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# HD74HC149

## 8-to-8-line Priority Encoder

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### Description

The HD74HC149 is priority encoder which has 8 input lines (0 - 7) and 8 output lines ( $Y_0$  -  $Y_7$ ).

It is the logical combination of a HD74HC148 8-3 line priority encoder driving a HD74HC138 3-8 line decoder.

Only one request output can be low at a time. The output that is low is dependent on the highest priority request that is low. The order of priority is 7 highest and 0 lowest.

When  $\bar{E}$  input is high, all outputs are high.

When a output ( $Y_0$  -  $Y_7$ ) is low,  $\bar{P}$  output is low and this indicates active condition.

### Features

- High Speed Operation:  $t_{pd}$  (0 - 7 to Y) = 16 ns typ ( $C_L$  = 50 pF)
- 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:  $I_{CC}$  (static) = 4  $\mu$ A max ( $T_a$  = 25°C)

# HD74HC149

## Function Table

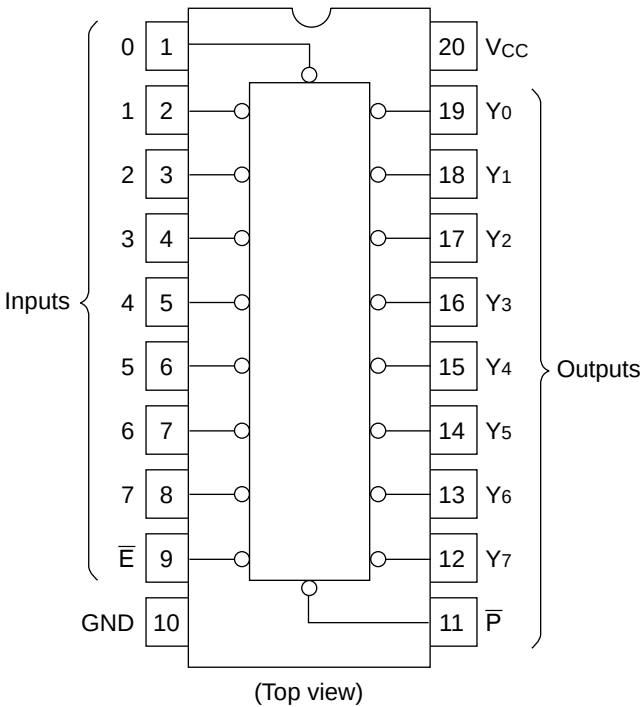
| Inputs |   |   |   |   |   |   |   |           | Outputs |       |       |       |       |       |       |       |           |
|--------|---|---|---|---|---|---|---|-----------|---------|-------|-------|-------|-------|-------|-------|-------|-----------|
| 0      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | $\bar{E}$ | $Y_0$   | $Y_1$ | $Y_2$ | $Y_3$ | $Y_4$ | $Y_5$ | $Y_6$ | $Y_7$ | $\bar{P}$ |
| X      | X | X | X | X | X | X | X | H         | H       | H     | H     | H     | H     | H     | H     | H     | H         |
| H      | H | H | H | H | H | H | H | L         | H       | H     | H     | H     | H     | H     | H     | H     | H         |
| X      | X | X | X | X | X | X | L | L         | H       | H     | H     | H     | H     | H     | H     | L     | L         |
| X      | X | X | X | X | X | L | H | L         | H       | H     | H     | H     | H     | H     | L     | H     | L         |
| X      | X | X | X | X | L | H | H | L         | H       | H     | H     | H     | H     | L     | H     | H     | L         |
| X      | X | X | X | L | H | H | H | L         | H       | H     | H     | H     | L     | H     | H     | H     | L         |
| X      | X | X | L | H | H | H | H | L         | H       | H     | H     | L     | H     | H     | H     | H     | L         |
| X      | X | L | H | H | H | H | H | L         | H       | H     | L     | H     | H     | H     | H     | H     | L         |
| X      | L | H | H | H | H | H | H | L         | H       | L     | H     | H     | H     | H     | H     | H     | L         |
| L      | H | H | H | H | H | H | H | L         | L       | H     | H     | H     | H     | H     | H     | H     | L         |

