HD74AC221 • Dual Monostable Multivibrator with Schmitt Trigger Input.

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 input that when taken low resets the one shot. The HD74AC221 can be triggered on the positive transition of the 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:

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

● Outputs Source/Sink 24 mA

Pin Assignment

$\overline{A}_1$ [1]	[16] V_{CC}
B_1 [2]	[15] $R_{X1}C_{X1}$
$\overline{C}_{D1}$ [3]	[14] C_{X1}
$\overline{Q}_1$ [4]	[13] Q_1
Q_2 [5]	[12] $\overline{Q}_2$
C_{X2} [6]	[11] $\overline{C}_{D2}$
$R_{X2}C_{X2}$ [7]	[10] B_2
GND [8]	[9] $\overline{A}_2$

(Top View)

Logic Symbol

Triggering Truth Table

Inputs			Response
A	B	$\overline{C}_D$	
X	X	L	No Trigger
⌐	L	X	No Trigger
⌐	H	H	Trigger
H	⌐	X	No Trigger
L	⌐	H	Trigger
L	H	⌐	Trigger

H = High Voltage Level
L = Low Voltage Level
X = Immaterial
⌐ = Low-to-High Transition
⌐ = High-to-Low Transition

Pin Names

$\overline{A}_1$, $\overline{A}_2$	Trigger Inputs (Active Falling Edge)
B_1, B_2	Trigger Inputs (Active Rising Edge)
$\overline{C}_{D1}$, $\overline{C}_{D2}$	Direct Clear Inputs (Active Low)
Q_1, Q_2	Positive Pulse Output
$\overline{Q}_1$, $\overline{Q}_2$	Negative Pulse Output

DC Characteristics (unless otherwise specified)

Symbol	Parameter	Max	Unit	Conditions
I_{CC}	Maximum Quiescent Supply Current	80	μA	$V_{IN} = V_{CC}$ or Ground, $V_{CC} = 5.5V$, Ta = Worst Case
I_{CC}	Maximum Quiescent Supply Current	8.0	μA	$V_{IN} = V_{CC}$ or Ground, $V_{CC} = 5.5V$, Ta = 25°C

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AC Characteristics

Symbol	Parameter	Vcc* (V)	Ta=+25°C CL=50pF			Ta=-40°C to +85°C CL=50pF		Unit
			Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay A or B to Q	3.3	1.0		21.0	1.0	24.0	ns
		5.0	1.0		16.5	1.0	19.0	
t_{PHL}	Propagation Delay A or B to $\overline{Q}$	3.3	1.0		21.0	1.0	24.0	ns
		5.0	1.0		16.5	1.0	19.0	
t_{PLH}	Propagation Delay $\overline{C}_{DN}$ to $\overline{Q}$	3.3	1.0		18.0	1.0	21.0	ns
		5.0	1.0		14.0	1.0	15.5	
t_{PHL}	Propagation Delay $\overline{C}_{DN}$ to Q	3.3	1.0		18.0	1.0	21.0	ns
		5.0	1.0		14.0	1.0	15.5	

*Voltage Range 3.0 is 3.3V±0.3V
Voltage Ranga 5.0 is 5.0V±0.5V

AC Operating Requirements

Smybol	Parameter	Vcc* (V)	Ta=+25°C CL=50pF	Ta=-40°C to +85°C CL=50pF	Unit
			Typ	Guaranteed Minimum	
t_w	A or B or $\overline{C}_{dn}$ PulseWidth	3.3	5.5	7.0	ns
		5.0	4.5	5.0	
t_{rec}	Recovery Time $\overline{C}_{DN}$ to A or B	3.3	3.5	4.0	ns
		5.0	3.0	3.5	

*Voltage Range 3.3 is 3.3V±0.3V
Voltage Range 5.0 is 5.0V±0.5V

Capacitance

Symbol	Parameter	Typ	Unit	Condition
C_{IN}	Input Capacitance		pF	Vcc=5.5V
C_{PD}	Power Dissipation Capacitance		pF	Vcc=5.0V

