

# 74AHC123A; 74AHCT123A

Dual retriggerable monostable multivibrator with reset

Rev. 7 — 28 February 2024

Product data sheet

## 1. General description

The 74AHC123A; 74AHCT123A 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 ( $nA$  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.

## 2. Features and benefits

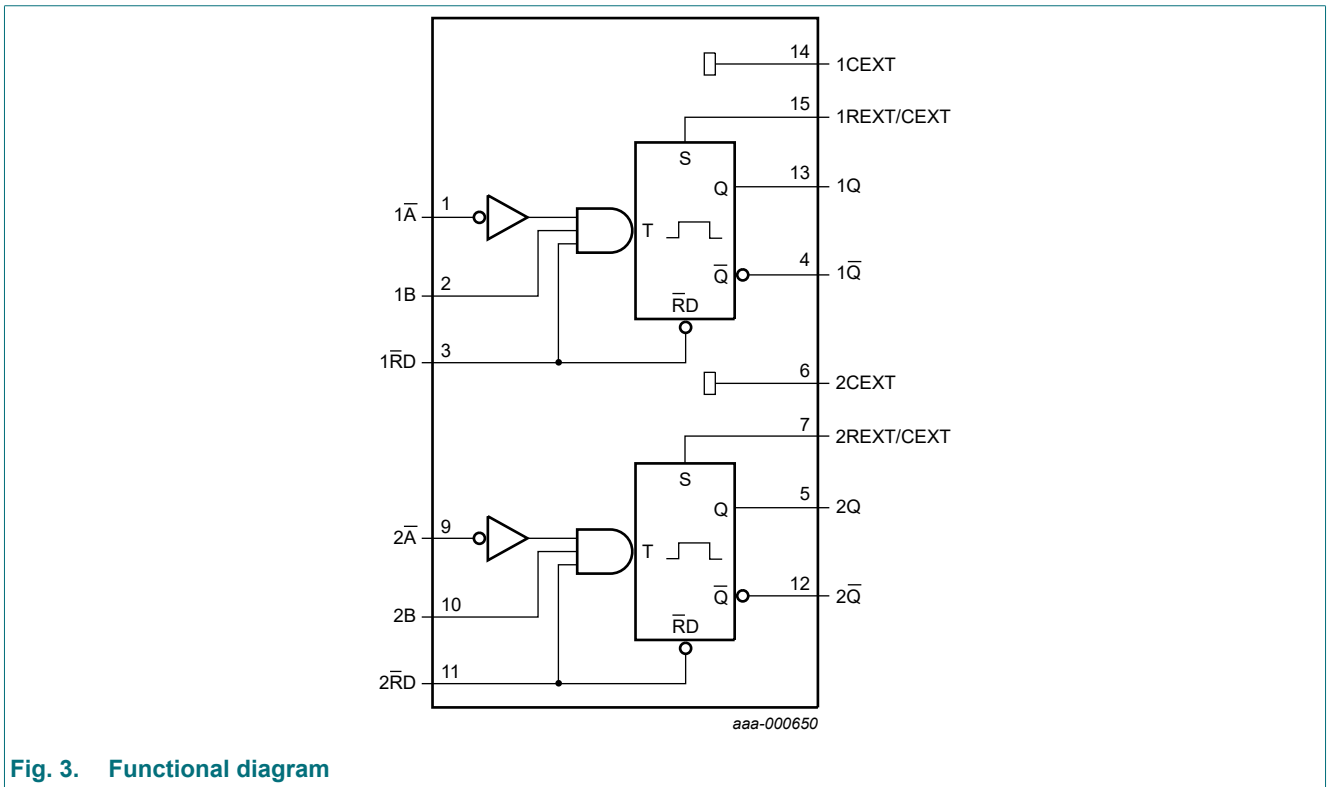
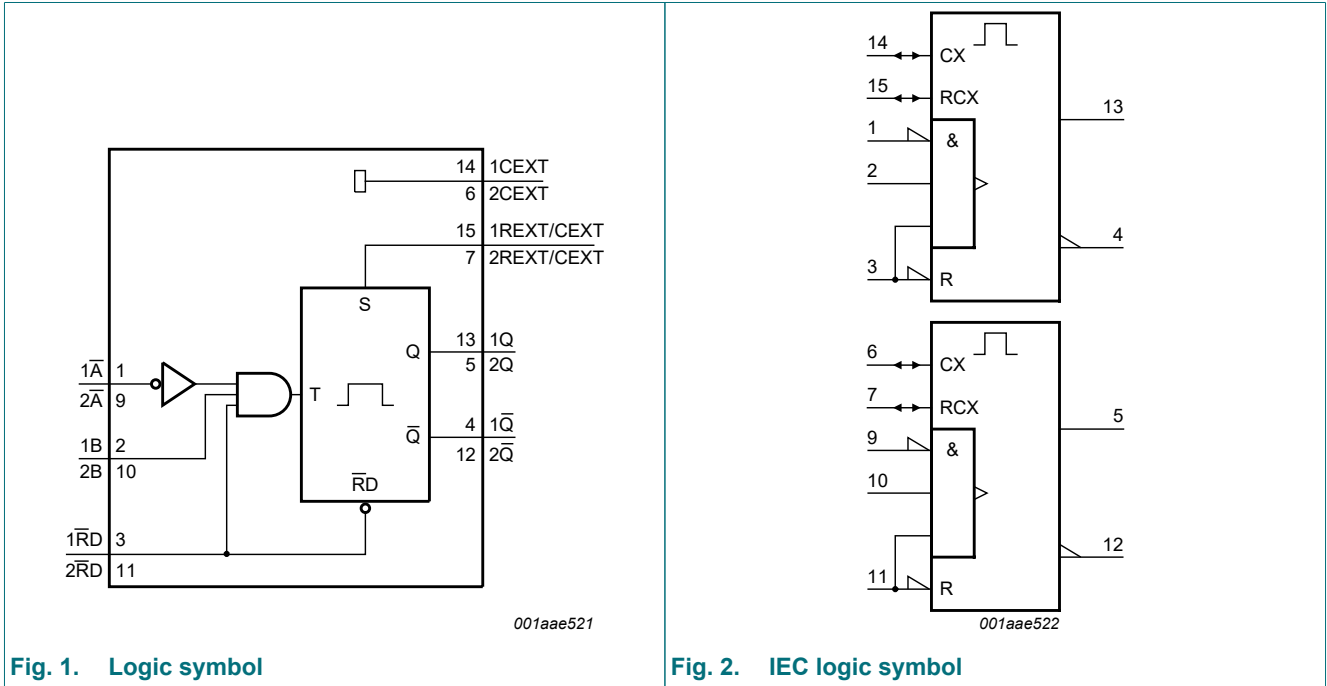
- Wide supply voltage range from 2.0 V to 5.5 V
- DC triggered from active HIGH or active LOW inputs
- Retriggerable for very long pulses up to 100 % duty factor
- Direct reset terminates output pulse
- Overvoltage tolerant inputs to 5.5 V
- All inputs have a Schmitt-trigger action
- High noise immunity
- Input levels:
  - For 74AHC123A: CMOS level
  - For 74AHCT123A: TTL level
- Latch-up performance exceeds 100 mA per JEDEC 78 Class II Level A
- 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

