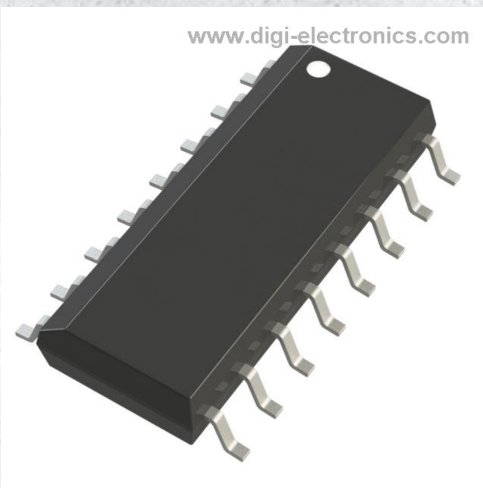
74AHCT123AD,112 Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	74AHCT123AD,112-DG
Manufacturer	Nexperia USA Inc.
Manufacturer Product Number	74AHCT123AD,112
Description	IC MULTIVIBRATOR 5NS 16SO
Detailed Description	Monostable Multivibrator 5 ns 16-SO

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
74AHCT123AD,112	Nexperia USA Inc.
Series:	Product Status:
74AHCT	Obsolete
Logic Type:	Independent Circuits:
Monostable	2
Schmitt Trigger Input:	Propagation Delay:
No	5 ns
Current - Output High, Low:	Voltage - Supply:
8mA, 8mA	4.5 V ~ 5.5 V
Operating Temperature:	Mounting Type:
-40°C ~ 125°C	Surface Mount
Package / Case:	Supplier Device Package:
16-SOIC (0.154", 3.90mm Width)	16-SO
Base Product Number:	
74AHCT123	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8542.39.0001	

