74HC123; 74HCT123

Dual retriggerable monostable multivibrator with reset

Rev. 13 — 21 February 2024 Product data sheet

1. General description

The 74HC123; 74HCT123 is a dual retriggerable monostable multivibrator with reset. The basic output pulse width is programmed by selection of external components (R_{EXT} and C_{EXT}). Once triggered this basic pulse width may be extended by retriggering either of the edge triggered inputs ($n\overline{A}$ or nB). By repeating this process, the output pulse period (nQ = HIGH, $n\overline{Q}$ = LOW) can be made as long as desired. Alternatively, an output delay can be terminated at any time by a LOW-going edge on input $n\overline{RD}$. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of V_{CC}.

Schmitt-trigger action in the $n\overline{A}$ and nB inputs, makes the circuit highly tolerant to slower input rise and fall times.

2. Features and benefits

- Wide supply voltage range from 2.0 V to 6.0 V
- CMOS low power dissipation
- High noise immunity
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Complies with JEDEC standards:
  - JESD8C (2.7 V to 3.6 V)
  - JESD7A (2.0 V to 6.0 V)
- Input levels:
  - For 74HC123: CMOS level
  - For 74HCT123: TTL level
- DC triggered from active HIGH or active LOW inputs
- Retriggerable for very long pulses up to 100 % duty factor
- Direct reset terminates output pulse
- Schmitt-trigger action on all inputs except for the reset input
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Multiple package options
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C

3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74HC123D 74HCT123D	-40 °C to +125 °C	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1
74HC123PW 74HCT123PW	-40 °C to +125 °C	TSSOP16	plastic thin shrink small outline package; 16 leads; body width 4.4 mm	SOT403-1
74HC123BQ	-40 °C to +125 °C	DHVQFN16	plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 16 terminals; body 2.5 × 3.5 × 0.85 mm	SOT763-1

4. Functional diagram

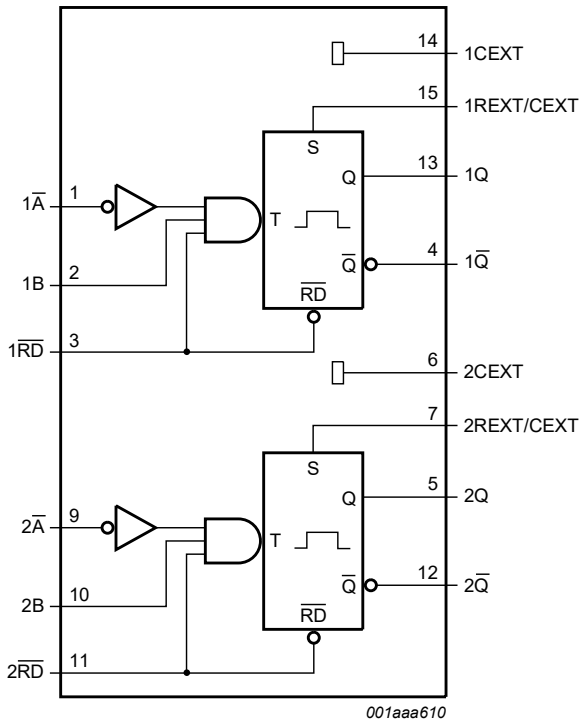


Fig. 1. Functional diagram

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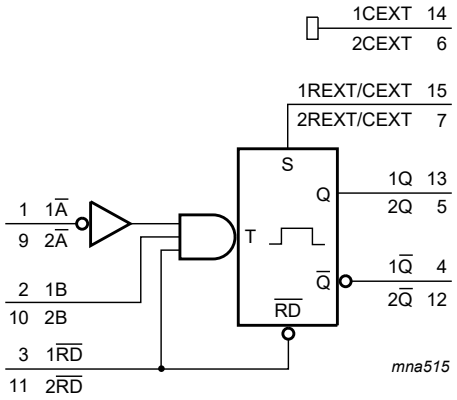


