
HD74HC356

8-to-1-line Data Selectors/Multiplexer/Register
(with 3-state outputs)

HITACHI

Description

This data selectors/multiplexers contain full on-chip binary decoding to select one of eight data sources. The data select address is stored in transparent latches that are enabled by a low level address on pin 11, Select Control. Data on the 8 input lines is stored in a parallel input/output register which in the HD74HC356 is composed of 8 edge-triggered flip-flops, clocked by a low to high transition on pin 9, clock. Both true (Y) and complementary (W) 3-state outputs are available.









Features

- High Speed Operation: t_{pd} (Clock to W, Y) = 27 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 ($T_a = 25^\circ\text{C}$)

HD74HC356

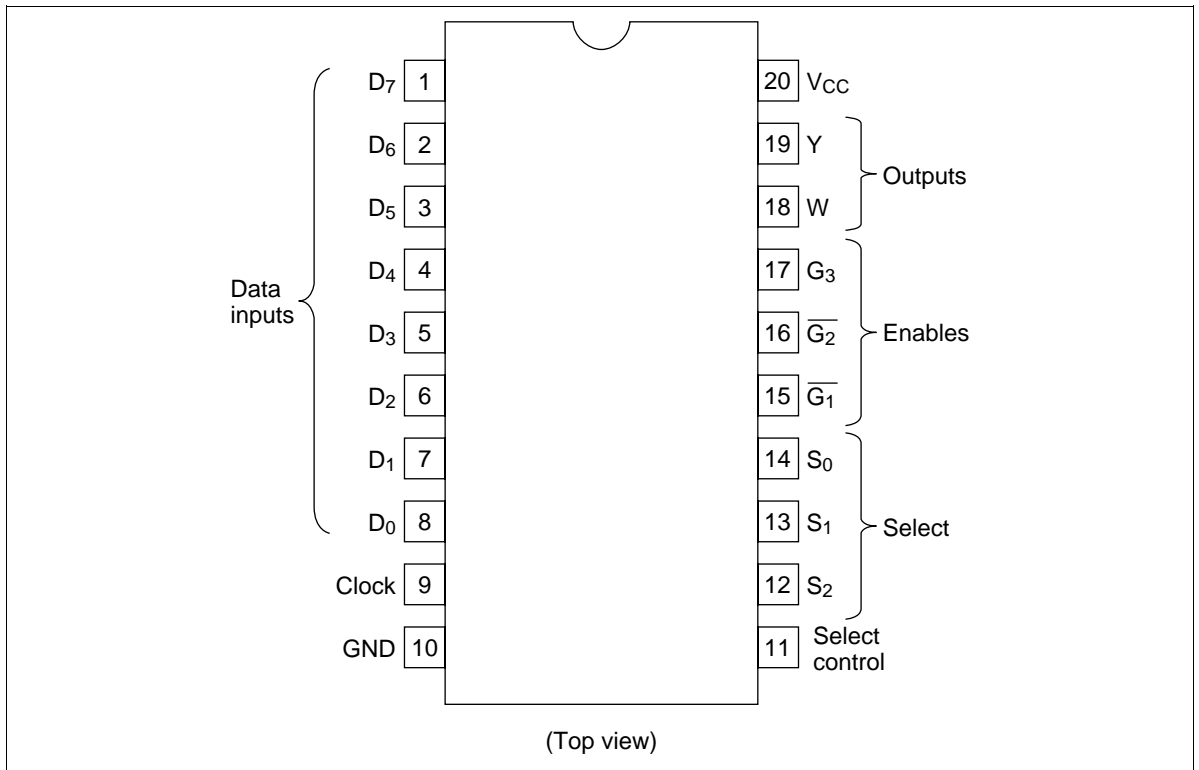
Function Table

Inputs

| Select | | | | Output Enable | | | Outputs | |
|----------------|----------------|----------------|---|------------------|------------------|----------------|---------------------|-----------------|
| S ₁ | S ₂ | S ₀ | Clock | \overline{G}_1 | \overline{G}_2 | G ₃ | W | Y |
| X | X | X | X | H | X | X | Z | Z |
