

# HD74HC132

Quad. 2-input NAND Schmitt Triggers

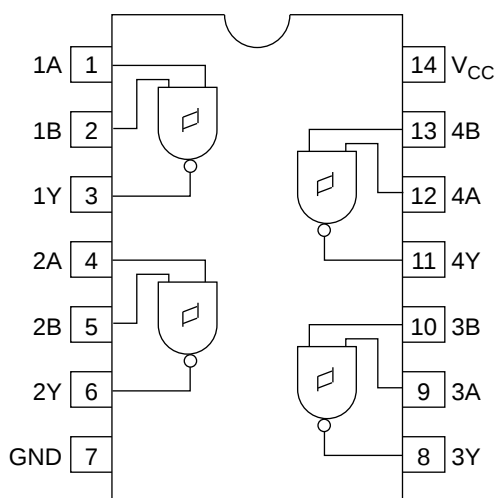
# HITACHI

ADE-205-441 (Z)  
1st. Edition  
Sep. 2000

## Features

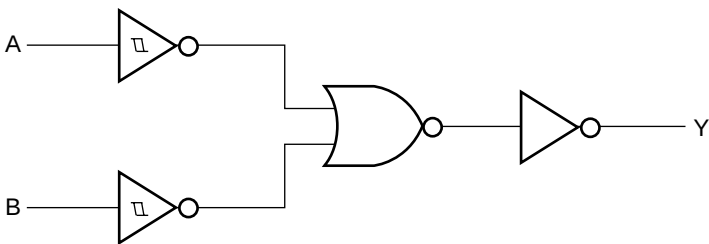
- High Speed Operation:  $t_{pd} = 9.5 \text{ ns typ}$  ( $C_L = 50 \text{ pF}$ )
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage:  $V_{CC} = 2 \text{ to } 6 \text{ V}$
- Low Input Current:  $1 \mu\text{A max}$
- Low Quiescent Supply Current:  $I_{CC}(\text{static}) = 1 \mu\text{A max}$  ( $T_a = 25^\circ\text{C}$ )

## Pin Arrangement



(Top view)

Logic Diagram (1/4)



DC Characteristics

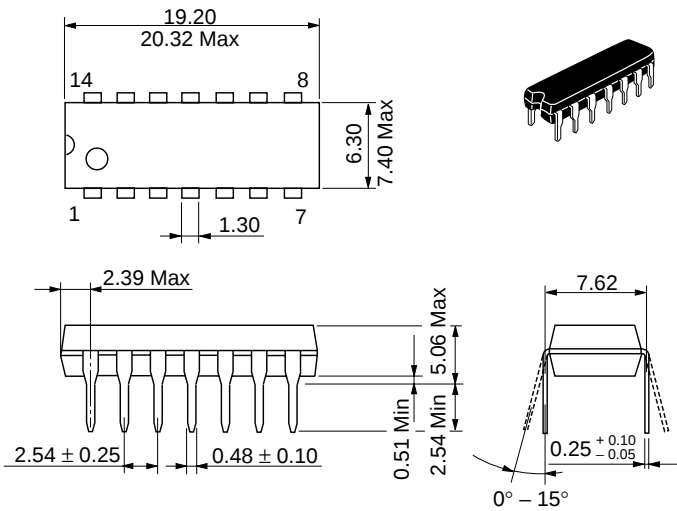
| Item                     | Symbol          | V <sub>CC</sub> (V) | Ta = -40 to +85°C |     |      |      |      | Unit                      | Test Conditions                                       |                          |
|--------------------------|-----------------|---------------------|-------------------|-----|------|------|------|---------------------------|-------------------------------------------------------|--------------------------|
|                          |                 |                     | Min               | Typ | Max  | Min  | Max  |                           |                                                       |                          |
| Threshold voltage        | V <sub>T+</sub> | 2.0                 | 0.8               | —   | 1.5  | 0.8  | 1.5  | V                         |                                                       |                          |
|                          |                 | 4.5                 | 2.25              | —   | 3.15 | 2.25 | 3.15 |                           |                                                       |                          |
|                          |                 | 6.0                 | 3.0               | —   | 4.2  | 3.0  | 4.2  |                           |                                                       |                          |
|                          | V <sub>T-</sub> | 2.0                 | 0.2               | —   | 1.0  | 0.2  | 1.0  | V                         |                                                       |                          |
|                          |                 | 4.5                 | 0.9               | —   | 2.25 | 0.9  | 2.25 |                           |                                                       |                          |
|                          |                 | 6.0                 | 1.2               | —   | 3.0  | 1.2  | 3.0  |                           |                                                       |                          |
| Hysteresis voltage       | V <sub>H</sub>  | 2.0                 | 0.2               | —   | 1.2  | 0.2  | 1.2  | V                         |                                                       |                          |
|                          |                 | 4.5                 | 0.4               | —   | 2.25 | 0.4  | 2.25 |                           |                                                       |                          |
|                          |                 | 6.0                 | 0.6               | —   | 3.0  | 0.6  | 3.0  |                           |                                                       |                          |
| Output voltage           | V <sub>OH</sub> | 2.0                 | 1.9               | 2.0 | —    | 1.9  | —    | V                         | Vin = V <sub>IH</sub> or V <sub>IL</sub>              | I <sub>OH</sub> = -20 μA |
|                          |                 | 4.5                 | 4.4               | 4.5 | —    | 4.4  | —    |                           |                                                       |                          |
|                          |                 | 6.0                 | 5.9               | 6.0 | —    | 5.9  | —    |                           |                                                       |                          |
|                          |                 | 4.5                 | 4.18              | —   | —    | 4.13 | —    | I <sub>OH</sub> = -4 mA   |                                                       |                          |
|                          |                 | 6.0                 | 5.68              | —   | —    | 5.63 | —    | I <sub>OH</sub> = -5.2 mA |                                                       |                          |
|                          | V <sub>OL</sub> | 2.0                 | —                 | 0.0 | 0.1  | —    | 0.1  | V                         | Vin = V <sub>IH</sub> or V <sub>IL</sub>              | I <sub>OL</sub> = 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 <sub>OL</sub> = 4 mA    |                                                       |                          |
|                          |                 | 6.0                 | —                 | —   | 0.26 | —    | 0.33 | I <sub>OL</sub> = 5.2 mA  |                                                       |                          |
| Input current            | I <sub>in</sub> | 6.0                 | —                 | —   | ±0.1 | —    | ±1.0 | μA                        | Vin = V <sub>CC</sub> or GND                          |                          |
| Quiescent supply current | I <sub>CC</sub> | 6.0                 | —                 | —   | 1.0  | —    | 10   | μA                        | Vin = V <sub>CC</sub> or GND, I <sub>out</sub> = 0 μA |                          |