Fig. 2. Logic symbol

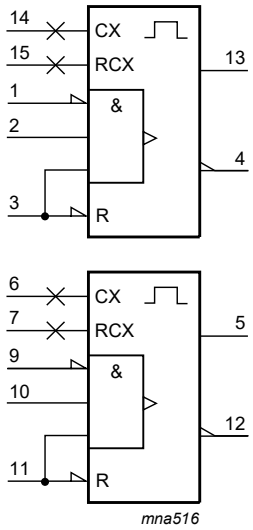


Fig. 3. IEC logic symbol

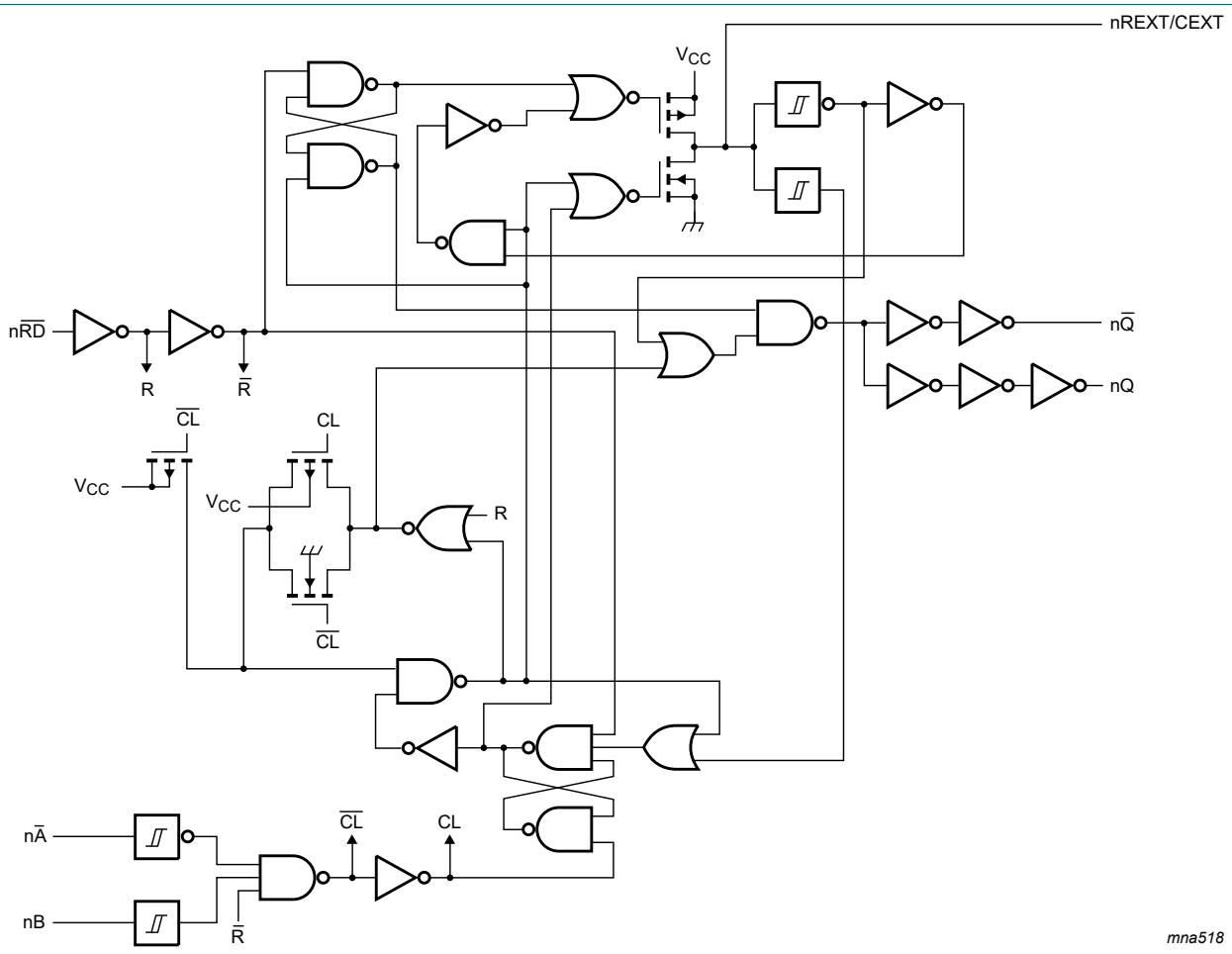


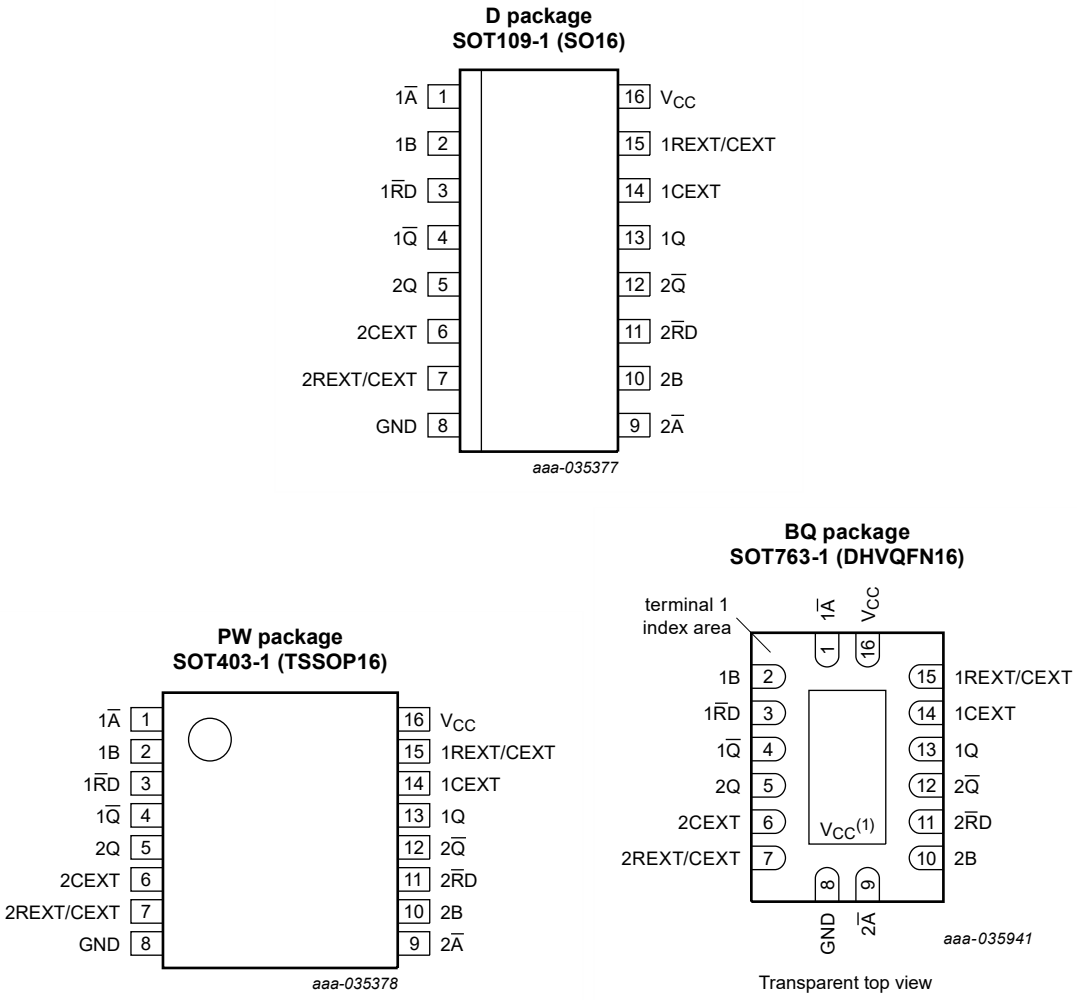
Fig. 4. Logic diagram

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5. Pinning information

5.1. Pinning



(1) This is not a supply pin. There is no electrical or mechanical requirement to solder the pad. In case soldered, the solder land should remain floating or connected to V_{CC}.

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5.2. Pin description

Table 2. Pin description

Symbol	Pin	Description
$1\overline{A}$	1	negative-edge triggered input 1
1B	2	positive-edge triggered input 1
$1\overline{RD}$	3	direct reset LOW and positive-edge triggered input 1
$1\overline{Q}$	4	active LOW output 1
2Q	5	active HIGH output 2
2CEXT	6	external capacitor connection 2
2REXT/CEXT	7	external resistor and capacitor connection 2
GND	8	ground (0 V)
$2\overline{A}$	9	negative-edge triggered input 2
2B	10	positive-edge triggered input 2
$2\overline{RD}$	11	direct reset LOW and positive-edge triggered input 2
$2\overline{Q}$	12	active LOW output 2
1Q	13	active HIGH output 1
1CEXT	14	external capacitor connection 1
1REXT/CEXT	15	external resistor and capacitor connection 1
V_{CC}	16	supply voltage

6. Functional description

Table 3. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care; ↑ = LOW-to-HIGH transition; ↓ = HIGH-to-LOW transition; ⎍ *= one HIGH level output pulse;* ⎏ *= one LOW level output pulse.*

Input			Output	
$n\overline{RD}$	$n\overline{A}$	nB	nQ	$n\overline{Q}$
L	X	X	L	H
X	H	X	L [1]	H [1]
X	X	L	L [1]	H [1]
H	L	↑	⎍	⎏
H	↓	H	⎍	⎏
↑	L	H	⎍	⎏

[1] If the monostable was triggered before this condition was established, the pulse will continue as programmed.

