

# 74AHC123A-Q100; 74AHCT123A-Q100

Dual retriggerable monostable multivibrator with reset

Rev. 2 — 17 June 2020

Product data sheet

## 1. General description

The 74AHC123A-Q100; 74AHCT123A-Q100 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 ( $n\bar{A}$  or  $nB$ ). By repeating this process, the output pulse period ( $nQ = HIGH$ ,  $n\bar{Q} = LOW$ ) can be made as long as desired. Alternatively, an output delay can be terminated at any time by a LOW-going edge on input  $n\bar{RD}$ . Inputs are overvoltage tolerant. This feature allows the use of these devices as translators in mixed voltage environments.

This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

## 2. Features and benefits

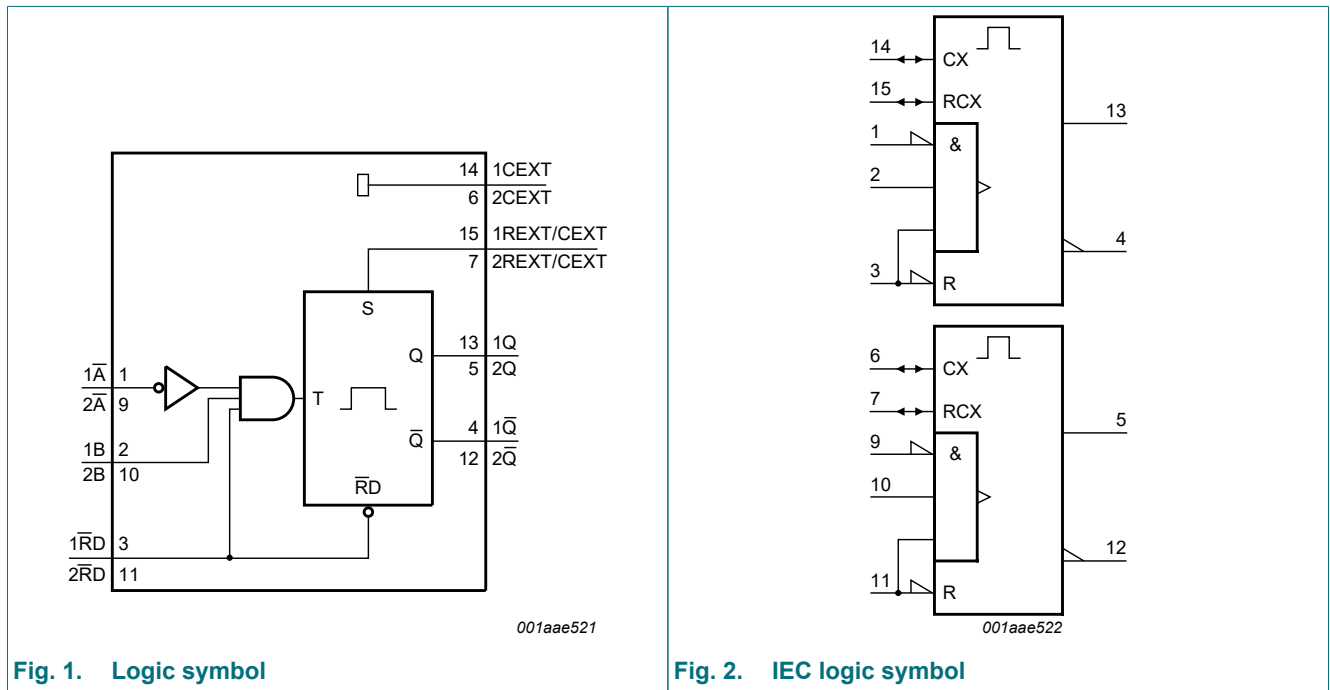
- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and from  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$
- Wide supply voltage range from 2.0 V to 5.5 V
- DC triggered from active HIGH or active LOW inputs
- Retriggerable for very long pulses up to 100 % duty factor
- Direct reset terminates output pulse
- Overvoltage tolerant inputs to 5.5 V
- All inputs have a Schmitt-trigger action
- High noise immunity
- Input levels:
  - For 74AHC123A-Q100: CMOS level
  - For 74AHCT123A-Q100: TTL level
- ESD protection:
  - MIL-STD-883, method 3015 exceeds 2000 V
  - HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V ( $C = 200\text{ pF}$ ,  $R = 0\text{ }\Omega$ )
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level A
- Multiple package options
- DHVQFN package with Side-Wettable Flanks enabling Automatic Optical Inspection (AOI) of solder joints

### 3. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74AHC123AD-Q100	-40 °C to +125 °C	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1
74AHCT123AD-Q100				
74AHC123APW-Q100	-40 °C to +125 °C	TSSOP16	plastic thin shrink small outline package; 16 leads; body width 4.4 mm	SOT403-1
74AHCT123APW-Q100				
74AHC123ABQ-Q100	-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
74AHCT123ABQ-Q100				

