# HD74HC592

8-bit Register/Binary Counter

HITACHI

## Description

The HD74HC592 consists of a parallel input, 8-bit storage register feeding an 8-bit binary counter. Both the register and the counter have individual positive edge-triggered clocks. In addition, the counter has direct load and clear functions. Expansion is easily accomplished by connecting $\overline{RCO}$ of the first stage to the count enable of the second stage, etc.

## Features

- High Speed Operation: $t_{pd}$ (CCK to $\overline{RCO}$) = 24 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 µA max
- Low Quiescent Supply Current: $I_{CC}$ (static) = 4 µA max (Ta = 25°C)

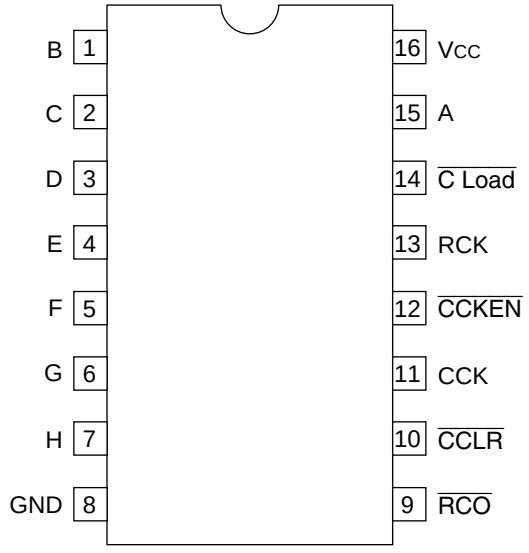
## Function Table

| Inputs | | | | | |
|---|---|---|---|---|---|
| **RCK** | **$\overline{CLoad}$** | **$\overline{CCLR}$** | **$\overline{CCKEN}$** | **CCK** | **Function** |
| X | L | H | X | X | Regiater data loaded into counter |
| X | H | L | X | X | Counter clear |
| ⎍ | H | H | X | X | Input data A to H stored into register |
| ⎏ | H | H | X | X | No change in register |
| X | H | H | L | ⎍ | Count up |
| X | H | H | L | ⎏ | No count |
| X | H | H | H | X | No cont |

$\overline{RCO}$ = QA'•QB'•QC'•QD'•QE'•QF'•QG'•QH'• $\overline{(\overline{CCKEN})}$ (QA' to QH': Output of Internal Counter)