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7. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	supply voltage		-0.5	+7	V
I_{IK}	input clamping current	$V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V	-	±20	mA
I_{OK}	output clamping current	$V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V	-	±20	mA
I_O	output current	except for pins nREXT/CEXT; $V_O = -0.5$ V to ($V_{CC} + 0.5$ V)	-	±25	mA
I_{CC}	supply current		-	50	mA
I_{GND}	ground current		-	-50	mA
T_{stg}	storage temperature		-65	+150	°C
P_{tot}	total power dissipation	[1]	-	500	mW

[1] For SOT109-1 (SO16) package: P_{tot} derates linearly with 12.4 mW/K above 110 °C.
For SOT403-1 (TSSOP16) package: P_{tot} derates linearly with 8.5 mW/K above 91 °C.
For SOT763-1 (DHVQFN16) package: P_{tot} derates linearly with 11.2 mW/K above 106 °C.

8. Recommended operating conditions

Table 5. Recommended operating conditions

Symbol	Parameter	Conditions	74HC123			74HCT123			Unit
			Min	Typ	Max	Min	Typ	Max	
V_{CC}	supply voltage		2.0	5.0	6.0	4.5	5.0	5.5	V
V_I	input voltage		0	-	V_{CC}	0	-	V_{CC}	V
V_O	output voltage		0	-	V_{CC}	0	-	V_{CC}	V
Δt/ΔV	input transition rise and fall rate	$n\overline{RD}$ input							
		V_{CC} = 2.0 V	-	-	625	-	-	-	ns/V
		V_{CC} = 4.5 V	-	1.67	139	-	1.67	139	ns/V
		V_{CC} = 6.0 V	-	-	83	-	-	-	ns/V
T_{amb}	ambient temperature		-40	+25	+125	-40	+25	+125	°C

9. Static characteristics

Table 6. Static characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
74HC123										
V_{IH}	HIGH-level input voltage	V_{CC} = 2.0 V	1.5	1.2	-	1.5	-	1.5	-	V
		V_{CC} = 4.5 V	3.15	2.4	-	3.15	-	3.15	-	V
		V_{CC} = 6.0 V	4.2	3.2	-	4.2	-	4.2	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 2.0 V	-	0.8	0.5	-	0.5	-	0.5	V
		V_{CC} = 4.5 V	-	2.1	1.35	-	1.35	-	1.35	V
		V_{CC} = 6.0 V	-	2.8	1.8	-	1.8	-	1.8	V

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Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}								
		I_O = -20 µA; V_{CC} = 2.0 V	1.9	2.0	-	1.9	-	1.9	-	V
		I_O = -20 µA; V_{CC} = 4.5 V	4.4	4.5	-	4.4	-	4.4	-	V
		I_O = -20 µA; V_{CC} = 6.0 V	5.9	6.0	-	5.9	-	5.9	-	V
		I_O = -4 mA; V_{CC} = 4.5 V	3.98	4.32	-	3.84	-	3.7	-	V
		I_O = -5.2 mA; V_{CC} = 6.0 V	5.48	5.81	-	5.34	-	5.2	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}								
		I_O = 20 µA; V_{CC} = 2.0 V	-	0	0.1	-	0.1	-	0.1	V
		I_O = 20 µA; V_{CC} = 4.5 V	-	0	0.1	-	0.1	-	0.1	V
		I_O = 20 µA; V_{CC} = 6.0 V	-	0	0.1	-	0.1	-	0.1	V
		I_O = 4 mA; V_{CC} = 4.5 V	-	0.15	0.26	-	0.33	-	0.4	V
		I_O = 5.2 mA; V_{CC} = 6.0 V	-	0.16	0.26	-	0.33	-	0.4	V
I_I	input leakage current	$V_I = V_{CC}$ or GND; V_{CC} = 6.0 V	-	-	±0.1	-	±1.0	-	±1.0	µA
I_{CC}	supply current	$V_I = V_{CC}$ or GND; I_O = 0 A; V_{CC} = 6.0 V	-	-	8.0	-	80	-	160	µA
C_I	input capacitance		-	3.5	-	-	-	-	-	pF
74HCT123										
V_{IH}	HIGH-level input voltage	V_{CC} = 4.5 V to 5.5 V	2.0	1.6	-	2.0	-	2.0	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 4.5 V to 5.5 V	-	1.2	0.8	-	0.8	-	0.8	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}; V_{CC} = 4.5 V								
		I_O = -20 µA	4.4	4.5	-	4.4	-	4.4	-	V
		I_O = -4 mA	3.98	4.32	-	3.84	-	3.7	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}; V_{CC} = 4.5 V								
		I_O = 20 µA	-	0	0.1	-	0.1	-	0.1	V
		I_O = 4.0 mA	-	0.15	0.26	-	0.33	-	0.4	V
I_I	input leakage current	$V_I = V_{CC}$ or GND; V_{CC} = 5.5 V	-	-	±0.1	-	±1.0	-	±1.0	µA
I_{CC}	supply current	$V_I = V_{CC}$ or GND; I_O = 0 A; V_{CC} = 5.5 V	-	-	8.0	-	80	-	160	µA
ΔI_{CC}	additional supply current	per input pin; I_O = 0 A; $V_I = V_{CC}$ - 2.1 V; other inputs at V_{CC} or GND; V_{CC} = 4.5 V to 5.5 V								
		pins n$\overline{A}$, nB	-	35	125	-	160	-	170	µA
		pin n$\overline{RD}$	-	50	180	-	225	-	245	µA
C_I	input capacitance		-	3.5	-	-	-	-	-	pF

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10. Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); C_L = 50 pF unless otherwise specified; for test circuit see Fig. 10.

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
74HC123										
t_{pd}	propagation delay	$n\overline{RD}$, nA, nB to nQ or $n\overline{Q}$; C_{EXT} = 0 pF; R_{EXT} = 5 kΩ; see Fig. 7 [1]								
		V_{CC} = 2.0 V	-	83	255	-	320	-	385	ns
		V_{CC} = 4.5 V	-	30	51	-	64	-	77	ns
		V_{CC} = 5 V; C_L = 15 pF	-	26	-	-	-	-	-	ns
		V_{CC} = 6.0 V	-	24	43	-	54	-	65	ns
		$n\overline{RD}$ (reset) to nQ or $n\overline{Q}$; C_{EXT} = 0 pF; R_{EXT} = 5 kΩ; see Fig. 7								
		V_{CC} = 2.0 V	-	66	215	-	270	-	325	ns
		V_{CC} = 4.5 V	-	24	43	-	54	-	65	ns
		V_{CC} = 5 V; C_L = 15 pF	-	20	-	-	-	-	-	ns
		V_{CC} = 6.0 V	-	19	37	-	46	-	55	ns
t_t	transition time	see Fig. 7 [1]								
		V_{CC} = 2.0 V	-	19	75	-	95	-	110	ns
		V_{CC} = 4.5 V	-	7	15	-	19	-	22	ns
		V_{CC} = 6.0 V	-	6	13	-	16	-	19	ns
t_W	pulse width	$n\overline{A}$ LOW; see Fig. 8								
		V_{CC} = 2.0 V	100	8	-	125	-	150	-	ns
		V_{CC} = 4.5 V	20	3	-	25	-	30	-	ns
		V_{CC} = 6.0 V	17	2	-	21	-	26	-	ns
		nB HIGH; see Fig. 8								
		V_{CC} = 2.0 V	100	17	-	125	-	150	-	ns
		V_{CC} = 4.5 V	20	6	-	25	-	30	-	ns
		V_{CC} = 6.0 V	17	5	-	21	-	26	-	ns
		$n\overline{RD}$ LOW; see Fig. 9								
		V_{CC} = 2.0 V	100	14	-	125	-	150	-	ns
		V_{CC} = 4.5 V	20	5	-	25	-	30	-	ns
		V_{CC} = 6.0 V	17	4	-	21	-	26	-	ns
		nQ HIGH and $n\overline{Q}$ LOW; V_{CC} = 5.0 V; see Fig. 8 and Fig. 9 [2]								
		C_{EXT} = 100 nF; R_{EXT} = 10 kΩ	-	450	-	-	-	-	-	µs
		C_{EXT} = 0 pF; R_{EXT} = 5 kΩ	-	75	-	-	-	-	-	ns
t_{rtrig}	retrigger time	nA, nB; C_{EXT} = 0 pF; R_{EXT} = 5 kΩ; V_{CC} = 5.0 V; see Fig. 8 [3] [4]	-	110	-	-	-	-	-	ns