### 4. Functional diagram



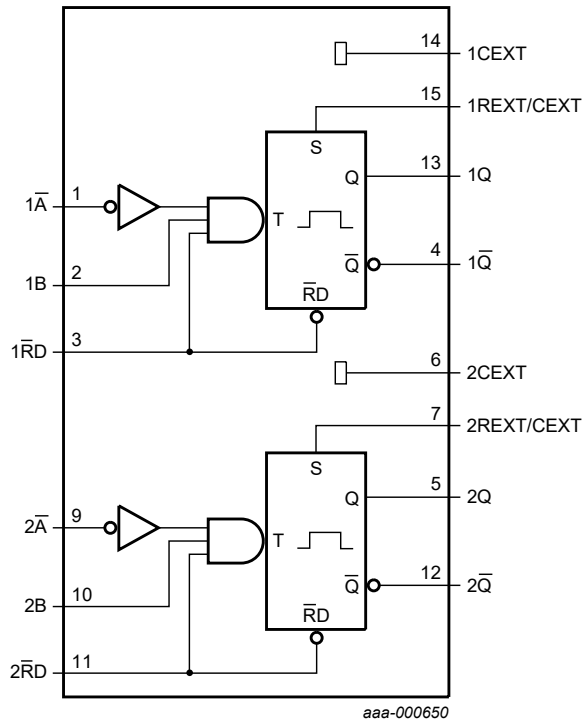
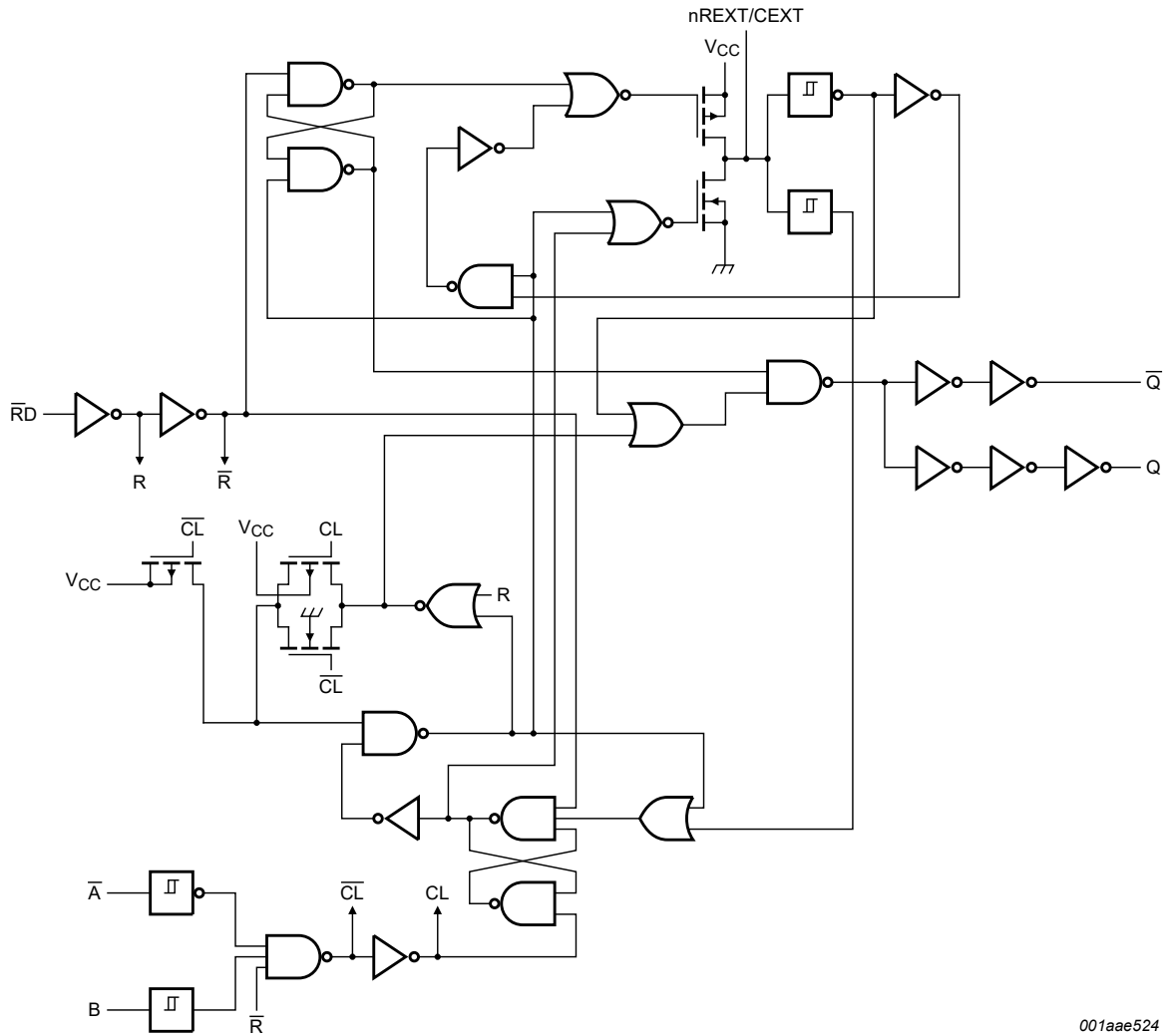


Fig. 3. Functional diagram



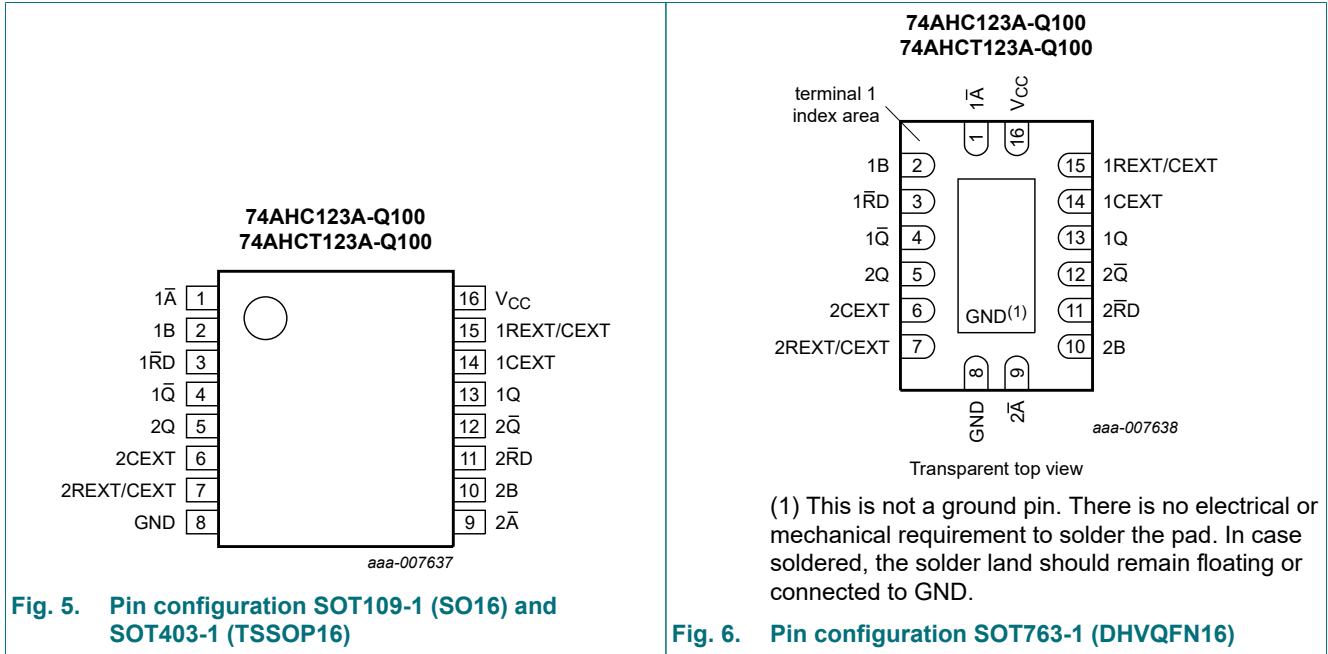
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For minimum noise generation it is recommended to ground pins 6 (2CEXT) and 14 (1CEXT) externally to pin 8 (GND).

