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# HD74HC680

## 12-bit Address Comparator

# HITACHI

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### Description

The HD74HC680 address comparator simplifies addressing of memory boards and/or other peripheral devices. The four P inputs are normally hard wired with a preprogrammed address. An internal decoder determines what input information applied to the 12 A inputs must be low or high to cause a low state at the output (Y). For example, a positive-logic bit combination of 0111 (decimal 7) at the P input determines that inputs A<sub>1</sub> through A<sub>7</sub> must be low and that inputs A<sub>8</sub> through A<sub>12</sub> must be high to cause the output to go low. Equality of the address applied at the A inputs to the preprogrammed address is indicated by the output being low.

The HD74HC680 features a transparent latch and a latch enable input (C). When C is high, the device is in the transparent mode. When C is low, the previous logical state of Y is latched.

### Features

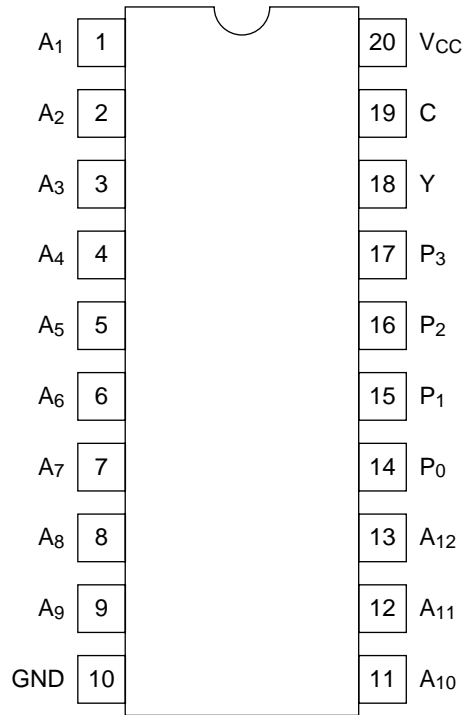
- High Speed Operation
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage:  $V_{CC} = 2$  to 6 V
- Low Input Current: 1  $\mu$ A max
- Low Quiescent Supply Current:  $I_{CC}(\text{static}) = 4 \mu\text{A max}$  ( $T_a = 25^\circ\text{C}$ )

