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# HD74HCT137

3-to-8-line Decoder/Demultiplexer with Address Latch

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## Description

The HD74HCT137 implements a three-to-eight line decoder with latches on the three address inputs. When  $\overline{GL}$  goes from low to high, the address present at the select inputs (A, B and C) is stored in the latches. As long as  $\overline{GL}$  remains high no address changes will be recognized. Output enable controls,  $G_1$  and  $\overline{G_2}$ , control the state of the outputs independently of the select or latch-enable inputs.

All of the outputs are high unless  $G_1$  is high and  $\overline{G_2}$  is low. The HD74HCT137 is ideally suited for the implementation of glitchfree decoders in stored-address applications in bus oriented systems.

## Features

- LSTTL Output Logic Level Compatibility as well as CMOS Output Compatibility
- High Speed Operation:  $t_{pd}$  (A, B, C to Y) = 18 ns typ ( $C_L = 50$  pF)
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage:  $V_{CC} = 4.5$  to  $5.5$  V
- Low Input Current: 1  $\mu$ A max
- Low Quiescent Supply Current:  $I_{CC}$  (static) = 4  $\mu$ A max ( $T_a = 25^\circ\text{C}$ )

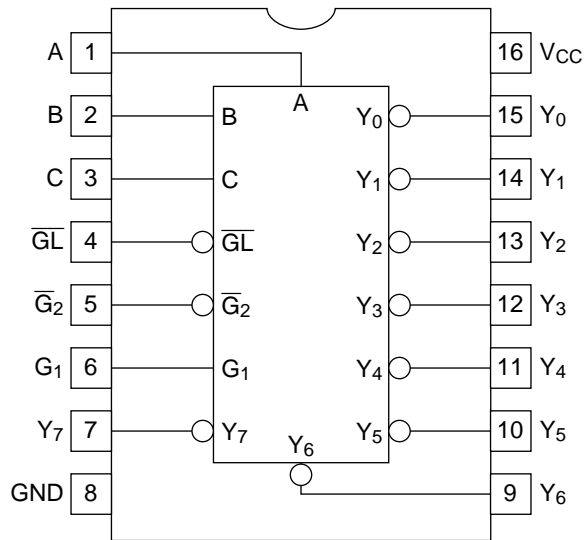
# HD74HCT137

## Function Table

### Inputs

| Enable           |       |                  | Select |   |   | Outputs  |       |       |       |       |       |       |       |
|------------------|-------|------------------|--------|---|---|--|-------|-------|-------|-------|-------|-------|-------|
| $\overline{G_L}$ | $G_1$ | $\overline{G_2}$ | C      | B | A | $Y_0$  | $Y_1$ | $Y_2$ | $Y_3$ | $Y_4$ | $Y_5$ | $Y_6$ | $Y_7$ |
| X                | X     | H                | X      | X | X | H  | H     | H     | H     | H     | H     | H     | H     |
| X                | L     | X                | X      | X | X | H  | H     | H     | H     | H     | H     | H     | H     |
| L                | H     | L                | L      | L | L | L  | H     | H     | H     | H     | H     | H     | H     |
| L                | H     | L                | L      | L | H | H  | L     | H     | H     | H     | H     | H     | H     |
| L                | H     | L                | L      | H | L | H  | H     | L     | H     | H     | H     | H     | H     |
| L                | H     | L                | L      | H | H | H  | H     | H     | L     | H     | H     | H     | H     |
| L                | H     | L                | H      | L | L | H  | H     | H     | H     | L     | H     | H     | H     |
| L                | H     | L                | H      | L | H | H  | H     | H     | H     | H     | L     | H     | H     |
| L                | H     | L                | H      | H | L | H  | H     | H     | H     | H     | H     | L     | H     |
| L                | H     | L                | H      | H | H | H  | H     | H     | H     | H     | H     | H     | L     |
| H                | H     | L                | X      | X | X | Output Corresponding to stored address L; all others H |       |       |       |       |       |       |       |