Fig. 4. Functional diagram

## 5. Pinning information

### 5.1. Pinning



### 5.2. Pin description

Table 2. Pin description

Symbol	Pin	Description
1A	1	negative-edge triggered input 1
1B	2	positive-edge triggered input 1
1RD	3	direct reset LOW and positive-edge triggered input 1
1Q	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)
2A	9	negative-edge triggered input 2
2B	10	positive-edge triggered input 2
2RD	11	direct reset LOW and positive-edge triggered input 2
2Q	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 <sub>CC</sub>	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	
nRD	n $\bar{A}$	nB	nQ	n $\bar{Q}$
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 multivibrator was triggered before this condition was established, the pulse will continue as programmed.

## 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 <sub>CC</sub>	supply voltage		-0.5	+7.0	V
V <sub>I</sub>	input voltage		-0.5	+7.0	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < -0.5 V [1]	-20	-	mA
I <sub>OK</sub>	output clamping current	V <sub>O</sub> < -0.5 V or V <sub>O</sub> > V <sub>CC</sub> + 0.5 V [1]	-	±20	mA
I <sub>O</sub>	output current	V <sub>O</sub> = -0.5 V to (V <sub>CC</sub> + 0.5 V)	-	±25	mA
I <sub>CC</sub>	supply current		-	75	mA
I <sub>GND</sub>	ground current		-75	-	mA
T <sub>stg</sub>	storage temperature		-65	+150	°C
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = -40 °C to +125 °C [2]	-	500	mW

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[2] For SOT109-1 (SO16) package: P<sub>tot</sub> derates linearly with 12.4 mW/K above 110 °C.

For SOT403-1 (TSSOP16) package: P<sub>tot</sub> derates linearly with 8.5 mW/K above 91 °C.

For SOT763-1 (DHVQFN16) package: P<sub>tot</sub> derates linearly with 11.2 mW/K above 106 °C.

## 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	74AHC123A-Q100			74AHCT123A-Q100			Unit
			Min	Typ	Max	Min	Typ	Max	
V <sub>CC</sub>	supply voltage		2.0	5.0	5.5	4.5	5.0	5.5	V
V <sub>I</sub>	input voltage		0	-	5.5	0	-	5.5	V
V <sub>O</sub>	output voltage		0	-	V <sub>CC</sub>	0	-	V <sub>CC</sub>	V
T <sub>amb</sub>	ambient temperature		-40	+25	+125	-40	+25	+125	°C
Δt/ΔV	input transition rise and fall rate	V <sub>CC</sub> = 3.3 V ± 0.3 V	-	-	100	-	-	-	ns/V
		V <sub>CC</sub> = 5.0 V ± 0.5 V	-	-	20	-	-	20	ns/V

## 9. Static characteristics

**Table 6. Static characteristics**

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	
<b>74AHC123A-Q100</b>										
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 2.0 V	1.5	-	-	1.5	-	1.5	-	V
		V <sub>CC</sub> = 3.0 V	2.1	-	-	2.1	-	2.1	-	V
		V <sub>CC</sub> = 5.5 V	3.85	-	-	3.85	-	3.85	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.0 V	-	-	0.5	-	0.5	-	0.5	V
		V <sub>CC</sub> = 3.0 V	-	-	0.9	-	0.9	-	0.9	V
		V <sub>CC</sub> = 5.5 V	-	-	1.65	-	1.65	-	1.65	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>								
		I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 2.0 V	1.9	2.0	-	1.9	-	1.9	-	V
		I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 3.0 V	2.9	3.0	-	2.9	-	2.9	-	V
		I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 4.5 V	4.4	4.5	-	4.4	-	4.4	-	V
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V	2.58	-	-	2.48	-	2.40	-	V
	I <sub>O</sub> = -8.0 mA; V <sub>CC</sub> = 4.5 V	3.94	-	-	3.8	-	3.70	-	V	
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>								
		I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 2.0 V	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 3.0 V	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 4.5 V	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.36	-	0.44	-	0.55	V
	I <sub>O</sub> = 8.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.36	-	0.44	-	0.55	V	

## Dual retriggerable monostable multivibrator with reset

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
I <sub>I</sub>	input leakage current	V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 0 V to 5.5 V								
		nREXT/CEXT [1]	-	-	±0.25	-	±2.5	-	±10.0	µA
		pins n $\bar{A}$ , nB, n $\bar{R}$ D	-	-	±0.1	-	±1.0	-	±2.0	µA
I <sub>CC</sub>	supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	4.0	-	40	-	80	µA
		active state (per circuit); V <sub>I</sub> = V <sub>CC</sub> or GND [1]								
		V <sub>CC</sub> = 3.0 V	-	160	250	-	280	-	280	µA
		V <sub>CC</sub> = 4.5 V	-	380	500	-	650	-	650	µA
		V <sub>CC</sub> = 5.5 V	-	560	750	-	975	-	975	µA
C <sub>I</sub>	input capacitance		-	5.0	10	-	10	-	10	pF
C <sub>O</sub>	output capacitance		-	4.0	-	-	-	-	-	pF
<b>74AHCT123A-Q100</b>										
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	-	-	2.0	-	2.0	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.8	-	0.8	-	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V								
		I <sub>O</sub> = -50 µA	4.4	4.5	-	4.4	-	4.4	-	V
		I <sub>O</sub> = -8.0 mA	3.94	-	-	3.8	-	3.70	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V								
		I <sub>O</sub> = 50 µA	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 8.0 mA	-	-	0.36	-	0.44	-	0.55	V
I <sub>I</sub>	input leakage current	nREXT/CEXT; [1] V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 0 V to 5.5 V	-	-	±0.25	-	±2.5	-	±10.0	µA
		pins n $\bar{A}$ , nB, n $\bar{R}$ D; V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V	-	-	±0.1	-	±1.0	-	±2.0	µA
I <sub>CC</sub>	supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	4.0	-	40	-	80	µA
		active state (per circuit); V <sub>I</sub> = V <sub>CC</sub> or GND [1]								
		V <sub>CC</sub> = 4.5 V	-	380	500	-	650	-	650	µA
		V <sub>CC</sub> = 5.5 V	-	560	750	-	975	-	975	µA
C <sub>I</sub>	input capacitance		-	3	10	-	10	-	10	pF
C <sub>O</sub>	output capacitance		-	4.0	-	-	-	-	-	pF

[1] Voltage on nREXT/CEXT = 0.5 × V<sub>CC</sub> and pin nREXT/CEXT in OFF-state during test.