# HD74HC680

## Function Table

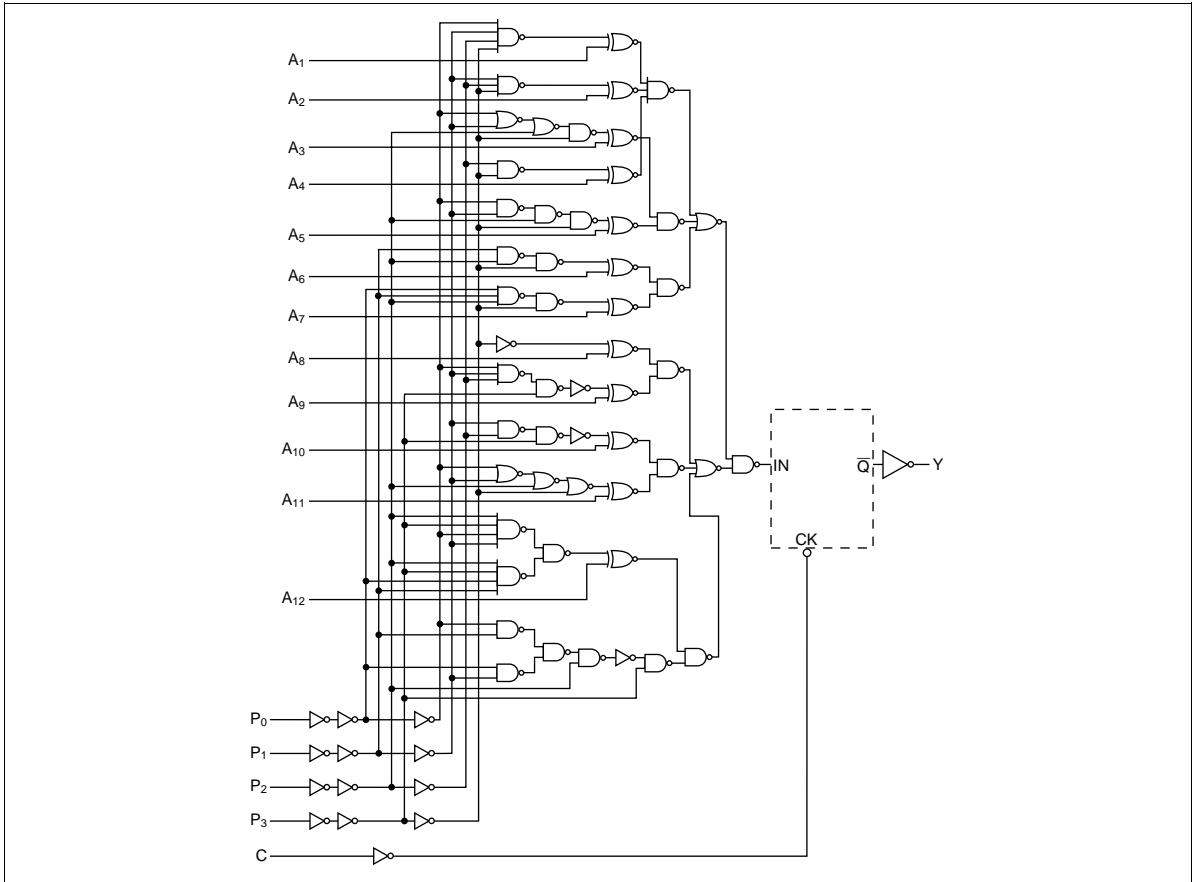
| C | Inputs                 |                |                |                |                |                |                |                |                |                |                |                | Output Y |                |                 |                 |                 |
|---|------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|----------------|-----------------|-----------------|-----------------|
|   | P <sub>3</sub>         | P <sub>2</sub> | P <sub>1</sub> | P <sub>0</sub> | A <sub>1</sub> | A <sub>2</sub> | A <sub>3</sub> | A <sub>4</sub> | A <sub>5</sub> | A <sub>6</sub> | A <sub>7</sub> | A <sub>8</sub> |          | A <sub>9</sub> | A <sub>10</sub> | A <sub>11</sub> | A <sub>12</sub> |
| H | L                      | L              | L              | L              | H              | H              | H              | H              | H              | H              | H              | H              | H        | H              | H               | H               | L               |
| H | L                      | L              | L              | H              | L              | H              | H              | H              | H              | H              | H              | H              | H        | H              | H               | H               | L               |
| H | L                      | L              | H              | L              | L              | L              | H              | H              | H              | H              | H              | H              | H        | H              | H               | H               | L               |
| H | L                      | L              | H              | H              | L              | L              | L              | H              | H              | H              | H              | H              | H        | H              | H               | H               | L               |
| H | L                      | H              | L              | L              | L              | L              | L              | L              | H              | H              | H              | H              | H        | H              | H               | H               | L               |
| H | L                      | H              | L              | H              | L              | L              | L              | L              | L              | H              | H              | H              | H        | H              | H               | H               | L               |
| H | L                      | H              | H              | L              | L              | L              | L              | L              | L              | L              | H              | H              | H        | H              | H               | H               | L               |
| H | L                      | H              | H              | H              | L              | L              | L              | L              | L              | L              | L              | H              | H        | H              | H               | H               | L               |
| H | H                      | L              | L              | L              | L              | L              | L              | L              | L              | L              | L              | L              | H        | H              | H               | H               | L               |
| H | H                      | L              | H              | L              | L              | L              | L              | L              | L              | L              | L              | L              | L        | L              | H               | H               | L               |
| H | H                      | L              | H              | H              | L              | L              | L              | L              | L              | L              | L              | L              | L        | L              | L               | H               | L               |
| H | H                      | H              | L              | L              | L              | L              | L              | L              | L              | L              | L              | L              | L        | L              | L               | L               | L               |
| H | H                      | H              | L              | H              | X              | X              | X              | X              | X              | X              | X              | X              | X        | X              | X               | X               | H               |
| H | H                      | H              | H              | L              | X              | X              | X              | X              | X              | X              | X              | X              | X        | X              | X               | X               | H               |
| H | H                      | H              | H              | H              | L              | L              | L              | L              | L              | L              | L              | L              | L        | L              | L               | L               | L               |
| H | All other combinations |                |                |                |                |                |                |                |                |                |                |                |          |                |                 |                 | H               |
| L | Any combination        |                |                |                |                |                |                |                |                |                |                |                |          |                |                 |                 | Latched         |