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

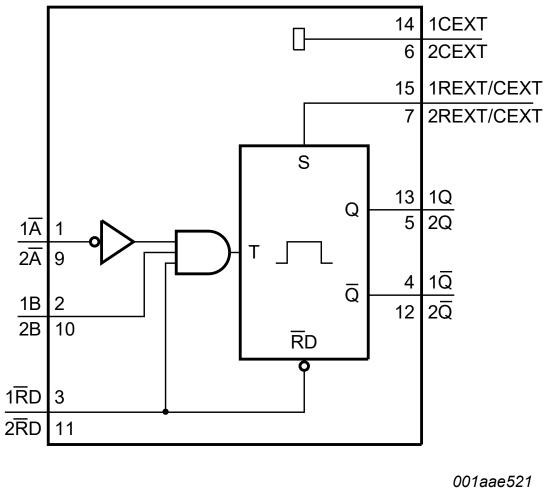


Fig. 1. Logic symbol

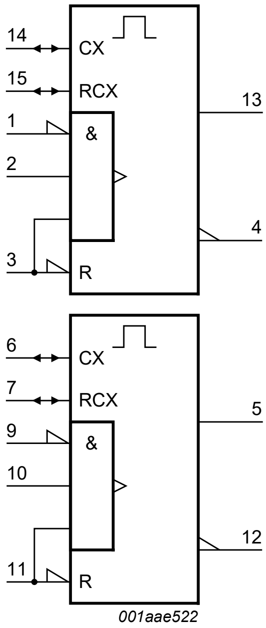


Fig. 2. IEC logic symbol

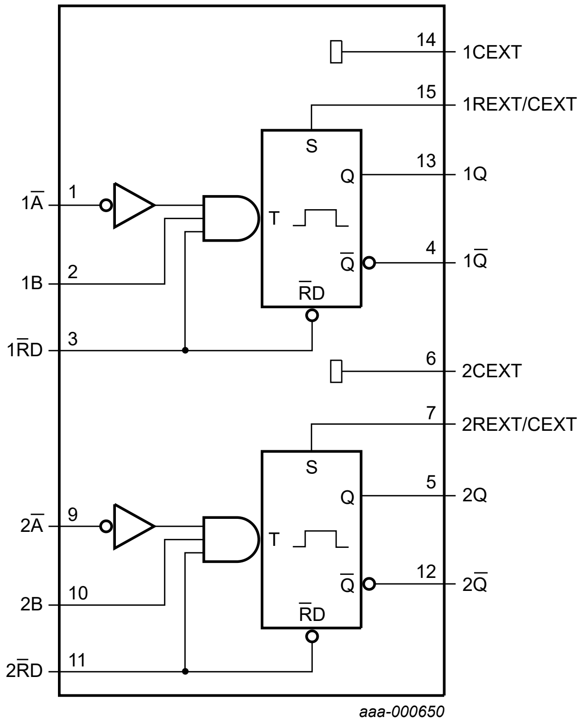
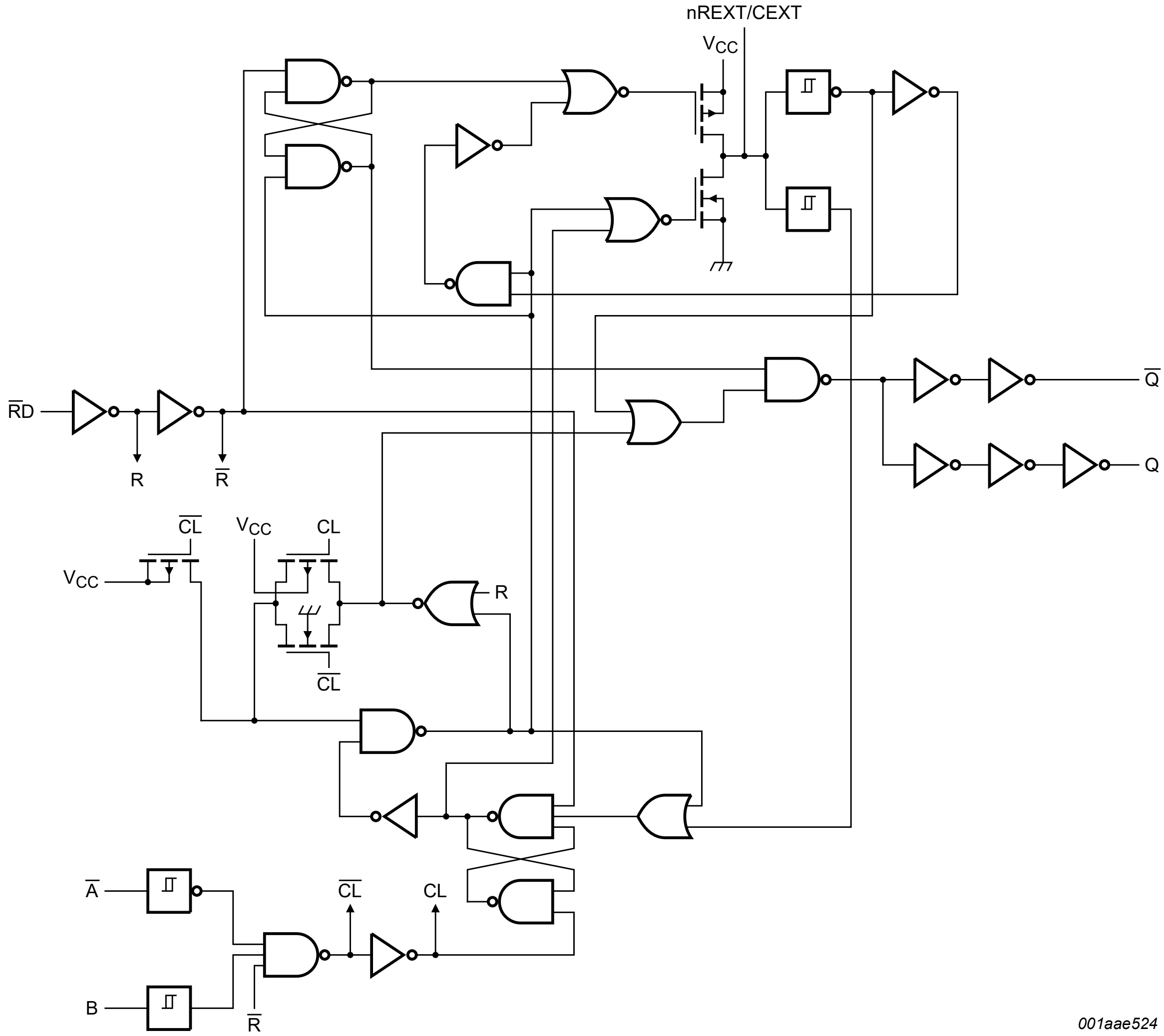