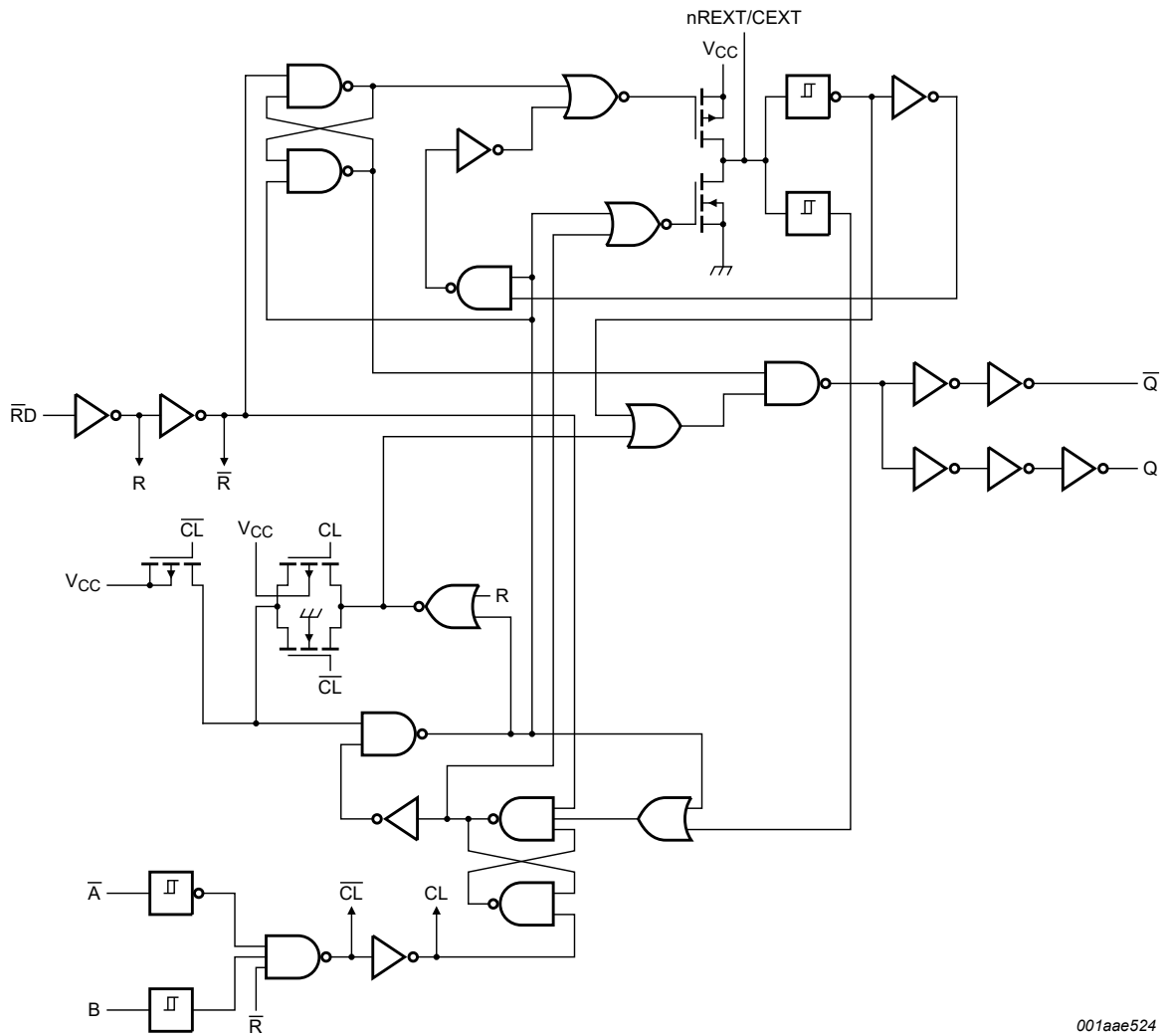
## 3. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
<a href="#">74AHC123AD</a> <a href="#">74AHCT123AD</a>	-40 °C to +125 °C	SO16	plastic small outline package; 16 leads; body width 3.9 mm	<a href="#">SOT109-1</a>
<a href="#">74AHC123APW</a> <a href="#">74AHCT123APW</a>	-40 °C to +125 °C	TSSOP16	plastic thin shrink small outline package; 16 leads; body width 4.4 mm	<a href="#">SOT403-1</a>
<a href="#">74AHC123ABQ</a> <a href="#">74AHCT123ABQ</a>	-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	<a href="#">SOT763-1</a>