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Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
R_{EXT}	external timing resistor	see Fig. 5								
		V_{CC} = 2.0 V	10	-	1000	-	-	-	-	kΩ
		V_{CC} = 5.0 V	2	-	1000	-	-	-	-	kΩ
C_{EXT}	external timing capacitor	V_{CC} = 5.0 V; see Fig. 5 [4]	-	-	-	-	-	-	-	pF
C_{PD}	power dissipation capacitance	per monostable; V_I = GND to V_{CC} [5]	-	54	-	-	-	-	-	pF
74HCT123										
t_{PHL}	HIGH to LOW propagation delay	nRD, nA, nB to nQ or nQ; C_{EXT} = 0 pF; R_{EXT} = 5 kΩ; see Fig. 7								
		V_{CC} = 4.5 V	-	30	51	-	64	-	77	ns
		V_{CC} = 5 V; C_L = 15 pF	-	26	-	-	-	-	-	ns
		nRD (reset) to nQ or nQ; C_{EXT} = 0 pF; R_{EXT} = 5 kΩ; see Fig. 7								
		V_{CC} = 4.5 V	-	27	46	-	58	-	69	ns
		V_{CC} = 5 V; C_L = 15 pF	-	23	-	-	-	-	-	ns
t_{PLH}	LOW to HIGH propagation delay	nRD, nA, nB to nQ or nQ; C_{EXT} = 0 pF; R_{EXT} = 5 kΩ; see Fig. 7								
		V_{CC} = 4.5 V	-	28	51	-	64	-	77	ns
		V_{CC} = 5 V; C_L = 15 pF	-	26	-	-	-	-	-	ns
		nRD (reset) to nQ or nQ; C_{EXT} = 0 pF; R_{EXT} = 5 kΩ; see Fig. 7								
		V_{CC} = 4.5 V	-	23	46	-	58	-	69	ns
		V_{CC} = 5 V; C_L = 15 pF	-	23	-	-	-	-	-	ns
t_t	transition time	V_{CC} = 4.5 V; see Fig. 7 [1]	-	7	15	-	19	-	22	ns
t_W	pulse width	V_{CC} = 4.5 V								
		nA LOW; see Fig. 8	20	3	-	25	-	30	-	ns
		nB HIGH; see Fig. 8	20	5	-	25	-	30	-	ns
		nRD LOW; see Fig. 9	20	7	-	25	-	30	-	ns
		nQ HIGH and nQ LOW; V_{CC} = 5.0 V; see Fig. 8 and Fig. 9 [2]								
		C_{EXT} = 100 nF; R_{EXT} = 10 kΩ	-	450	-	-	-	-	-	µs
		C_{EXT} = 0 pF; R_{EXT} = 5 kΩ	-	75	-	-	-	-	-	ns
t_{rtrig}	retrigger time	nA, nB; C_{EXT} = 0 pF; R_{EXT} = 5 kΩ; V_{CC} = 5.0 V; see Fig. 8 [3] [4]	-	110	-	-	-	-	-	ns
R_{EXT}	external timing resistor	V_{CC} = 5.0 V; see Fig. 5	2	-	1000	-	-	-	-	kΩ
C_{EXT}	external timing capacitor	V_{CC} = 5.0 V; see Fig. 5 [4]	-	-	-	-	-	-	-	pF

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Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
C_{PD}	power dissipation capacitance	per monostable; V_I = GND to V_{CC} - 1.5 V [5]	-	56	-	-	-	-	-	pF

[1] t_{pd} is the same as t_{PHL} and t_{PLH}; t_t is the same as t_{THL} and t_{TLH}

[2] For other R_{EXT} and C_{EXT} combinations see Fig. 5. If C_{EXT} > 10 nF, the next formula is valid:

$t_W = K \times R_{EXT} \times C_{EXT}$, where:

t_W = typical output pulse width in ns;

R_{EXT} = external resistor in kΩ;

C_{EXT} = external capacitor in pF;

K = constant = 0.45 for V_{CC} = 5.0 V and 0.55 for V_{CC} = 2.0 V, see Fig. 6.

The inherent test jig and pin capacitance at pins 15 and 7 (nREXT/CEXT) is approximately 7 pF.

[3] The time to retrigger the monostable multivibrator depends on the values of R_{EXT} and C_{EXT}. The output pulse width will only be extended when the time between the active-going edges of the trigger input pulses meets the minimum retrigger time. If C_{EXT} >10 pF, the next formula (at V_{CC} = 5.0 V) for the setup time of a retrigger pulse is valid:

$t_{rtrig} = 30 + 0.19 \times R_{EXT} \times C_{EXT}^{0.9} + 13 \times R_{EXT}^{1.05}$, where:

t_{rtrig} = retrigger time in ns;

C_{EXT} = external capacitor in pF; R_{EXT} = external resistor in kΩ.

The inherent test jig and pin capacitance at pins 15 and 7 (nREXT/CEXT) is 7 pF.

[4] When the device is powered-up, initiate the device via a reset pulse, when C_{EXT} < 50 pF.

[5] C_{PD} is used to determine the dynamic power dissipation (P_D in µW).