H : High level

L : Low level

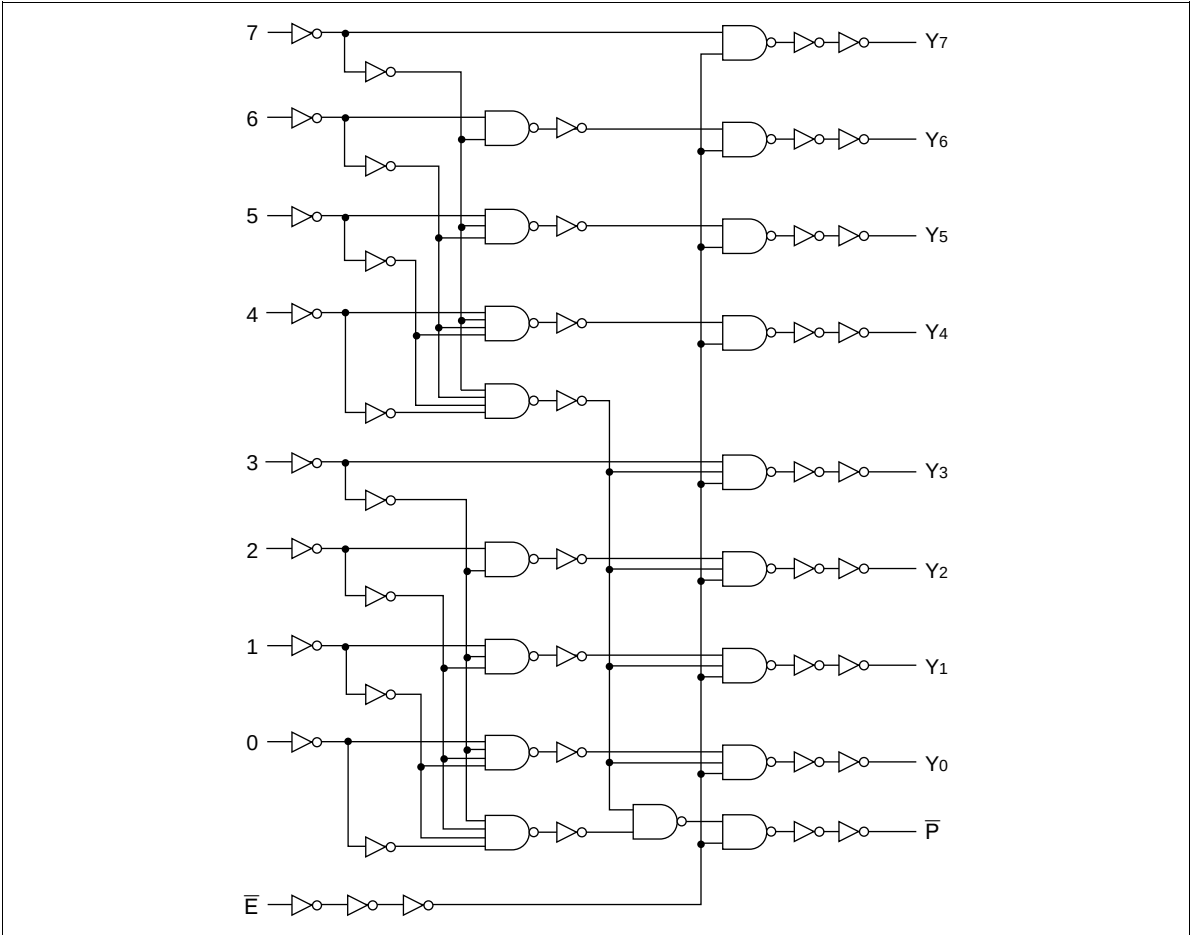
X : Irrelevant

## Pin Arrangement



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Logic Diagram

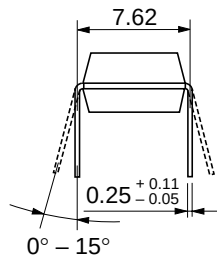
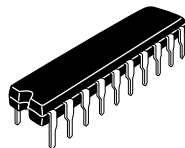
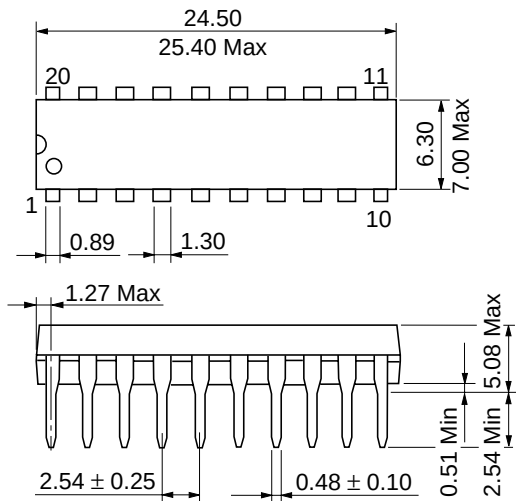


