

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# HD74HC123A

## Dual Retriggerable Monostable Multivibrators (with Clear)

REJ03D0564-0200  
 (Previous ADE-205-438)  
 Rev.2.00  
 Oct 11, 2005

### Description

This multivibrator features both a negative, A, and a positive, B, transition triggered input, either of which can be used as an inhibit input. Also included is a clear input that when taken low resets the one shot. The HD74HC123A can be triggered on the positive transition of the clear while A is held low and B is held high.

The HD74HC123A is retriggerable. That is it may be triggered repeatedly while their outputs are generating a pulse and the pulse will be extended.

Pulse width stability over a wide range of temperature. The output pulse equation is simply:  $t_w = (R_{ext}) (C_{ext})$ .










### 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  $\mu$ A max
- Low Quiescent Supply Current
- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74HC123AP	DILP-16 pin	PRDP0016AE-B (DP-16FV)	P	—
HD74HC123AFPEL	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.

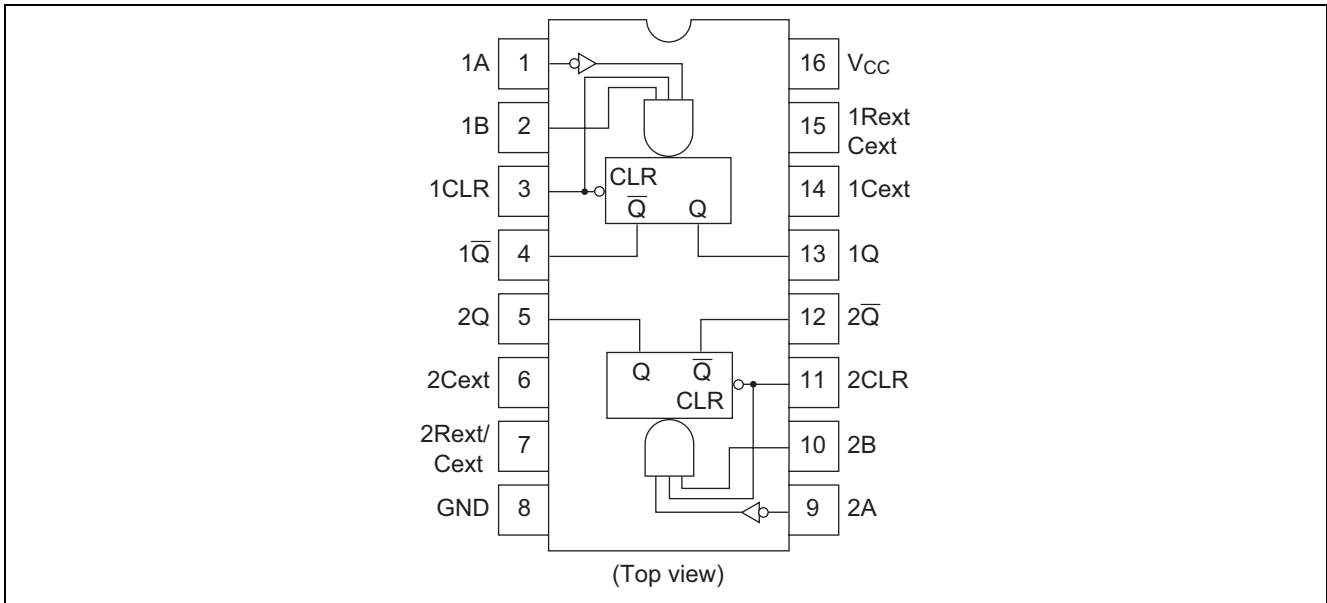
### Function Table

Clear	Inputs		Outputs	
	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		

Note: External timing capacitance connects between  $C_{ext}$  and  $R_{ext}/C_{ext}$ .

