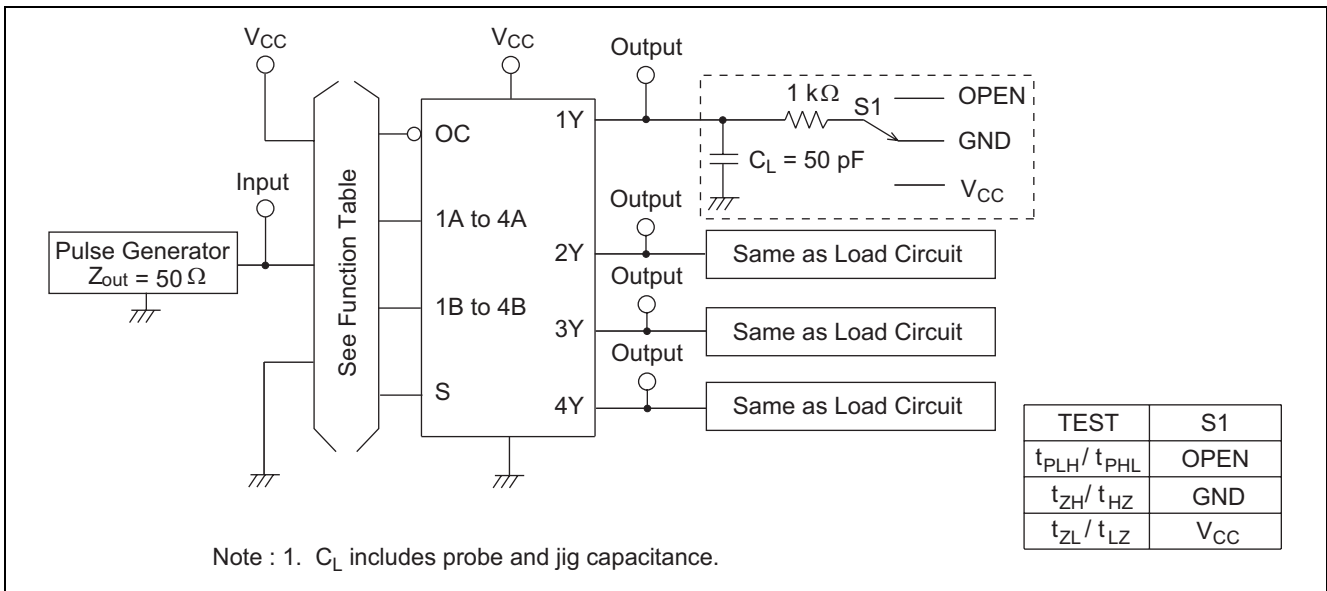
| Item | Symbol | V_{CC} (V) | $T_a = 25^\circ\text{C}$ | | | $T_a = -40 \text{ to } +85^\circ\text{C}$ | | Unit | Test Conditions | |
|--------------------------|----------|--------------|--------------------------|-----|-----------|---|-----------|---------------|--|------------------------------|
| | | | 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} | $I_{OH} = -20$ μA |
| | | 4.5 | 4.4 | 4.5 | — | 4.4 | — | | | $I_{OH} = -6$ mA |
| | | 6.0 | 5.9 | 6.0 | — | 5.9 | — | | | $I_{OH} = -7.8$ 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} | $I_{OL} = 20$ μA |
| | | 4.5 | — | 0.0 | 0.1 | — | 0.1 | | | |
| | | 6.0 | — | 0.0 | 0.1 | — | 0.1 | | | |
| | | 4.5 | — | — | 0.26 | — | 0.33 | | | $I_{OL} = 6$ mA |
| | | 6.0 | — | — | 0.26 | — | 0.33 | | | $I_{OL} = 7.8$ 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, $I_{out} = 0$ μA | |

