74AHC123A-Q100; 74AHCT123A-Q100

Dual retriggerable monostable multivibrator with reset

Rev. 1 — 23 May 2013 **Product data sheet**

1. General description

The 74AHC123A-Q100; 74AHCT123A-Q100 are high-speed Si-gate CMOS devices and are pin compatible with Low-power Schottky TTL (LSTTL). They are specified in compliance with JEDEC standard no. 7A.

The 74AHC123A-Q100; 74AHCT123A-Q100 are dual retriggerable monostable multivibrators with output pulse width control by three methods. The selection of an external resistor (R_{ext}) and capacitor (C_{ext}) program the basic pulse time. The external resistor and capacitor are normally connected as shown in Figure 11.

Once triggered, the basic output pulse width may be extended by retriggering the gated active LOW-going edge input ($n\overline{A}$) or the active HIGH-going edge input (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 $n\overline{RD}$, which also inhibits the triggering.

An internal connection from $n\overline{RD}$ to the input gate makes it possible to trigger the circuit by a positive-going signal at input $n\overline{RD}$ as shown in Table 3. Figure 8 and Figure 9 illustrate pulse control by retriggering and early reset. The values of the external timing components R_{ext} and C_{ext}, determine the basic output pulse width. When $C_{ext} \geq 10$ nF, the typical output pulse width is defined as: $t_W = R_{ext} \times C_{ext}$ where t_W = pulse width in ns; R_{ext} = external resistor in kΩ; C_{ext} = external capacitor in pF. Schmitt-trigger action at all inputs makes the circuit highly tolerant to slower input rise and fall times.

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 °C to +85 °C and from −40 °C to +125 °C
- All inputs have a Schmitt-trigger action
- Inputs accept voltages higher than V_{CC}
- DC triggered from active HIGH or active LOW inputs
- Retriggerable for very long pulses up to 100 % duty factor
- Direct reset terminates output pulse
- For 74AHC123A-Q100 only: operates with CMOS input levels
- For 74AHCT123A-Q100 only: operates with TTL input levels
- 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 pF, R = 0 Ω)
- Multiple package options

3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
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

