HD74HC423A

Dual Retriggerable Monostable Multivibrators

REJ03D0626-0200
(Previous ADE-205-505)
Rev.2.00
Mar 30, 2006

Description

This multivibrator features output-pulse-duration control by two methods. The basic pulse duration is programmed by selection of external resistance and capacitance values. Once triggered, the basic pulse duration may be extended by retriggering the gated low-level-active (A) or high-level-active (B) inputs, or be reduced by use of the overriding clear. The B input is a Schmitt trigger enabling jitter-free triggering from input signals with slow transition rates.

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 µA max
- Low Quiescent Supply Current
- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74HC423AP	DILP-16 pin	PRDP0016AE-B (DP-16FV)	P	—
HD74HC423AFPEL	SOP-16 pin (JEITA)	PRSP0016DH-B (FP-16DAV)	FP	EL (2,000 pcs/reel)

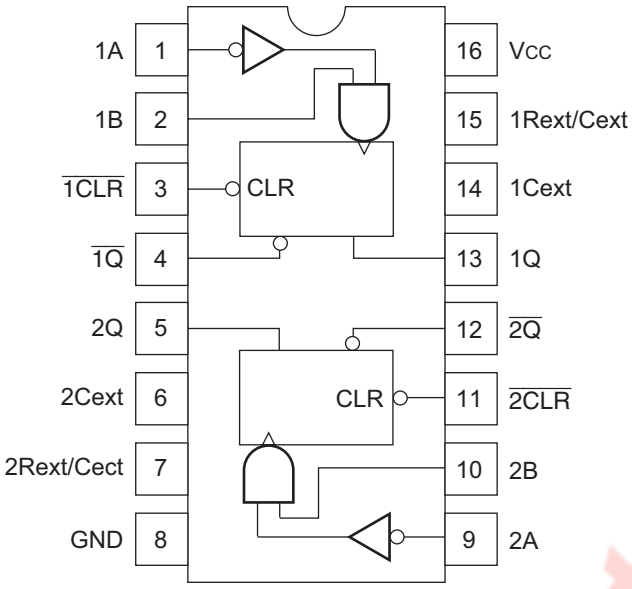
Note: Please consult the sales office for the above package availability.

Function Table

Inputs			Outputs	
Clear	**A**	**B**	**Q**	**$\overline{Q}$**
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L	⎍	⎍	⎍
H	⎎	H	⎍	⎍

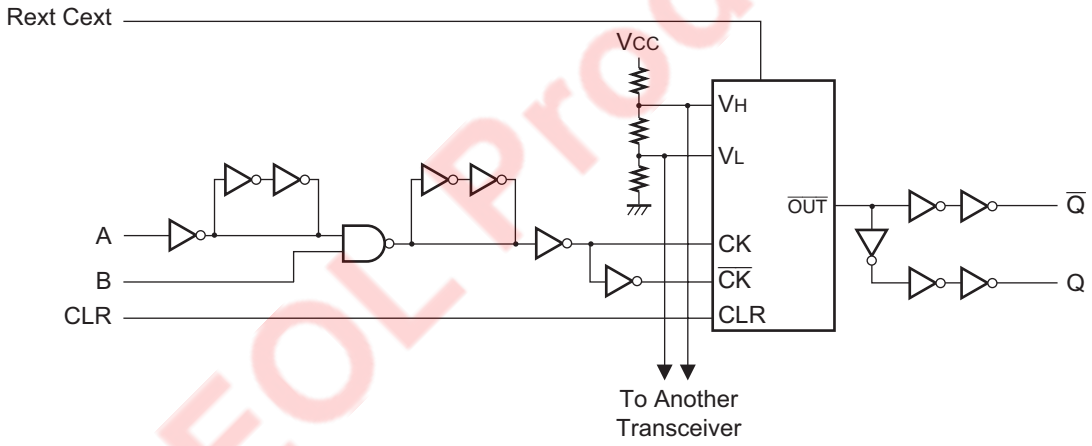
Note: 1. H; High level, L; Low level, X; Irrelevant

Pin Arrangement



(Top view)

Logic Diagram (1/2)



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage range	V_{CC}	–0.5 to 7.0	V
Input / Output voltage	V_{IN}, V_{OUT}	–0.5 to V_{CC} +0.5	V
Input / Output diode current	I_{IK}, I_{OK}	±20	mA
Output current	I_{OUT}	±25	mA
V_{CC}, GND current	I_{CC} or I_{GND}	±50	mA
Power dissipation	P_T	500	mW
Storage temperature	Tstg	–65 to +150	°C