4. Functional diagram



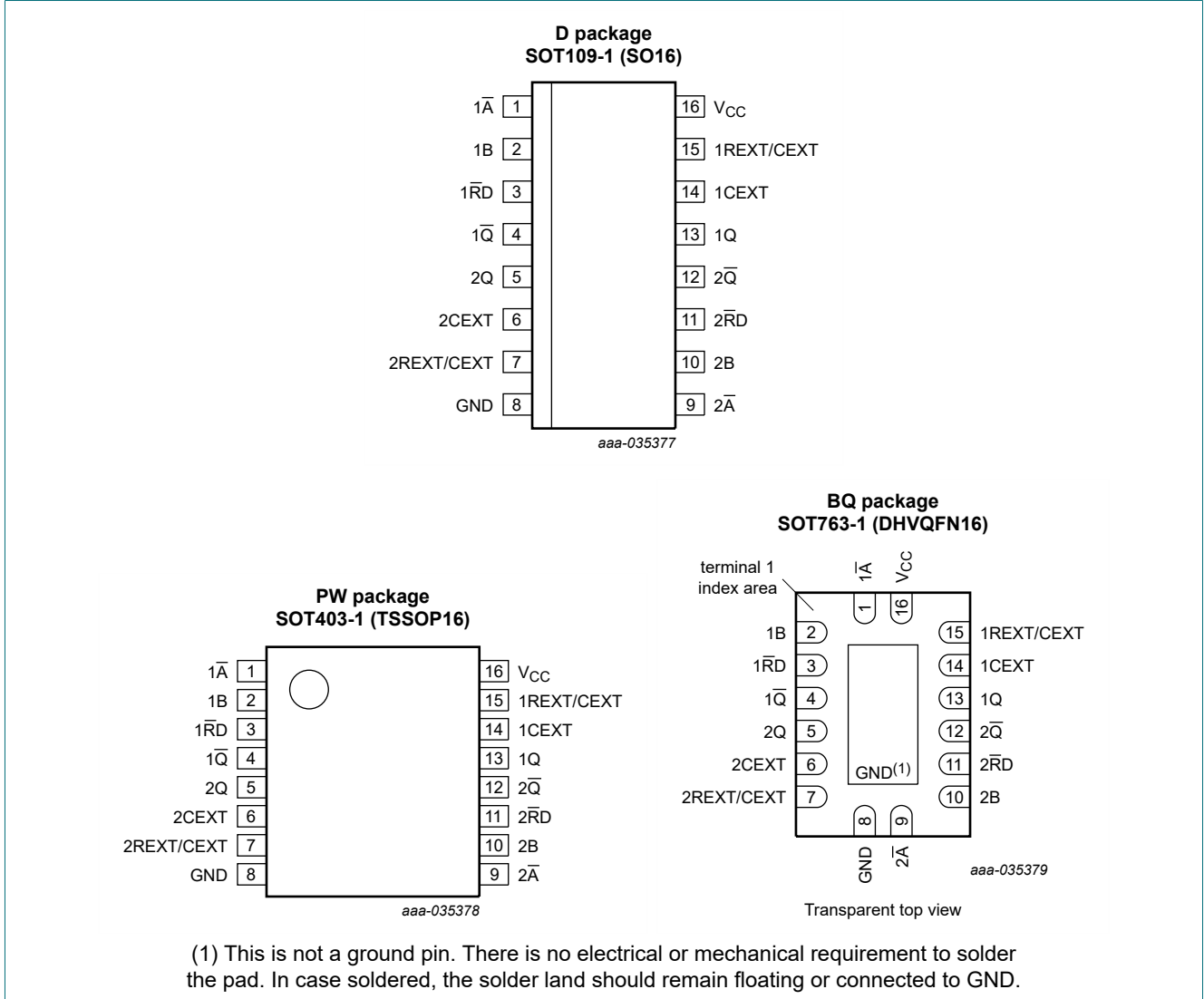


For minimum noise generation it is recommended to ground pins 6 (2CEXT) and 14 (1CEXT) externally to pin 8 (GND).

**Fig. 4. Functional diagram**

5. Pinning information

5.1. Pinning



## 5.2. Pin description

Table 2. Pin description

Symbol	Pin	Description
1 $\bar{A}$	1	negative-edge triggered input 1
1B	2	positive-edge triggered input 1
1 $\bar{R}D$	3	direct reset LOW and positive-edge triggered input 1
1 $\bar{Q}$	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 $\bar{A}$	9	negative-edge triggered input 2
2B	10	positive-edge triggered input 2
2 $\bar{R}D$	11	direct reset LOW and positive-edge triggered input 2
2 $\bar{Q}$	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 <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	
n $\bar{R}D$	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
$V_{CC}$	supply voltage		-0.5	+7.0	V
$V_I$	input voltage		-0.5	+7.0	V
$I_{IK}$	input clamping current	$V_I < -0.5$ V [1]	-20	-	mA
$I_{OK}$	output clamping current	$V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V [1]	-	$\pm 20$	mA
$I_O$	output current	$V_O = -0.5$ V to $(V_{CC} + 0.5$ V)	-	$\pm 25$	mA
$I_{CC}$	supply current		-	75	mA
$I_{GND}$	ground current		-75	-	mA
$T_{stg}$	storage temperature		-65	+150	°C
$P_{tot}$	total power dissipation	$T_{amb} = -40$ °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:  $P_{tot}$  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**

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

Symbol	Parameter	Conditions	74AHC123A			74AHCT123A			Unit
			Min	Typ	Max	Min	Typ	Max	
$V_{CC}$	supply voltage		2.0	5.0	5.5	4.5	5.0	5.5	V
$V_I$	input voltage		0	-	5.5	0	-	5.5	V
$V_O$	output voltage		0	-	$V_{CC}$	0	-	$V_{CC}$	V
$T_{amb}$	ambient temperature		-40	+25	+125	-40	+25	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CC} = 3.3$ V $\pm$ 0.3 V	-	-	100	-	-	-	ns/V
		$V_{CC} = 5.0$ V $\pm$ 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</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		
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 nA, nB, nRD	-	-	±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

## 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	
<b>74AHCT123A</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; V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 0 V to 5.5 V [1]	-	-	±0.25	-	±2.5	-	±10.0	µA
		pins nĀ, nB, nRD; 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 V; For test circuit see Fig. 10.