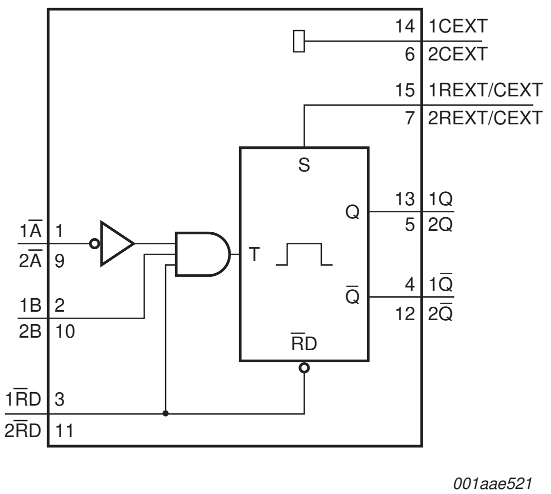


Fig 1. Logic symbol

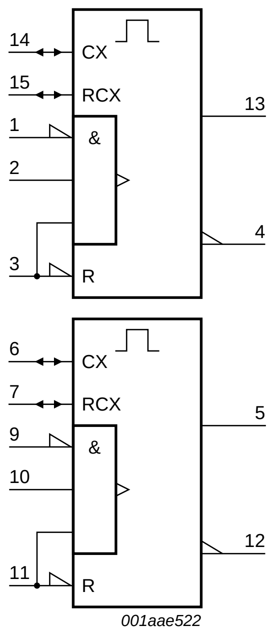


Fig 2. IEC logic symbol

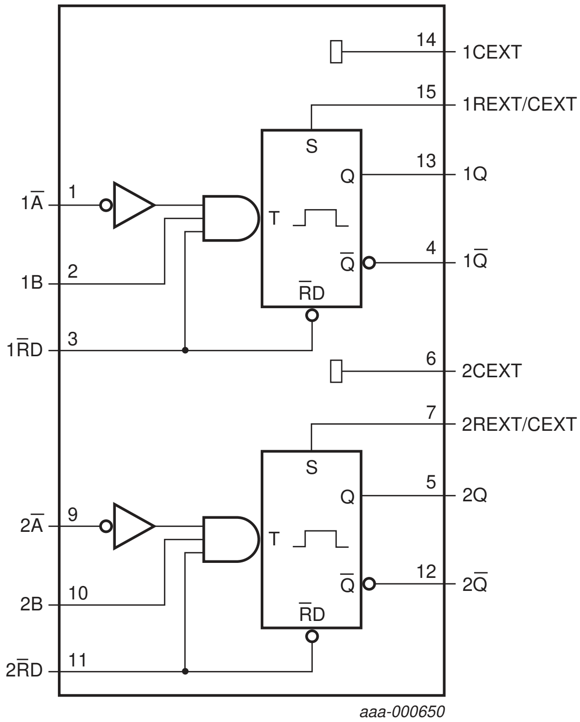
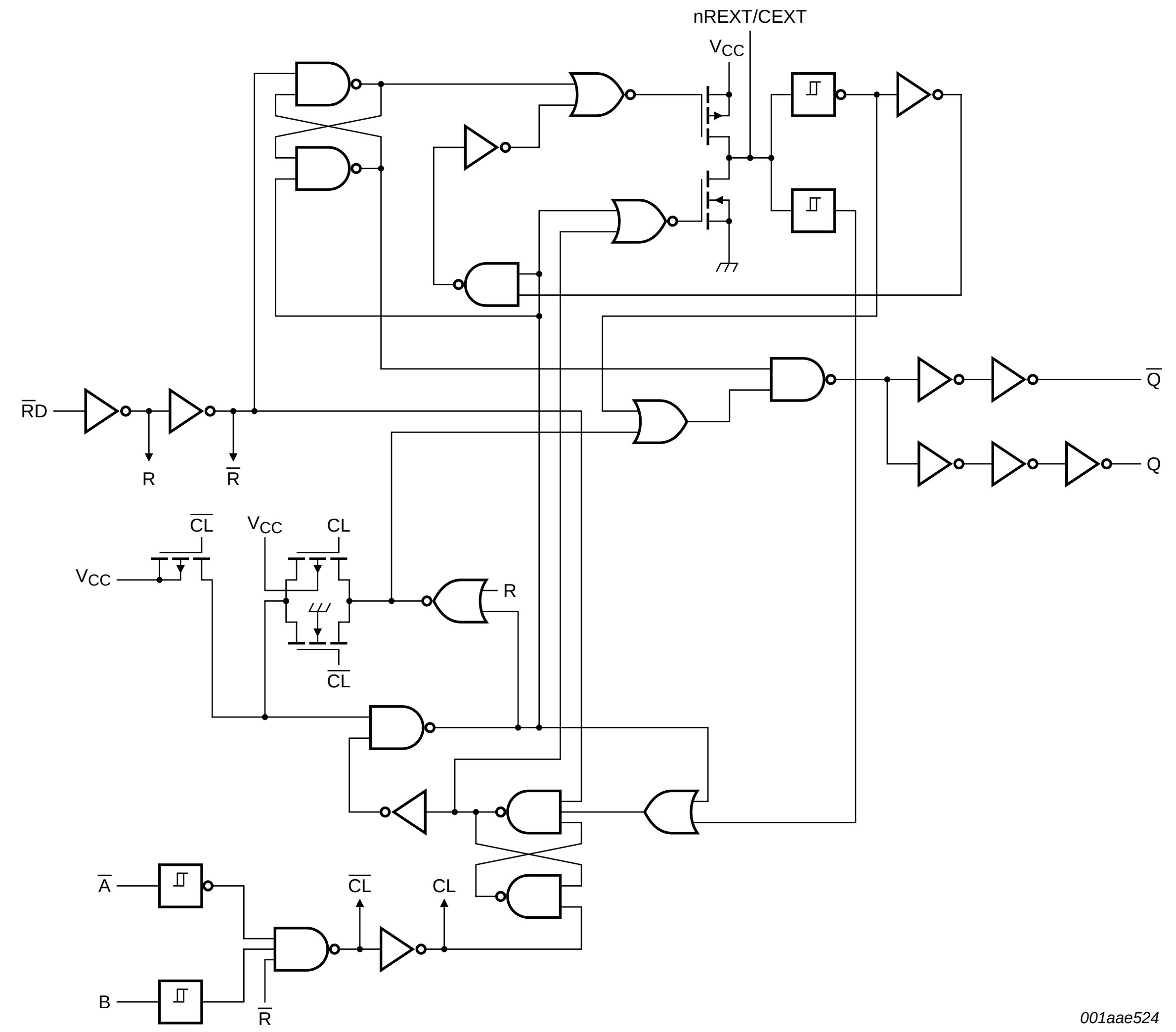


Fig 3. Functional diagram



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

Fig 4. Functional diagram

5. Pinning information

5.1 Pinning

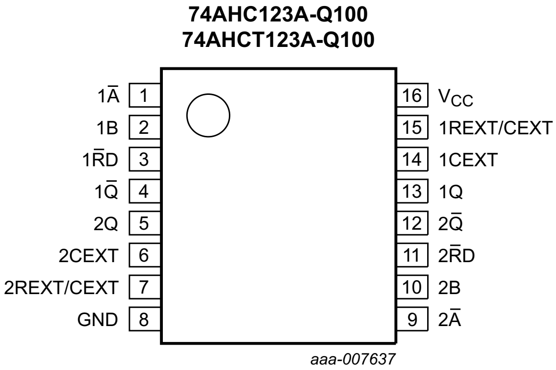
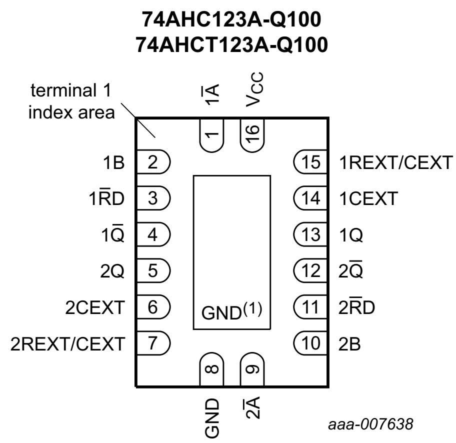


Fig 5. Pin configuration SO16, TSSOP16



Transparent top view

(1) This is not a supply pin. The substrate is attached to this pad using conductive die attach material. There is no electrical or mechanical requirement to solder this pad. However, if it is soldered, the solder land should remain floating or be connected to GND.

Fig 6. Pin configuration DHVQFN16

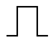
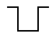
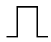
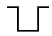
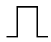
5.2 Pin description

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[1]

Input			Output	
$\overline{nRD}$	$n\overline{A}$	nB	nQ	$n\overline{Q}$
L	X	X	L	H
X	H	X	L[2]	H[2]
X	X	L	L[2]	H[2]
H	L	↑		
H	↓	H		
↑	L	H		

[1] 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.

[2] If the monostable multivibrator was triggered before this condition was established, the pulse continues 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]	-	±20	mA
I_O	output current	$V_O = -0.5$ V to ($V_{CC} + 0.5$ V)		-	±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				
	SO16 package		[2]	-	500	mW
	TSSOP16 package		[3]	-	500	mW
	DHVQFN16 package		[4]	-	500	mW

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

[2] P_{tot} derates linearly with 8 mW/K above 70 °C.