Switching Characteristics

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

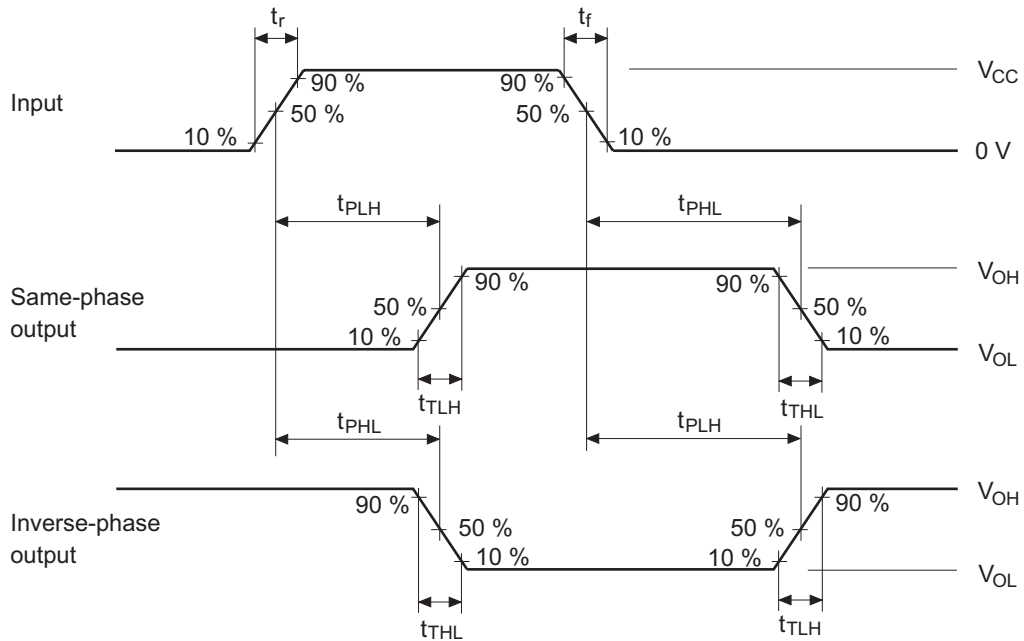
| Item | Symbol | V_{CC} (V) | $T_a = 25^\circ\text{C}$ | | | $T_a = -40\text{ to }+85^\circ\text{C}$ | | Unit | Test Conditions |
|------------------------|-----------|--------------|--------------------------|-----|-----|---|-----|------|-----------------|
| | | | Min | Typ | Max | Min | Max | | |
| Propagation delay time | t_{PLH} | 2.0 | — | — | 115 | — | 145 | ns | Data to Y |
| | | 4.5 | — | 11 | 23 | — | 29 | | |
| | | 6.0 | — | — | 20 | — | 25 | | |
| | t_{PHL} | 2.0 | — | — | 115 | — | 145 | ns | Select to Y |
| | | 4.5 | — | 13 | 23 | — | 29 | | |
| | | 6.0 | — | — | 20 | — | 25 | | |
| Output enable time | t_{ZL} | 2.0 | — | — | 150 | — | 190 | ns | |
| | | 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 | |
| | | 4.5 | — | 13 | 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