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</b>										
t <sub>pd</sub>	propagation delay	n $\bar{A}$ and nB to nQ and n $\bar{Q}$ ; see Fig. 5 [2]								
		V <sub>CC</sub> = 3.0 V to 3.6 V; C <sub>L</sub> = 15 pF	-	7.4	20.6	1.0	24.0	1.0	26.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V; C <sub>L</sub> = 50 pF	-	10.5	24.1	1.0	27.5	1.0	30.0	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V; C <sub>L</sub> = 15 pF	-	5.1	12.0	1.0	14.0	1.0	15.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V; C <sub>L</sub> = 50 pF	-	7.3	14.0	1.0	16.0	1.0	17.5	ns
		n $\bar{R}D$ to nQ and n $\bar{Q}$ ; see Fig. 5 [2]								
		V <sub>CC</sub> = 3.0 V to 3.6 V; C <sub>L</sub> = 15 pF	-	8.2	22.4	1.0	26.0	1.0	28.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V; C <sub>L</sub> = 50 pF	-	11.7	25.9	1.0	29.5	1.0	32.0	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V; C <sub>L</sub> = 15 pF	-	5.6	12.9	1.0	15.0	1.0	16.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V; C <sub>L</sub> = 50 pF	-	8.1	14.9	1.0	17.0	1.0	19.0	ns
		n $\bar{R}D$ to nQ and n $\bar{Q}$ (reset); see Fig. 5 [2]								
		V <sub>CC</sub> = 3.0 V to 3.6 V; C <sub>L</sub> = 15 pF	-	6.4	15.8	1.0	18.5	1.0	20.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V; C <sub>L</sub> = 50 pF	-	9.2	19.3	1.0	22.0	1.0	24.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V; C <sub>L</sub> = 15 pF	-	4.4	9.4	1.0	11.0	1.0	12.0	ns
V <sub>CC</sub> = 4.5 V to 5.5 V; C <sub>L</sub> = 50 pF	-	6.3	11.4	1.0	13.0	1.0	14.5	ns		
t <sub>w</sub>	pulse width	inputs; n $\bar{A}$ = LOW; see Fig. 5								
		V <sub>CC</sub> = 3.0 V to 3.6 V	5.0	-	-	5.0	-	5.0	-	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	5.0	-	-	5.0	-	5.0	-	ns
		inputs; nB = HIGH; see Fig. 5								
		V <sub>CC</sub> = 3.0 V to 3.6 V	5.0	-	-	5.0	-	5.0	-	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	5.0	-	-	5.0	-	5.0	-	ns
		inputs; n $\bar{R}D$ = LOW; see Fig. 5								
		V <sub>CC</sub> = 3.0 V to 3.6 V	5.0	-	-	5.0	-	5.0	-	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	5.0	-	-	5.0	-	5.0	-	ns
		outputs; n $\bar{Q}$ = LOW and nQ = HIGH; C <sub>L</sub> = 50 pF; see Fig. 5, Fig. 6, Fig. 7 and Fig. 8 [3]								
		C <sub>EXT</sub> = 28 pF; R <sub>EXT</sub> = 2 k $\Omega$								
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	115	240	-	300	-	300	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	-	100	200	-	240	-	240	ns
		C <sub>EXT</sub> = 0.01 $\mu$ F; R <sub>EXT</sub> = 10 k $\Omega$								
		V <sub>CC</sub> = 3.0 V to 3.6 V	90	100	110	90	110	85	115	$\mu$ s
		V <sub>CC</sub> = 4.5 V to 5.5 V	90	100	110	90	110	85	115	$\mu$ s
		C <sub>EXT</sub> = 0.1 $\mu$ F; R <sub>EXT</sub> = 10 k $\Omega$ ;								
		V <sub>CC</sub> = 3.0 V to 3.6 V	0.9	1	1.1	0.9	1.1	0.85	1.15	ms
V <sub>CC</sub> = 4.5 V to 5.5 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. 6</a> and <a href="#">Fig. 8</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. 6</a> and <a href="#">Fig. 8</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</b>										
$t_{\text{pd}}$	propagation delay	$n\bar{A}$ and nB to nQ and $n\bar{Q}$ ; see <a href="#">Fig. 5</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
		$n\bar{R}\bar{D}$ to nQ and $n\bar{Q}$ ; see <a href="#">Fig. 5</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
		$n\bar{R}\bar{D}$ to nQ and $n\bar{Q}$ (reset); see <a href="#">Fig. 5</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. 5</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. 5</a>								
		$V_{\text{CC}} = 4.5 \text{ V to } 5.5 \text{ V}$	5.0	-	-	5.0	-	5.0	-	ns
		inputs; $n\bar{R}\bar{D} = \text{LOW}$ ; $C_L = 50 \text{ pF}$ ; see <a href="#">Fig. 5</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. 5</a> , <a href="#">Fig. 6</a> , <a href="#">Fig. 7</a> and <a href="#">Fig. 8</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 <sub>trig</sub>	retrigger time	n $\bar{A}$ to nB; C <sub>EXT</sub> = 100 pF; R <sub>EXT</sub> = 1 k $\Omega$ ; C <sub>L</sub> = 50 pF; see Fig. 6 and Fig. 8									
		V <sub>CC</sub> = 4.5 V to 5.5 V	-	60	-	-	-	-	-	ns	
		n $\bar{A}$ to nB; C <sub>EXT</sub> = 0.01 $\mu$ F; R <sub>EXT</sub> = 1 k $\Omega$ ; C <sub>L</sub> = 50 pF; see Fig. 6 and Fig. 8									
		V <sub>CC</sub> = 4.5 V to 5.5 V	-	1.5	-	-	-	-	-	$\mu$ s	
C <sub>PD</sub>	power dissipation capacitance	C <sub>L</sub> = 50 pF; f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub>	[4]	-	58	-	-	-	-	pF	
<b>External components</b>											
R <sub>EXT</sub>	external resistance	V <sub>CC</sub> = 2.0 V	5	-	-	-	-	-	-	k $\Omega$	
		V <sub>CC</sub> > 3.0 V	1	-	-	-	-	-	-	k $\Omega$	
C <sub>EXT</sub>	external capacitance	V <sub>CC</sub> = 2.0 V	[5]	-	-	-	-	-	-	pF	
		V <sub>CC</sub> > 3.0 V	[5]	-	-	-	-	-	-	pF	

- [1] Typical values are measured at nominal supply voltage (V<sub>CC</sub> = 3.3 V and V<sub>CC</sub> = 5.0 V).
- [2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>; C<sub>EXT</sub> = 0 pF; R<sub>EXT</sub> = 5 k $\Omega$ .
- [3] For C<sub>EXT</sub>  $\geq$  10 nF the typical value of the pulse width t<sub>w</sub> ( $\mu$ s) = C<sub>EXT</sub> (nF)  $\times$  R<sub>EXT</sub> (k $\Omega$ ).
- [4] C<sub>PD</sub> is used to determine the dynamic power dissipation P<sub>D</sub> ( $\mu$ W).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum(C_L \times V_{CC}^2 \times f_o)$  where:  
 f<sub>i</sub> = input frequency in MHz;  
 f<sub>o</sub> = output frequency in MHz;  
 C<sub>L</sub> = output load capacitance in pF;  
 V<sub>CC</sub> = supply voltage in V.
- [5] C<sub>EXT</sub> has no limits.