[3] P_{tot} derates linearly with 5.5 mW/K above 60 °C.

[4] P_{tot} derates linearly with 4.5 mW/K above 60 °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_{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
Δt/ΔV	input transition rise and fall rate	V_{CC} = 3.3 V ± 0.3 V	-	-	100	-	-	-	ns/V
		V_{CC} = 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	
74AHC123A-Q100											
V_{IH}	HIGH-level input voltage	V_{CC} = 2.0 V		1.5	-	-	1.5	-	1.5	-	V
		V_{CC} = 3.0 V		2.1	-	-	2.1	-	2.1	-	V
		V_{CC} = 5.5 V		3.85	-	-	3.85	-	3.85	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 2.0 V		-	-	0.5	-	0.5	-	0.5	V
		V_{CC} = 3.0 V		-	-	0.9	-	0.9	-	0.9	V
		V_{CC} = 5.5 V		-	-	1.65	-	1.65	-	1.65	V
V_{OH}	HIGH-level output voltage	V_I = V_{IH} or V_{IL}									
		I_O = −50 μA; V_{CC} = 2.0 V		1.9	2.0	-	1.9	-	1.9	-	V
		I_O = −50 μA; V_{CC} = 3.0 V		2.9	3.0	-	2.9	-	2.9	-	V
		I_O = −50 μA; V_{CC} = 4.5 V		4.4	4.5	-	4.4	-	4.4	-	V
		I_O = −4.0 mA; V_{CC} = 3.0 V		2.58	-	-	2.48	-	2.40	-	V
		I_O = −8.0 mA; V_{CC} = 4.5 V		3.94	-	-	3.8	-	3.70	-	V
V_{OL}	LOW-level output voltage	V_I = V_{IH} or V_{IL}									
		I_O = 50 μA; V_{CC} = 2.0 V		-	0	0.1	-	0.1	-	0.1	V
		I_O = 50 μA; V_{CC} = 3.0 V		-	0	0.1	-	0.1	-	0.1	V
		I_O = 50 μA; V_{CC} = 4.5 V		-	0	0.1	-	0.1	-	0.1	V
		I_O = 4.0 mA; V_{CC} = 3.0 V		-	-	0.36	-	0.44	-	0.55	V
		I_O = 8.0 mA; V_{CC} = 4.5 V		-	-	0.36	-	0.44	-	0.55	V
I_I	input leakage current	V_I = 5.5 V or GND; V_{CC} = 0 V to 5.5 V									
		nREXT/CEXT	[1]	-	-	±0.25	-	±2.5	-	±10.0	μA
		pins $n\overline{A}$, nB, $n\overline{RD}$		-	-	±0.1	-	±1.0	-	±2.0	μA

Table 6. Static characteristics *...continued*

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	
I_{CC}	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V		-	-	4.0	-	40	-	80	μA
		active state (per circuit); $V_I = V_{CC}$ or GND	[1]								
		$V_{CC} = 3.0$ V		-	160	250	-	280	-	280	μA
		$V_{CC} = 4.5$ V		-	380	500	-	650	-	650	μA
		$V_{CC} = 5.5$ V		-	560	750	-	975	-	975	μA
C_I	input capacitance			-	5.0	10	-	10	-	10	pF
C_O	output capacitance			-	4.0	-	-	-	-	-	pF
74AHCT123A-Q100											
V_{IH}	HIGH-level input voltage	$V_{CC} = 4.5$ V to 5.5 V		2.0	-	-	2.0	-	2.0	-	V
V_{IL}	LOW-level input voltage	$V_{CC} = 4.5$ V to 5.5 V		-	-	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									
		$I_O = -50$ μA		4.4	4.5	-	4.4	-	4.4	-	V
		$I_O = -8.0$ mA		3.94	-	-	3.8	-	3.70	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}; $V_{CC} = 4.5$ V									
		$I_O = 50$ μA		-	0	0.1	-	0.1	-	0.1	V
		$I_O = 8.0$ mA		-	-	0.36	-	0.44	-	0.55	V
I_I	input leakage current	nREXT/CEXT; $V_I = 5.5$ V or GND; $V_{CC} = 0$ V to 5.5 V	[1]	-	-	±0.25	-	±2.5	-	±10.0	μA
		pins $n\overline{A}$, nB, $n\overline{RD}$; $V_I = V_{CC}$ or GND; $V_{CC} = 5.5$ V		-	-	±0.1	-	±1.0	-	±2.0	μA
I_{CC}	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V		-	-	4.0	-	40	-	80	μA
		active state (per circuit); $V_I = V_{CC}$ or GND	[1]								
		$V_{CC} = 4.5$ V		-	380	500	-	650	-	650	μA
		$V_{CC} = 5.5$ V		-	560	750	-	975	-	975	μA
C_I	input capacitance			-	3	10	-	10	-	10	pF
C_O	output capacitance			-	4.0	-	-	-	-	-	pF

[1] Voltage on nREXT/CEXT = 0.5 × V_{CC} and pin nREXT/CEXT in OFF-state during test.

