HD74AC123A

Dual Retriggerable Resettable Multivibrator

REJ03D0245–0200Z
(Previous ADE-205-365 (Z))
Rev.2.00
Jul.16.2004

Description

Each half of the HD74AC123A features retriggerable capability, complementary dc level triggering and overriding Direct Clear. When a circuit is in the quasi-stable (delay) state, another trigger applied to the inputs (per the Truth Table) will cause the delay period to start again, without disturbing the outputs. By repeating this process, the output pulse period (Q High, $\overline{Q}$ Low) can be made as long as desired. Alternatively, a delay period can be terminated at any time by a Low signal on $\overline{C}_D$, which also inhibits triggering. An internal connection from $\overline{C}_D$ to the input gate makes it possible to trigger the circuit by a positive-going signal on $\overline{C}_D$, as shown in the Truth Table. For timing capacitor values greater than 1000 pF, the output pulse width is defined as follows.

Where t_w is in ns, R_X is in kΩ and C_X is in pF.
$t_w = R_X C_X$

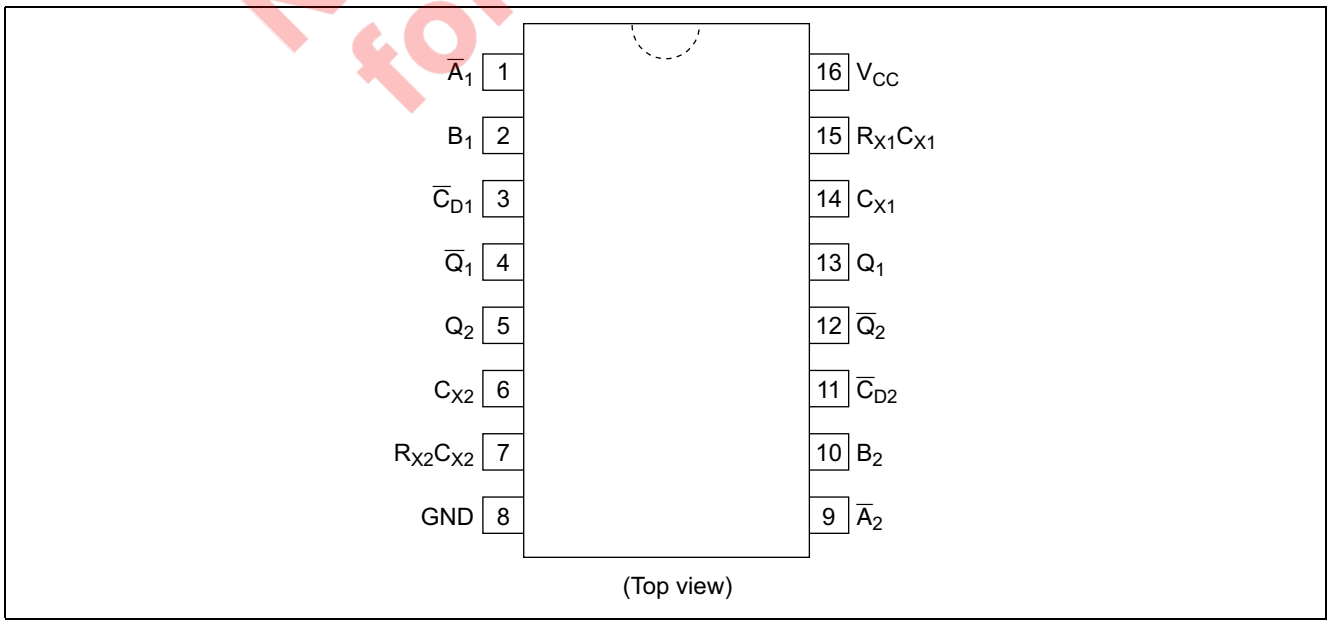
Features

- Outputs Source/Sink 24 mA
- Ordering Information

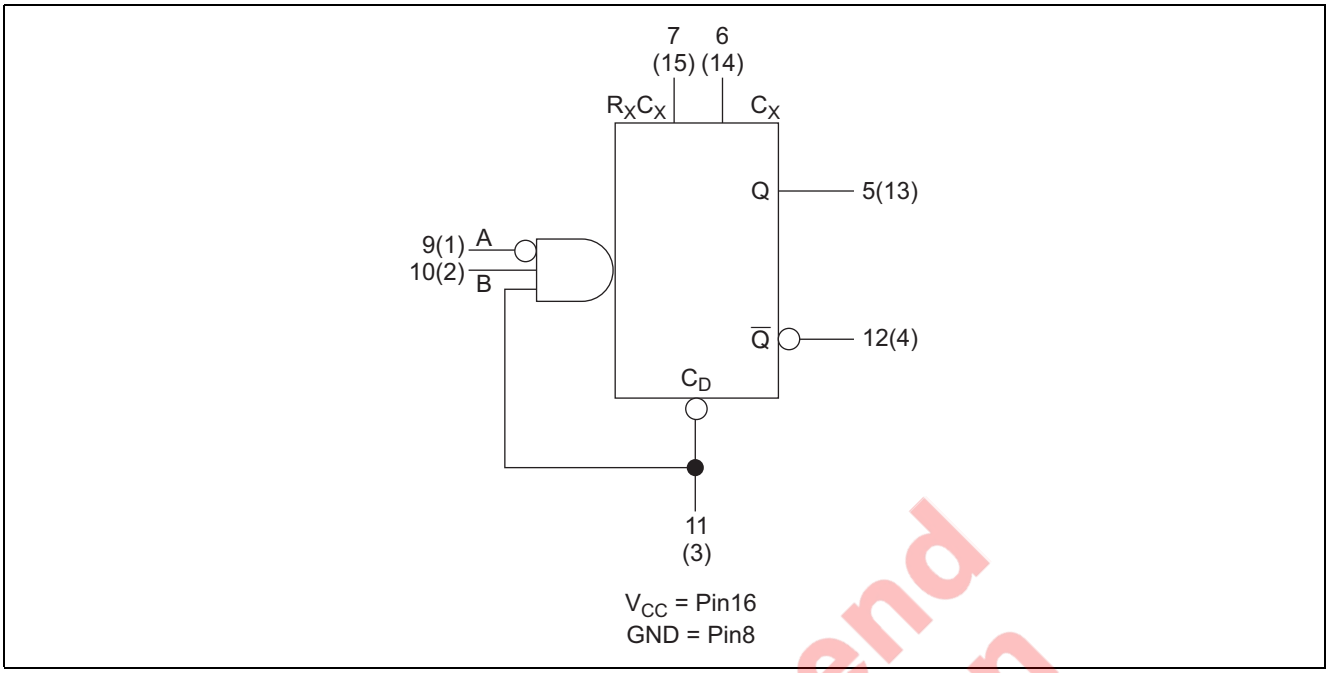
Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74AC123AP	DIP-16 pin	DP-16E, -16FV	P	—
HD74AC123AFPEL	SOP-16 pin (JEITA)	FP-16DAV	FP	EL (2,000 pcs/reel)
HD74AC123ARPEL	SOP-16 pin (JEDEC)	FP-16DNV	RP	EL (2,500 pcs/reel)

Notes: 1. Please consult the sales office for the above package availability.
2. The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code.