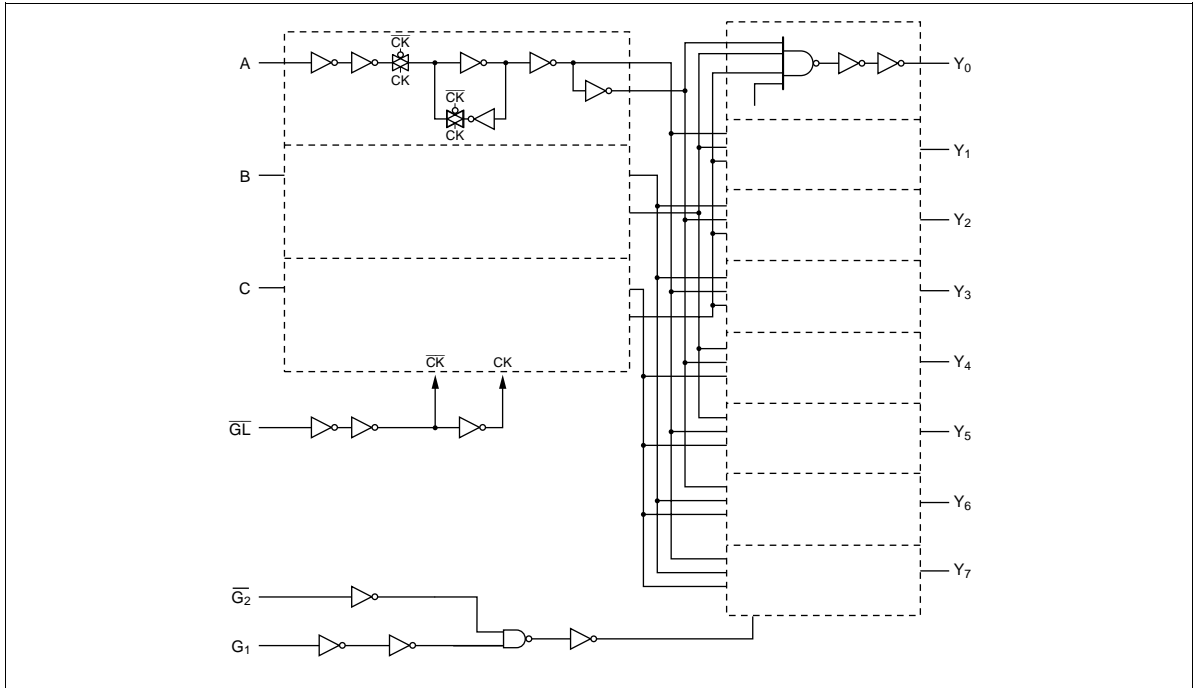
## Pin Arrangement



(Top view)

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Logic Diagram



DC Characteristics

| Item                     | Symbol          | Ta = 25°C |     | Ta = -40 to +85°C |      | Unit | Test Conditions |   |
|--------------------------|-----------------|-----------|-----|-------------------|------|------|-----------------|---|
|                          |                 | Min       | Typ | Max               | Min  |      | Max             | V <sub>CC</sub> (V)   |
| Input voltage            | V <sub>IH</sub> | 2.0       | —   | —                 | 2.0  | —    | V               | 4.5 to 5.5  |
|                          | V <sub>IL</sub> | —         | —   | 0.8               | —    | 0.8  | V               | 4.5 to 5.5  |
| Output voltage           | V <sub>OH</sub> | 4.4       | —   | —                 | 4.4  | —    | V               | 4.5 Vin = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OH</sub> = -20 μA |
|                          |                 | 4.18      | —   | —                 | 4.13 | —    |                 | 4.5 I <sub>OH</sub> = -4 mA   |
|                          | V <sub>OL</sub> | —         | —   | 0.1               | —    | 0.1  | V               | 4.5 Vin = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OL</sub> = 20 μA  |
|                          |                 | —         | —   | 0.26              | —    | 0.33 |                 | 4.5 I <sub>OL</sub> = 4 mA  |
| Input current            | I <sub>in</sub> | —         | —   | ±0.1              | —    | ±1.0 | μA              | 5.5 Vin = V <sub>CC</sub> or GND                                      |
| Quiescent supply current | I <sub>CC</sub> | —         | —   | 4.0               | —    | 40   | μA              | 5.5 Vin = V <sub>CC</sub> or GND, I <sub>out</sub> = 0 μA             |

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

| Item                   | Symbol           | Ta = 25°C |     | Ta = -40 to +85°C |     | Unit | Test Conditions |                     |                       |
|------------------------|------------------|-----------|-----|-------------------|-----|------|-----------------|---------------------|-----------------------|
|                        |                  | Min       | Typ | Max               | Min |      | Max             | V <sub>cc</sub> (V) |                       |
| Propagation delay time | t <sub>PLH</sub> | —         | 14  | 34                | —   | 43   | ns              | 4.5                 | A, B or C to Y        |
|                        | t <sub>PHL</sub> | —         | 22  | 48                | —   | 60   |                 | 4.5                 |                       |
|                        | t <sub>PLH</sub> | —         | 11  | 26                | —   | 33   | ns              | 4.5                 | $\overline{G}_2$ to Y |
|                        | t <sub>PHL</sub> | —         | 23  | 39                | —   | 49   |                 | 4.5                 |                       |
|                        | t <sub>PLH</sub> | —         | 13  | 30                | —   | 38   | ns              | 4.5                 | G <sub>1</sub> to Y   |
|                        | t <sub>PHL</sub> | —         | 17  | 39                | —   | 49   |                 | 4.5                 |                       |
|                        | t <sub>PLH</sub> | —         | 16  | 35                | —   | 44   | ns              | 4.5                 | $\overline{GL}$ to Y  |
|                        | t <sub>PHL</sub> | —         | 23  | 50                | —   | 63   |                 | 4.5                 |                       |
| Pulse width            | t <sub>w</sub>   | 16        | 6   | —                 | 20  | —    | ns              | 4.5                 |                       |
| Setup time             | t <sub>su</sub>  | 20        | 3   | —                 | 25  | —    | ns              | 4.5                 |                       |
| Hold time              | t <sub>h</sub>   | 10        | 0   | —                 | 13  | —    | ns              | 4.5                 |                       |
| Output rise/fall time  | t <sub>TLH</sub> | —         | 5   | 15                | —   | 19   | ns              | 4.5                 |                       |
|                        | t <sub>THL</sub> |           |     |                   |     |      |                 |                     |                       |
| Input capacitance      | C <sub>in</sub>  | —         | 5   | 10                | —   | 10   | pF              | —                   |                       |



|                          |          |
|--------------------------|----------|
| Hitachi Code             | DP-16    |
| JEDEC                    | Conforms |
| EIAJ                     | Conforms |
| Weight (reference value) | 1.07 g   |



\*Dimension including the plating thickness  
Base material dimension

|                          |          |
|--------------------------|----------|
| Hitachi Code             | FP-16DA  |
| JEDEC                    | —        |
| EIAJ                     | Conforms |
| Weight (reference value) | 0.24 g   |



\*Dimension including the plating thickness  
Base material dimension

|                          |          |
|--------------------------|----------|
| Hitachi Code             | FP-16DN  |
| JEDEC                    | Conforms |
| EIAJ                     | Conforms |
| Weight (reference value) | 0.15 g   |

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