10. Dynamic characteristics

Table 7. Dynamic characteristics
GND = 0 V; For test circuit see Figure 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	
74AHC123A-Q100											
t_{pd}	propagation delay	n$\overline{A}$ and nB to nQ and n$\overline{Q}$; see Figure 7	[2]								
		V_{CC} = 3.0 V to 3.6 V									
		C_L = 15 pF		-	7.4	20.6	1.0	24.0	1.0	26.0	ns
		C_L = 50 pF		-	10.5	24.1	1.0	27.5	1.0	30.0	ns
		V_{CC} = 4.5 V to 5.5 V									
		C_L = 15 pF		-	5.1	12.0	1.0	14.0	1.0	15.5	ns
		C_L = 50 pF		-	7.3	14.0	1.0	16.0	1.0	17.5	ns
		n$\overline{RD}$ to nQ and n$\overline{Q}$; see Figure 7	[2]								
		V_{CC} = 3.0 V to 3.6 V									
		C_L = 15 pF		-	8.2	22.4	1.0	26.0	1.0	28.0	ns
		C_L = 50 pF		-	11.7	25.9	1.0	29.5	1.0	32.0	ns
		V_{CC} = 4.5 V to 5.5 V									
		C_L = 15 pF		-	5.6	12.9	1.0	15.0	1.0	16.5	ns
		C_L = 50 pF		-	8.1	14.9	1.0	17.0	1.0	19.0	ns
		n$\overline{RD}$ to nQ and n$\overline{Q}$ (reset); see Figure 7	[2]								
		V_{CC} = 3.0 V to 3.6 V									
		C_L = 15 pF		-	6.4	15.8	1.0	18.5	1.0	20.0	ns
		C_L = 50 pF		-	9.2	19.3	1.0	22.0	1.0	24.5	ns
		V_{CC} = 4.5 V to 5.5 V									
		C_L = 15 pF		-	4.4	9.4	1.0	11.0	1.0	12.0	ns
		C_L = 50 pF		-	6.3	11.4	1.0	13.0	1.0	14.5	ns

Table 7. Dynamic characteristics *...continued*
GND = 0 V; For test circuit see Figure 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	
t_W	pulse width	inputs; $n\overline{A}$ = LOW; see Figure 7								
		V_{CC} = 3.0 V to 3.6 V	5.0	-	-	5.0	-	5.0	-	ns
		V_{CC} = 4.5 V to 5.5 V	5.0	-	-	5.0	-	5.0	-	ns
		inputs; nB = HIGH; see Figure 7								
		V_{CC} = 3.0 V to 3.6 V	5.0	-	-	5.0	-	5.0	-	ns
		V_{CC} = 4.5 V to 5.5 V	5.0	-	-	5.0	-	5.0	-	ns
		inputs; $n\overline{RD}$ = LOW; see Figure 7								
		V_{CC} = 3.0 V to 3.6 V	5.0	-	-	5.0	-	5.0	-	ns
		V_{CC} = 4.5 V to 5.5 V	5.0	-	-	5.0	-	5.0	-	ns
		outputs; $n\overline{Q}$ = LOW and nQ = HIGH; C_L = 50 pF; see Figure 7, Figure 8, Figure 9 and Figure 10 [3]								
		C_{ext} = 28 pF; R_{ext} = 2 kΩ								
		V_{CC} = 3.0 V to 3.6 V	-	115	240	-	300	-	300	ns
		V_{CC} = 4.5 V to 5.5 V	-	100	200	-	240	-	240	ns
		C_{ext} = 0.01 μF; R_{ext} = 10 kΩ								
		V_{CC} = 3.0 V to 3.6 V	90	100	110	90	110	85	115	μs
		V_{CC} = 4.5 V to 5.5 V	90	100	110	90	110	85	115	μs
		C_{ext} = 0.1 μF; R_{ext} = 10 kΩ;								
		V_{CC} = 3.0 V to 3.6 V	0.9	1	1.1	0.9	1.1	0.85	1.15	ms
		V_{CC} = 4.5 V to 5.5 V	0.9	1	1.1	0.9	1.1	0.85	1.15	ms
t_{rtrig}	retrigger time	$n\overline{A}$ to nB; C_{ext} = 100 pF; R_{ext} = 1 kΩ; C_L = 50 pF; see Figure 8 and Figure 10								
		V_{CC} = 3.0 V to 3.6 V	-	60	-	-	-	-	-	ns
		V_{CC} = 4.5 V to 5.5 V	-	39	-	-	-	-	-	ns
		$n\overline{A}$ to nB; C_{ext} = 0.01 μF; R_{ext} = 1 kΩ; C_L = 50 pF; see Figure 8 and Figure 10								
		V_{CC} = 3.0 V to 3.6 V	-	1.5	-	-	-	-	-	μs
		V_{CC} = 4.5 V to 5.5 V	-	1.2	-	-	-	-	-	μs
C_{PD}	power dissipation capacitance	C_L = 50 pF; f_i = 1 MHz; V_I = GND to V_{CC} [4]	-	57	-	-	-	-	-	pF