## 10. Dynamic characteristics

Table 7. Dynamic characteristics

$GND = 0\text{ V}$ ; For test circuit see Fig. 12.

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
<b>74AHC123A-Q100</b>										
$t_{pd}$	propagation delay	$n\bar{A}$ and $nB$ to $nQ$ and $n\bar{Q}$ ; see Fig. 7 [2]								
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}; C_L = 15\text{ pF}$	-	7.4	20.6	1.0	24.0	1.0	26.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}; C_L = 50\text{ pF}$	-	10.5	24.1	1.0	27.5	1.0	30.0	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}; C_L = 15\text{ pF}$	-	5.1	12.0	1.0	14.0	1.0	15.5	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}; C_L = 50\text{ pF}$	-	7.3	14.0	1.0	16.0	1.0	17.5	ns
		$n\bar{RD}$ to $nQ$ and $n\bar{Q}$ ; see Fig. 7 [2]								
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}; C_L = 15\text{ pF}$	-	8.2	22.4	1.0	26.0	1.0	28.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}; C_L = 50\text{ pF}$	-	11.7	25.9	1.0	29.5	1.0	32.0	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}; C_L = 15\text{ pF}$	-	5.6	12.9	1.0	15.0	1.0	16.5	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}; C_L = 50\text{ pF}$	-	8.1	14.9	1.0	17.0	1.0	19.0	ns
		$n\bar{RD}$ to $nQ$ and $n\bar{Q}$ (reset); see Fig. 7 [2]								
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}; C_L = 15\text{ pF}$	-	6.4	15.8	1.0	18.5	1.0	20.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}; C_L = 50\text{ pF}$	-	9.2	19.3	1.0	22.0	1.0	24.5	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}; C_L = 15\text{ pF}$	-	4.4	9.4	1.0	11.0	1.0	12.0	ns
$V_{CC} = 4.5\text{ V to }5.5\text{ V}; C_L = 50\text{ pF}$	-	6.3	11.4	1.0	13.0	1.0	14.5	ns		
$t_w$	pulse width	inputs; $n\bar{A} = \text{LOW}$ ; see Fig. 7								
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	5.0	-	-	5.0	-	5.0	-	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	5.0	-	-	5.0	-	5.0	-	ns
		inputs; $nB = \text{HIGH}$ ; see Fig. 7								
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	5.0	-	-	5.0	-	5.0	-	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	5.0	-	-	5.0	-	5.0	-	ns
		inputs; $n\bar{RD} = \text{LOW}$ ; see Fig. 7								
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	5.0	-	-	5.0	-	5.0	-	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	5.0	-	-	5.0	-	5.0	-	ns
		outputs; $n\bar{Q} = \text{LOW}$ and $nQ = \text{HIGH}$ ; $C_L = 50\text{ pF}$ ; see Fig. 7, Fig. 8, Fig. 9 and Fig. 10 [3]								
		$C_{EXT} = 28\text{ pF}; R_{EXT} = 2\text{ k}\Omega$								
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	-	115	240	-	300	-	300	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	100	200	-	240	-	240	ns
		$C_{EXT} = 0.01\text{ }\mu\text{F}; R_{EXT} = 10\text{ k}\Omega$								
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	90	100	110	90	110	85	115	$\mu\text{s}$
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	90	100	110	90	110	85	115	$\mu\text{s}$
		$C_{EXT} = 0.1\text{ }\mu\text{F}; R_{EXT} = 10\text{ k}\Omega$								
$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	0.9	1	1.1	0.9	1.1	0.85	1.15	ms		
$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	0.9	1	1.1	0.9	1.1	0.85	1.15	ms		

## Dual retriggerable monostable multivibrator with reset

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
$t_{\text{trig}}$	retrigger time	$n\bar{A}$ to nB; $C_{\text{EXT}} = 100 \text{ pF}$ ; $R_{\text{EXT}} = 1 \text{ k}\Omega$ ; $C_L = 50 \text{ pF}$ ; see <a href="#">Fig. 8</a> and <a href="#">Fig. 10</a>								
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	-	60	-	-	-	-	-	ns
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	-	39	-	-	-	-	-	ns
		$n\bar{A}$ to nB; $C_{\text{EXT}} = 0.01 \text{ }\mu\text{F}$ ; $R_{\text{EXT}} = 1 \text{ k}\Omega$ ; $C_L = 50 \text{ pF}$ ; see <a href="#">Fig. 8</a> and <a href="#">Fig. 10</a>								
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	-	1.5	-	-	-	-	-	$\mu\text{s}$
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	-	1.2	-	-	-	-	-	$\mu\text{s}$
$C_{\text{PD}}$	power dissipation capacitance	$C_L = 50 \text{ pF}$ ; $f_i = 1 \text{ MHz}$ ; $V_i = \text{GND to } V_{\text{CC}}$	[4]	-	57	-	-	-	-	pF
<b>74AHCT123A-Q100</b>										
$t_{\text{pd}}$	propagation delay	$n\bar{A}$ and nB to nQ and $n\bar{Q}$ ; see <a href="#">Fig. 7</a> [2]								
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$ ; $C_L = 15 \text{ pF}$	-	5.0	12.0	1.0	14.0	1.0	15.5	ns
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$ ; $C_L = 50 \text{ pF}$	-	7.1	14.0	1.0	16.0	1.0	17.5	ns
		$n\bar{R}\text{D}$ to nQ and $n\bar{Q}$ ; see <a href="#">Fig. 7</a> [2]								
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$ ; $C_L = 15 \text{ pF}$	-	5.2	12.9	1.0	15.0	1.0	16.5	ns
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$ ; $C_L = 50 \text{ pF}$	-	7.5	14.9	1.0	17.0	1.0	18.5	ns
		$n\bar{R}\text{D}$ to nQ and $n\bar{Q}$ (reset); see <a href="#">Fig. 7</a> [2]								
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$ ; $C_L = 15 \text{ pF}$	-	4.7	9.4	1.0	11.0	1.0	12.0	ns
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$ ; $C_L = 50 \text{ pF}$	-	6.7	11.4	1.0	13.0	1.0	14.5	ns
$t_{\text{w}}$	pulse width	inputs; $n\bar{A} = \text{LOW}$ ; $C_L = 50 \text{ pF}$ ; see <a href="#">Fig. 7</a>								
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	5.0	-	-	5.0	-	5.0	-	ns
		inputs; nB = HIGH; $C_L = 50 \text{ pF}$ ; see <a href="#">Fig. 7</a>								
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	5.0	-	-	5.0	-	5.0	-	ns
		inputs; $n\bar{R}\text{D} = \text{LOW}$ ; $C_L = 50 \text{ pF}$ ; see <a href="#">Fig. 7</a>								
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	5.0	-	-	5.0	-	5.0	-	ns
		outputs; $n\bar{Q} = \text{LOW}$ and nQ = HIGH; $C_L = 50 \text{ pF}$ ; $C_{\text{EXT}} = 28 \text{ pF}$ ; $R_{\text{EXT}} = 2 \text{ k}\Omega$ ; see <a href="#">Fig. 7</a> , <a href="#">Fig. 8</a> , <a href="#">Fig. 9</a> and <a href="#">Fig. 10</a>	[3]							
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	-	100	200	-	240	-	240	ns
		$C_{\text{EXT}} = 0.01 \text{ }\mu\text{F}$ ; $R_{\text{EXT}} = 10 \text{ k}\Omega$								
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	90	100	110	90	110	85	115	$\mu\text{s}$
$C_{\text{EXT}} = 0.1 \text{ }\mu\text{F}$ ; $R_{\text{EXT}} = 10 \text{ k}\Omega$										
$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	0.9	1	1.1	0.9	1.1	0.85	1.15	ms		