Pin Arrangement



(Top view)

## Logic Diagram



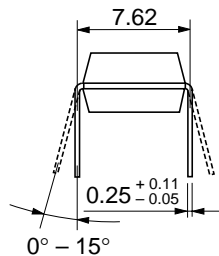
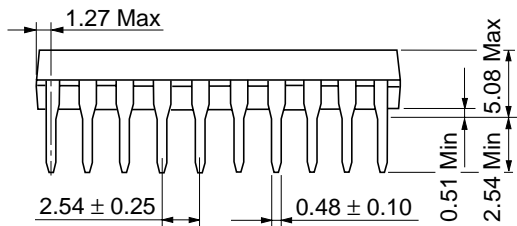
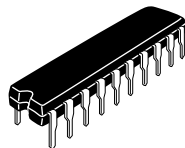
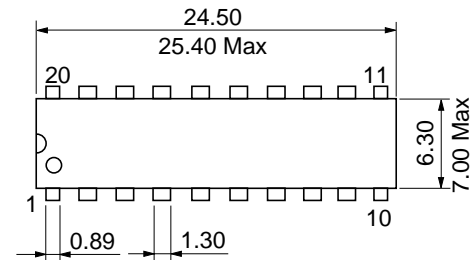
DC Characteristics

| Item                     | Symbol          | V <sub>CC</sub> (V) | Ta = 25°C |      |      | Ta = -40 to +85°C |                          | Unit | Test Conditions   |                           |
|--------------------------|-----------------|---------------------|-----------|------|------|-------------------|--------------------------|------|---|---------------------------|
|                          |                 |                     | Min       | Typ  | Max  | Min               | Max                      |      |   |                           |
| Input voltage            | V <sub>IH</sub> | 2.0                 | 1.5       | —    | —    | 1.5               | —                        | V    |   |                           |
|                          |                 | 4.5                 | 3.15      | —    | —    | 3.15              | —                        |      |   |                           |
|                          |                 | 6.0                 | 4.2       | —    | —    | 4.2               | —                        |      |   |                           |
|                          | V <sub>IL</sub> | 2.0                 | —         | —    | 0.5  | —                 | 0.5                      |      |   | V                         |
|                          |                 | 4.5                 | —         | —    | 1.35 | —                 | 1.35                     |      |   |                           |
|                          |                 | 6.0                 | —         | —    | 1.8  | —                 | 1.8                      |      |   |                           |
| 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 |
|                          |                 | 6.0                 | —         | 0.0  | 0.1  | —                 | 0.1                      |      |   | V                         |
|                          | 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                 | —         | —    | 4.0  | —                 | 40                       | μA   | Vin = V <sub>CC</sub> or GND, I <sub>out</sub> = 0 μA             |                           |

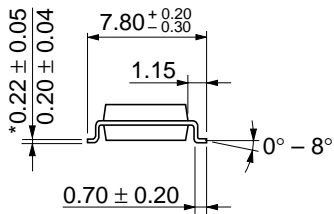
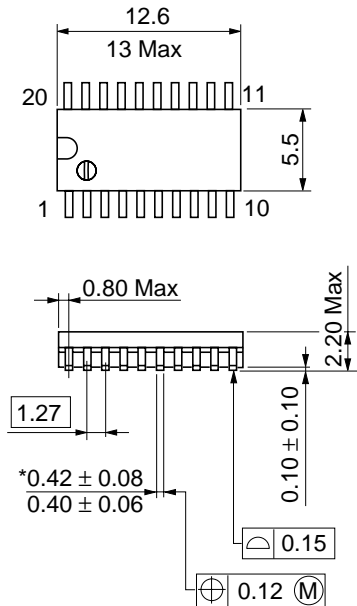
# HD74HC680