| X | X | X | X | X | H | X | Z | Z |
| X | X | X | X | X | X | L | Z | Z |
| L | L | L |  | L | L | H | \overline{D}_0 | D ₀ |
| L | L | L | H or L | L | L | H | \overline{D}_{0n} | D _{0n} |
| L | L | H |  | L | L | H | \overline{D}_1 | D ₁ |
| L | L | H | H or L | L | L | H | \overline{D}_{1n} | D _{1n} |
| L | H | L |  | L | L | H | \overline{D}_2 | D ₂ |
| L | H | L | H or L | L | L | H | \overline{D}_{2n} | D _{2n} |
| L | H | H |  | L | L | H | \overline{D}_3 | D ₃ |
| L | H | H | H or L | L | L | H | \overline{D}_{3n} | D _{3n} |
| H | L | L |  | L | L | H | \overline{D}_4 | D ₄ |
| H | L | L | H or L | L | L | H | \overline{D}_{4n} | D _{4n} |
| H | L | H |  | L | L | H | \overline{D}_5 | D ₅ |
| H | L | H | H or L | L | L | H | \overline{D}_{5n} | D _{5n} |
| H | H | L |  | L | L | H | \overline{D}_6 | D ₆ |
| H | H | L | H or L | L | L | H | \overline{D}_{6n} | D _{6n} |
| H | H | H |  | L | L | H | \overline{D}_7 | D ₇ |
| H | H | H | H or L | L | L | H | \overline{D}_{7n} | D _{7n} |

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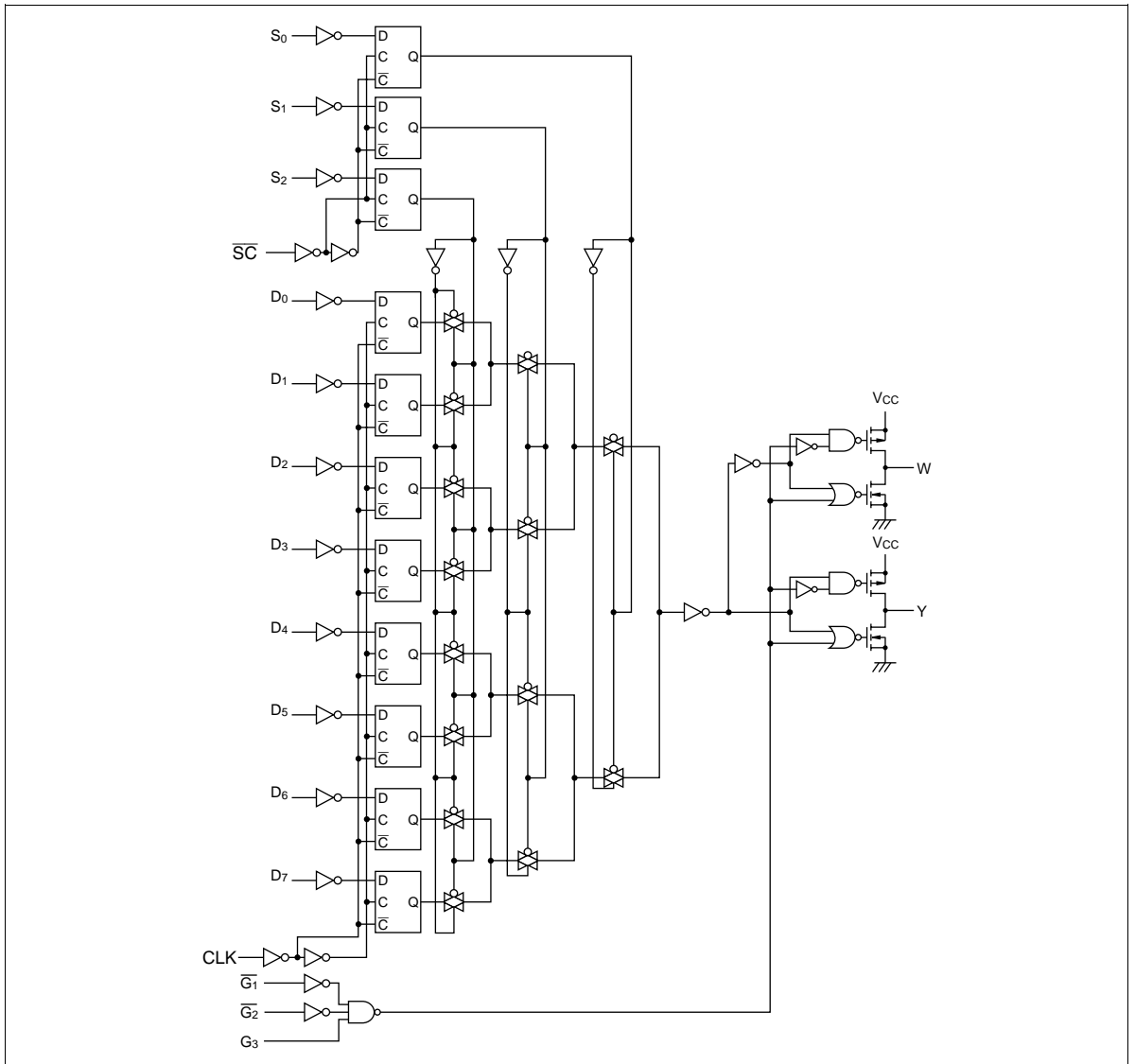
Pin Arrangement