H : High level  
 L : Low level  
 X : Irrelevant

### Pin Arrangement



### 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	$I_{IK}, I_{OK}$	$\pm 20$	mA
Output current	$I_o$	$\pm 25$	mA
$V_{CC}$ , GND current	$I_{CC}$ or $I_{GND}$	$\pm 50$	mA
Power dissipation	$P_T$	500	mW
Storage temperature	$T_{stg}$	-65 to +150	$^{\circ}C$

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	$T_a$	-40 to 85	$^{\circ}C$	
Input rise / fall time <sup>*1</sup>	$t_r, t_f$	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**

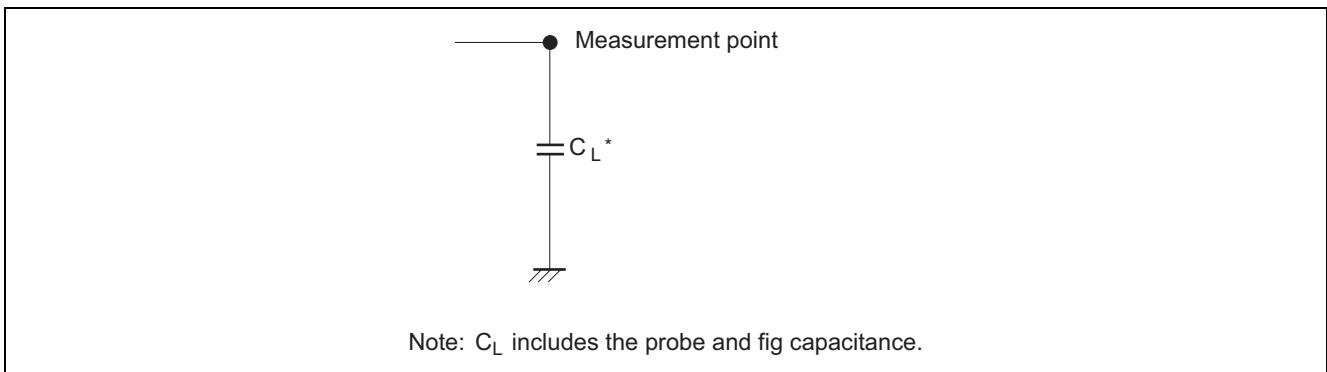
Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40 to+85°C		Unit	Test Conditions		
			Min	Typ	Max	Min	Max				
Input voltage	V <sub>IH</sub>	2.0	1.5	—	—	1.5	—	V			
		4.5	3.15	—	—	3.15	—				
		6.0	4.2	—	—	4.2	—				
	V <sub>IL</sub>	2.0	—	—	0.5	—	0.5	V			
		4.5	—	—	1.35	—	1.35				
		6.0	—	—	1.8	—	1.8				
Output voltage	V <sub>OH</sub>	2.0	1.9	2.0	—	1.9	—	V	V <sub>in</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -20 μA	
		4.5	4.4	4.5	—	4.4	—			I <sub>OH</sub> = -4 mA	
		6.0	5.9	6.0	—	5.9	—			I <sub>OH</sub> = -5.2 mA	
		4.5	4.18	—	—	4.13	—				
		6.0	5.68	—	—	5.63	—				
	V <sub>OL</sub>	2.0	—	0.0	0.1	—	0.1	V	V <sub>in</sub> = 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	V <sub>in</sub> = V <sub>CC</sub> or GND		
Quiescent supply current	Standby state	I <sub>CC</sub>	6.0	—	—	130	—	220	μA	V <sub>in</sub> = V <sub>CC</sub> or GND	I <sub>out</sub> = 0 μA
	Active state		6.0	—	—	130	—	220			R <sub>ext</sub> /C <sub>ext</sub> = 0.5 V <sub>CC</sub>