DC Characteristics

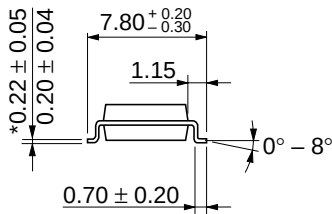
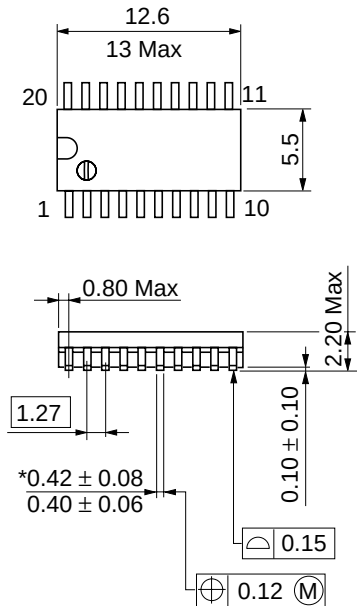
| Item                     | Symbol          | V <sub>CC</sub> (V) | Ta = 25°C |     |      | Ta = -40 to +85°C |      | Unit | Test Conditions                                                   |
|--------------------------|-----------------|---------------------|-----------|-----|------|-------------------|------|------|-------------------------------------------------------------------|
|                          |                 |                     | 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              | —    |      |                                                                   |
|                          |                 | 6.0                 | 5.68      | —   | —    | 5.63              | —    |      |                                                                   |
|                          | 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 |      |                                                                   |
|                          |                 | 6.0                 | —         | —   | 0.26 | —                 | 0.33 |      |                                                                   |
| 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             |

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                 | —         | —   | 140 | —                 | 175 | ns   | 0 - 7 to Y, $\overline{P}$          |
|                        | t <sub>PHL</sub> | 4.5                 | —         | 16  | 28  | —                 | 35  |      |                                     |
|                        |                  | 6.0                 | —         | —   | 24  | —                 | 30  |      |                                     |
|                        | t <sub>PLH</sub> | 2.0                 | —         | —   | 155 | —                 | 195 | ns   | $\overline{E}$ to Y, $\overline{P}$ |
|                        | t <sub>PHL</sub> | 4.5                 | —         | 13  | 31  | —                 | 39  |      |                                     |
|                        |                  | 6.0                 | —         | —   | 26  | —                 | 33  |      |                                     |
| 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   |                                     |

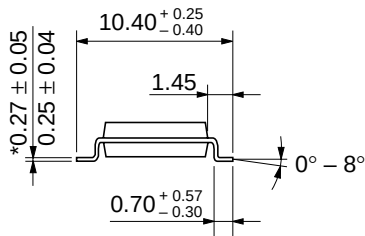
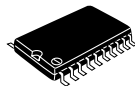
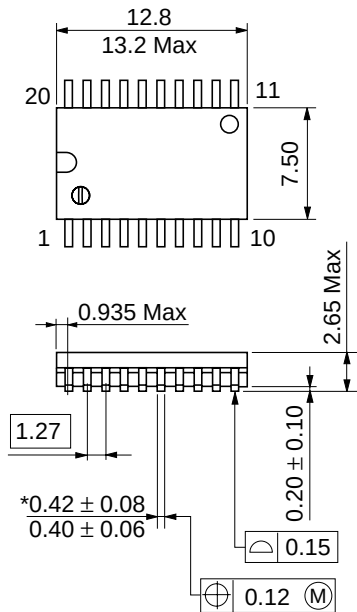


|                          |          |
|--------------------------|----------|
| Hitachi Code             | DP-20N   |
| JEDEC                    | —        |
| EIAJ                     | Conforms |
| Weight (reference value) | 1.26 g   |



\*Dimension including the plating thickness  
Base material dimension

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



|                          |          |
|--------------------------|----------|
| 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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