## Dual retriggerable monostable multivibrator with reset

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
$t_{\text{trig}}$	retrigger time	$n\bar{A}$ to nB; $C_{\text{EXT}} = 100 \text{ pF}$ ; $R_{\text{EXT}} = 1 \text{ k}\Omega$ ; $C_L = 50 \text{ pF}$ ; see Fig. 8 and Fig. 10								
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	-	60	-	-	-	-	-	ns
		$n\bar{A}$ to nB; $C_{\text{EXT}} = 0.01 \text{ }\mu\text{F}$ ; $R_{\text{EXT}} = 1 \text{ k}\Omega$ ; $C_L = 50 \text{ pF}$ ; see Fig. 8 and Fig. 10								
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	-	1.5	-	-	-	-	-	$\mu\text{s}$
$C_{\text{PD}}$	power dissipation capacitance	$C_L = 50 \text{ pF}$ ; $f_i = 1 \text{ MHz}$ ; $V_I = \text{GND to } V_{\text{CC}}$	[4]	58	-	-	-	-	-	pF
<b>External components</b>										
$R_{\text{EXT}}$	external resistance	$V_{\text{CC}} = 2.0 \text{ V}$	5	-	-	-	-	-	-	k $\Omega$
		$V_{\text{CC}} > 3.0 \text{ V}$	1	-	-	-	-	-	-	k $\Omega$
$C_{\text{EXT}}$	external capacitance	$V_{\text{CC}} = 2.0 \text{ V}$	[5]	-	-	-	-	-	-	pF
		$V_{\text{CC}} > 3.0 \text{ V}$	[5]	-	-	-	-	-	-	pF

[1] Typical values are measured at nominal supply voltage ( $V_{\text{CC}} = 3.3 \text{ V}$  and  $V_{\text{CC}} = 5.0 \text{ V}$ ).

[2]  $t_{\text{pd}}$  is the same as  $t_{\text{PLH}}$  and  $t_{\text{PHL}}$ ;  $C_{\text{EXT}} = 0 \text{ pF}$ ;  $R_{\text{EXT}} = 5 \text{ k}\Omega$ .

[3] For  $C_{\text{EXT}} \geq 10 \text{ nF}$  the typical value of the pulse width  $t_W (\mu\text{s}) = C_{\text{EXT}} (\text{nF}) \times R_{\text{EXT}} (\text{k}\Omega)$ .

[4]  $C_{\text{PD}}$  is used to determine the dynamic power dissipation  $P_D (\mu\text{W})$ .

$$P_D = C_{\text{PD}} \times V_{\text{CC}}^2 \times f_i + \sum (C_L \times V_{\text{CC}}^2 \times f_o) \text{ where:}$$

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

$C_L$  = output load capacitance in pF;

$V_{\text{CC}}$  = supply voltage in V.

[5]  $C_{\text{EXT}}$  has no limits.