$P_D = C_{PD} \times V_{CC}^2 \times f_i + \Sigma(C_L \times V_{CC}^2 \times f_o) + 0.75 \times C_{EXT} \times V_{CC}^2 \times f_o + D \times 16 \times V_{CC}$ where:

f_i = input frequency in MHz;

f_o = output frequency in MHz;

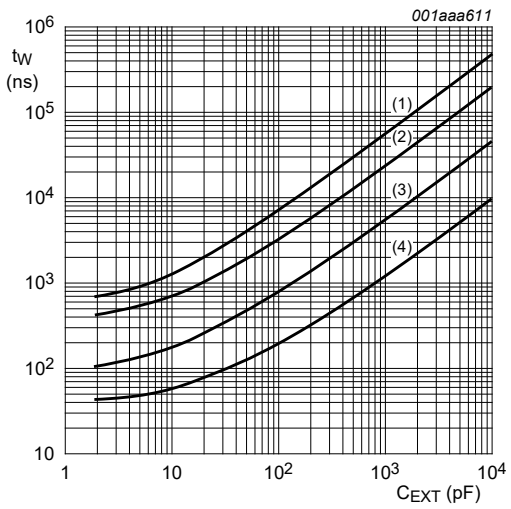
D = duty factor in %;

C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

C_{EXT} = timing capacitance in pF;

$\Sigma(C_L \times V_{CC}^2 \times f_o)$ sum of outputs.



V_{CC} = 5.0 V; T_{amb} = 25 °C.

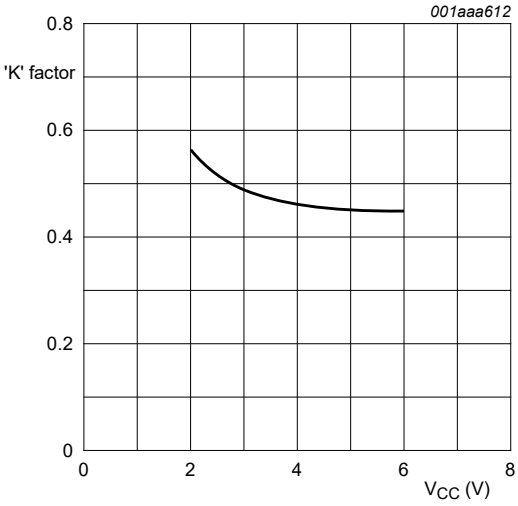
(1) R_{EXT} = 100 kΩ

(2) R_{EXT} = 50 kΩ

(3) R_{EXT} = 10 kΩ

(4) R_{EXT} = 2 kΩ

Fig. 5. Typical output pulse width as a function of the external capacitor value



C_{EXT} = 10 nF; R_{EXT} = 10 kΩ to 100 kΩ.

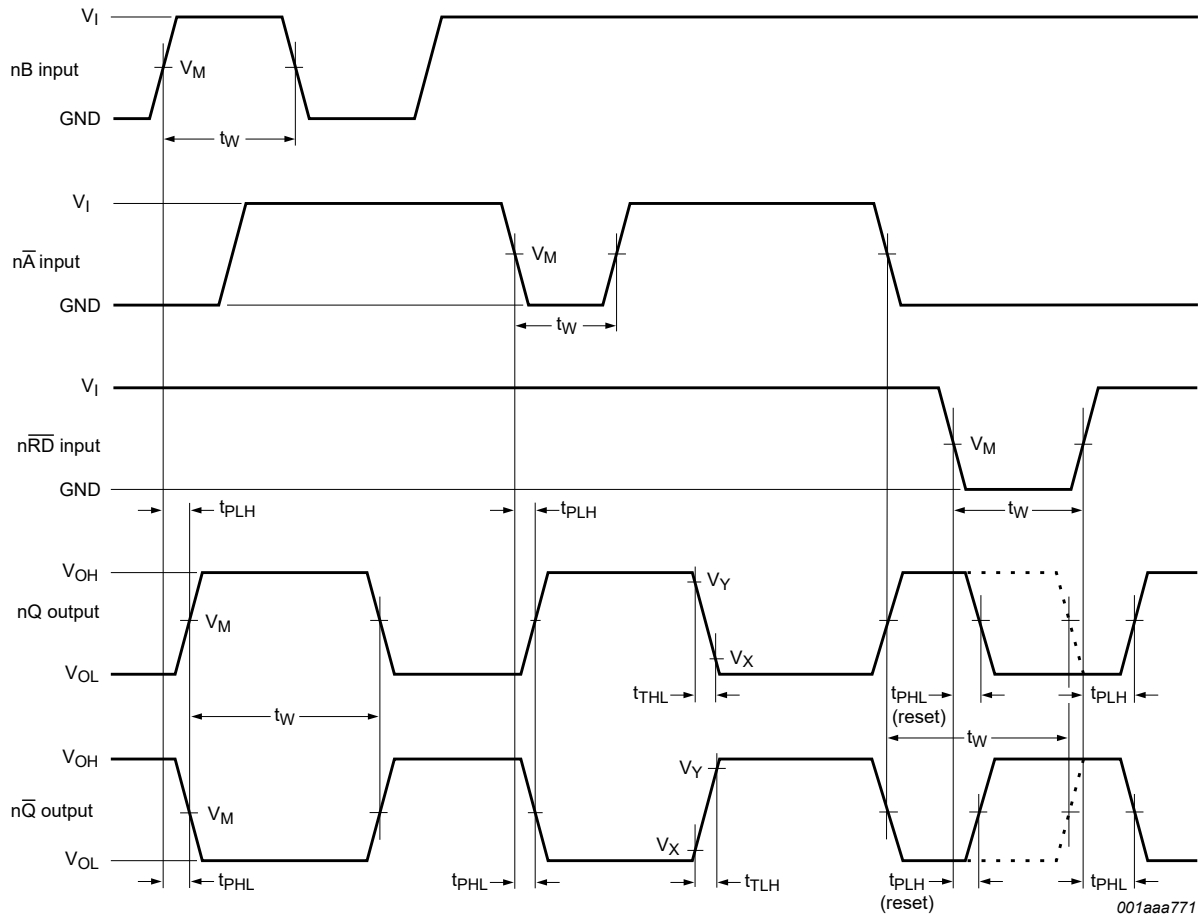
T_{amb} = 25 °C.

Fig. 6. 74HC123 typical 'K' factor as function of V_{CC}

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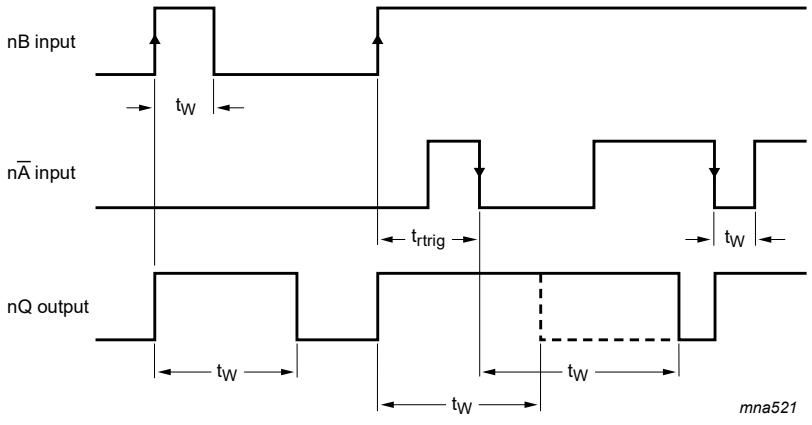
10.1. Waveforms and test circuit



Measurement points are given in Table 8.

V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.