AC Characteristics (C<sub>L</sub> = 50 pF, Input t<sub>r</sub> = t<sub>f</sub> = 6 ns)

| Item                   | Symbol           | V <sub>CC</sub> (V) | Ta = 25°C |     |     | Ta = -40 to +85°C |     | Unit | Test Conditions |
|------------------------|------------------|---------------------|-----------|-----|-----|-------------------|-----|------|-----------------|
|                        |                  |                     | Min       | Typ | Max | Min               | Max |      |                 |
| Propagation delay time | t <sub>PLH</sub> | 2.0                 | —         | —   | 100 | —                 | 125 | ns   |                 |
|                        |                  | 4.5                 | —         | 8   | 20  | —                 | 25  |      |                 |
|                        |                  | 6.0                 | —         | —   | 17  | —                 | 21  |      |                 |
|                        | t <sub>PHL</sub> | 2.0                 | —         | —   | 100 | —                 | 125 | ns   |                 |
|                        |                  | 4.5                 | —         | 11  | 20  | —                 | 25  |      |                 |
|                        |                  | 6.0                 | —         | —   | 17  | —                 | 21  |      |                 |
| Output rise/fall time  | t <sub>TLH</sub> | 2.0                 | —         | —   | 75  | —                 | 95  | ns   |                 |
|                        | t <sub>THL</sub> | 4.5                 | —         | 5   | 15  | —                 | 19  |      |                 |
|                        |                  | 6.0                 | —         | —   | 13  | —                 | 16  |      |                 |
| Input capacitance      | C <sub>in</sub>  | —                   | —         | 5   | 10  | —                 | 10  | pF   |                 |

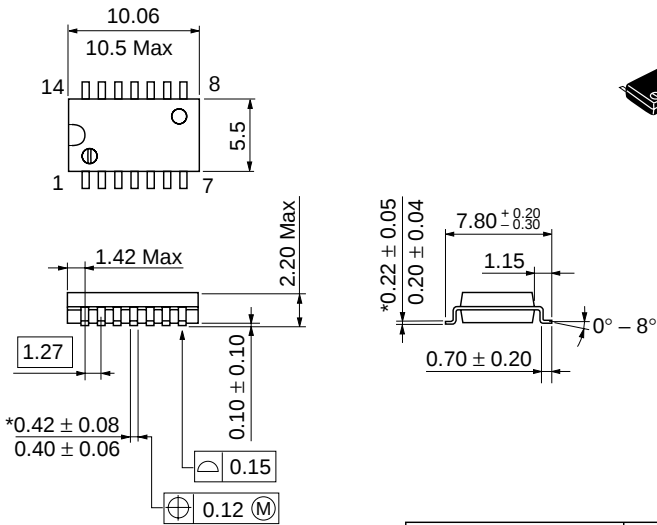
Package Dimensions

Unit: mm



|                        |          |
|------------------------|----------|
| Hitachi Code           | DP-14    |
| JEDEC                  | Conforms |
| EIAJ                   | Conforms |
| Mass (reference value) | 0.97 g   |

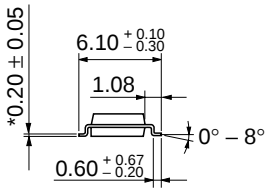
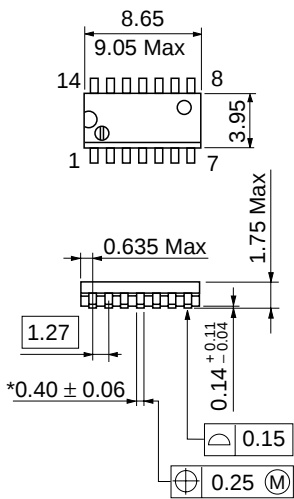
Unit: mm



\*Dimension including the plating thickness  
Base material dimension

|                        |          |
|------------------------|----------|
| Hitachi Code           | FP-14DA  |
| JEDEC                  | —        |
| EIAJ                   | Conforms |
| Mass (reference value) | 0.23 g   |

Unit: mm



\*Pd plating

|                        |          |
|------------------------|----------|
| Hitachi Code           | FP-14DN  |
| JEDEC                  | Conforms |
| EIAJ                   | Conforms |
| Mass (reference value) | 0.13 g   |

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