Note: The absolute maximum ratings are values, which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V_{CC}	2 to 6	V	
Input / Output voltage	V_{IN}, V_{OUT}	0 to V_{CC}	V	
Operating temperature	Ta	–40 to 85	°C	
Input rise / fall time[*1]	t_r, t_f	0 to 1000	ns	V_{CC} = 2.0 V
		0 to 500		V_{CC} = 4.5 V
		0 to 400		V_{CC} = 6.0 V

Note: 1. This item guarantees maximum limit when one input switches.
Waveform: Refer to test circuit of switching characteristics.

Electrical Characteristics

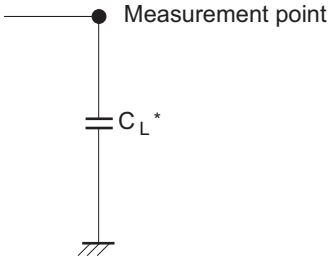
Item		Symbol	V_{CC} (V)	Ta = 25°C			Ta = –40 to+85°C		Unit	Test Conditions	
				Min	Typ	Max	Min	Max			
Input voltage		V_{IH}	2.0	1.5	—	—	1.5	—	V		
			4.5	3.15	—	—	3.15	—			
			6.0	4.2	—	—	4.2	—			
		V_{IL}	2.0	—	—	0.5	—	0.5	V		
			4.5	—	—	1.35	—	1.35			
			6.0	—	—	1.8	—	1.8			
Output voltage		V_{OH}	2.0	1.9	2.0	—	1.9	—	V	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_{OH} = 4 mA
			6.0	—	—	0.26	—	0.33			I_{OH} = 5.2 mA
Input current		Iin	6.0	—	—	±0.1	—	±1.0	µA	Vin = V_{CC} or GND	
Quiescent Supply current	Standby state	I_{CC}	6.0	—	—	130	—	220	µA	Vin = V_{CC} or GND	I_{OUT} = 0 µA
	Active state			—	—	130	—	220			Rext / Cext = 0.5 V_{CC}

Switching Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

Item	Symbol	V_{CC} (V)	Ta = 25°C			Ta = –40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Propagation delay time	t_{PLH}	2.0	—	—	210	—	265	ns	A or B to Q	
		4.5	—	20	42	—	53			
		6.0	—	—	36	—	45			
	t_{PHL}	2.0	—	—	240	—	300	ns	A or B to $\overline{Q}$	
		4.5	—	21	48	—	60			
		6.0	—	—	41	—	51			
	t_{PHL}	2.0	—	—	170	—	215	ns	Clear to Q	
		4.5	—	17	34	—	43			
		6.0	—	—	29	—	37			
	t_{PLH}	2.0	—	—	180	—	225	ns	Clear to $\overline{Q}$	
		4.5	—	15	36	—	45			
		6.0	—	—	31	—	38			
Pulse width	t_w	2.0	150	—	—	190	—	ns	A, B, Clear	
		4.5	30	6	—	38	—			
		6.0	26	—	—	33	—			
Removal time	t_{rem}	2.0	0	—	—	5	—	ns	Clear	
		4.5	0	–3	—	5	—			
		6.0	0	—	—	5	—			
Minimum output pulse width	$t_{WQ\ (min)}$	2.0	—	1.5	—	—	—	µs	Cext = 28 pF	Rext = 6 kΩ
		4.5	—	450	—	—	—	ns		Rext = 2 kΩ
		6.0	—	380	—	—	—			
Output pulse width	t_{WQ}	4.5	—	1.0	—	—	—	ms	Cext = 0.1 µF, Rext = 10 kΩ	
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	—	—	—	20	—	20	pF	Pins 7 & 15	
		—	—	5	10	—	10		Other pins	