10.1. Waveforms and test circuit

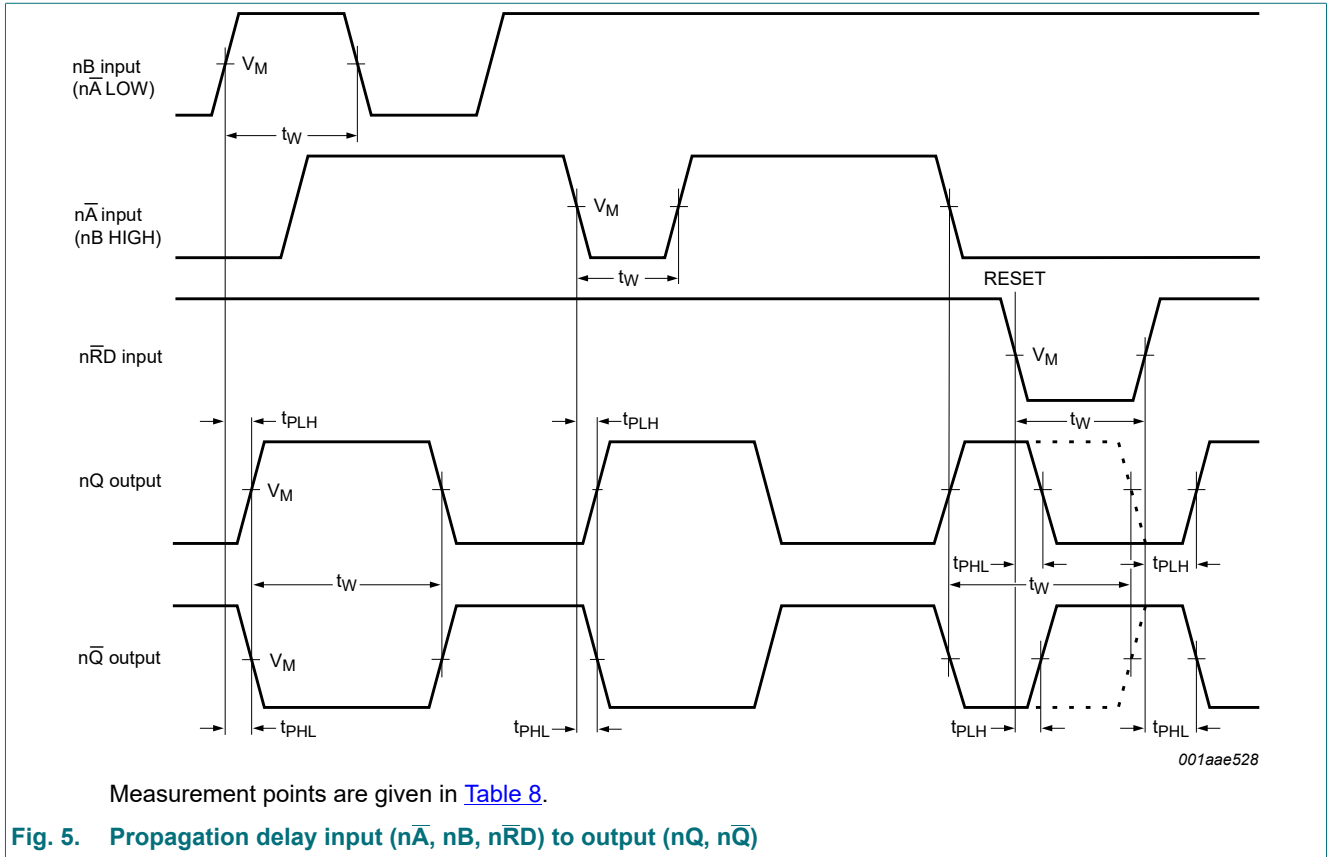
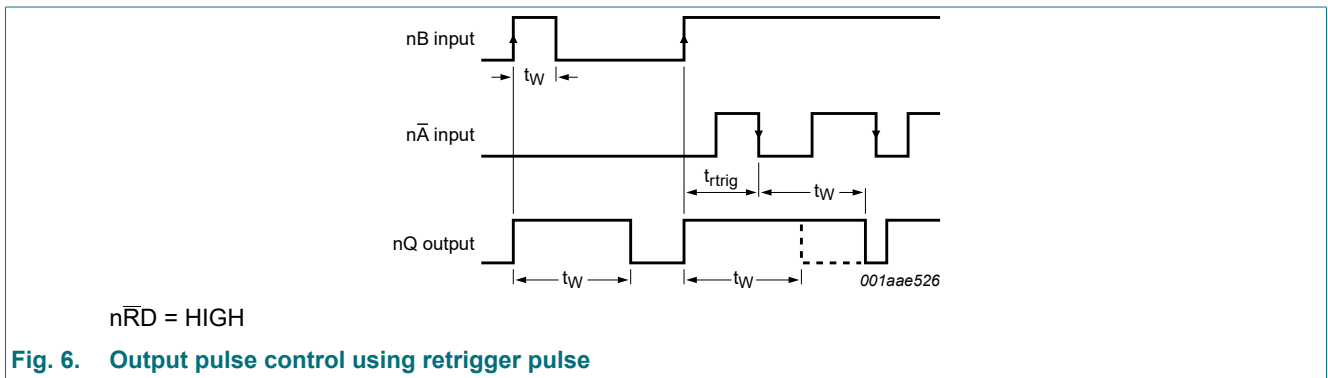
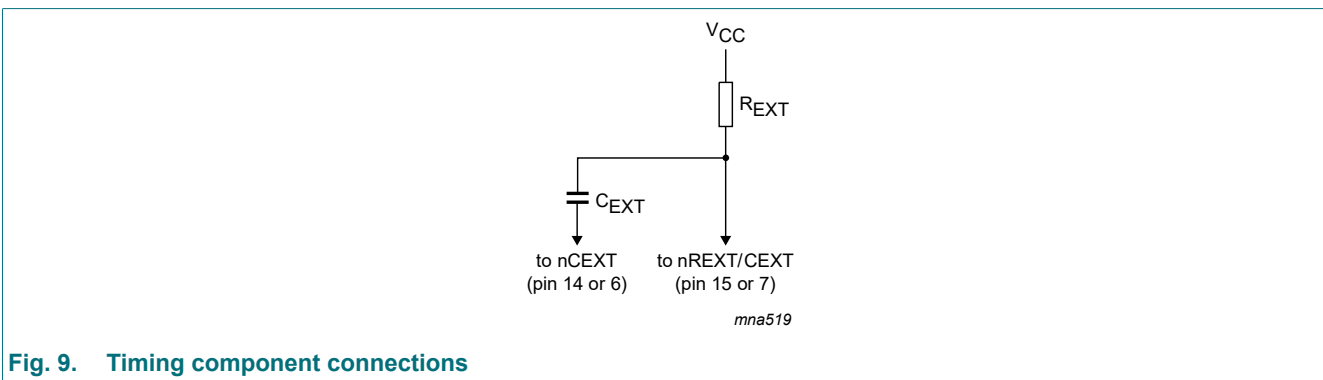
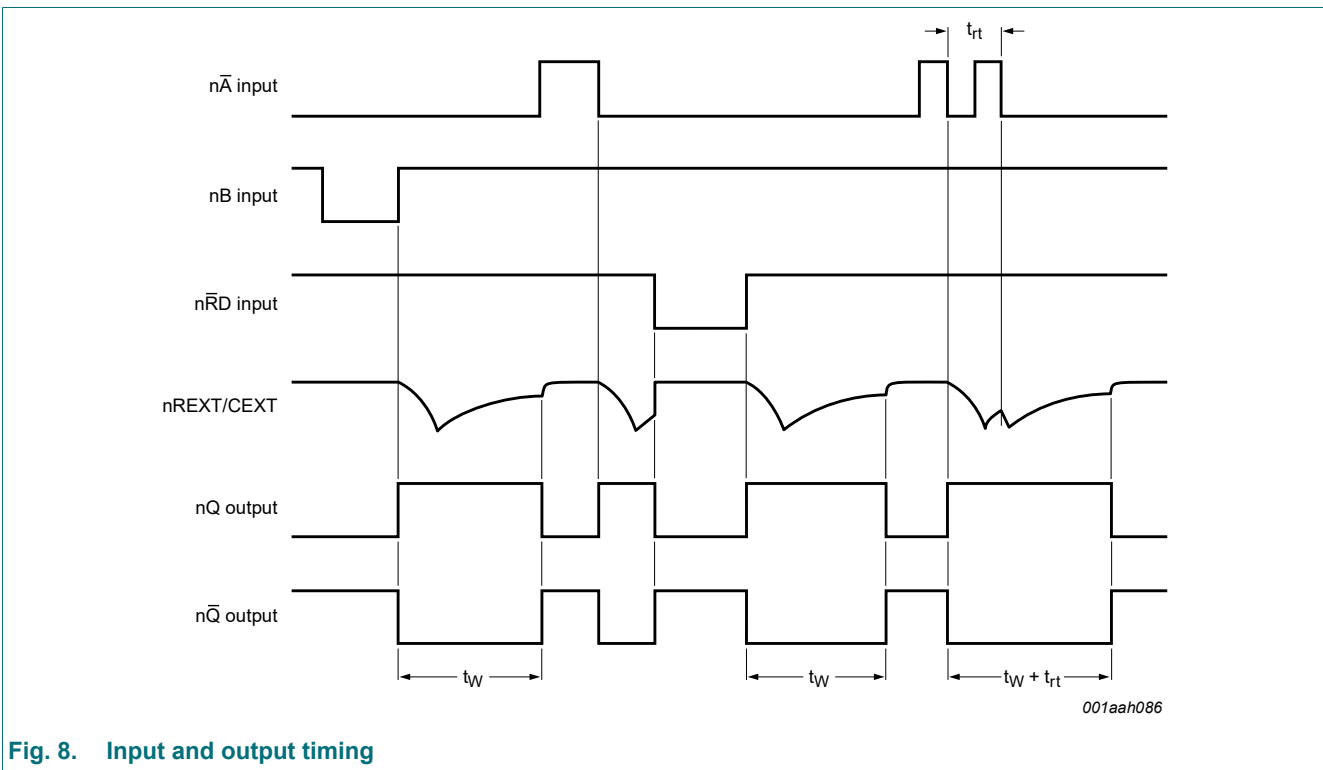
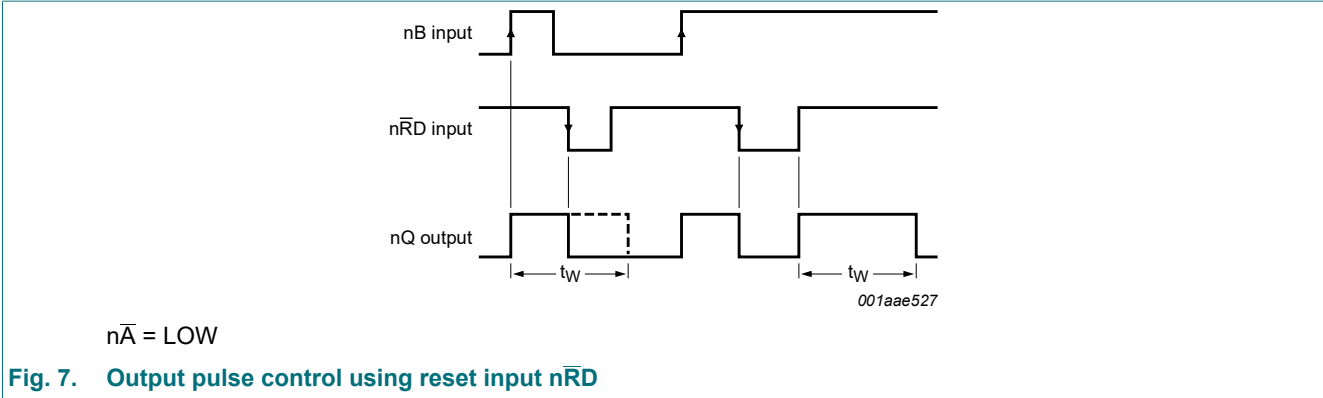