Absolute Masimum Ratings

| Item | Symbol | Rating | Unit |
|-------------------------------------|----------------------|------------------------|-------------|
| Supply voltage range | V_{CC} | -0.5 to +7.0 | V |
| Input voltage | V_{IN} | -0.5 to $V_{CC} + 0.5$ | V |
| Output voltage | V_{OUT} | -0.5 to $V_{CC} + 0.5$ | V |
| Output current | I_{OUT} | ± 35 | mA |
| DC current drain per V_{CC} , GND | I_{CC} , I_{GND} | ± 75 | mA |
| DC input diode current | I_{IK} | ± 20 | mA |
| DC output diode current | I_{OK} | ± 20 | mA |
| Power dissipation per package | P_T | 500 | mW |
| Storage temperature | T_{stg} | -65 to +150 | $^{\circ}C$ |

Block Diagram



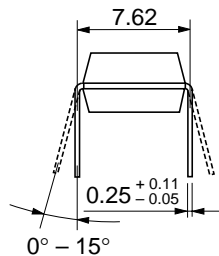
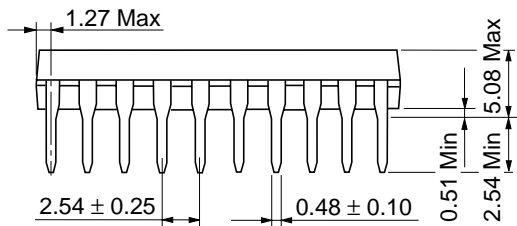
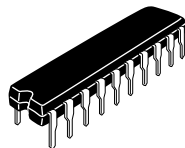
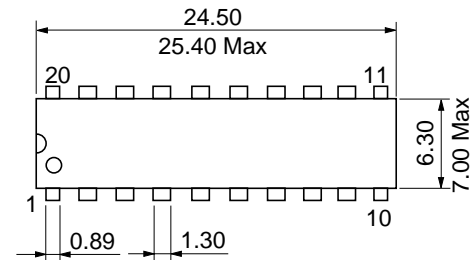
DC Characteristics

| Item | Symbol | V _{CC} (V) | Ta = 25°C | | Ta = -40 to +85°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 | — | Vin = V _{IH} or V _{IL} I _{OH} = -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 _{OH} = -6 mA |
| | | 6.0 | 5.68 | — | — | 5.63 | — | | I _{OH} = -7.8 mA |
| | | 6.0 | — | 0.0 | 0.1 | — | 0.1 | | Vin = V _{IH} or V _{IL} I _{OL} = 20 μA |
| | V _{OL} | 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 | Vin = V _{IH} or V _{IL} , Vout = V _{CC} or GND |
| Input current | I _{in} | 6.0 | — | — | ±0.1 | — | ±1.0 | μA | Vin = V _{CC} or GND |
| Quiescent supply current | I _{CC} | 6.0 | — | — | 4.0 | — | 40 | μA | Vin = V _{CC} or GND, Iout = 0 μA |