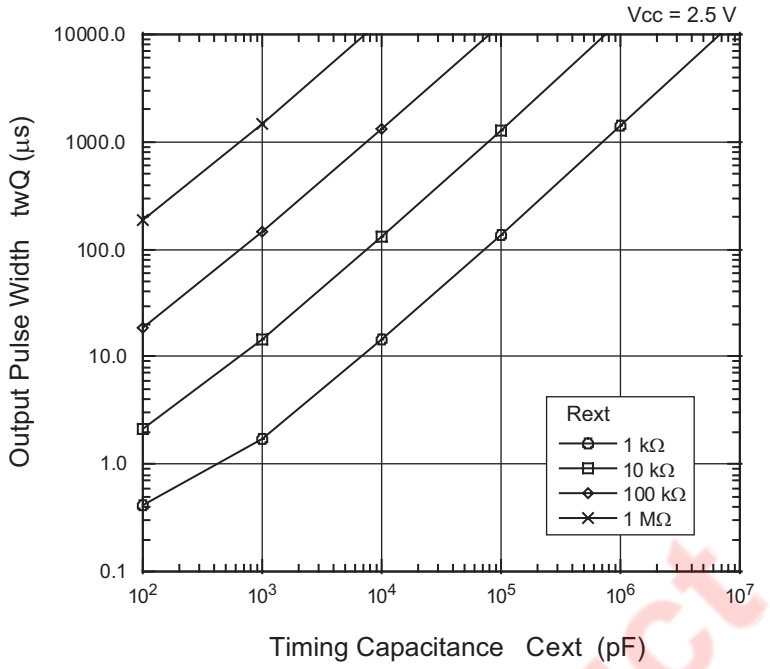
Caution in use: In order to prevent any malfunctions due to noise, connect a highfrequency performance capacitor between V_{CC} and GND, and keep the wiring between the external components and Cext, Rext/Cext pins as short as possible.