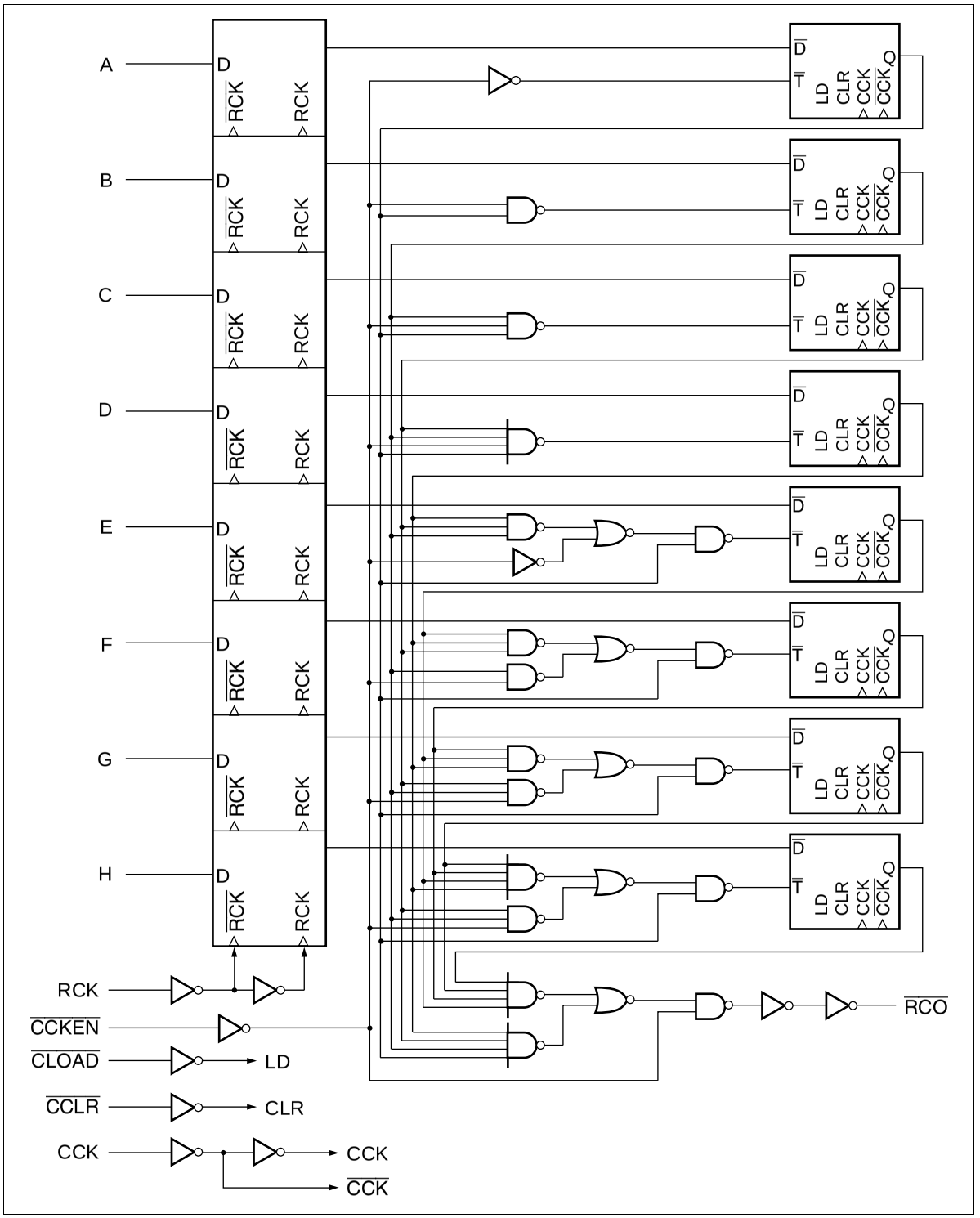
Hitachi semiconductor

## Pin Arrangement




(Top view)

## Logic Diagram



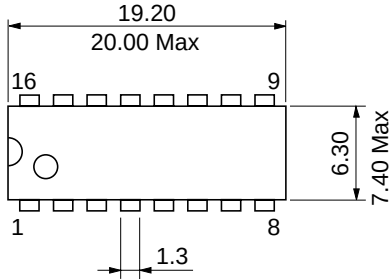
## DC Characteristics

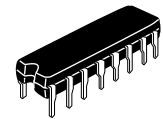
| Item | Symbol | $V_{CC}$ (V) | Ta = 25°C Min | Typ | Max | Ta = –40 to +85°C Min | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|---|---|
| Input voltage | $V_{IH}$ | 2.0 | 1.5 | — | — | 1.5 | — | V | |
| | | 4.5 | 3.15 | — | — | 3.15 | — | | |
| | | 6.0 | 4.2 | — | — | 4.2 | — | | |
| | $V_{IL}$ | 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 | — | V | 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 | — | | $I_{OH}$ = –4 mA |
| | | 6.0 | 5.68 | — | — | 5.63 | — | | $I_{OH}$ = –5.2 mA |
| | $V_{OL}$ | 2.0 | — | 0.0 | 0.1 | — | 0.1 | V | Vin = $V_{IH}$ or $V_{IL}$ $I_{OL}$ = 20 µA |
| | | 4.5 | — | 0.0 | 0.1 | — | 0.1 | | |
| | | 6.0 | — | 0.0 | 0.1 | — | 0.1 | | |
| | | 4.5 | — | — | 0.26 | — | 0.33 | | $I_{OL}$ = 4 mA |
| | | 6.0 | — | — | 0.26 | — | 0.33 | | $I_{OL}$ = 5.2 mA |
| Input current | Iin | 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 |

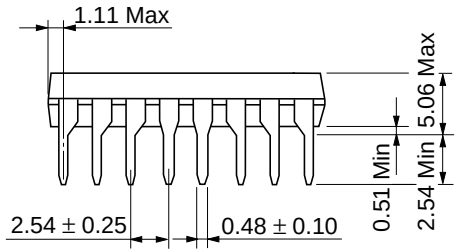
## AC Characteristics ($C_L$ = 50 pF, Input $t_r = t_f$ = 6 ns)