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

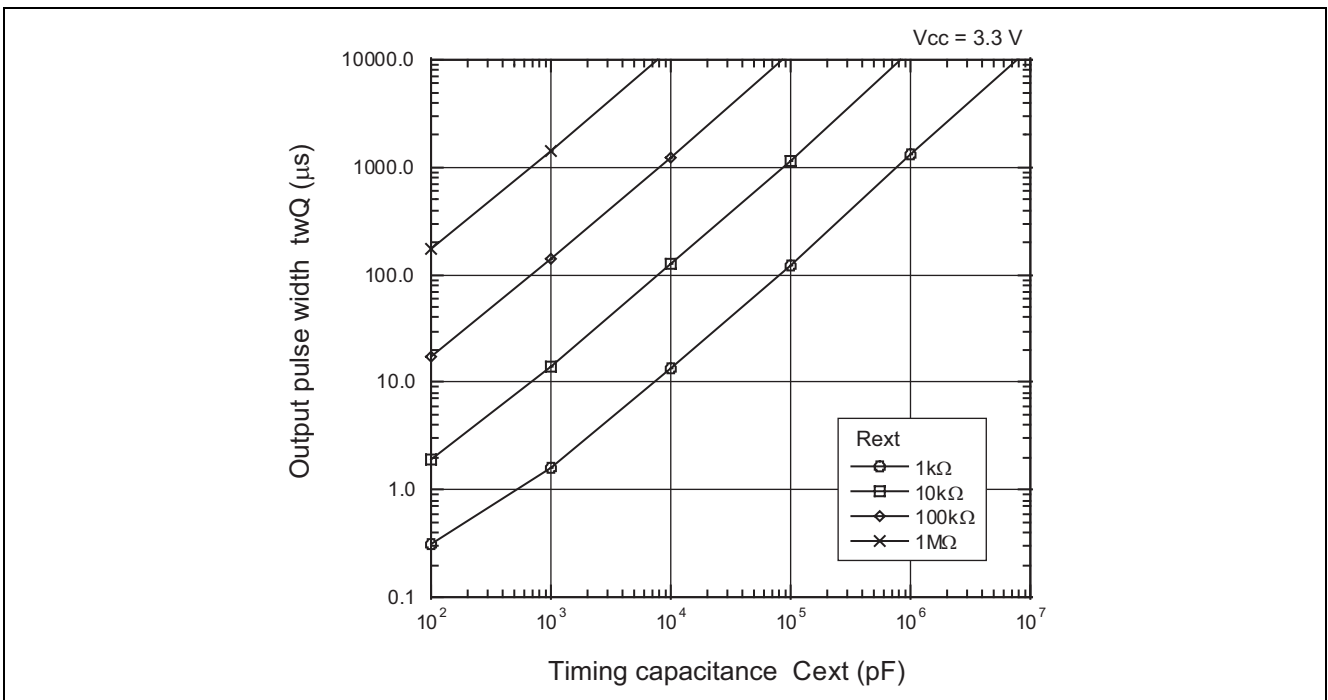
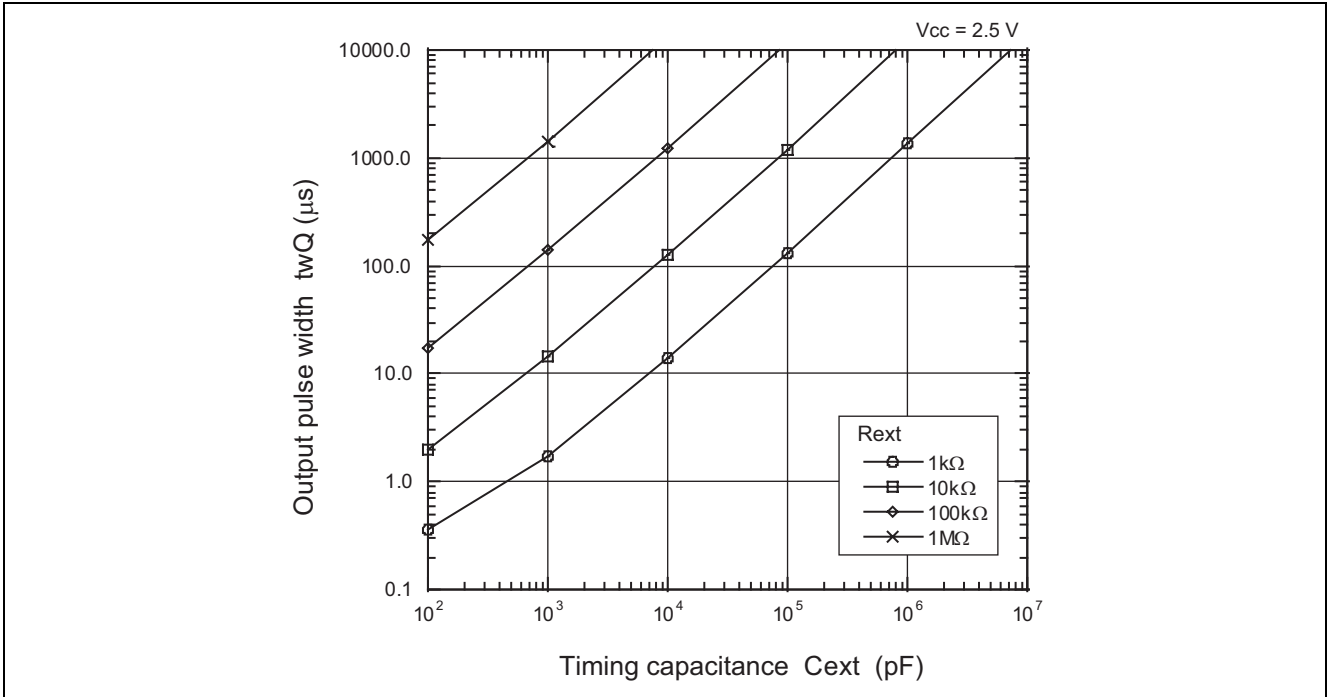
Item	Symbol	$V_{CC}$ (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } +85^\circ\text{C}$		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Propagation delay time	$t_{PLH}$	2.0	—	—	210	—	265	ns	A, B or Clear to Q	
		4.5	—	22	42	—	53			
		6.0	—	—	36	—	45			
	$t_{PHL}$	2.0	—	—	240	—	300	ns	A, B or Clear to $\bar{Q}$	
		4.5	—	23	48	—	60			
		6.0	—	—	41	—	51			
	$t_{PHL}$	2.0	—	—	170	—	215	ns	Clear to Q	
		4.5	—	18	34	—	43			
		6.0	—	—	29	—	37			
	$t_{PLH}$	2.0	—	—	180	—	225	ns	Clear to $\bar{Q}$	
		4.5	—	16	36	—	45			
		6.0	—	—	31	—	38			
Output rise/fall time	$t_{TLH}, t_{THL}$	2.0	—	—	75	—	95	ns		
		4.5	—	5	15	—	19			
		6.0	—	—	13	—	16			
Pulse width	$t_w$	2.0	150	—	—	190	—	ns	A, B, Clear	
		4.5	30	6	—	38	—			
		6.0	26	—	—	33	—			
Minimum output pulse width	$t_{wQ(\text{min})}$	2.0	—	1.5	—	—	—	$\mu\text{s}$	Cext = 28 pF	Rest = 6 k $\Omega$
		4.5	—	450	—	—	—	ns		Rest = 2 k $\Omega$
		6.0	—	380	—	—	—			
Output pulse width	$t_{wQ}$	4.5	—	1.0	—	—	—	ms	Cext = 0.1 $\mu\text{F}$ , Rest = 10 k $\Omega$	
Input capacitance	Cin	—	—	5	10	—	10	pF		