Symbol	Paramerer	Vcc* (V)	Ta=+25°C CL=50pF			Ta=-40°C to +85°C CL=50pF		Unit	Condition
			Min	Typ	Max	Min	Max		
t_{WQ}	Output Pulse Width	3.3						μs	Cext=0.1μF
		5.0	630		770	630	770		Rext=10kΩ
t_{WQ}(min)	Minimum Output Pulse Width	3.3	120		600	110	660	ns	Cent=28pF
		5.0	80		400	75	440		Rext=2kΩ

✱ Voltage Range 3.0 is 3.3V±0.3V

Voltage Range 5.0 is 5.0V±0.5V

Cext an Rext should be connected as close to the IC terminals as possible, in order to prevent malfunction.

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Package Information

In the HD74AC series of Advanced CMOS logic, either plastic DIP and small outline packages can be selected.
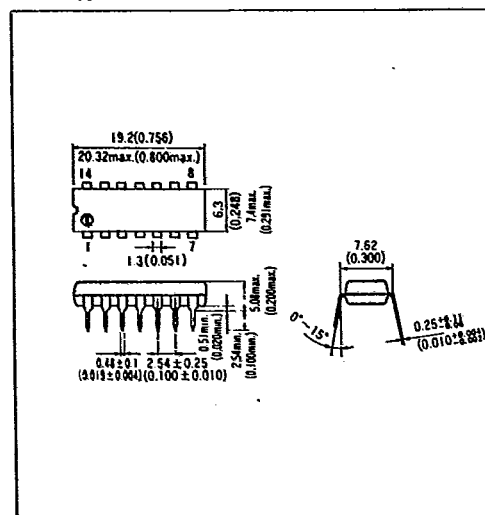To order, please refer to the following package code.

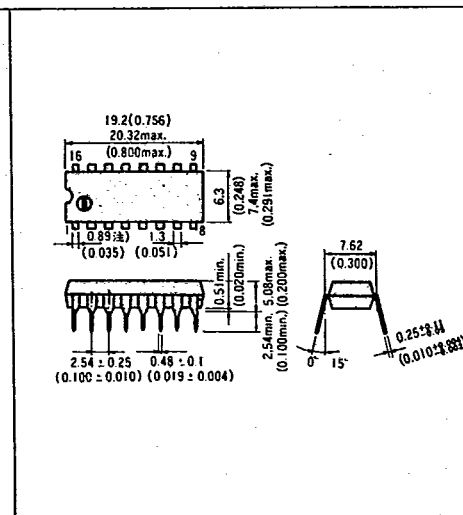● Package code of Advanced CMOS Logic

HD74AC XXXX P

Package code
P: Plastic DIP,
FP: Small outline package
Individual device code
74AC: Commercial FACT
74ACT: Commercial TTL-Compatible Advanced CMOS
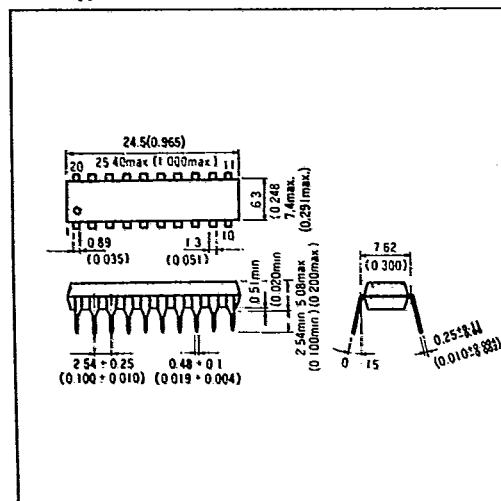Initial cad of Hitachi digital IC