Fig. 3. Functional diagram

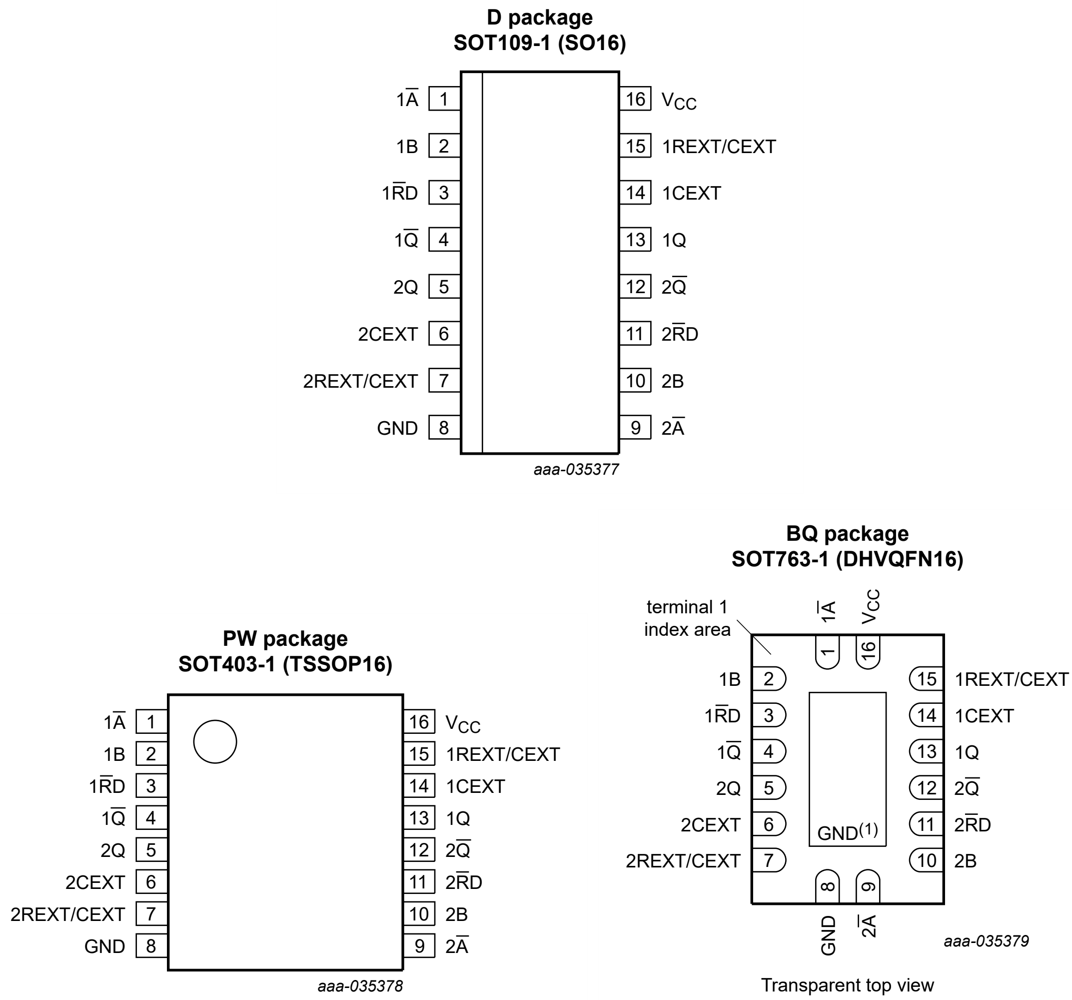


For minimum noise generation it is recommended to ground pins 6 (2CEXT) and 14 (1CEXT) externally to pin 8 (GND).