10.1. Waveforms

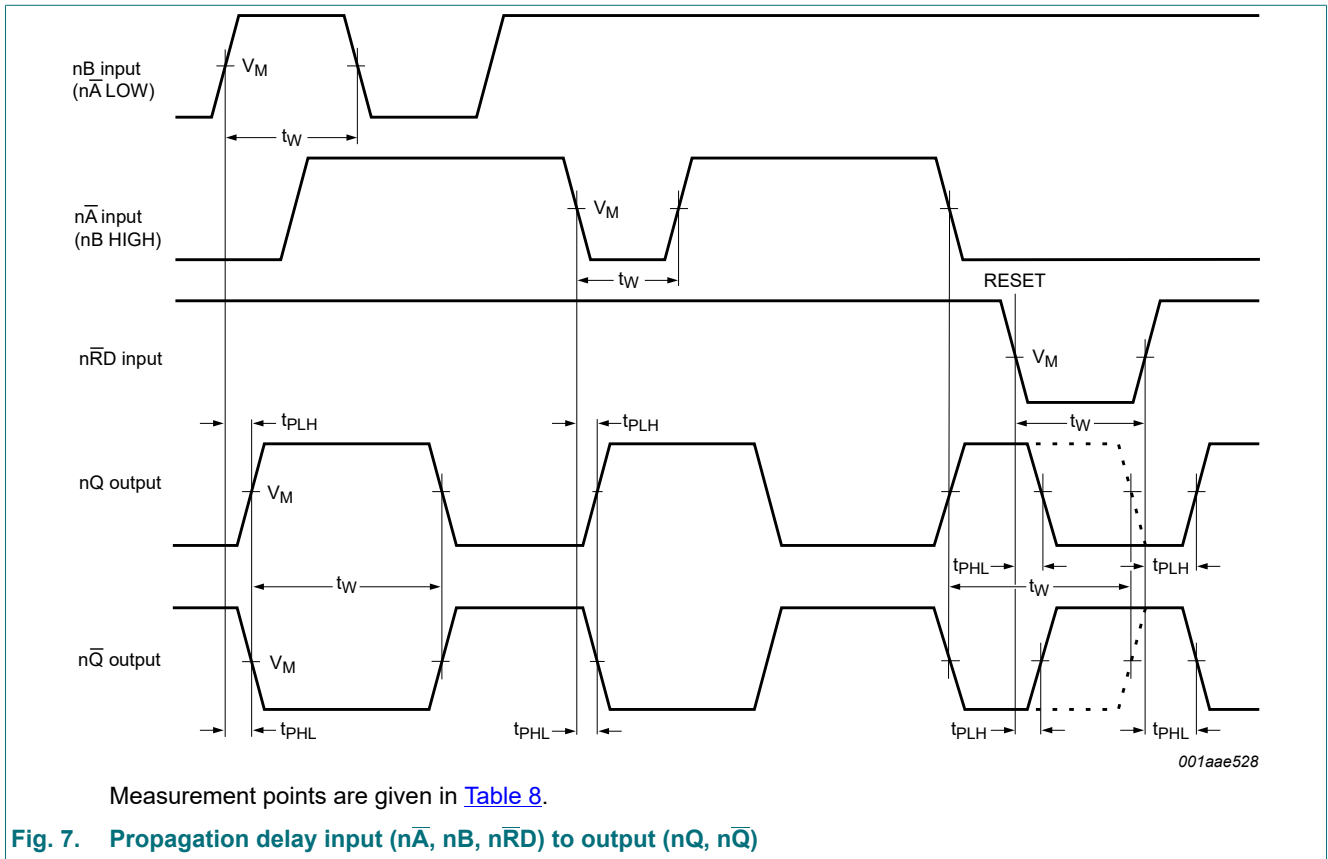
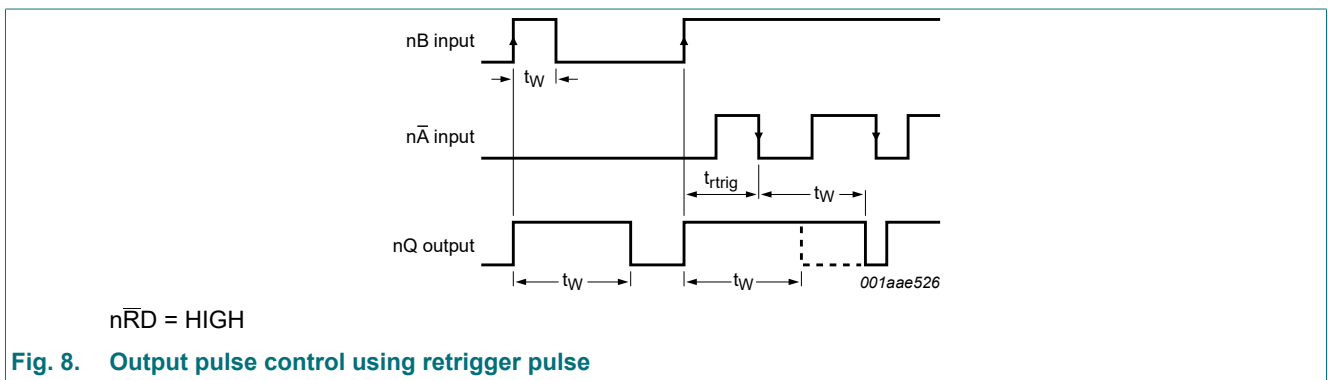