Fig. 7. Propagation delays from inputs (nA, nB, nRD) to outputs (nQ, nQ) and output transition times

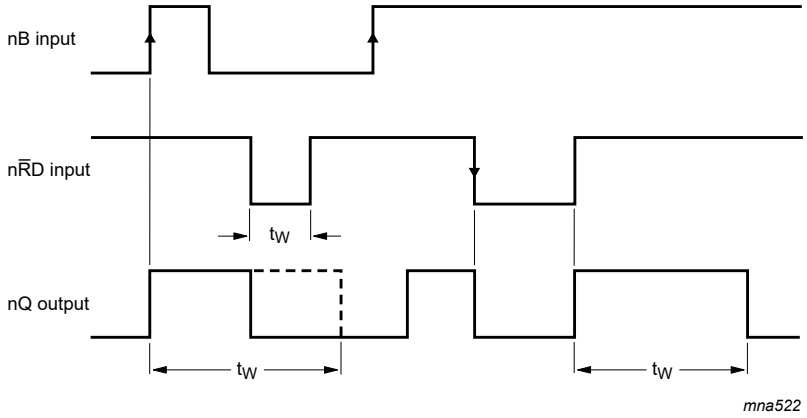


nRD = HIGH

Fig. 8. Output pulse control using retrigger pulse

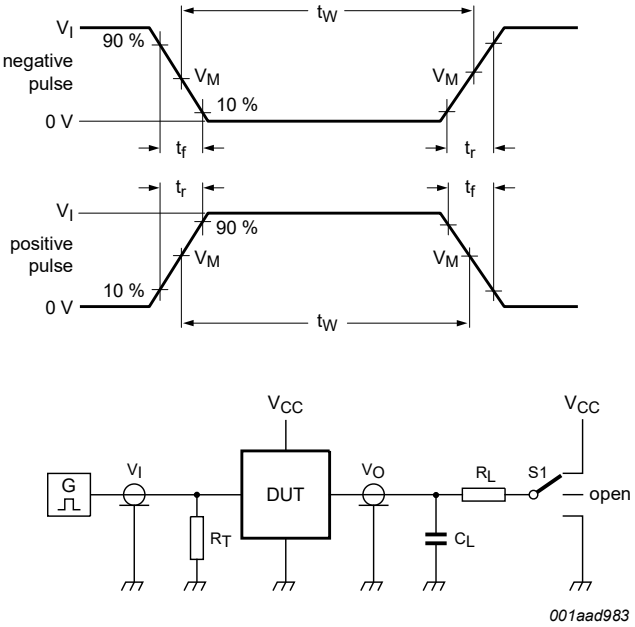
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nA̅ = LOW

Fig. 9. Output pulse control using reset input nR̅D̅



Test data is given in Table 8.

Definitions test circuit:

R_T = Termination resistance should be equal to output impedance Z_o of the pulse generator;

C_L = Load capacitance including jig and probe capacitance;

R_L = Load resistance;

S1 = Test selection switch.

Fig. 10. Test circuit for measuring switching times

Table 8. Test data

Type	Input		Load		S1 position
	V_I	t_r, t_f	C_L	R_L	t_{PHL}, t_{PLH}
74HC123	V_{CC}	6 ns	15 pF, 50 pF	1 kΩ	open
74HCT123	3 V	6 ns	15 pF, 50 pF	1 kΩ	open

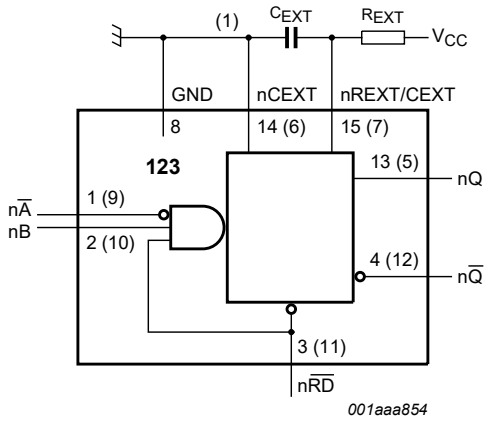
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11. Application information

11.1. Timing component connections

The basic output pulse width is essentially determined by the values of the external timing components R_{EXT} and C_{EXT}.



(1) For minimum noise generation it is recommended to ground pins 6 (2CEXT) and 14 (1CEXT) externally to pin 8 (GND).

Fig. 11. Timing component connections

11.2. Power-up considerations

When the monostable is powered-up it may produce an output pulse, with a pulse width defined by the values of R_{EXT} and C_{EXT}. This output pulse can be eliminated using the circuit shown in Fig. 12.

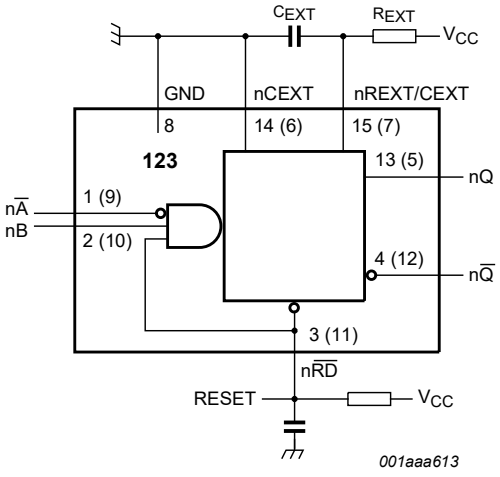


Fig. 12. Power-up output pulse elimination circuit

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11.3. Power-down considerations

A large capacitor C_{EXT} may cause problems when powering-down the monostable due to the energy stored in this capacitor. When a system containing this device is powered-down or a rapid decrease of V_{CC} to zero occurs, the monostable may sustain damage, due to the capacitor discharging through the input protection diodes. To avoid this possibility, use a damping diode (D_{EXT}) preferably a germanium or Schottky type diode able to withstand large current surges and connect as shown in Fig. 13.