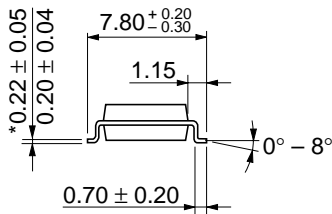
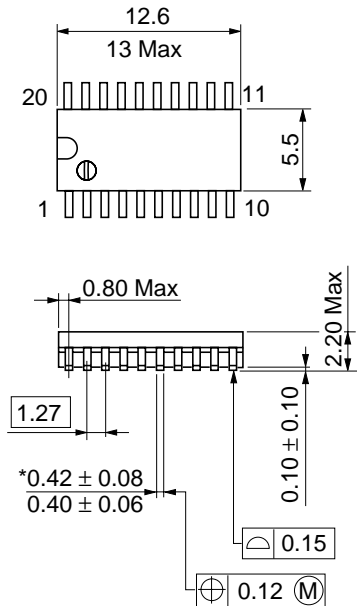
HD74HC356

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 | — | — | 255 | — | 320 | ns | Clock to output |
| | | 4.5 | — | 27 | 51 | — | 64 | | |
| | | 6.0 | — | — | 43 | — | 54 | | |
| | t_{PHL} | 2.0 | — | — | 285 | — | 355 | ns | $S_0 - S_2$ to output |
| | | 4.5 | — | 25 | 57 | — | 71 | | |
| | | 6.0 | — | — | 48 | — | 60 | | |
| | t_{PLH} | 2.0 | — | — | 300 | — | 375 | ns | Select control to output |
| | | 4.5 | — | 25 | 60 | — | 75 | | |
| | | 6.0 | — | — | 51 | — | 64 | | |
| Output enable time | t_{ZH} | 2.0 | — | — | 150 | — | 190 | ns | |
| | | 4.5 | — | 12 | 30 | — | 38 | | |
| | | 6.0 | — | — | 26 | — | 33 | | |
| Output disable time | t_{LZ} | 2.0 | — | — | 165 | — | 205 | ns | |
| | | 4.5 | — | 17 | 33 | — | 41 | | |
| | | 6.0 | — | — | 28 | — | 35 | | |
| Setup time | t_{su} | 2.0 | 50 | — | — | 65 | — | ns | D_0 to D_7 to Clock S_0 to S_7 to Select control |
| | | 4.5 | 10 | 2 | — | 13 | — | | |
| | | 6.0 | 10 | — | — | 13 | — | | |
| Hold time | t_h | 2.0 | 5 | — | — | 5 | — | ns | D_0 to D_7 to Clock S_0 to S_7 to Select control |
| | | 4.5 | 5 | 1 | — | 5 | — | | |
| | | 6.0 | 5 | — | — | 5 | — | | |
| Pulse width | t_w | 2.0 | 80 | — | — | 100 | — | ns | |
| | | 4.5 | 16 | 5 | — | 20 | — | | |
| | | 6.0 | 14 | — | — | 17 | — | | |
| Output rise/fall time | t_{TLH} | 2.0 | — | — | 60 | — | 75 | ns | |
| | | 4.5 | — | 4 | 12 | — | 15 | | |
| | | 6.0 | — | — | 10 | — | 13 | | |
| Input capacitance | C_{in} | — | — | 5 | 10 | — | 10 | pF | |

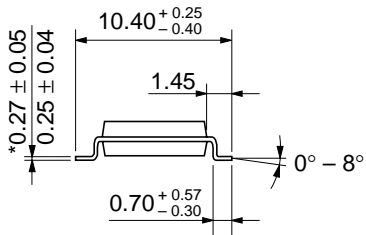
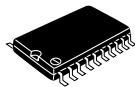
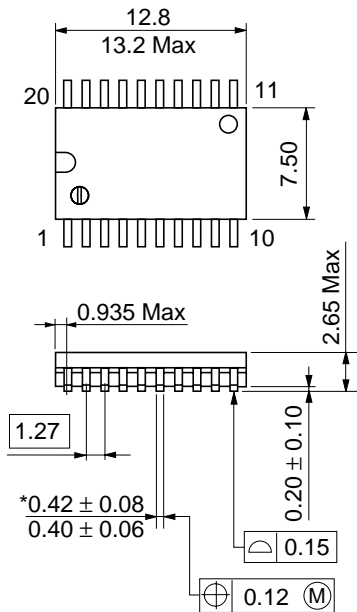


| | |
|--------------------------|----------|
| Hitachi Code | DP-20N |
| JEDEC | — |
| EIAJ | Conforms |
| Weight (reference value) | 1.26 g |



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