Table 7. Dynamic characteristics *…continued*

GND = 0 V; For test circuit see Figure 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	
74AHCT123A-Q100											
t_{pd}	propagation delay	n$\overline{A}$ and nB to nQ and n$\overline{Q}$; see Figure 7	[2]								
		V_{CC} = 4.5 V to 5.5 V									
		C_L = 15 pF		-	5.0	12.0	1.0	14.0	1.0	15.5	ns
		C_L = 50 pF		-	7.1	14.0	1.0	16.0	1.0	17.5	ns
		n$\overline{RD}$ to nQ and n$\overline{Q}$; see Figure 7	[2]								
		V_{CC} = 4.5 V to 5.5 V									
		C_L = 15 pF		-	5.2	12.9	1.0	15.0	1.0	16.5	ns
		C_L = 50 pF		-	7.5	14.9	1.0	17.0	1.0	18.5	ns
		n$\overline{RD}$ to nQ and n$\overline{Q}$ (reset); see Figure 7	[2]								
		V_{CC} = 4.5 V to 5.5 V									
		C_L = 15 pF		-	4.7	9.4	1.0	11.0	1.0	12.0	ns
		C_L = 50 pF		-	6.7	11.4	1.0	13.0	1.0	14.5	ns
t_W	pulse width	inputs; n$\overline{A}$ = LOW; C_L = 50 pF; see Figure 7									
		V_{CC} = 4.5 V to 5.5 V		5.0	-	-	5.0	-	5.0	-	ns
		inputs; nB = HIGH; C_L = 50 pF; see Figure 7									
		V_{CC} = 4.5 V to 5.5 V		5.0	-	-	5.0	-	5.0	-	ns
		inputs; n$\overline{RD}$ = LOW; C_L = 50 pF; see Figure 7									
		V_{CC} = 4.5 V to 5.5 V		5.0	-	-	5.0	-	5.0	-	ns
		outputs; n$\overline{Q}$ = LOW and nQ = HIGH; C_L = 50 pF; C_{ext} = 28 pF; R_{ext} = 2 kΩ; see Figure 7, Figure 8, Figure 9 and Figure 10	[3]								
		V_{CC} = 4.5 V to 5.5 V		-	100	200	-	240	-	240	ns
		C_{ext} = 0.01 μF; R_{ext} = 10 kΩ									
		V_{CC} = 4.5 V to 5.5 V		90	100	110	90	110	85	115	μs
		C_{ext} = 0.1 μF; R_{ext} = 10 kΩ									
		V_{CC} = 4.5 V to 5.5 V		0.9	1	1.1	0.9	1.1	0.85	1.15	ms

Table 7. Dynamic characteristics *...continued*

GND = 0 V; For test circuit see Figure 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	
t_{rtrig}	retrigger time	$n\overline{A}$ to nB; C_{ext} = 100 pF; R_{ext} = 1 kΩ; C_L = 50 pF; see Figure 8 and Figure 10									
		V_{CC} = 4.5 V to 5.5 V		-	60	-	-	-	-	-	ns
		$n\overline{A}$ to nB; C_{ext} = 0.01 μF; R_{ext} = 1 kΩ; C_L = 50 pF; see Figure 8 and Figure 10									
		V_{CC} = 4.5 V to 5.5 V		-	1.5	-	-	-	-	-	μs
C_{PD}	power dissipation capacitance	C_L = 50 pF; f_i = 1 MHz; V_I = GND to V_{CC}	[4]	-	58	-	-	-	-	-	pF
External components											
R_{ext}	external resistance	V_{CC} = 2.0 V		5	-	-	-	-	-	-	kΩ
		V_{CC} > 3.0 V		1	-	-	-	-	-	-	kΩ
C_{ext}	external capacitance	V_{CC} = 2.0 V	[5]	-	-	-	-	-	-	-	pF
		V_{CC} > 3.0 V	[5]	-	-	-	-	-	-	-	pF

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

[2] t_{pd} is the same as t_{PLH} and t_{PHL}; C_{ext} = 0 pF; R_{ext} = 5 kΩ.

[3] For $C_{ext} \geq 10$ nF, the typical value of the pulse width t_W (μs) = C_{ext} (nF) × R_{ext} (kΩ).

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

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

f_i = input frequency in MHz;

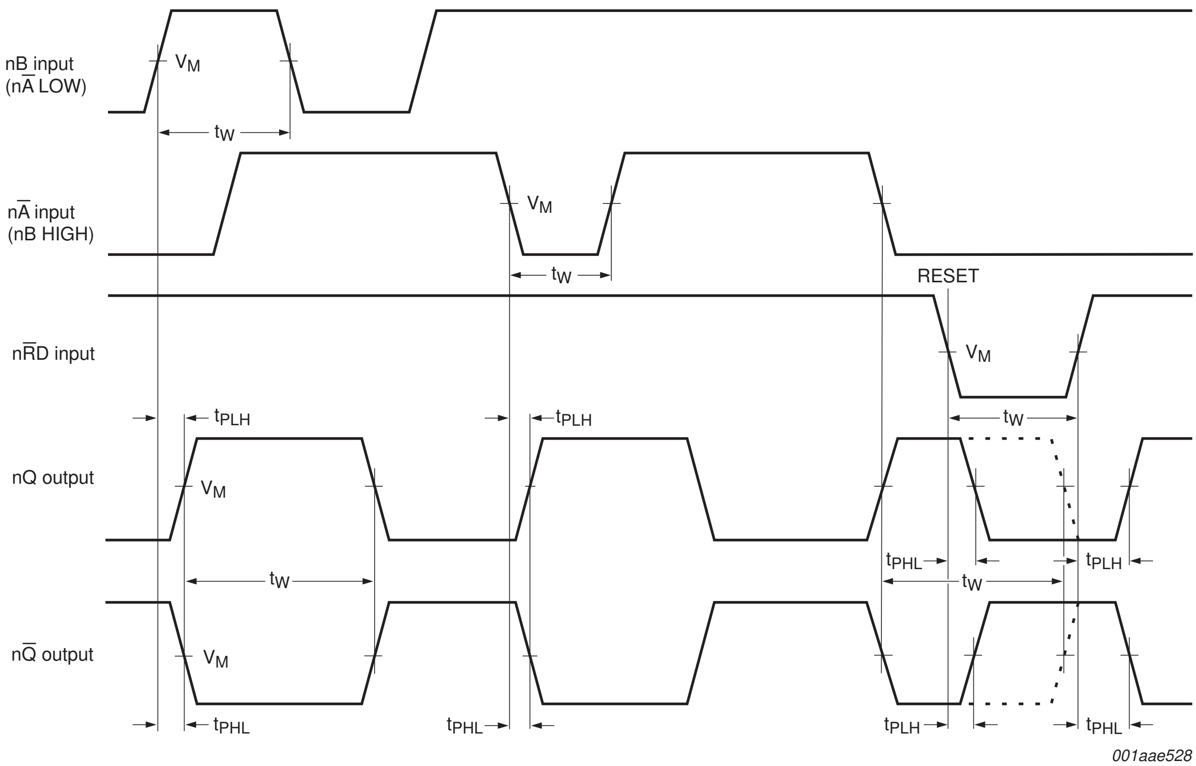
f_o = output frequency in MHz;

C_L = output load capacitance in pF;

V_{CC} = supply voltage in V.