Fig. 4. Functional diagram

5. Pinning information

5.1. Pinning



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

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 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]	-	±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	[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
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										
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
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

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
74AHCT123A										
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 Fig. 10.

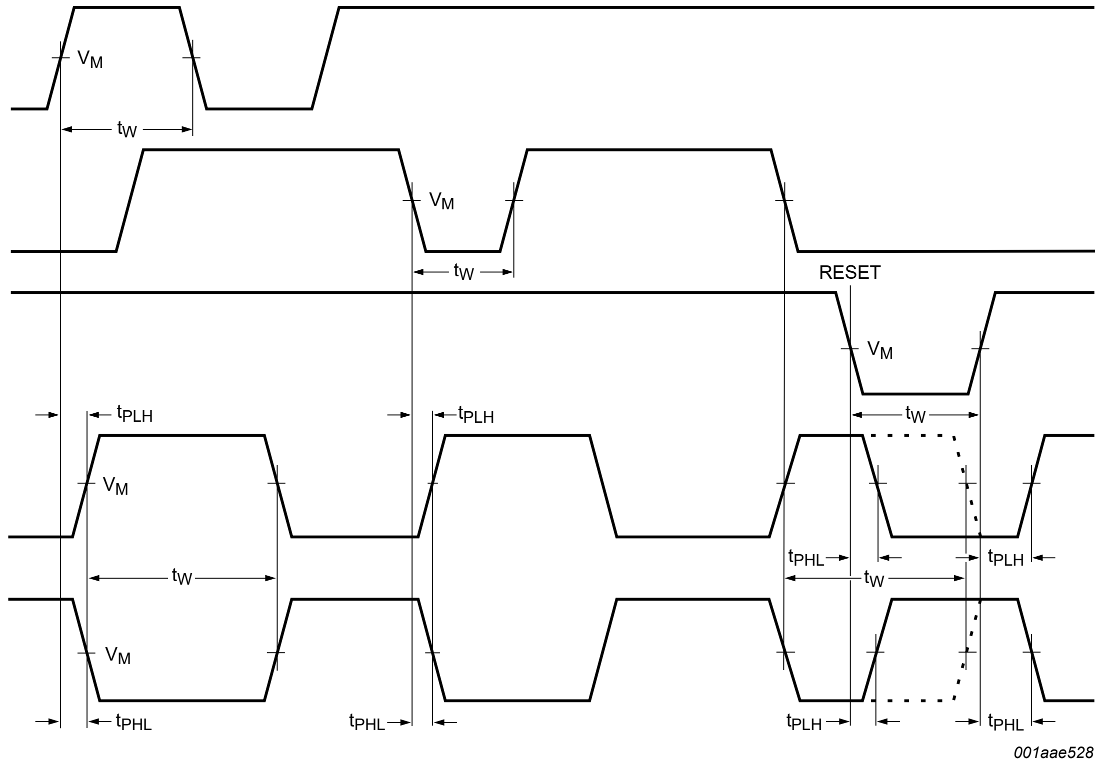
Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
74AHC123A										
t_{pd}	propagation delay	$n\overline{A}$ and nB to nQ and $n\overline{Q}$; see Fig. 5 [2]								
		V_{CC} = 3.0 V to 3.6 V; C_L = 15 pF	-	7.4	20.6	1.0	24.0	1.0	26.0	ns
		V_{CC} = 3.0 V to 3.6 V; 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
		V_{CC} = 4.5 V to 5.5 V; 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 Fig. 5 [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
		V_{CC} = 3.0 V to 3.6 V; 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
		V_{CC} = 4.5 V to 5.5 V; 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 Fig. 5 [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
		V_{CC} = 3.0 V to 3.6 V; 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
		V_{CC} = 4.5 V to 5.5 V; C_L = 50 pF	-	6.3	11.4	1.0	13.0	1.0	14.5	ns
t_W	pulse width	inputs; $n\overline{A}$ = LOW; see Fig. 5								
		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 Fig. 5								
		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 Fig. 5								
		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 Fig. 5, Fig. 6, Fig. 7 and Fig. 8 [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