Table 8. Measurement points

Type	Input	Output
	$V_M$	$V_M$
74AHC123A	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
74AHCT123A	1.5 V	$0.5 \times V_{CC}$





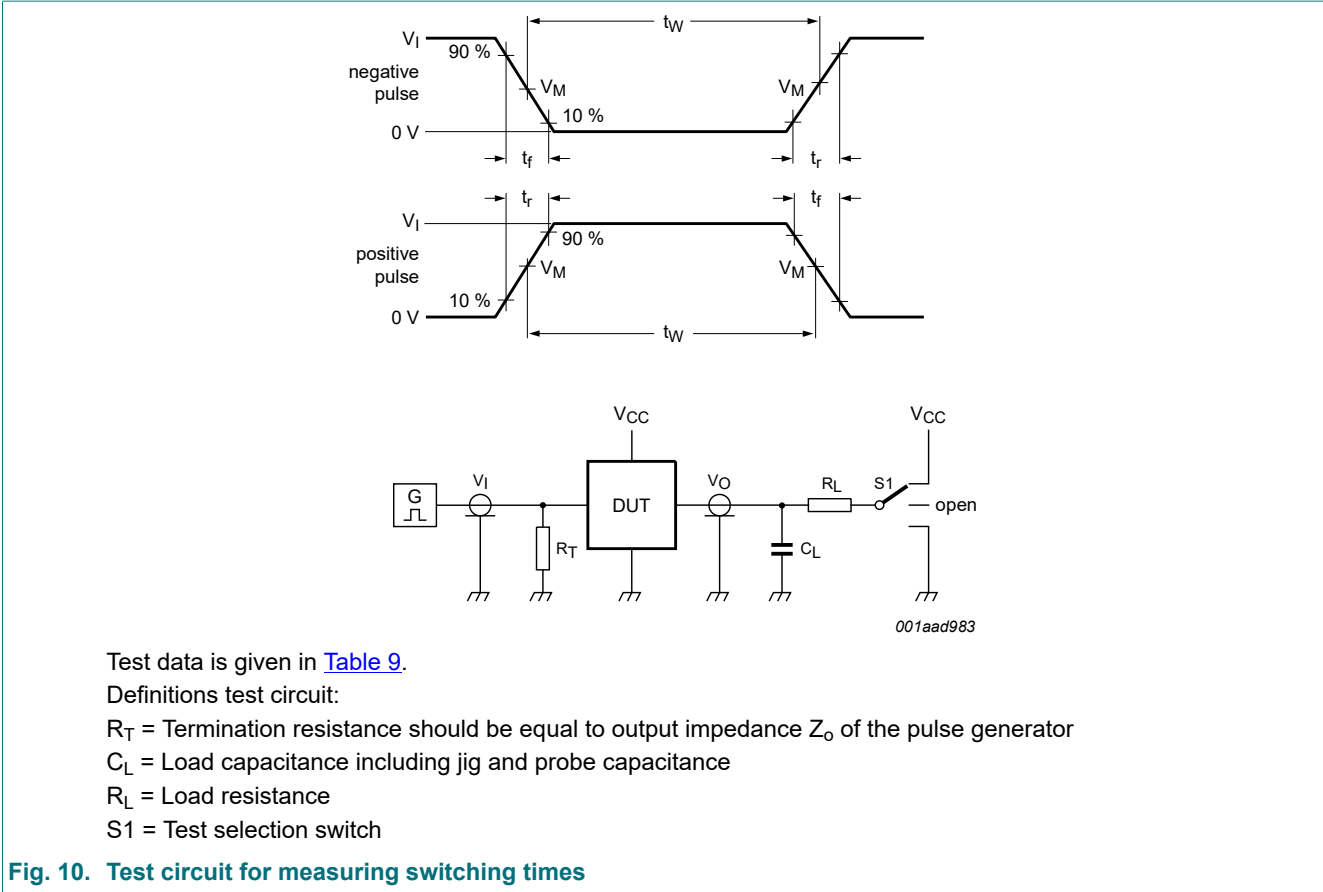


Fig. 10. Test circuit for measuring switching times

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	$V_{CC}$	3.0 ns	15 pF, 50 pF	1 k $\Omega$	open	GND	$V_{CC}$
74AHCT123A	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