## AC Characteristics ( $C_L = 50$ pF, Input $t_r = t_f = 6$ ns)

| Item                   | Symbol    | $V_{CC}$ (V) | $T_a = 25^\circ\text{C}$ |     |     | $T_a = -40$ to $+85^\circ\text{C}$ |     | Unit | Test Conditions |
|------------------------|-----------|--------------|--------------------------|-----|-----|------------------------------------|-----|------|-----------------|
|                        |           |              | Min                      | Typ | Max | Min                                | Max |      |                 |
| Propagation delay time | $t_{PLH}$ | 2.0          | —                        | —   | 330 | —                                  | 410 | ns   | P to Y          |
|                        |           | 4.5          | —                        | 26  | 66  | —                                  | 82  |      |                 |
|                        |           | 6.0          | —                        | —   | 56  | —                                  | 70  |      |                 |
|                        | $t_{PHL}$ | 2.0          | —                        | —   | 210 | —                                  | 265 | ns   | A to Y          |
|                        |           | 4.5          | —                        | 19  | 42  | —                                  | 53  |      |                 |
|                        |           | 6.0          | —                        | —   | 36  | —                                  | 45  |      |                 |
|                        | $t_{PLH}$ | 2.0          | —                        | —   | 150 | —                                  | 190 | ns   | C to Y          |
|                        |           | 4.5          | —                        | 18  | 30  | —                                  | 38  |      |                 |
|                        |           | 6.0          | —                        | —   | 26  | —                                  | 33  |      |                 |
| Output rise/fall time  | $t_{TLH}$ | 2.0          | —                        | —   | 75  | —                                  | 95  | ns   |                 |
|                        |           | 4.5          | —                        | 6   | 15  | —                                  | 19  |      |                 |
|                        |           | 6.0          | —                        | —   | 13  | —                                  | 16  |      |                 |
| Input capacitance      | $C_{in}$  | —            | —                        | 5   | 10  | —                                  | 10  | pF   |                 |



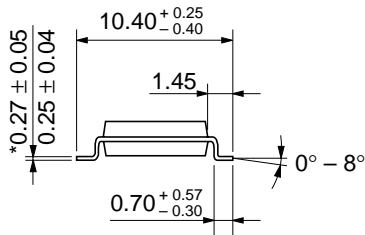
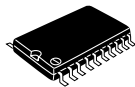
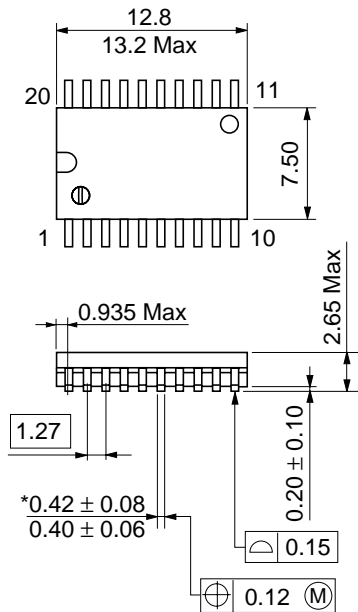
|                          |          |
|--------------------------|----------|
| Hitachi Code             | DP-20N   |
| JEDEC                    | —        |
| EIAJ                     | Conforms |
| Weight (reference value) | 1.26 g   |



|                          |          |
|--------------------------|----------|
| Hitachi Code             | FP-20DA  |
| JEDEC                    | —        |
| EIAJ                     | Conforms |
| Weight (reference value) | 0.31 g   |

\*Dimension including the plating thickness  
Base material dimension





|                          |          |
|--------------------------|----------|
| Hitachi Code             | FP-20DB  |
| JEDEC                    | Conforms |
| EIAJ                     | —        |
| Weight (reference value) | 0.52 g   |

\*Dimension including the plating thickness  
Base material dimension

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