

To all our customers

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Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003

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# HD74HC592

## 8-bit Register/Binary Counter



ADE-205-513 (Z)  
1st. Edition  
Sep. 2000

### 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  $\overline{\text{RCO}}$  of the first stage to the count enable of the second stage, etc.

### Features

- High Speed Operation:  $t_{pd}(\text{CCK to } \overline{\text{RCO}}) = 24 \text{ ns typ } (C_L = 50 \text{ pF})$
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage:  $V_{CC} = 2 \text{ to } 6 \text{ V}$
- Low Input Current:  $1 \mu\text{A max}$
- Low Quiescent Supply Current:  $I_{CC}(\text{static}) = 4 \mu\text{A max } (T_a = 25^\circ\text{C})$

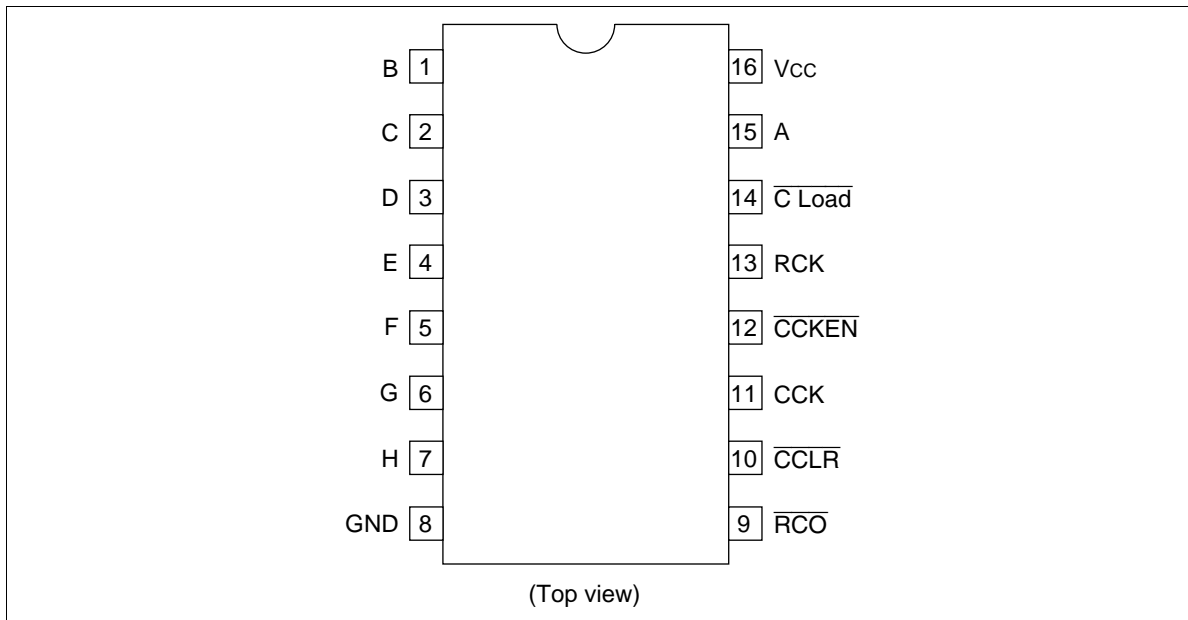
