

To all our customers

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

Cautions

Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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HD74HC221

Dual Monostable Multivibrators (with Schmitt Trigger Input)



ADE-205-468 (Z)
1st. Edition
Sep. 2000

Description

Each multivibrator features both a negative, A, and a positive, B, transition triggered input, either of which can be used as an inhibit. Also included is a clear inpt that when taken low resets the one shot. The HD74HC221 can be triggered on the positive transition of teh clear while A is held low and B is held high.

This device is a non-retriggerable, and therefore cannot be retriggered until the output pulse times out.

The output pulse equation is simply:

$$t_w = 0.7 \cdot (R_{ext}) \cdot (C_{ext})$$

Features

- High Speed Operation
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current

Function Table

Inputs			Outputs	
Clear	A	B	Q	$\bar{Q}$
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L			
H		H		
	L	H		

DC Characteristics

Item	Sym- bol	V_{CC} (V)	$T_a = 25^{\circ}\text{C}$			$T_a = -40 \text{ to } +85^{\circ}\text{C}$		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	—	V	$V_{in} = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -20 \mu\text{A}$
		4.5	4.4	4.5	—	4.4	—			
		6.0	5.9	6.0	—	5.9	—			
		4.5	4.18	—	—	4.13	—			$I_{OH} = -4 \text{ mA}$
		6.0	5.68	—	—	5.63	—			$I_{OH} = -5.2 \text{ mA}$
	V_{OL}	2.0	—	0.0	0.1	—	0.1	V	$V_{in} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 20 \mu\text{A}$
		4.5	—	0.0	0.1	—	0.1			
		6.0	—	0.0	0.1	—	0.1			
		4.5	—	—	0.26	—	0.33			$I_{OL} = 4 \text{ mA}$
		6.0	—	—	0.26	—	0.33			$I_{OL} = 5.2 \text{ mA}$
Input current	I_{in}	6.0	—	—	± 0.1	—	± 1.0	μA	$V_{in} = V_{CC} \text{ or GND}$	
Quiescent supply current	I_{CC}	6.0	—	—	130	—	220	μA	$V_{in} = V_{CC} \text{ or GND}$	$I_{out} = 0 \mu\text{A}$
		6.0	—	—	130	—	220			$R_{ext}/C_{ent} = 0.5 V_{CC}$

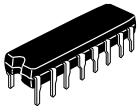
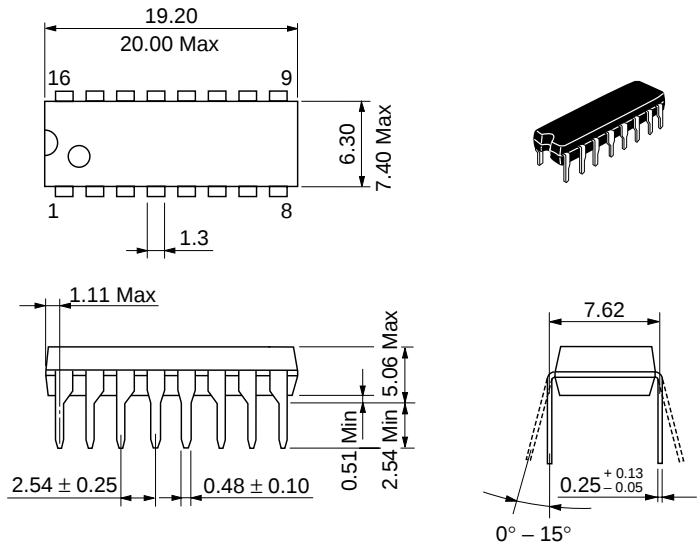
AC Characteristics ($C_L = 50 \text{ pF}$, Input $t_r = t_f = 6 \text{ ns}$)

Item	Symbol	V _{CC} (V)	Ta = 25°C		Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min			
Trigger propagation delay time	t _{PLH}	2.0	—	—	210	—	265	ns	A, B or Clear to Q
		4.5	—	—	42	—	53		
		6.0	—	—	36	—	45		
	t _{PHL}	2.0	—	—	240	—	300	ns	A, B or Clear to $\overline{Q}$
		4.5	—	—	48	—	60		
		6.0	—	—	41	—	51		
Propagation delay time	t _{PHL}	2.0	—	—	170	—	215	ns	Clear to Q
		4.5	—	—	34	—	43		
		6.0	—	—	29	—	37		
	t _{PLH}	2.0	—	—	180	—	225	ns	Clear to $\overline{Q}$
		4.5	—	—	36	—	45		
		6.0	—	—	31	—	38		
Pulse width	t _w	2.0	80	—	—	100	—	ns	A, B, Clear
		4.5	16	—	—	20	—		
		6.0	14	—	—	17	—		
Minimum output pulse width	t _{WQ (min)}	2.0	—	1.5	—	—	—	μs	Cext = 28 pF Rext = 6 kΩ
		4.5	—	450	—	—	—	ns	
		6.0	—	380	—	—	—		
Output pulse width	t _{WQ}	4.5	0.63	0.7	0.77	—	—	ms	Cext = 0.1 μF Rext = 10 kΩ
Output rise/fall time	t _{TLH}	2.0	—	—	75	—	95	ns	
	t _{THL}	4.5	—	—	15	—	19		
		6.0	—	—	13	—	16		
Input capacitance	Cin	—	—	5	10	—	10	pF	

Caution in use: In order to prevent any malfunctions due to noise, connect a high-frequency performance capacitor between V_{CC} and GND, and keep the wiring between the external components and Cext, Rext/Cext pins as short as possible.

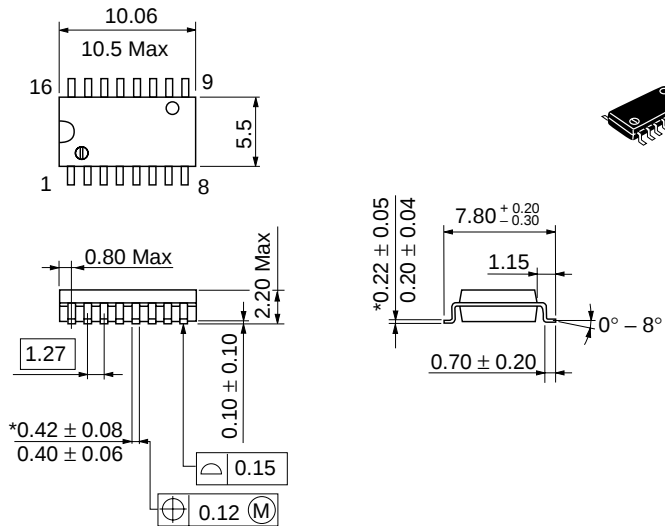
Package Dimensions

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
	Asia	:	http://sicapac.hitachi-asia.com
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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 GroupDornacher 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

URL: <http://www.hitachi.com.hk>