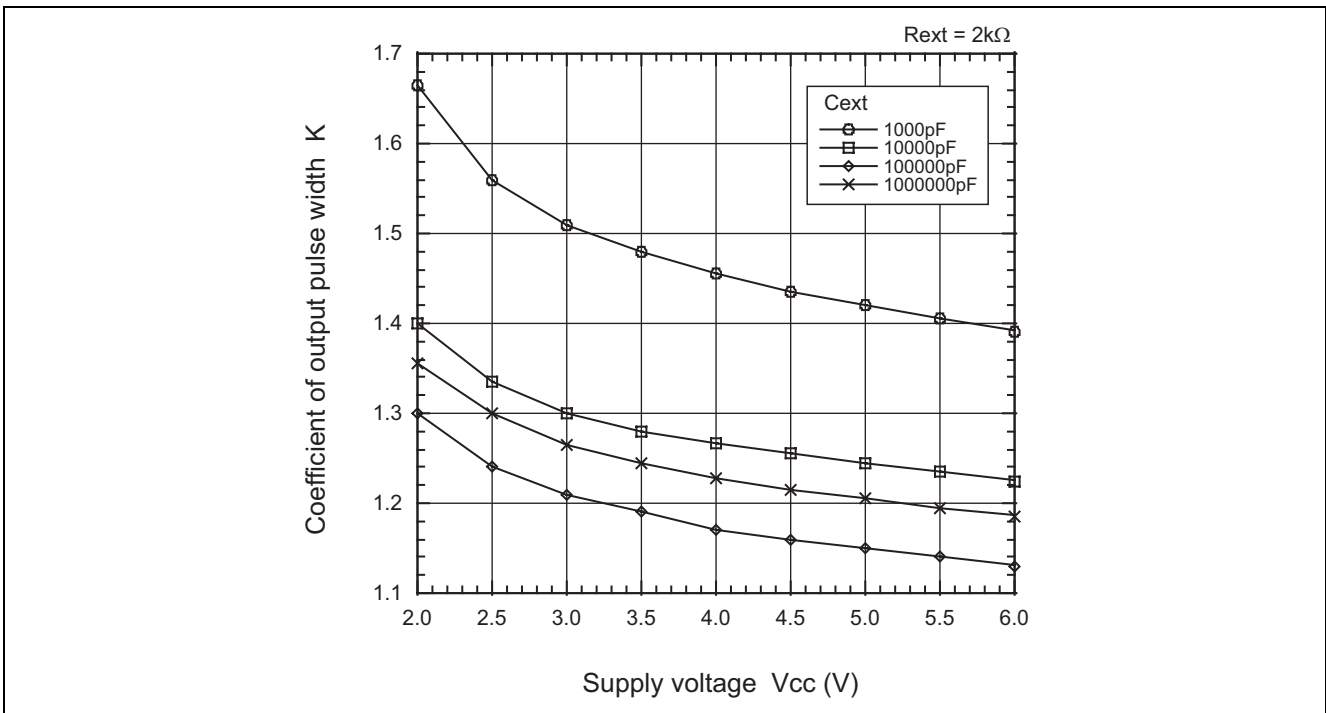
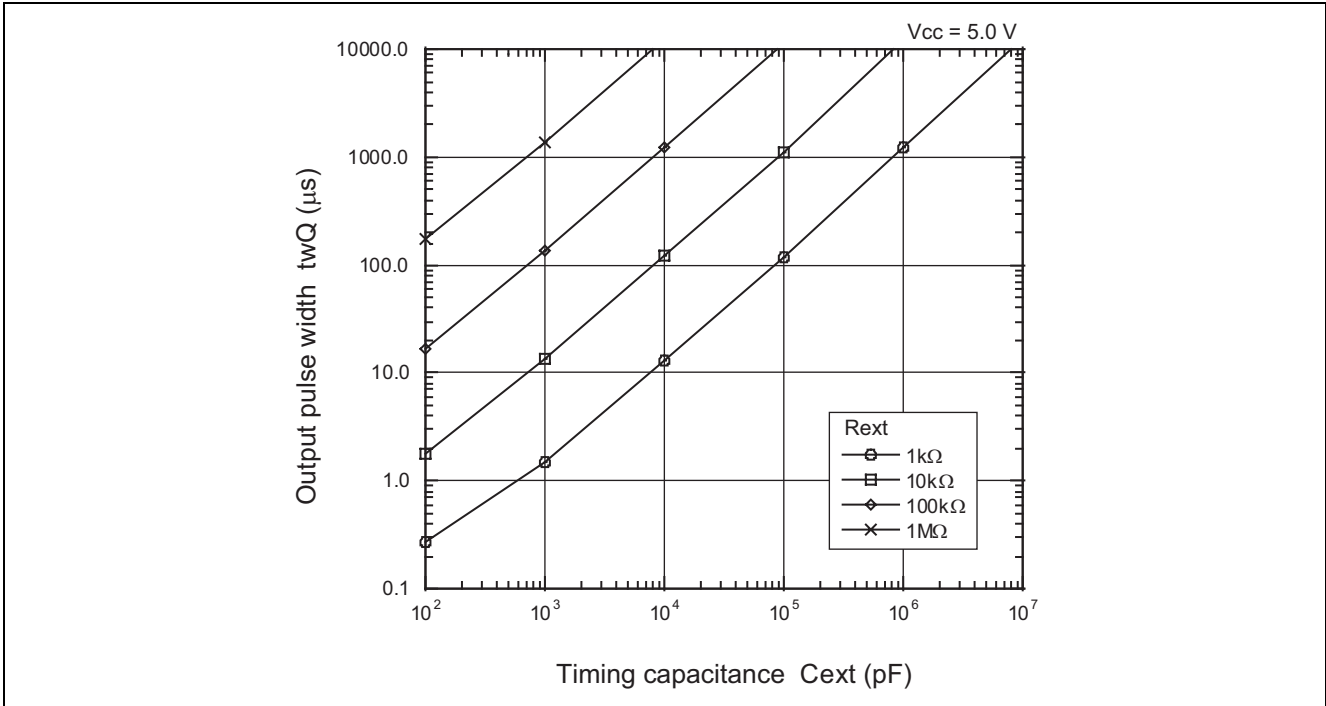
Caution in use: In order to prevent any malfunctions due to noise, connect a high-frequency performance capacitor between  $V_{CC}$  and GND, and keep the wiring between the External components and Cext, Rest/Cext pins as short as possible.