Pin Arrangement



Logic Symbol



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 Outputs
$\overline{Q}_1$, $\overline{Q}_2$	Negative Pulse Outputs

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

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Condition
Supply voltage	V_{CC}	–0.5 to 7	V	
DC input diode current	I_{IK}	–20	mA	V_I = –0.5V
		20	mA	V_I = Vcc+0.5V
DC input voltage	V_I	–0.5 to Vcc+0.5	V	
DC output diode current	I_{OK}	–50	mA	V_O = –0.5V
		50	mA	V_O = Vcc+0.5V
DC output voltage	V_O	–0.5 to Vcc+0.5	V	
DC output source or sink current	I_O	±50	mA	
DC V_{CC} or ground current per output pin	I_{CC}, I_{GND}	±50	mA	
Storage temperature	Tstg	–65 to +150	°C	

Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Condition
Supply voltage	V_{CC}	2 to 6	V	
Input and output voltage	V_I, V_O	0 to V_{CC}	V	
Operating temperature	Ta	–40 to +85	°C	
Input rise and fall time (except Schmitt inputs) V_{IN} 30% to 70% V_{CC}	tr, tf	8	ns/V	V_{CC} = 3.0V
				V_{CC} = 4.5 V
				V_{CC} = 5.5 V

DC Characteristics

Item	Sym-bol	Vcc (V)	Ta = 25°C			Ta = –40 to +85°C		Unit	Condition	
			min.	typ.	max.	min.	max.			
Input Voltage	V_{IH}	3.0	2.1	1.5	—	2.1	—	V	V_{OUT} = 0.1 V or V_{CC} –0.1 V	
		4.5	3.15	2.25	—	3.15	—			
		5.5	3.85	2.75	—	3.85	—			
	V_{IL}	3.0	—	1.50	0.9	—	0.9		V_{OUT} = 0.1 V or V_{CC} –0.1 V	
		4.5	—	2.25	1.35	—	1.35			
		5.5	—	2.75	1.65	—	1.65			
Output voltage	V_{OH}	3.0	2.9	2.99	—	2.9	—	V	V_{IN} = V_{IL} or V_{IH} I_{OUT} = –50 µA	
		4.5	4.4	4.49	—	4.4	—			
		5.5	5.4	5.49	—	5.4	—			
		3.0	2.58	—	—	2.48	—		V_{IN} = V_{IL} or V_{IH}	I_{OH} = –12 mA
		4.5	3.94	—	—	3.80	—			I_{OH} = –24 mA
		5.5	4.94	—	—	4.80	—			I_{OH} = –24 mA
	V_{OL}	3.0	—	0.002	0.1	—	0.1		V_{IN} = V_{IL} or V_{IH} I_{OUT} = 50 µA	
		4.5	—	0.001	0.1	—	0.1			
		5.5	—	0.001	0.1	—	0.1			
		3.0	—	—	0.32	—	0.37		V_{IN} = V_{IL} or V_{IH}	I_{OL} = 12 mA
		4.5	—	—	0.32	—	0.37			I_{OL} = 24 mA
		5.5	—	—	0.32	—	0.37			I_{OL} = 24 mA
Input leakage current	I_{IN}	5.5	—	—	±0.1	—	±1.0	µA	V_{IN} = V_{CC} or GND	
Dynamic output current*	I_{OLD}	5.5	—	—	—	86	—	mA	V_{OLD} = 1.1 V	
	I_{OHD}	5.5	—	—	—	–75	—	mA	V_{OHD} = 3.85 V	
Quiescent supply current	I_{CC}	5.5	—	—	130	—	220	µA	V_{IN} = V_{CC} or ground	

*Maximum test duration 2.0 ms, one output loaded at a time.

AC Characteristics: HD74AC123A

Item	Symbol	V_{CC} (V)*1	Ta = +25°C C_L = 50 pF			Ta = –40°C to +85°C C_L = 50 pF		Unit	Condition
			Min	Typ	Max	Min	Max		
Propagation delay $\overline{A}$ or B to Q	t_{PLH}	3.3	1.0	—	19.0	1.0	22.0	ns	Cext = 0 pF Rest = 5 kΩ
		5.0	1.0	—	15.0	1.0	17.0		
Propagation delay $\overline{A}$ or B to $\overline{Q}$	t_{PHL}	3.3	1.0	—	19.0	1.0	22.0	ns	
		5.0	1.0	—	15.0	1.0	17.0		
Propagation delay $\overline{C}_{Dn}$ to $\overline{Q}$	t_{PLH}	3.3	1.0	—	15.0	1.0	18.0	ns	
		5.0	1.0	—	12.0	1.0	13.5		
Propagation delay $\overline{C}_{Dn}$ to Q	t_{PHL}	3.3	1.0	—	15.0	1.0	18.0	ns	
		5.0	1.0	—	12.0	1.0	13.5		