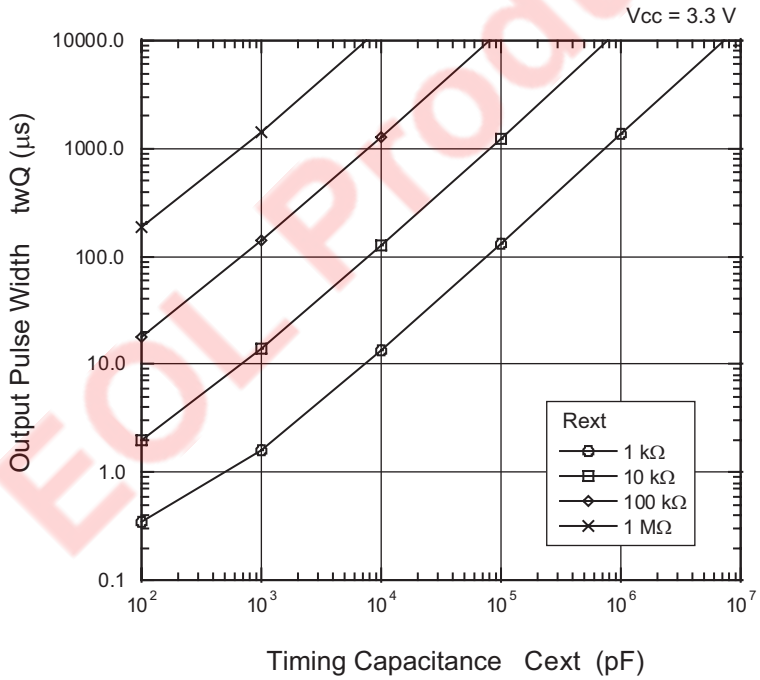
Test Circuit

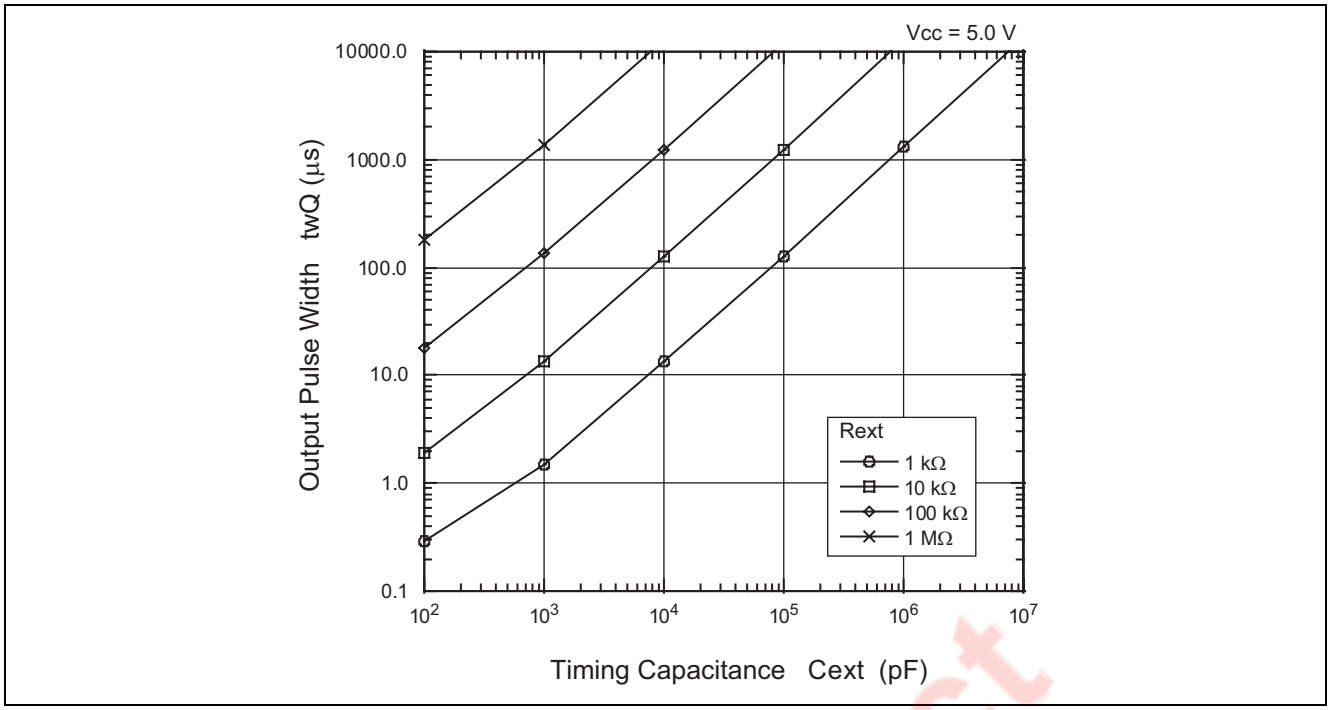


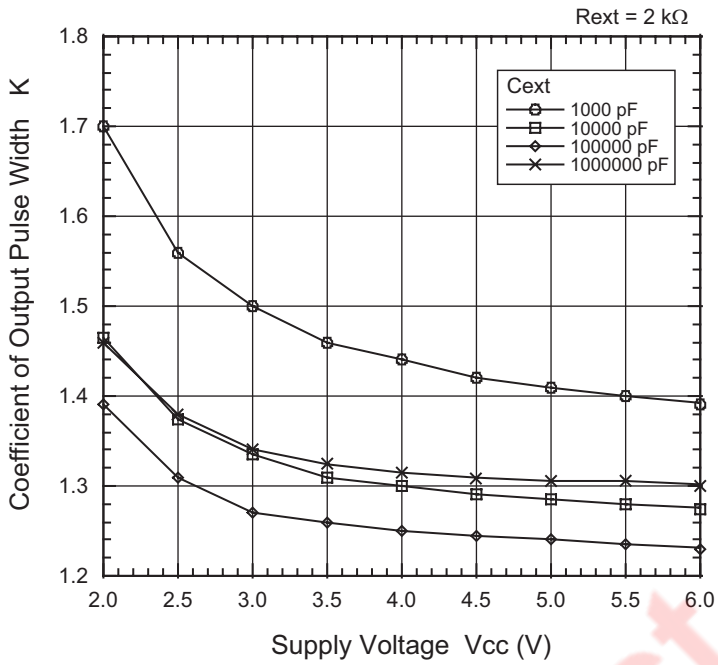
Note: C_L includes the probe and fig capacitance.