**Test Circuit**

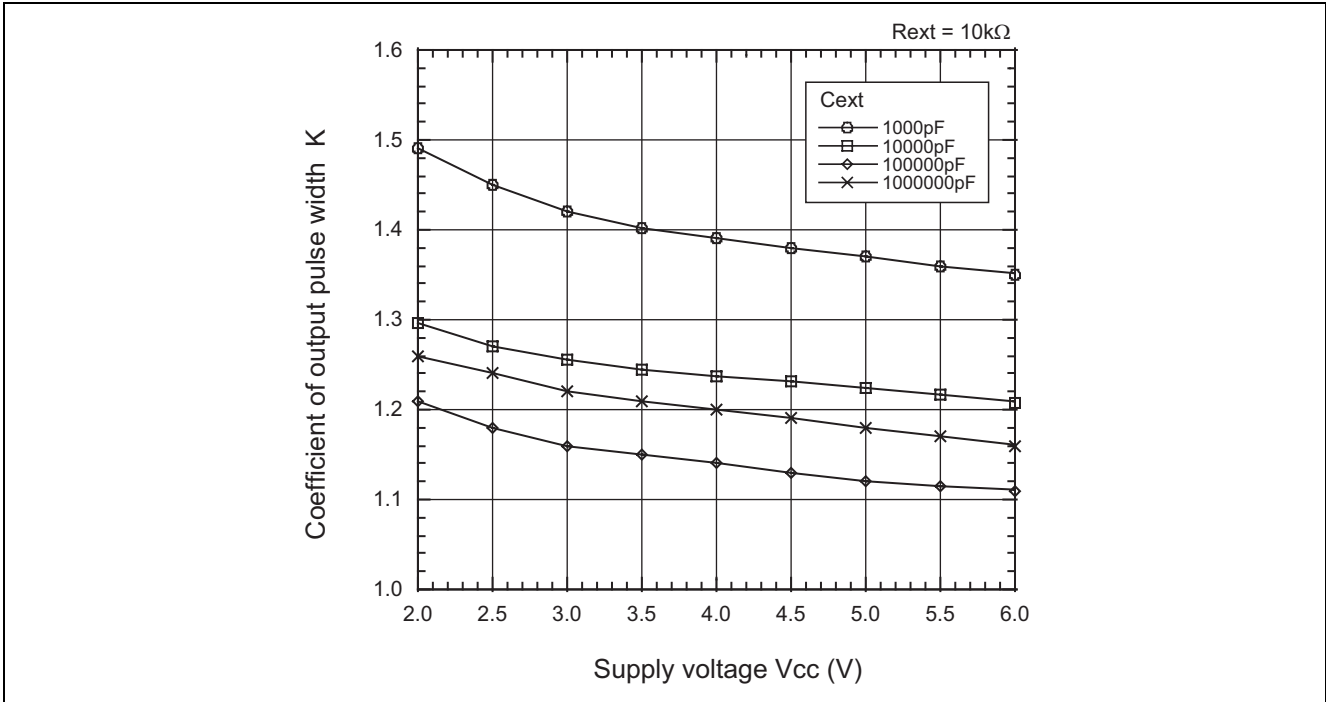


Application Data



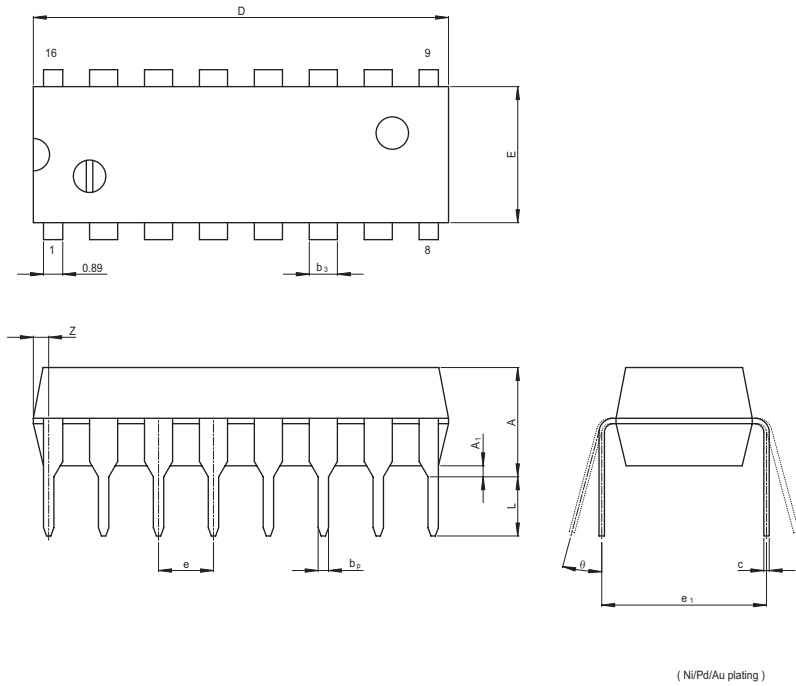






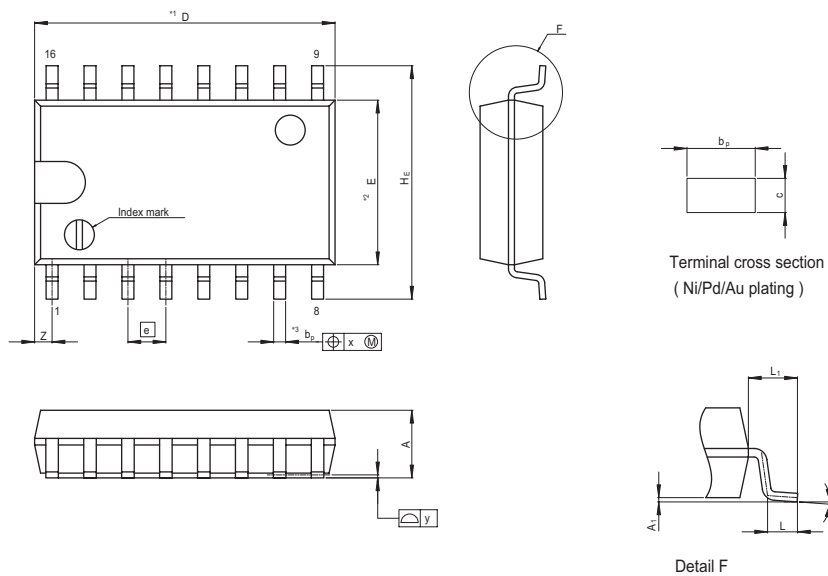
Package Dimensions

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



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e <sub>1</sub>	—	7.62	—
D	—	19.2	20.32
E	—	6.3	7.4
A	—	—	5.06
A <sub>1</sub>	0.51	—	—
b <sub>p</sub>	0.40	0.48	0.56
b <sub>3</sub>	—	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



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 <sub>2</sub>	—	—	—
A <sub>1</sub>	0.00	0.10	0.20
A	—	—	2.20
b <sub>p</sub>	0.34	0.40	0.46
b <sub>1</sub>	—	—	—
c	0.15	0.20	0.25
c <sub>1</sub>	—	—	—
θ	0°	—	8°
H <sub>E</sub>	7.50	7.80	8.00
Ⓢ	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.80
L	0.50	0.70	0.90
L <sub>1</sub>	—	1.15	—

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