Note: 1. Voltage Range 3.3 is 3.3 V ± 0.3 V
Voltage Range 5.0 is 5.0 V ± 0.5 V

AC Operating Requirements: HD74AC123A

Item	Symbol	V_{CC} (V)*1	Ta = +25°C C_L = 50 pF	Ta = –40 to +85°C C_L = 50 pF		Unit	Condition
			Typ	Guaranteed Minimum			
Pulse width $\overline{A}$ or B or $\overline{C}_{Dn}$	t_w	3.3	—	5.0	7.0	ns	Cext = 0 pF Rext = 5 kΩ
		5.0	—	4.5	5.0		
Recovery time $\overline{C}_{Dn}$ to $\overline{A}$ or B	t_{rec}	3.3	—	2.0	2.0	ns	
		5.0	—	2.0	2.0		

Note: 1. Voltage Range 3.3 is 3.3 V ± 0.3 V
Voltage Range 5.0 is 5.0 V ± 0.5 V

Item	Symbol	V_{CC} (V)*1	Ta = +25°C C_L = 50 pF			Ta = –40°C to +85°C C_L = 50 pF		Unit	Condition
			Min	Typ	Max	Min	Max		
Output pulse width	T_{WQ}	3.3	—	—	—	—	—	ms	Cext = 0.1 µF
		5.0	0.90	—	1.10	0.85	1.15		Rext = 10 kΩ
Minimum output pulse width	$T_{WQ(min)}$	3.3	190	—	350	170	380	ns	Cext = 28 pF
		5.0	160	—	300	140	330		Rext = 2 k

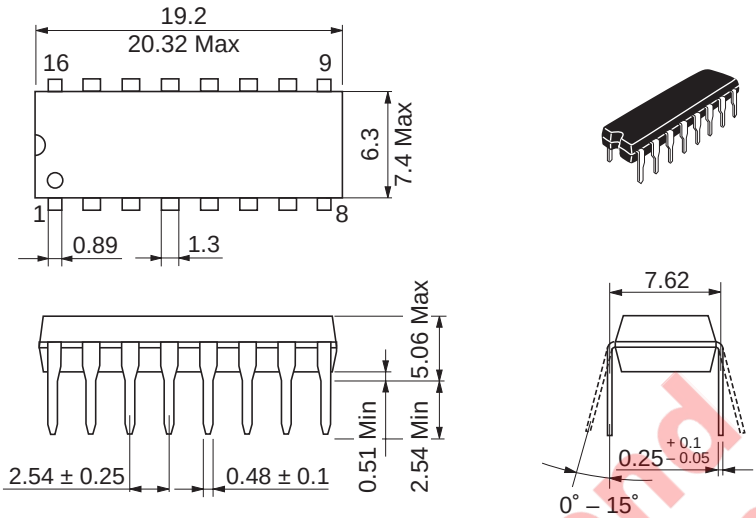
Note: 1. Voltage Range 3.3 is 3.3 V ± 0.3 V
Voltage Range 5.0 is 5.0 V ± 0.5 V