[5] C_{ext} has no limits.

11. Waveforms

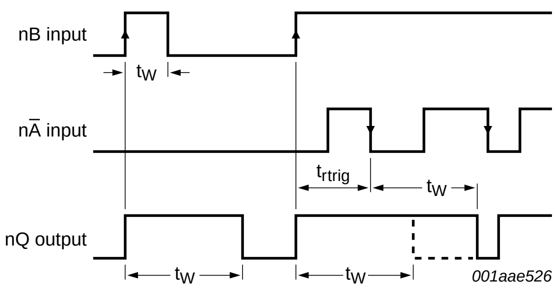


Measurement points are given in Table 8.

Fig 7. Propagation delay input ($n\overline{A}$, nB, $n\overline{RD}$) to output (nQ, $n\overline{Q}$)

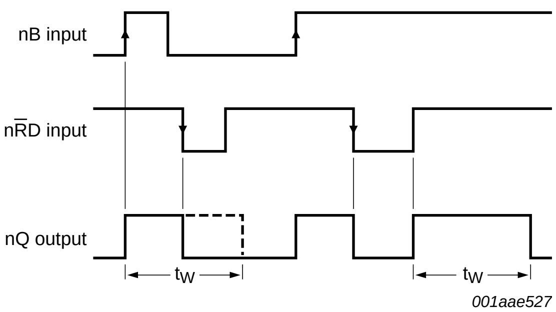
Table 8. Measurement points

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



$n\overline{RD}$ = HIGH

Fig 8. Output pulse control using retrigger pulse



nA = LOW

Fig 9. Output pulse control using reset input nRD

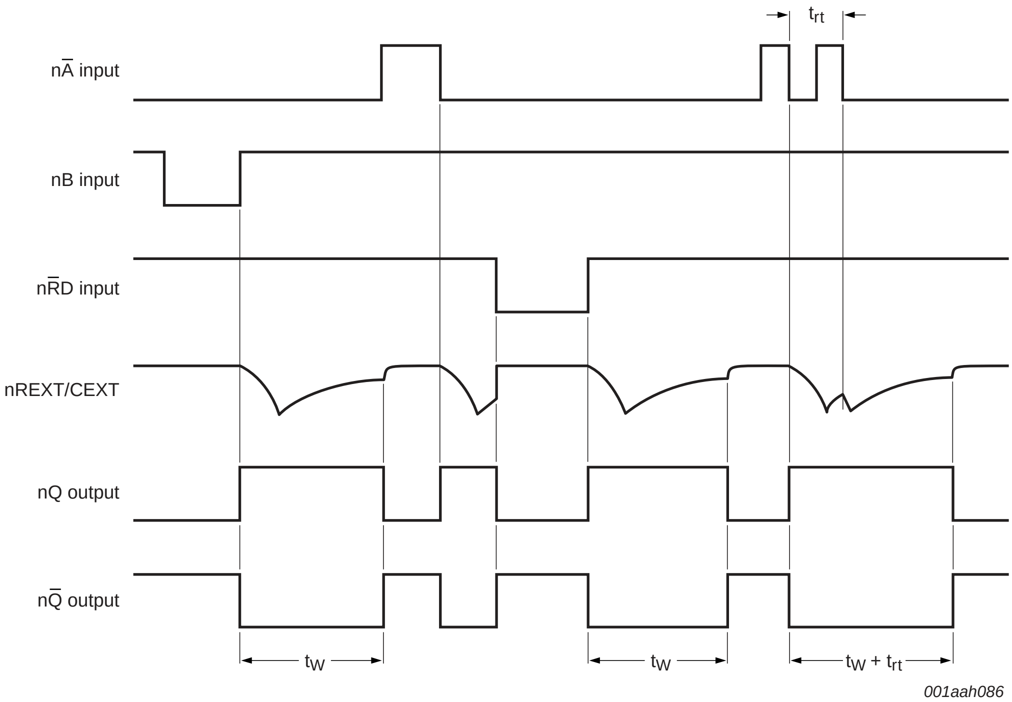


Fig 10. Input and output timing

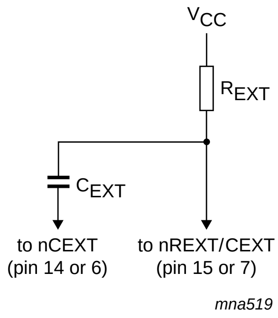
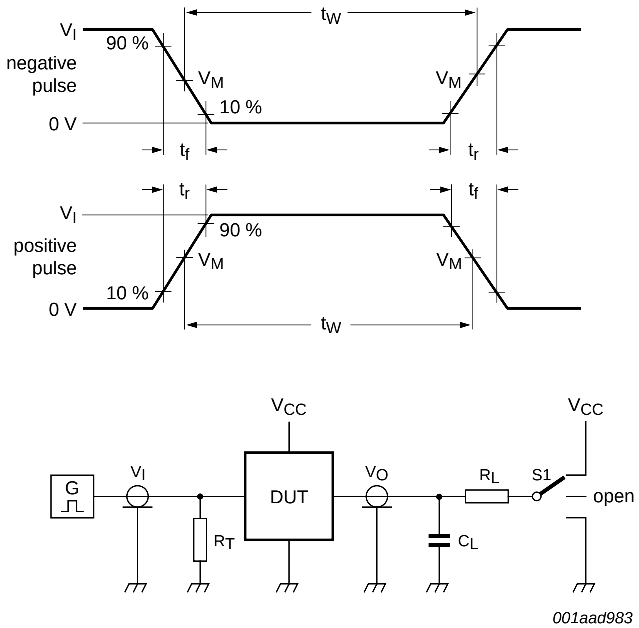


Fig 11. Timing component connections



Test data is given in Table 9.