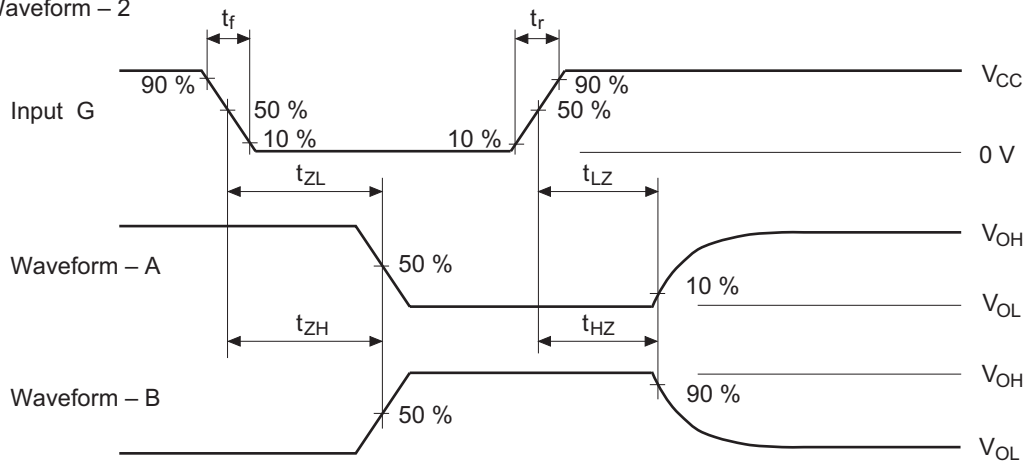


Waveforms

• Waveform – 1

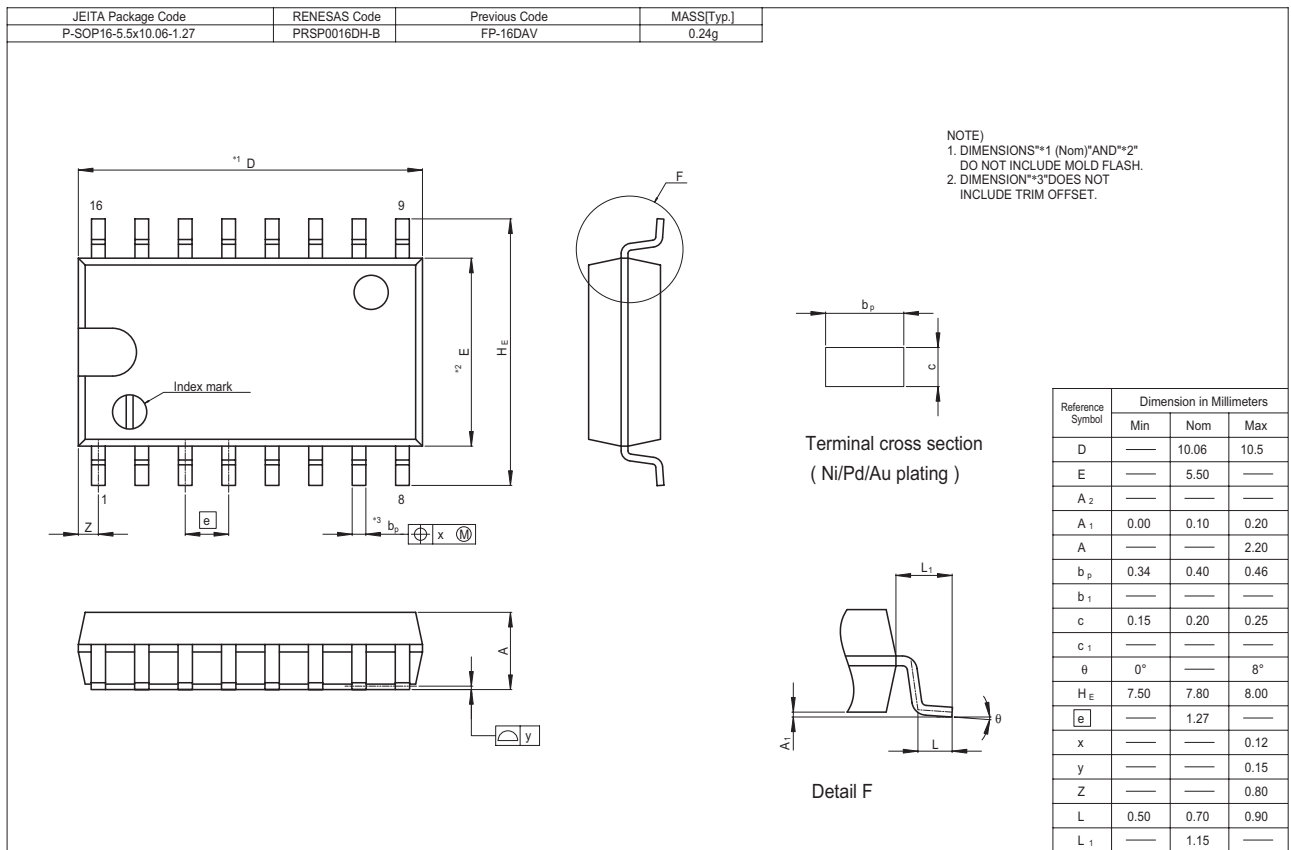
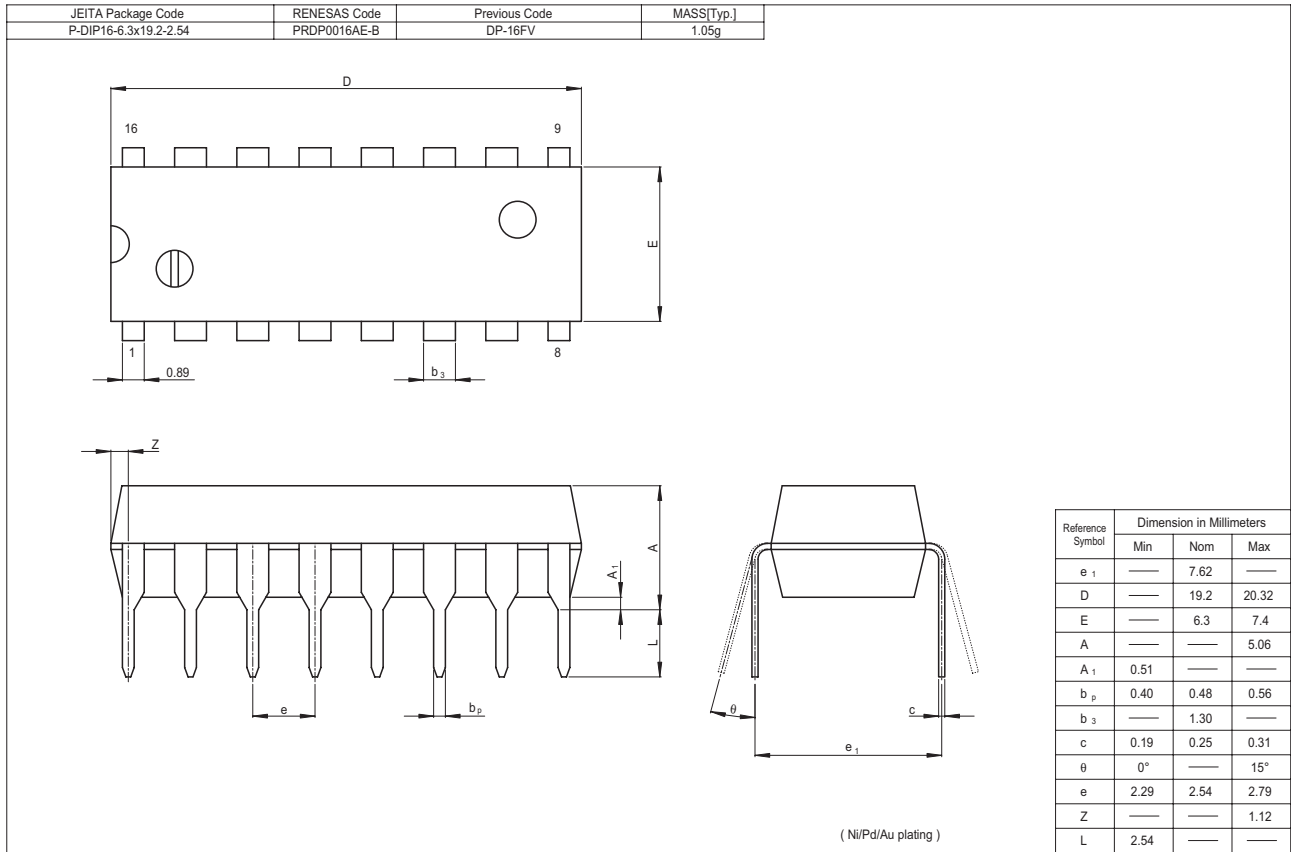