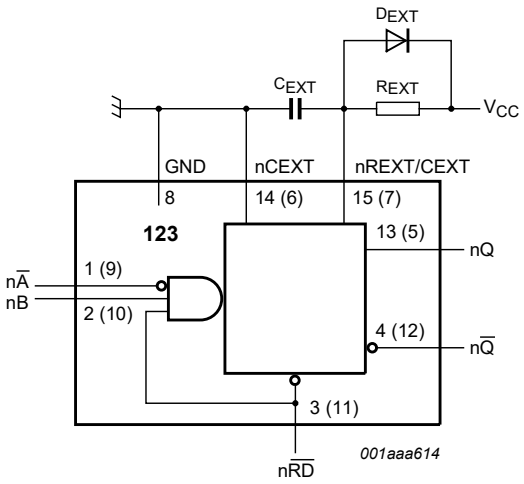


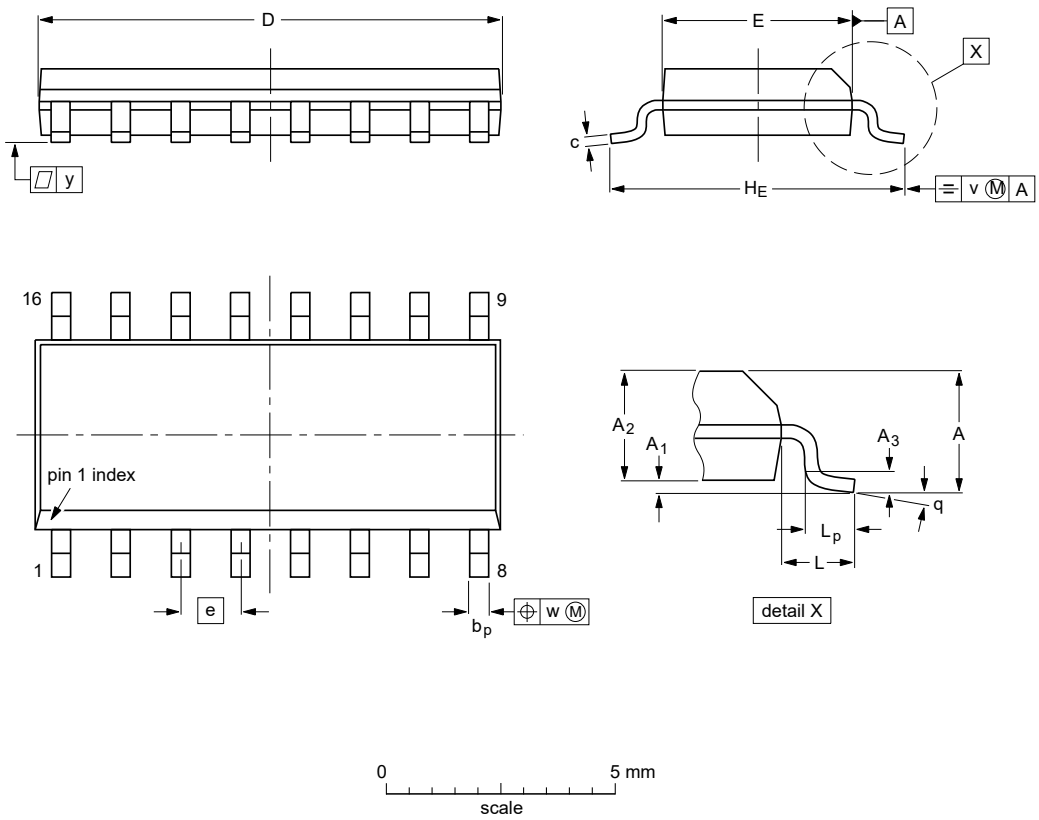
Fig. 13. Power-down protection circuit

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12. Package outline

SO16: plastic small outline package; 16 leads; body width 3.9 mm **SOT109-1**



Dimensions (inch dimensions are derived from the original mm dimensions)

Unit		A	A_1	A_2	A_3	b_p	c	D(1)	E(1)	e	H_E	L	L_p	v	w	y	θ
mm	max	1.75	0.25			0.51	0.25	10.0	4.0		6.2		1.27				8°
	nom				0.25					1.27		1.05		0.2	0.25	0.1	
	min		0.10	1.25		0.31	0.10	9.8	3.8		5.8		0.4				0°
inches	max	0.069	0.010			0.020	0.010	0.394	0.16		0.244		0.05				8°
	nom				0.01					0.05		0.041		0.008	0.01	0.004	
	min		0.004	0.049		0.012	0.004	0.386	0.15		0.228		0.016				0°

Note
1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

sot109-1_po

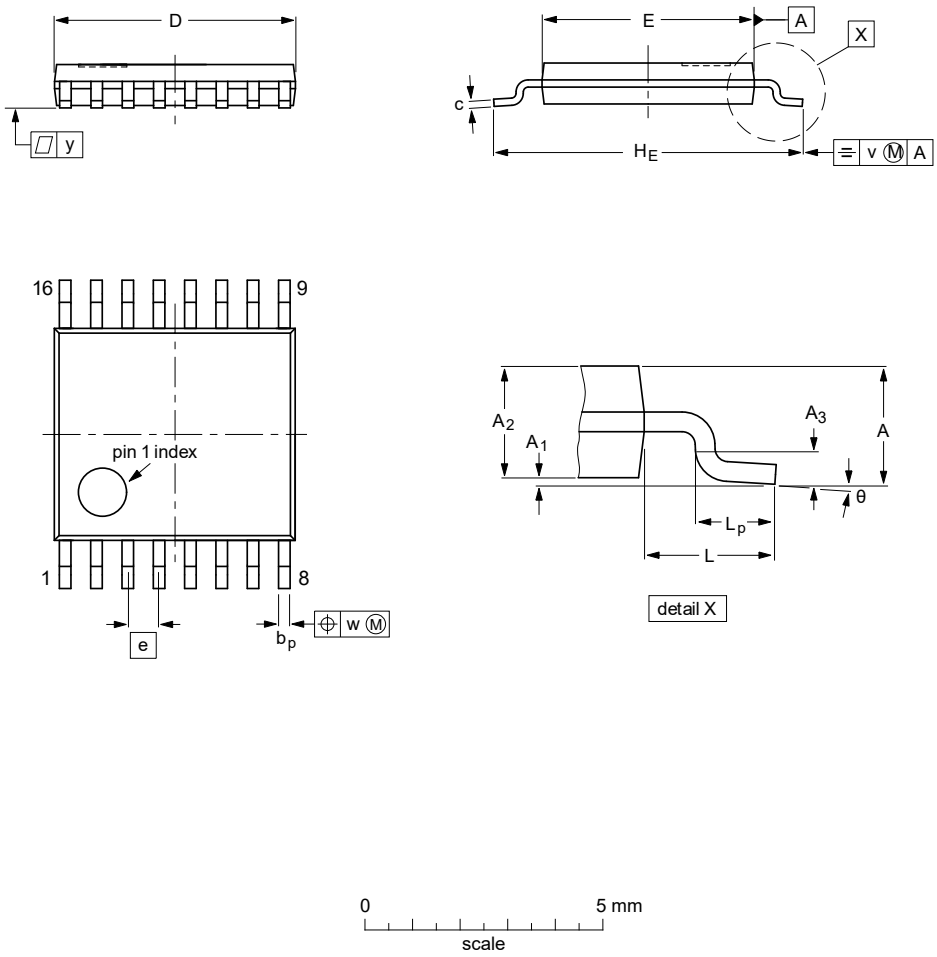
Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT109-1		MS-012				~~03-02-19~~ 23-10-27

Fig. 14. Package outline SOT109-1 (SO16)

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TSSOP16: plastic thin shrink small outline package; 16 leads; body width 4.4 mm **SOT403-1**



Dimensions (mm are the original dimensions)