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	nA̅ to nB; C_{EXT} = 100 pF; R_{EXT} = 1 kΩ; C_L = 50 pF; see Fig. 6 and Fig. 8								
		V_{CC} = 3.0 V to 3.6 V	-	60	-	-	-	-	-	ns
		V_{CC} = 4.5 V to 5.5 V	-	39	-	-	-	-	-	ns
		nA̅ to nB; C_{EXT} = 0.01 μF; R_{EXT} = 1 kΩ; C_L = 50 pF; see Fig. 6 and Fig. 8								
		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
74AHCT123A										
t_{pd}	propagation delay	nA̅ and nB to nQ and nQ̅; see Fig. 5 [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
		V_{CC} = 4.5 V to 5.5 V; C_L = 50 pF	-	7.1	14.0	1.0	16.0	1.0	17.5	ns
		nR̅D̅ to nQ and nQ̅; see Fig. 5 [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
		V_{CC} = 4.5 V to 5.5 V; C_L = 50 pF	-	7.5	14.9	1.0	17.0	1.0	18.5	ns
		nR̅D̅ to nQ and nQ̅ (reset); see Fig. 5 [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
		V_{CC} = 4.5 V to 5.5 V; C_L = 50 pF	-	6.7	11.4	1.0	13.0	1.0	14.5	ns
t_W	pulse width	inputs; nA̅ = LOW; C_L = 50 pF; see Fig. 5								
		V_{CC} = 4.5 V to 5.5 V	5.0	-	-	5.0	-	5.0	-	ns
		inputs; nB = HIGH; C_L = 50 pF; see Fig. 5								
		V_{CC} = 4.5 V to 5.5 V	5.0	-	-	5.0	-	5.0	-	ns
		inputs; nR̅D̅ = LOW; C_L = 50 pF; see Fig. 5								
		V_{CC} = 4.5 V to 5.5 V	5.0	-	-	5.0	-	5.0	-	ns
		outputs; nQ̅ = LOW and nQ = HIGH; C_L = 50 pF; C_{EXT} = 28 pF; R_{EXT} = 2 kΩ; see Fig. 5, Fig. 6, Fig. 7 and Fig. 8 [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

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 Fig. 6 and Fig. 8								
		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 Fig. 6 and Fig. 8								
		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} ≥ 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).
$P_D = C_{PD} \times V_{CC}^2 \times f_i + \Sigma(C_L \times V_{CC}^2 \times f_o)$ 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.

10.1. Waveforms and test circuit

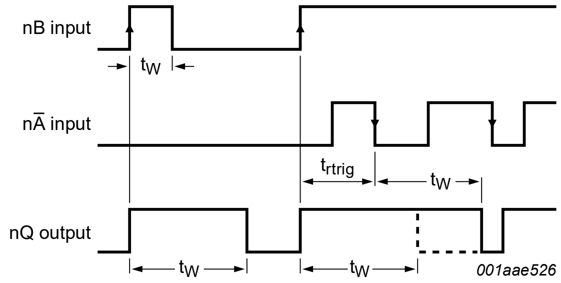


Measurement points are given in Table 8.

Fig. 5. Propagation delay input (nA̅, nB, nR̅D) to output (nQ, nQ̅)

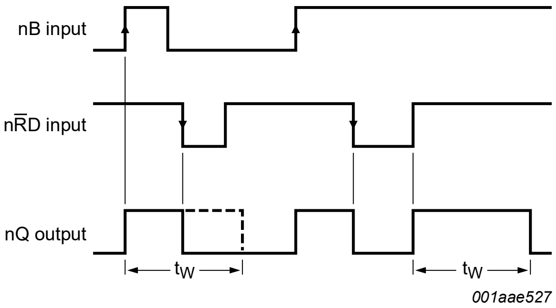
Table 8. Measurement points

Type	Input	Output
	V_M	V_M
74AHC123A	0.5 × V_{CC}	0.5 × V_{CC}
74AHCT123A	1.5 V	0.5 × V_{CC}