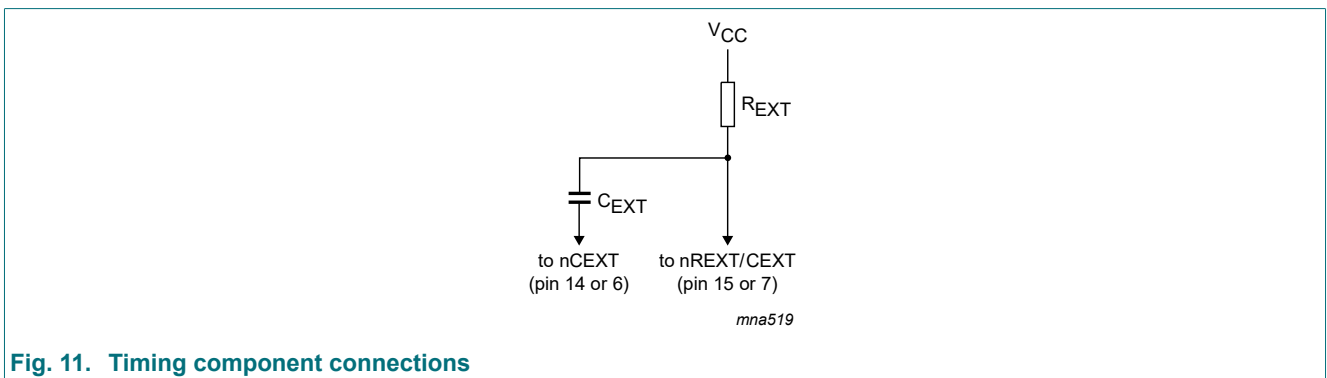
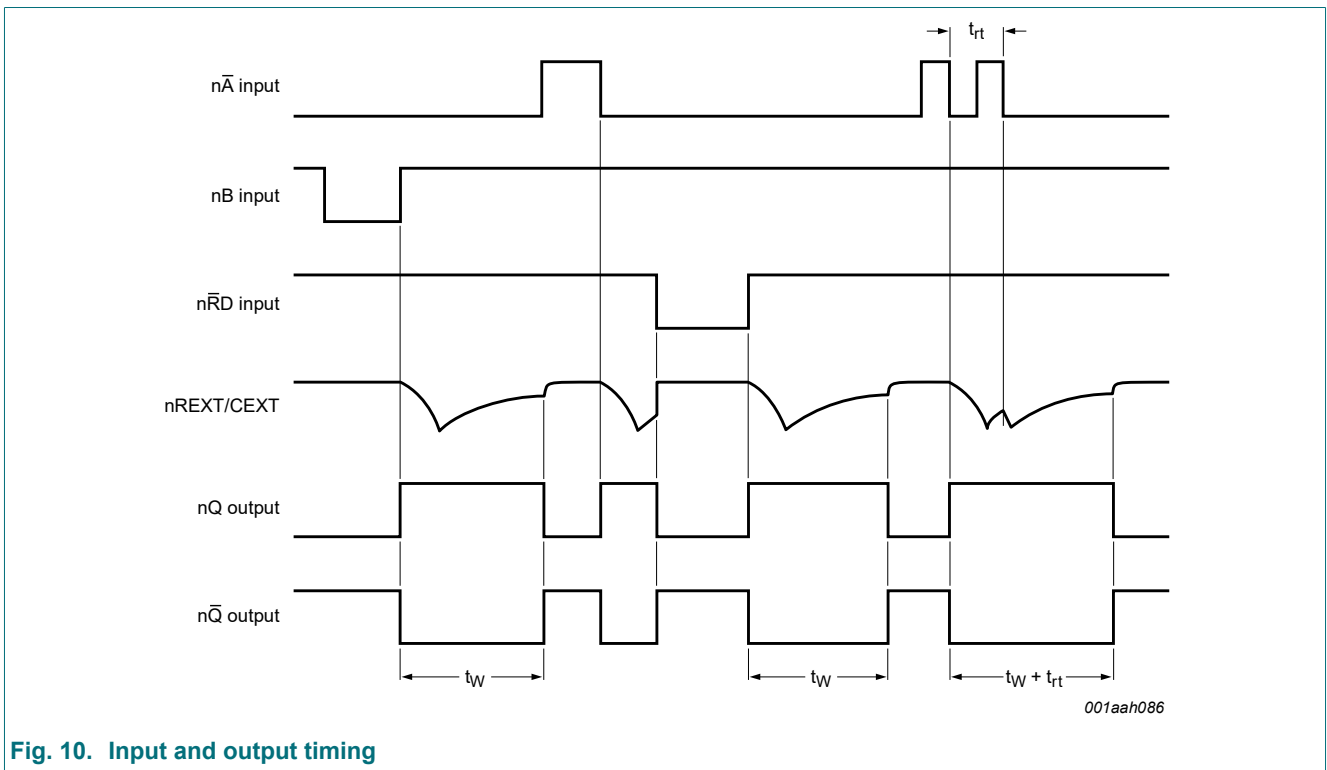
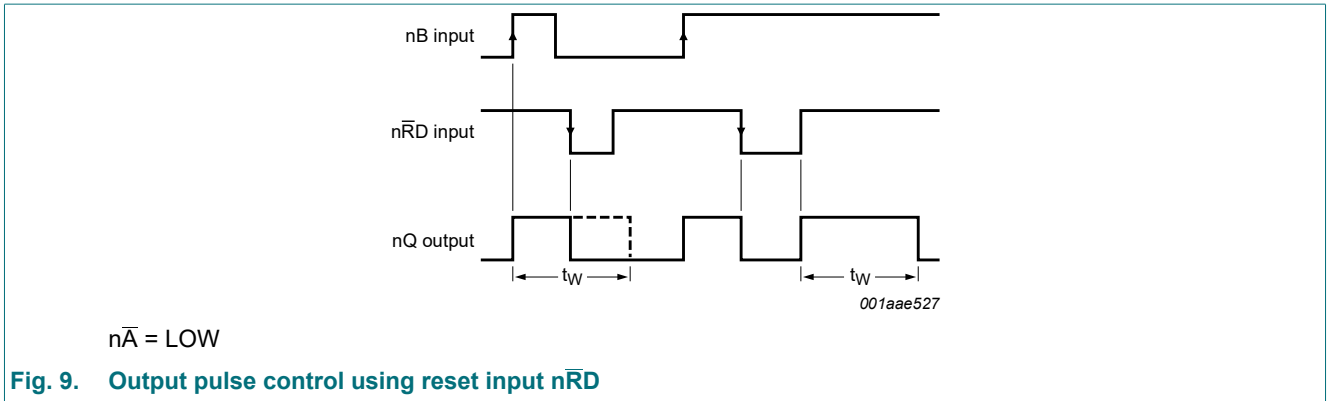