### Function Table

#### Inputs

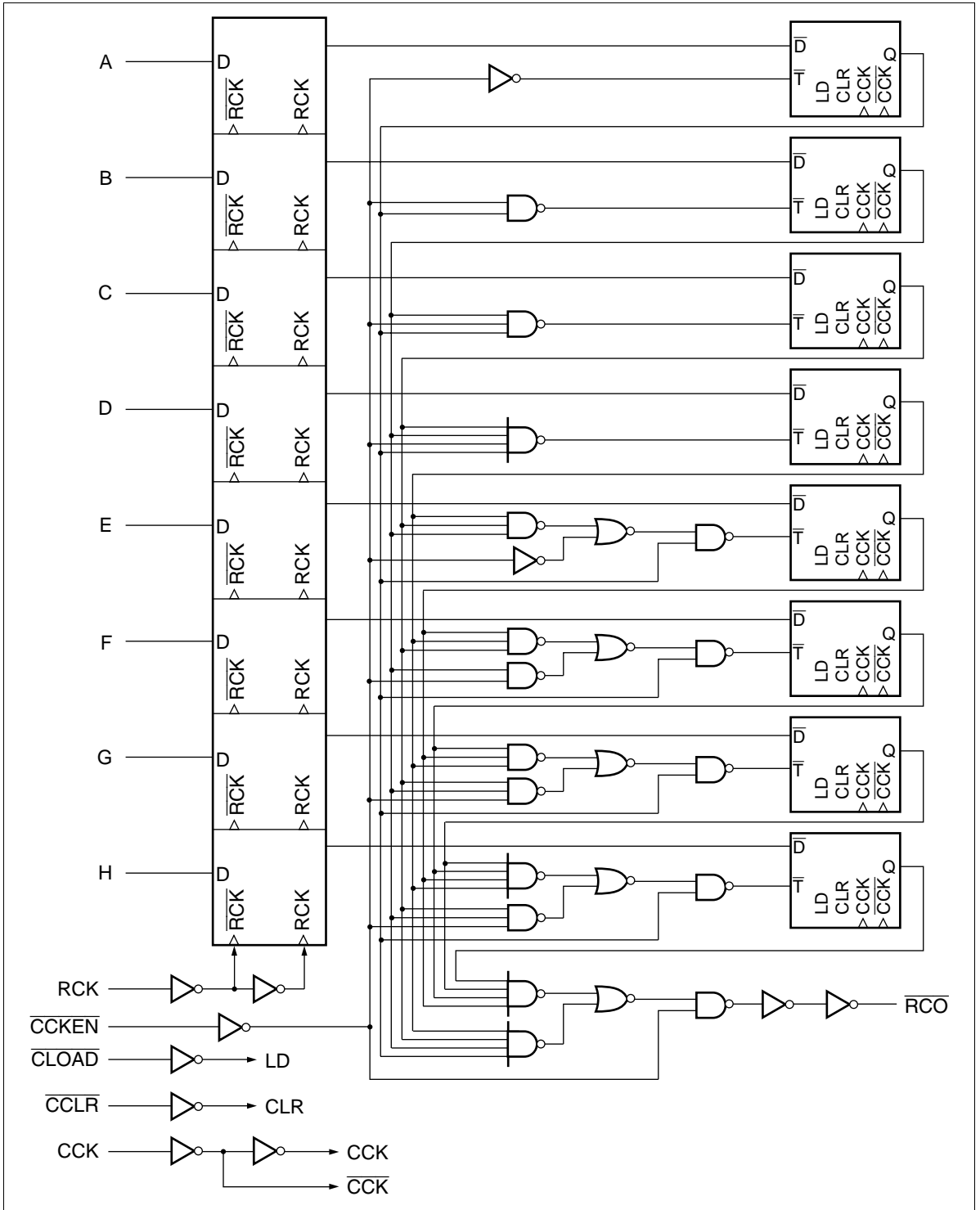
RCK	$\overline{\text{Cload}}$	$\overline{\text{CCLR}}$	$\overline{\text{CCKEN}}$	CCK	Function
X	L	H	X	X	Register data loaded into counter
X	H	L	X	X	Counter clear
	H	H	X	X	Input data A to H stored into register
	H	H	X	X	No change in register
X	H	H	L		Count up
X	H	H	L		No count
X	H	H	H	X	No count

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

## Pin Arrangement



Logic Diagram



## DC Characteristics

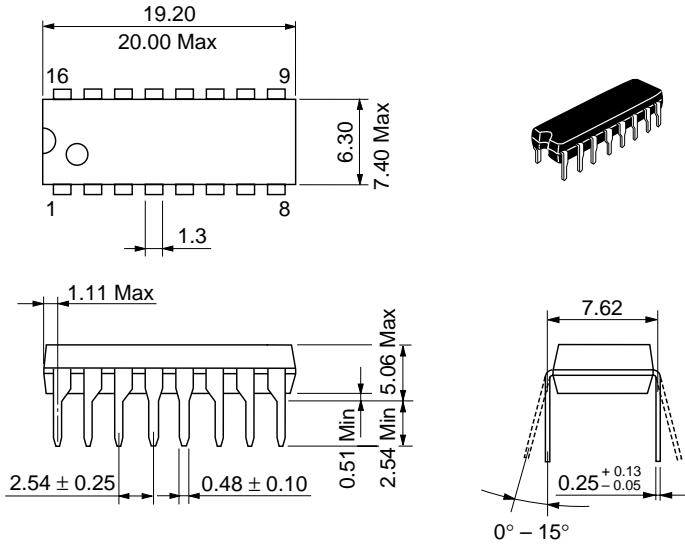
Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V <sub>IH</sub>	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V <sub>IL</sub>	2.0	—	—	0.5	—	0.5			V
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output 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
	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			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	