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

Package Dimensions

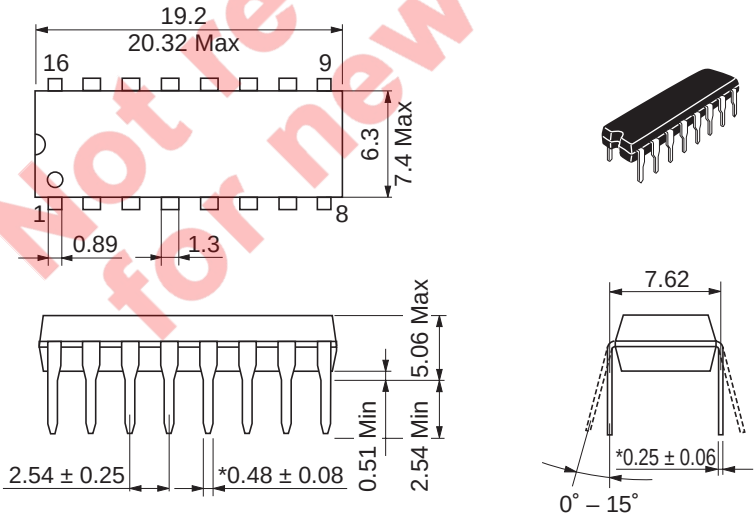
As of January, 2003

Unit: mm



Package Code	DP-16E
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.05 g

Unit: mm

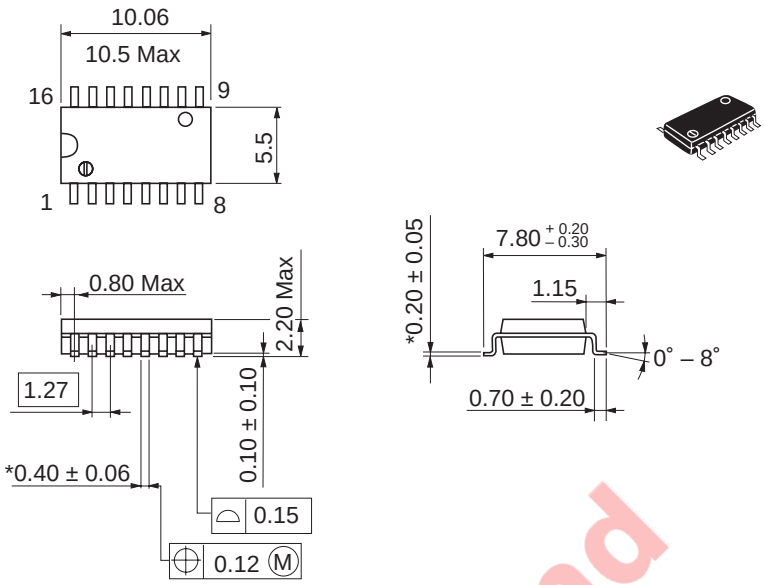


*NI/Pd/AU Plating

Package Code	DP-16FV
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.05 g

As of January, 2003

Unit: mm

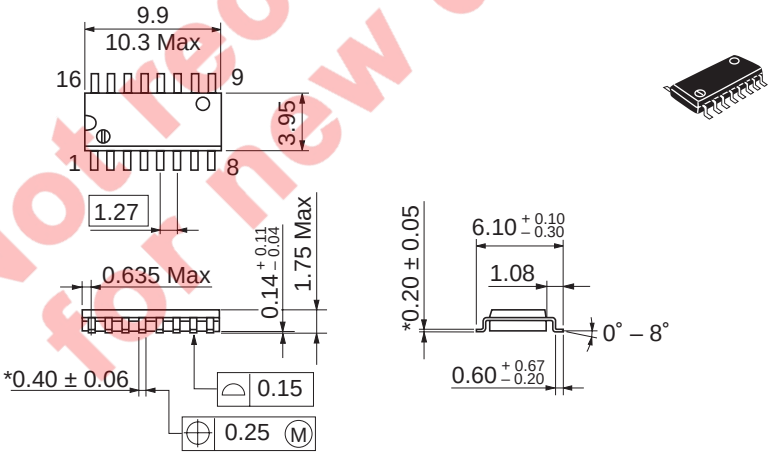


Package Code	FP-16DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.24 g

*Ni/Pd/Au plating

As of January, 2003

Unit: mm



Package Code	FP-16DNV
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.15 g

*Ni/Pd/Au plating

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