Table 8. Measurement points

Type	Input	Output
	$V_M$	$V_M$
74AHC123A-Q100	$0.5V_{CC}$	$0.5V_{CC}$
74AHCT123A-Q100	1.5 V	$0.5V_{CC}$





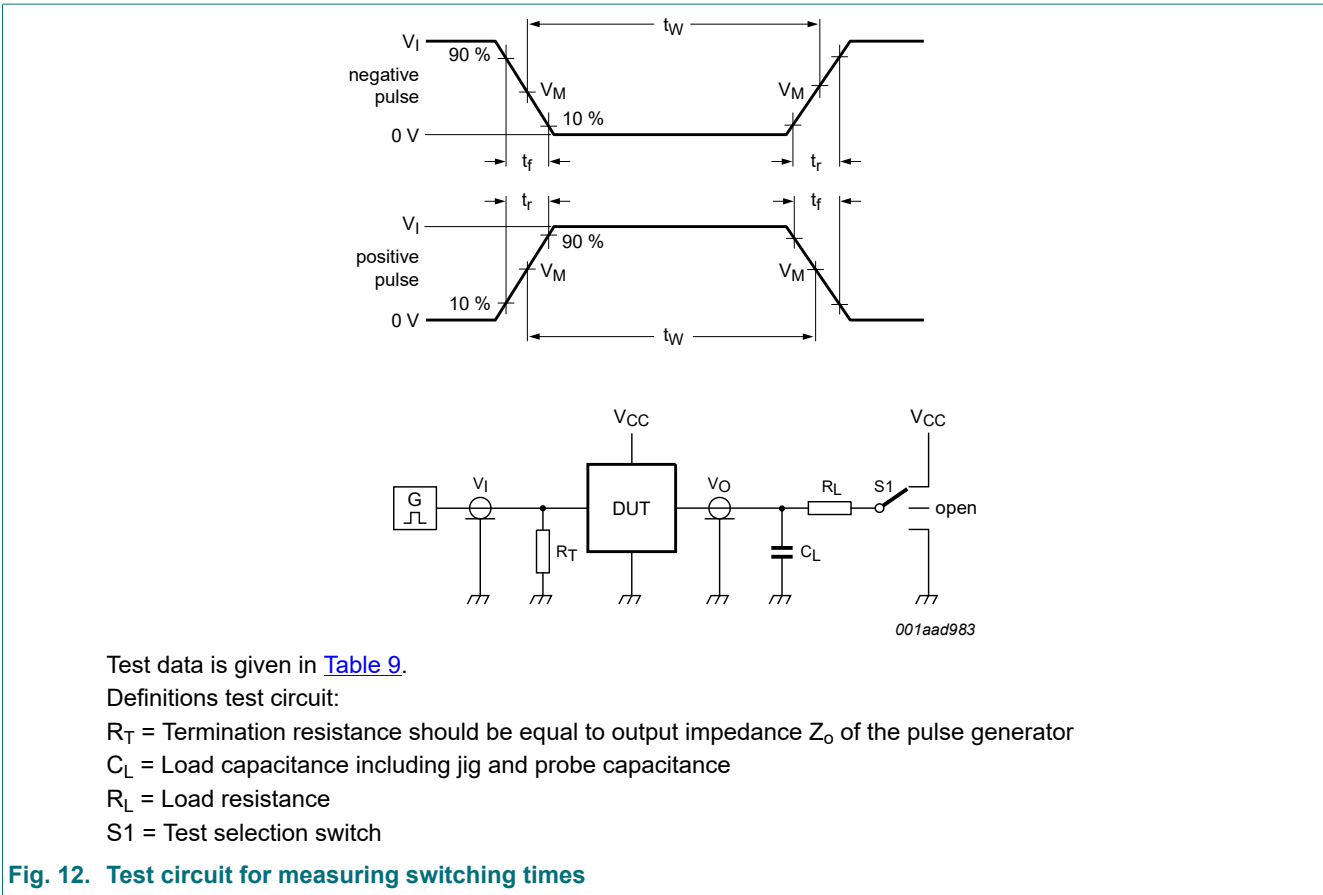


Fig. 12. Test circuit for measuring switching times

Table 9. Test data

Type	Input		Load		S1 position		
	$V_I$	$t_r, t_f$	$C_L$	$R_L$	$t_{PHL}, t_{PLH}$	$t_{PZH}, t_{PHZ}$	$t_{PZL}, t_{PLZ}$
74AHC123A-Q100	$V_{CC}$	3.0 ns	15 pF, 50 pF	1 k $\Omega$	open	GND	$V_{CC}$
74AHCT123A-Q100	3.0 V	3.0 ns	15 pF, 50 pF	1 k $\Omega$	open	GND	$V_{CC}$

### 11. Package outline

SO16: plastic small outline package; 16 leads; body width 3.9 mm

SOT109-1



Fig. 13. Package outline SOT109-1 (SO16)

TSSOP16: plastic thin shrink small outline package; 16 leads; body width 4.4 mm

SOT403-1



Fig. 14. Package outline SOT403-1 (TSSOP16)



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

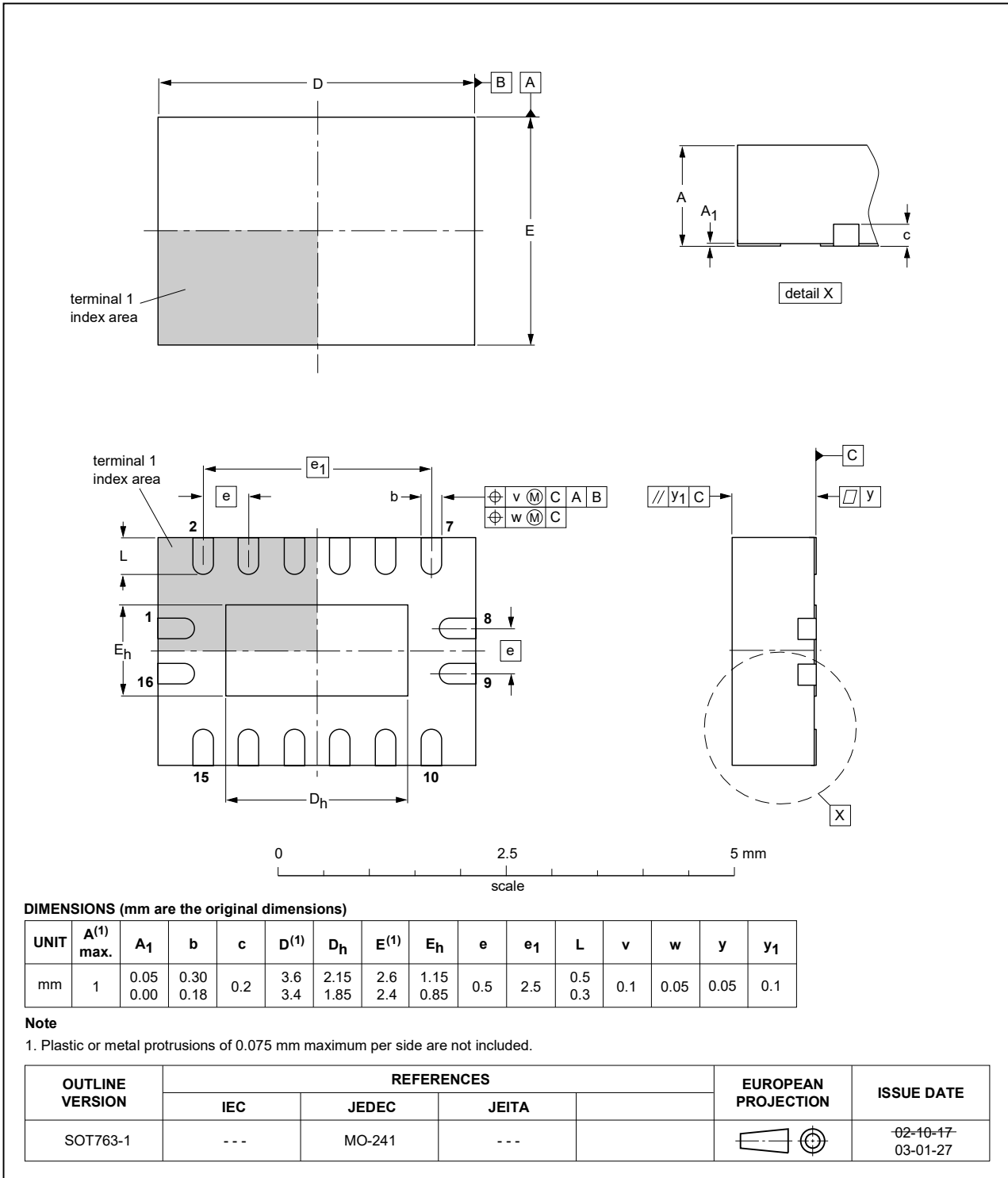


Fig. 15. Package outline SOT763-1 (DHVQFN16)

## 12. Abbreviations

Table 10. Abbreviations

Acronym	Description
CDM	Charged-Device Model
CMOS	Complementary Metal Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
MIL	Military
MM	Machine Model
TTL	Transistor-Transistor Logic

## 13. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AHC_AHCT123A_Q100 v.2	20200617	Product data sheet	-	74AHC_AHCT123A_Q100 v.1
Modifications:	<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li><a href="#">Section 1</a> and <a href="#">Section 2</a> updated.</li> <li><a href="#">Table 4</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li> </ul>			
74AHC_AHCT123A_Q100 v.1	20130523	Product data sheet	-	-

## 14. Legal information

### Data sheet status

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

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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