**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
Maximum clock frequency	$f_{max}$	2.0	—	—	5	—	4	MHz	
		4.5	—	—	25	—	20		
		6.0	—	—	29	—	24		
Propagation delay time	$t_{PLH}$	2.0	—	—	200	—	250	ns	$\overline{\text{CCK}}$ to $\overline{\text{RCO}}$
		4.5	—	24	40	—	50		
		6.0	—	—	34	—	43		
	$t_{PHL}$	2.0	—	—	200	—	250	ns	$\overline{\text{C}}$ Load to $\overline{\text{RCO}}$
		4.5	—	27	40	—	50		
		6.0	—	—	34	—	43		
	$t_{PLH}$	2.0	—	—	200	—	250	ns	$\overline{\text{CCLR}}$ to $\overline{\text{RCO}}$
		4.5	—	26	40	—	50		
		6.0	—	—	34	—	43		
	$t_{PHL}$	2.0	—	—	300	—	375	ns	RCK to $\overline{\text{RCO}}$
		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	$\overline{\text{CCLR}}$ to CCK
		4.5	20	12	—	25	—		
		6.0	17	—	—	21	—		
Setup time	$t_{su}$	2.0	100	—	—	125	—	ns	$\overline{\text{CCKEN}}$ to CCK
		4.5	20	0	—	25	—		
		6.0	17	—	—	21	—		
	$t_{PLH}$	2.0	200	—	—	250	—	ns	CCK to RCK
		4.5	40	14	—	50	—		
		6.0	34	—	—	43	—		
Output rise/fall time	$t_{TLH}$	2.0	—	—	75	—	95	ns	
		4.5	—	5	15	—	19		
		6.0	—	—	13	—	16		
Input capacitance	$C_{in}$	—	—	5	10	—	10	pF	

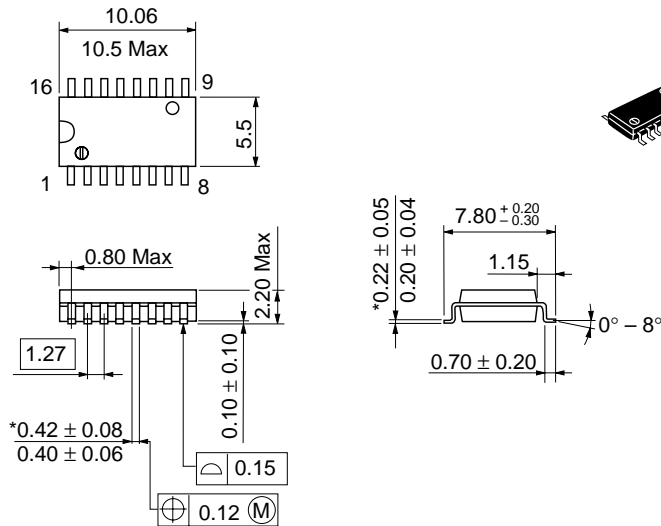
## Package Dimensions

Unit: mm



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

Unit: mm



\*Dimension including the plating thickness  
Base material dimension

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



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# HITACHI

## Hitachi, Ltd.

Semiconductor & Integrated Circuits.

Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL       NorthAmerica       : <http://semiconductor.hitachi.com/>  
           Europe                : <http://www.hitachi-eu.com/hel/ecg>  
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### For further information write to:

Hitachi Semiconductor  
(America) Inc.  
179 East Tasman Drive,  
San Jose, CA 95134  
Tel: <1> (408) 433-1990  
Fax: <1> (408) 433-0223

Hitachi Europe GmbH  
Electronic Components Group  
Dornacher Straße 3  
D-85622 Feldkirchen, Munich  
Germany  
Tel: <49> (89) 9 9180-0  
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.  
Electronic Components Group.  
Whitebrook Park  
Lower Cookham Road  
Maidenhead  
Berkshire SL6 8YA, United Kingdom  
Tel: <44> (1628) 585000  
Fax: <44> (1628) 585160

Hitachi Asia Ltd.  
Hitachi Tower  
16 Collyer Quay #20-00,  
Singapore 049318  
Tel : <65>-538-6533/538-8577  
Fax : <65>-538-6933/538-3877  
URL : <http://www.hitachi.com.sg>

Hitachi Asia Ltd.  
(Taipei Branch Office)  
4/F, No. 167, Tun Hwa North Road,  
Hung-Kuo Building,  
Taipei (105), Taiwan  
Tel : <886>-(2)-2718-3666  
Fax : <886>-(2)-2718-8180  
Telex : 23222 HAS-TP  
URL : <http://www.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.  
Group III (Electronic Components)  
7/F., North Tower,  
World Finance Centre,  
Harbour City, Canton Road  
Tsim Sha Tsui, Kowloon,  
Hong Kong  
Tel : <852>-(2)-735-9218  
Fax : <852>-(2)-730-0281  
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