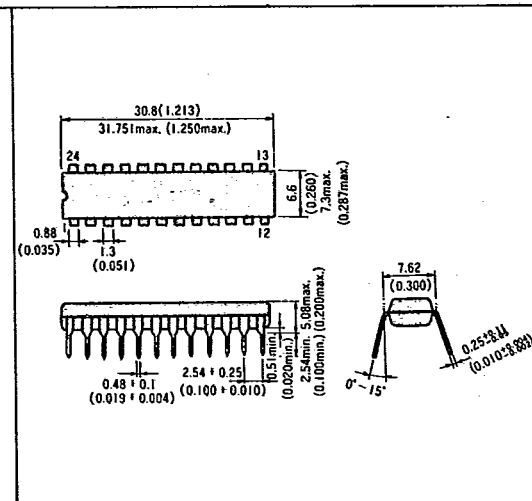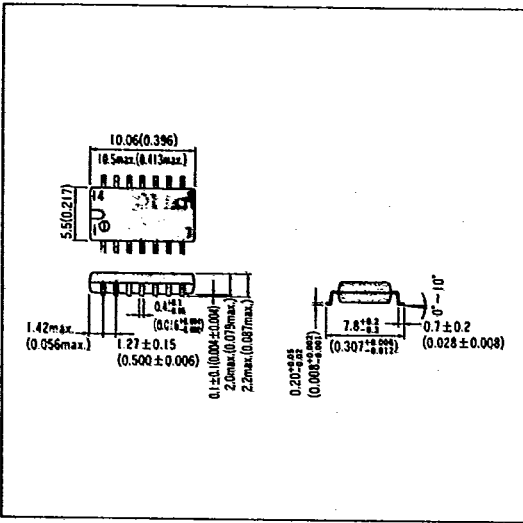**Plastic DIP Package** [Unit: mm (inch)]

14 Pin type

16 Pin type

20 Pin type

24 Pin type

Package Information

Small Outline Package [Unit: mm (inch)]

14 Pin type

10.06(0.396)
10.5max.(0.413max.)
5.5(0.217)
14
1.42max.
(0.056max.)
1.27±0.15
(0.500±0.006)
0.4⁺⁰·¹
(0.016⁺⁰·⁰⁰⁴)
0.1±0.1(0.004±0.004)
2.0max.(0.079max.)
2.2max.(0.087max.)
7.8⁺⁰·²₋₀·₃
(0.307⁺⁰·⁰⁰⁸)
0.7±0.2
(0.028±0.008)
0.20⁺⁰·⁰⁵₋₀·₀₂
(0.008⁺⁰·⁰⁰²)
0° ~ 10°

16 Pin type

10.06(0.396)
10.5max.(0.413max.)
5.5(0.217)
16
0.80max.
(0.031max.)
1.27±0.15
(0.500±0.006)
0.4⁺⁰·¹
(0.016⁺⁰·⁰⁰⁴)
0.1±0.1(0.004±0.004)
2.0max.(0.079max.)
2.2max.(0.087max.)
7.8⁺⁰·²₋₀·₃
(0.307⁺⁰·⁰⁰⁸)
0.7±0.2
(0.028±0.008)
0.20⁺⁰·⁰⁵₋₀·₀₂
(0.008⁺⁰·⁰⁰²)
0° ~ 10°

20 Pin type

12.6(0.496)
13.0max.(0.512max.)
5.5(0.217)
20   11
1   10
0.80max.
(0.031max.)
1.27±0.15
(0.500±0.006)
0.4⁺⁰·¹
(0.016⁺⁰·⁰⁰⁴)
0.1±0.1(0.004±0.004)
2.0max.(0.079max.)
2.2max.(0.087max.)
7.8⁺⁰·¹
(0.315⁺⁰·⁰⁰⁴)
0.7±0.2
(0.028±0.008)
0.15⁺⁰·¹
(0.006⁺⁰·⁰⁰⁴)
0° ~ 10°