• Waveform – 2



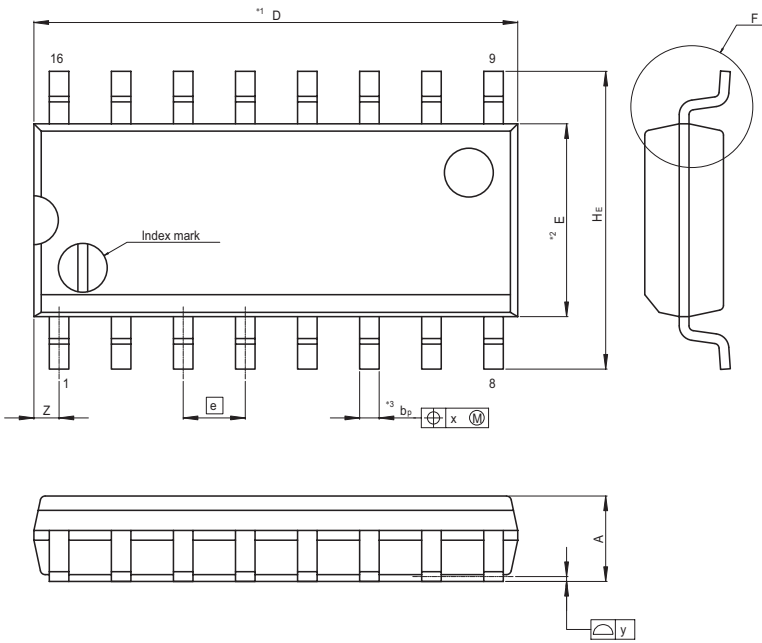
- Notes :
1. Input waveform : PRR \leq 1 MHz, duty cycle 50%, $t_r \leq$ 6 ns, $t_f \leq$ 6 ns
 2. Waveform– A is for an output with internal conditions such that the output is low except when disabled by the output control.
 3. Waveform– B is for an output with internal conditions such that the output 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

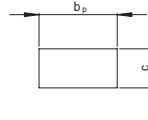


HD74HC258

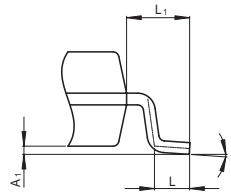
| | | | |
|---|------------------------------|---------------------------|---------------------|
| JEITA Package Code P-SOP16-3.95x9.9-1.27 | RENESAS Code PRSP0016DG-A | Previous Code FP-16DNV | MASS[Typ.] 0.15g |
|---|------------------------------|---------------------------|---------------------|



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 | — | 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 | — |

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