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 resistor

S1 = Test selection switch

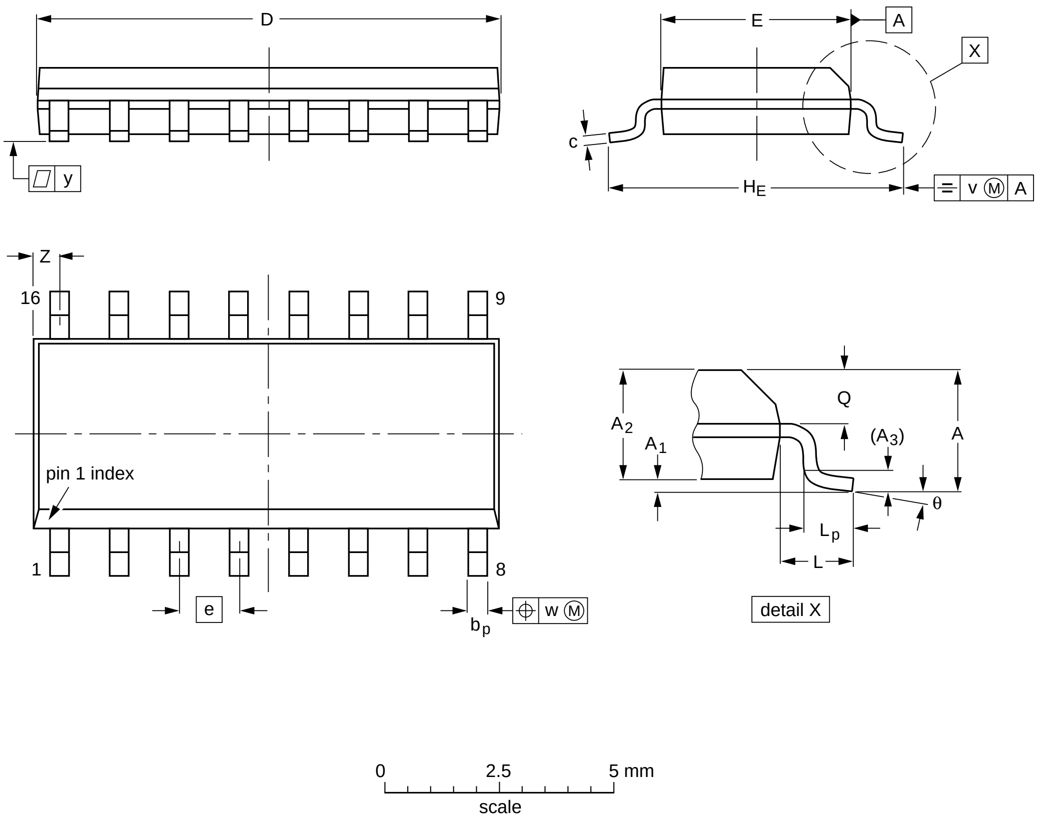
Fig 12. Load circuitry for switching times

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 kΩ	open	GND	V_{CC}
74AHCT123A-Q100	3.0 V	3.0 ns	15 pF, 50 pF	1 kΩ	open	GND	V_{CC}

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 max.	A_1	A_2	A_3	b_p	c	D (1)	E (1)	e	H_E	L	L_p	Q	v	w	y	Z (1)	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	10.0 9.8	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8^o 0^o
inches	0.069	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.39 0.38	0.16 0.15	0.05	0.244 0.228	0.041	0.039 0.016	0.028 0.020	0.01	0.01	0.004	0.028 0.012	