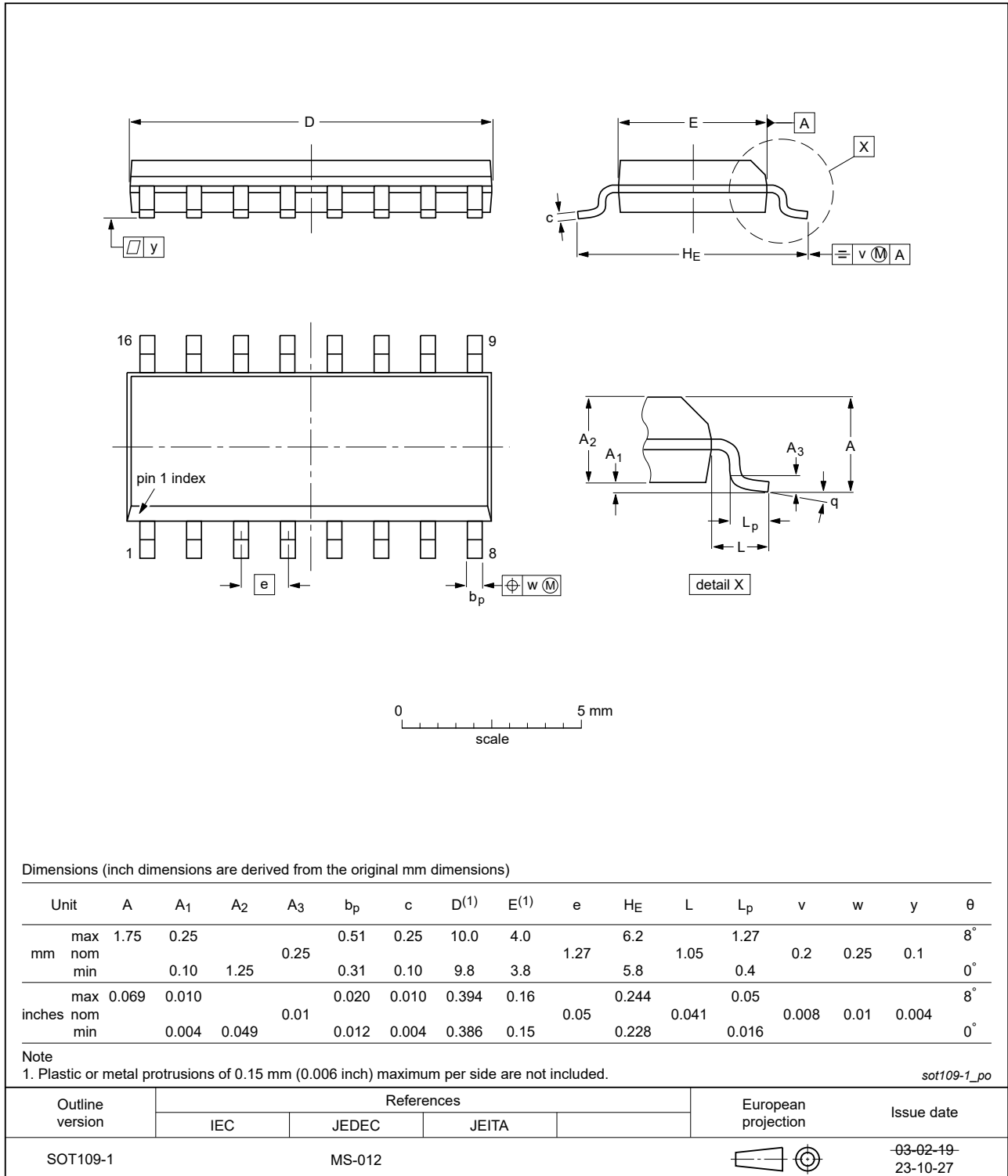


Fig. 11. Package outline SOT109-1 (SO16)