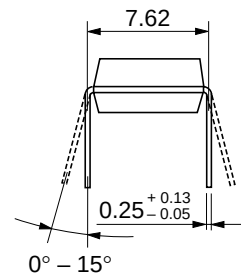
| | | | Ta = 25°C | | | Ta = –40 to +85°C | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Item** | **Symbol** | **$V_{cc}$ (V)** | **Min** | **Typ** | **Max** | **Min** | **Max** | **Unit** | **Test Conditions** |
| Maximum clock frequency | $f_{max}$ | 2.0 | — | — | 5 | — | 4 | MHz | |
| | | 4.5 | — | — | 25 | — | 20 | | |
| | | 6.0 | — | — | 29 | — | 24 | | |
| Propagation delay time | $t_{PLH}$ $t_{PHL}$ | 2.0 | — | — | 200 | — | 250 | ns | CCK to $\overline{RCO}$ |
| | | 4.5 | — | 24 | 40 | — | 50 | | |
| | | 6.0 | — | — | 34 | — | 43 | | |
| | $t_{PLH}$ $t_{PHL}$ | 2.0 | — | — | 200 | — | 250 | ns | $\overline{C\ Load}$ to $\overline{RCO}$ |
| | | 4.5 | — | 27 | 40 | — | 50 | | |
| | | 6.0 | — | — | 34 | — | 43 | | |
| | $t_{PLH}$ $t_{PHL}$ | 2.0 | — | — | 200 | — | 250 | ns | $\overline{CCLR}$ to $\overline{RCO}$ |
| | | 4.5 | — | 26 | 40 | — | 50 | | |
| | | 6.0 | — | — | 34 | — | 43 | | |
| | $t_{PLH}$ $t_{PHL}$ | 2.0 | — | — | 300 | — | 375 | ns | RCK to $\overline{RCO}$ |
| | | 4.5 | — | 29 | 60 | — | 75 | | |
| | | 6.0 | — | — | 51 | — | 64 | | |
| Pulse width | $t_w$ | 2.0 | 80 | — | — | 100 | — | ns | |
| | | 4.5 | 16 | 8 | – | 20 | — | | |
| | | 6.0 | 14 | — | — | 17 | — | | |
| Removal time | $t_{rem}$ | 2.0 | 100 | — | — | 125 | — | ns | $\overline{CCLR}$ to CCK |
| | | 4.5 | 20 | 12 | — | 25 | — | | |
| | | 6.0 | 17 | — | — | 21 | — | | |
| Setup time | $t_{su}$ | 2.0 | 100 | — | — | 125 | — | ns | $\overline{CCKEN}$ to CCK |
| | | 4.5 | 20 | 0 | — | 25 | — | | |
| | | 6.0 | 17 | — | — | 21 | — | | |
| | | 2.0 | 200 | — | — | 250 | — | ns | CCK to RCK |
| | | 4.5 | 40 | 14 | — | 50 | — | | |
| | | 6.0 | 34 | — | — | 43 | — | | |
| Output rise/fall time | $t_{TLH}$ $t_{THL}$ | 2.0 | — | — | 75 | — | 95 | ns | |
| | | 4.5 | — | 5 | 15 | — | 19 | | |
| | | 6.0 | — | — | 13 | — | 16 | | |
| Input capacitance | Cin | — | — | 5 | 10 | — | 10 | pF | |

Unit: mm



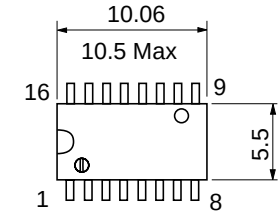



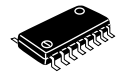


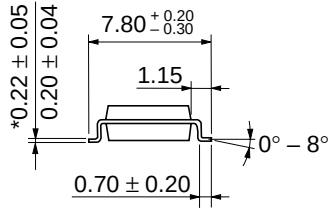



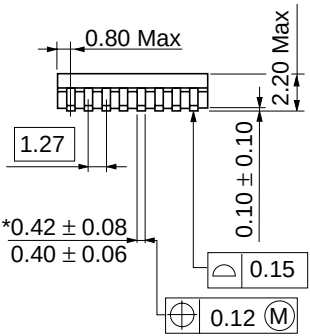

| | |
|---|---|
| Hitachi Code | DP-16 |
| JEDEC | Conforms |
| EIAJ | Conforms |
| Weight (reference value) | 1.07 g |

Unit: mm



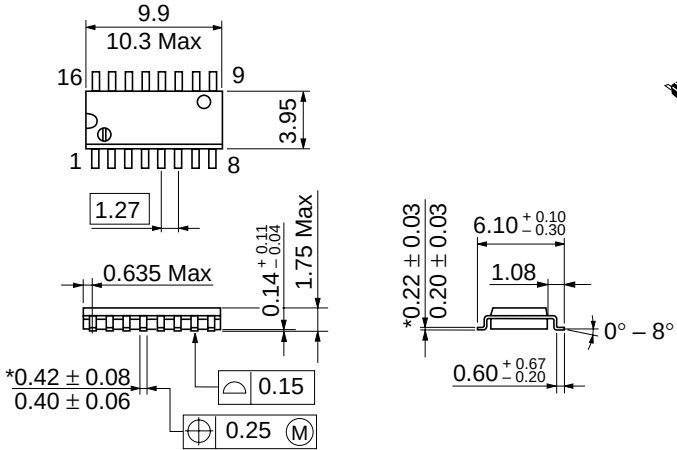


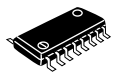




*Dimension including the plating thickness
Base material dimension

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

Unit: mm



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

*Dimension including the plating thickness
Base material dimension

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