Unit		A	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(2)}$	e	H_E	L	L_p	v	w	y	θ
mm	max	1.20	0.15	1.05		0.30	0.2	5.1	4.5		6.6		0.75				8°
	nom				0.25					0.65		1		0.2	0.1	0.1	
	min		0.05	0.80		0.19	0.09	4.9	4.3		6.2		0.45				0°

Note
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

sot403-1_po

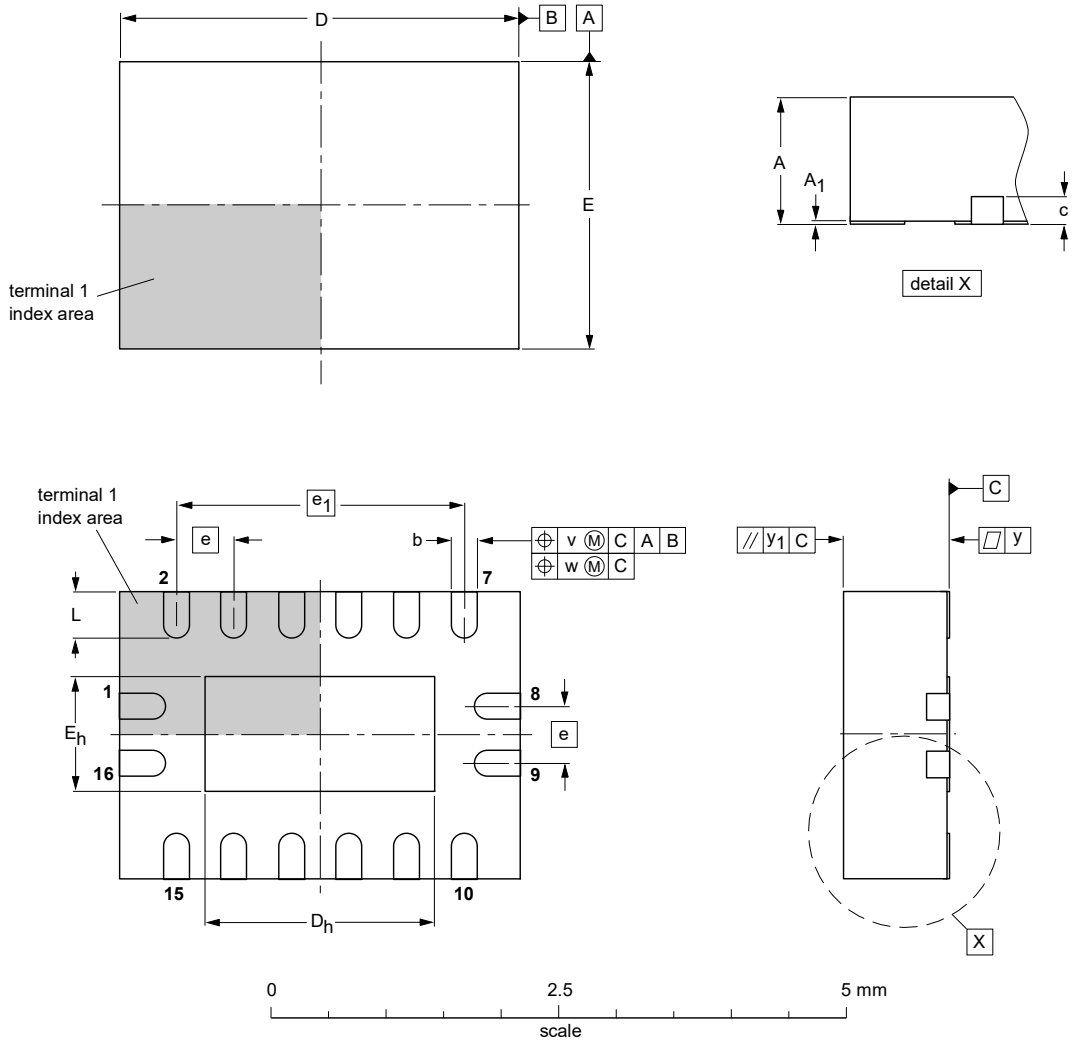
Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT403-1		MO-153				~~03-02-18~~ 23-10-27

Fig. 15. Package outline SOT403-1 (TSSOP16)

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DHVQFN16: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 16 terminals; body 2.5 x 3.5 x 0.85 mm **SOT763-1**



DIMENSIONS (mm are the original dimensions)

UNIT	$A^{(1)}$ max.	A_1	b	c	$D^{(1)}$	D_h	$E^{(1)}$	E_h	e	e_1	L	v	w	y	y_1
mm	1	0.05 0.00	0.30 0.18	0.2	3.6 3.4	2.15 1.85	2.6 2.4	1.15 0.85	0.5	2.5	0.5 0.3	0.1	0.05	0.05	0.1

Note

1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT763-1	- - -	MO-241	- - -			~~02-10-17~~ 03-01-27

Fig. 16. Package outline SOT763-1 (DHVQFN16)

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13. Abbreviations

Table 9. Abbreviations

Acronym	Abbreviation
CDM	Charged Device Model
CMOS	Complementary Metal Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
TTL	Transistor-Transistor Logic

14. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74HC_HCT123 v.13	20240221	Product data sheet	-	74HC_HCT123 v.12
Modifications:	• Section 2: ESD specification updated according to the latest JEDEC standard. • Fig. 14, Fig. 15: Aligned SO and TSSOP package outline drawings to JEDEC MS-012 and MO-153			
74HC_HCT123 v.12	20210811	Product data sheet	-	74HC_HCT123 v.11
Modifications:	• Type numbers 74HC123DB and 74HCT123DB (SOT338-1/SSOP16) removed.			
74HC_HCT123 v.11	20200903	Product data sheet	-	74HC_HCT123 v.10
Modifications:	• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate. • Section 1 and Section 2 updated. • Table 4: Derating values for P_{tot} total power dissipation have been updated.			
74HC_HCT123 v.10	20151203	Product data sheet	-	74HC_HCT123 v.9
Modifications:	• Type numbers 74HC123N and 74HCT123N (SOT38-4) removed.			
74HC_HCT123 v.9	20150119	Product data sheet	-	74HC_HCT123 v.8
Modifications:	• Table 7: Power dissipation capacitance condition for 74HCT123 is corrected.			
74HC_HCT123 v.8	20111216	Product data sheet	-	74HC_HCT123 v.7
Modifications:	• Legal pages updated.			
74HC_HCT123 v.7	20110825	Product data sheet	-	74HC_HCT123 v.6
74HC_HCT123 v.6	20110314	Product data sheet	-	74HC_HCT123 v.5
74HC_HCT123 v.5	20090713	Product data sheet	-	74HC_HCT123 v.4
74HC_HCT123 v.4	20060616	Product data sheet	-	74HC_HCT123 v.3
74HC_HCT123 v.3	20040511	Product specification	-	74HC_HCT123_CNV v.2
74HC_HCT123_CNV v.2	19980708	Product specification	-	-

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Document status [1][2]	Product status [3]	Definition
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Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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[2] The term 'short data sheet' is explained in section "Definitions".
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