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

SOT403-1

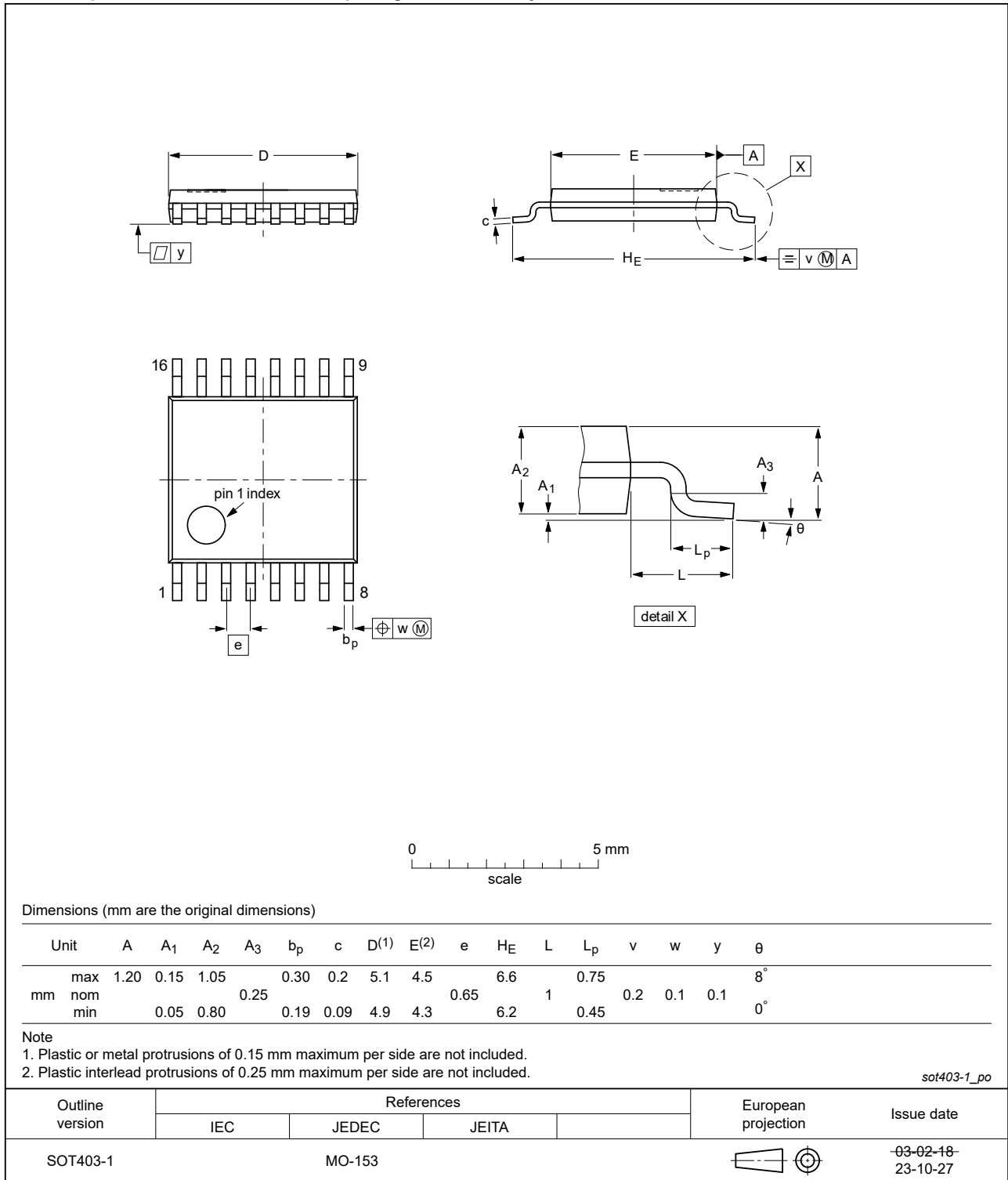


Fig. 12. Package outline SOT403-1 (TSSOP16)



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

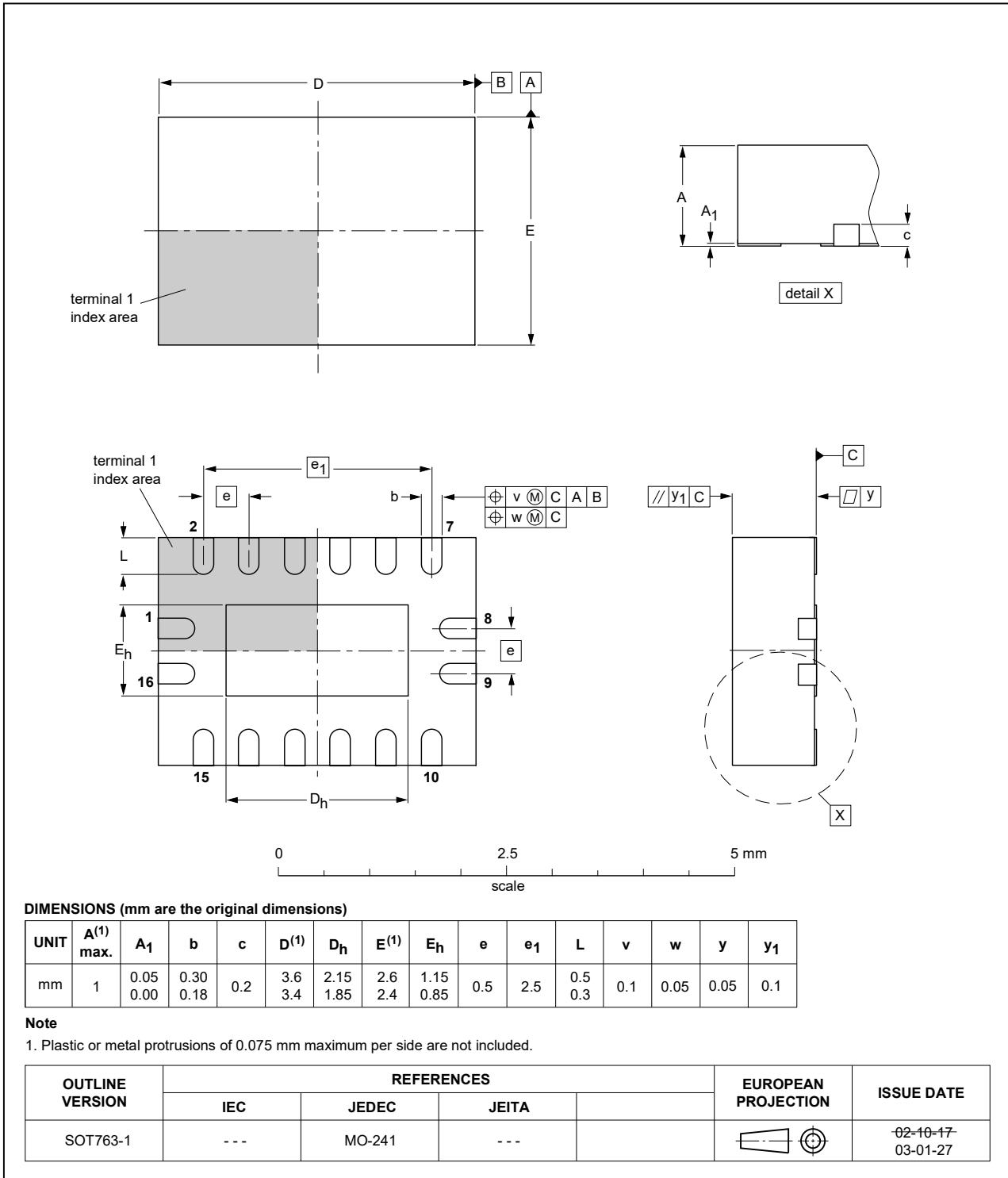


Fig. 13. Package outline SOT763-1 (DHVQFN16)

## 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
TTL	Transistor-Transistor Logic

## 13. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AHC_AHCT123A v.7	20240228	Product data sheet	-	74AHC_AHCT123A v.6
Modifications:	<ul style="list-style-type: none"> <li><a href="#">Fig. 11</a>, <a href="#">Fig. 12</a>: Aligned SO and TSSOP package outline drawings to JEDEC MS-012 and MO-153.</li> </ul>			
74AHC_AHCT123A v.6	20230904	Product data sheet	-	74AHC_AHCT123A v.5
Modifications:	<ul style="list-style-type: none"> <li><a href="#">Section 2</a>: ESD specification updated according to the latest JEDEC standard.</li> </ul>			
74AHC_AHCT123A v.5	20200617	Product data sheet	-	74AHC_AHCT123A v.4
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 v.4	20111108	Product data sheet	-	74AHC_AHCT123A v.3
Modifications:	<ul style="list-style-type: none"> <li>Legal pages updated.</li> </ul>			
74AHC_AHCT123A v.3	20110908	Product data sheet	-	74AHC_AHCT123A v.2
74AHC_AHCT123A v.2	20080118	Product data sheet	-	74AHC_AHCT123A v.1
74AHC_AHCT123A v.1	20000315	Product specification	-	-

## 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".
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