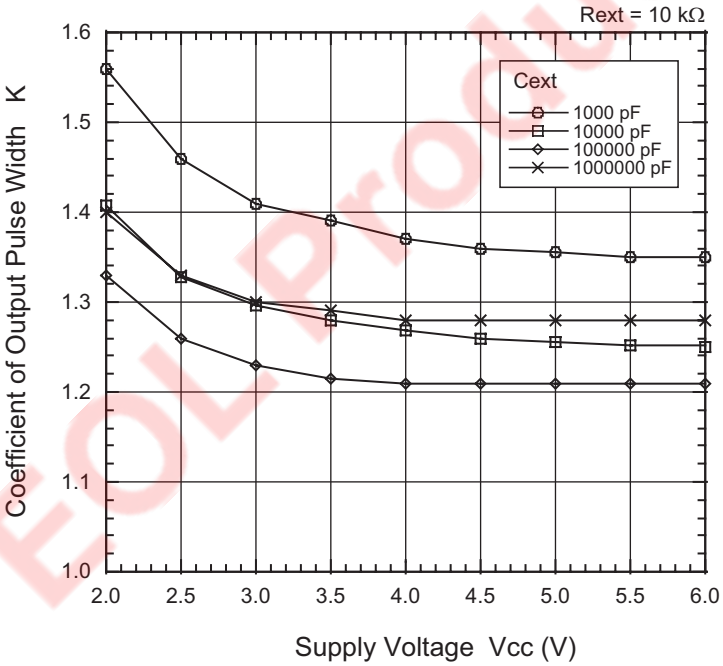
Application Data





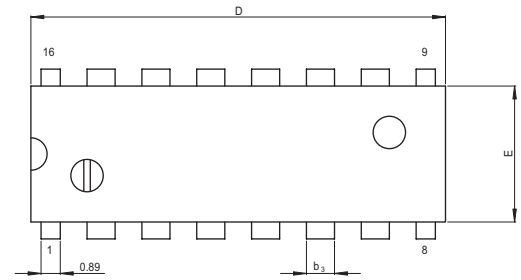

Vcc = 5.0 V
10000.0
1000.0
100.0
10.0
1.0
0.1
Output Pulse Width twQ (µs)
10^2
10^3
10^4
10^5
10^6
10^7
Timing Capacitance Cext (pF)
Rext
1 kΩ
10 kΩ
100 kΩ
1 MΩ

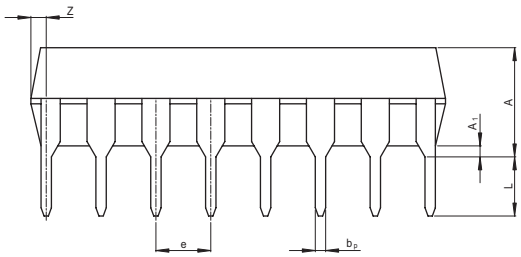

Rext = 2 kΩ
Cext
1000 pF
10000 pF
100000 pF
1000000 pF
Coefficient of Output Pulse Width K
1.8
1.7
1.6
1.5
1.4
1.3
1.2
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
Supply Voltage Vcc (V)

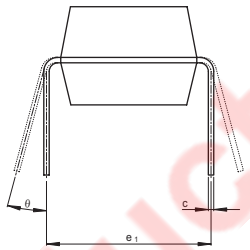

Rext = 10 kΩ
Cext
1000 pF
10000 pF
100000 pF
1000000 pF
Coefficient of Output Pulse Width K
1.6
1.5
1.4
1.3
1.2
1.1
1.0
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
Supply Voltage Vcc (V)

Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP16-6.3x19.2-2.54	PRDP0016AE-B	DP-16FV	1.05g



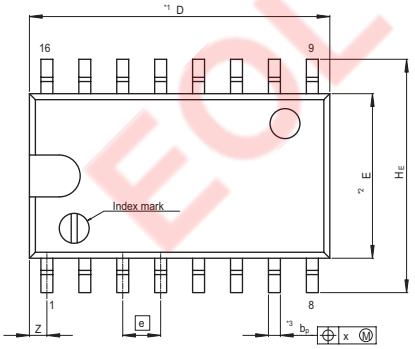


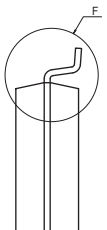


(Ni/Pd/Au plating)

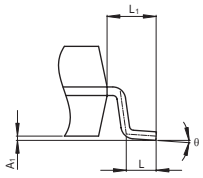
Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e_1	—	7.62	—
D	—	19.2	20.32
E	—	6.3	7.4
A	—	—	5.06
A_1	0.51	—	—
b_p	0.40	0.48	0.56
b_3	—	1.30	—
c	0.19	0.25	0.31
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	1.12
L	2.54	—	—

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP16-5.5x10.06-1.27	PRSP0016DH-B	FP-16DAV	0.24g





Terminal cross section
(Ni/Pd/Au plating)



Detail F

NOTE)
1. DIMENSIONS"*1 (Nom)"AND"*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	10.06	10.5
E	—	5.50	—
A_2	—	—	—
A_1	0.00	0.10	0.20
A	—	—	2.20
b_p	0.34	0.40	0.46
b_1	—	—	—
c	0.15	0.20	0.25
c_1	—	—	—
θ	0°	—	8°
H_E	7.50	7.80	8.00
e	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.80
L	0.50	0.70	0.90
L_1	—	1.15	—

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Colophon .6.0