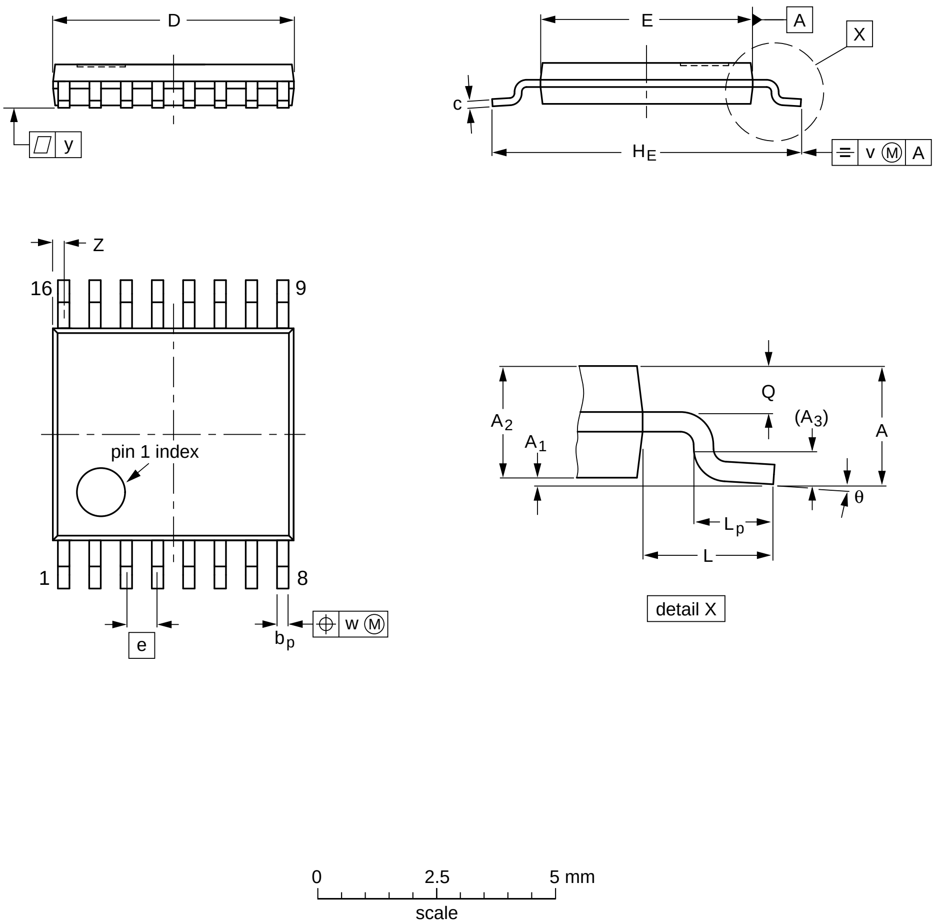
Note

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT109-1	076E07	MS-012				~~99-12-27~~ 03-02-19

Fig 13. Package outline SOT109-1 (SO16)

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



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	D (1)	E (2)	e	H_E	L	L_p	Q	v	w	y	Z (1)	θ
mm	1.1	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	5.1 4.9	4.5 4.3	0.65	6.6 6.2	1	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.40 0.06	8° 0°

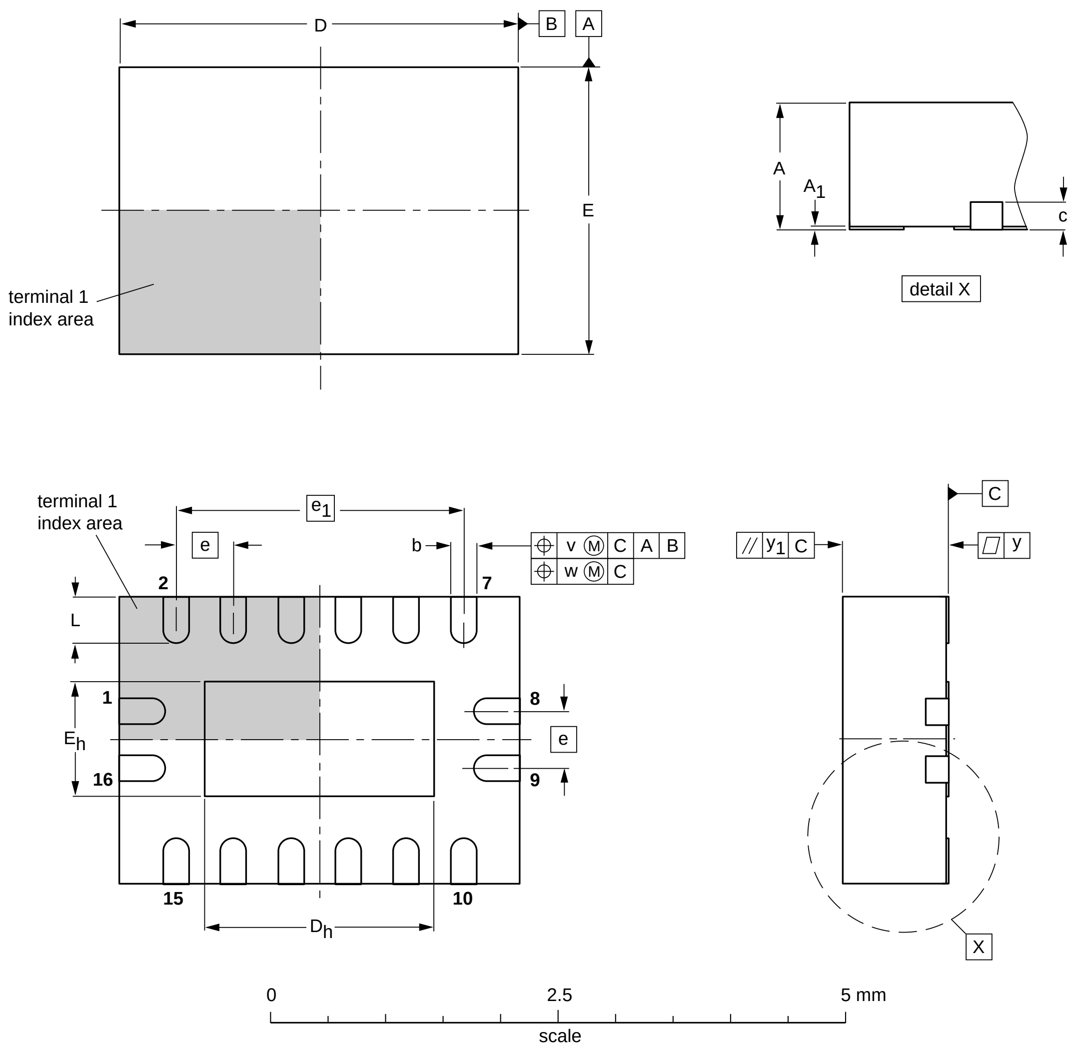
Notes

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.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT403-1		MO-153				~~99-12-27~~ 03-02-18

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**



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 15. Package outline SOT763-1 (DHVQFN16)

13. Abbreviations

Table 10. Abbreviations

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

14. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AHC_AHCT123A_Q100 v.1	20130523	Product data sheet	-	-

15. Legal information

15.1 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 URL http://www.nxp.com.

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17. Contents

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