nR̅D = HIGH

Fig. 6. Output pulse control using retrigger pulse



nA = LOW

Fig. 7. Output pulse control using reset input nRD

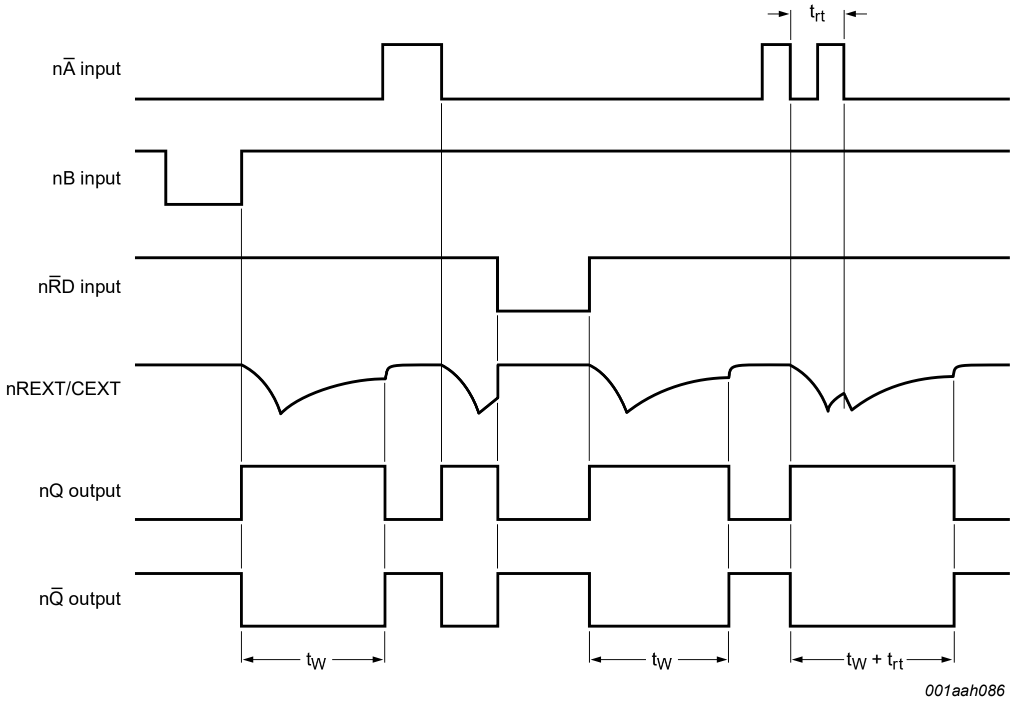


Fig. 8. Input and output timing

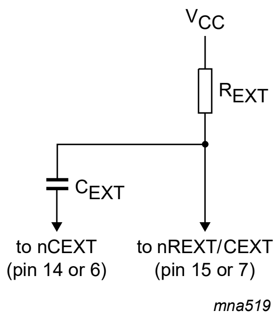
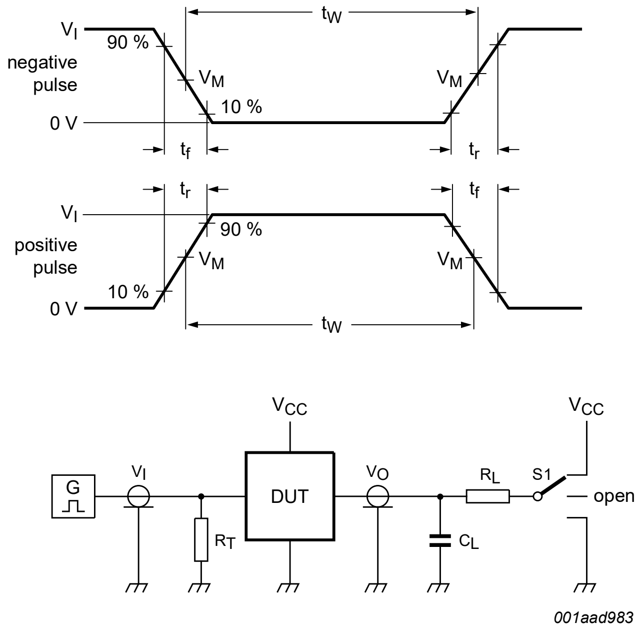


Fig. 9. Timing component connections



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 resistance

S1 = Test selection switch

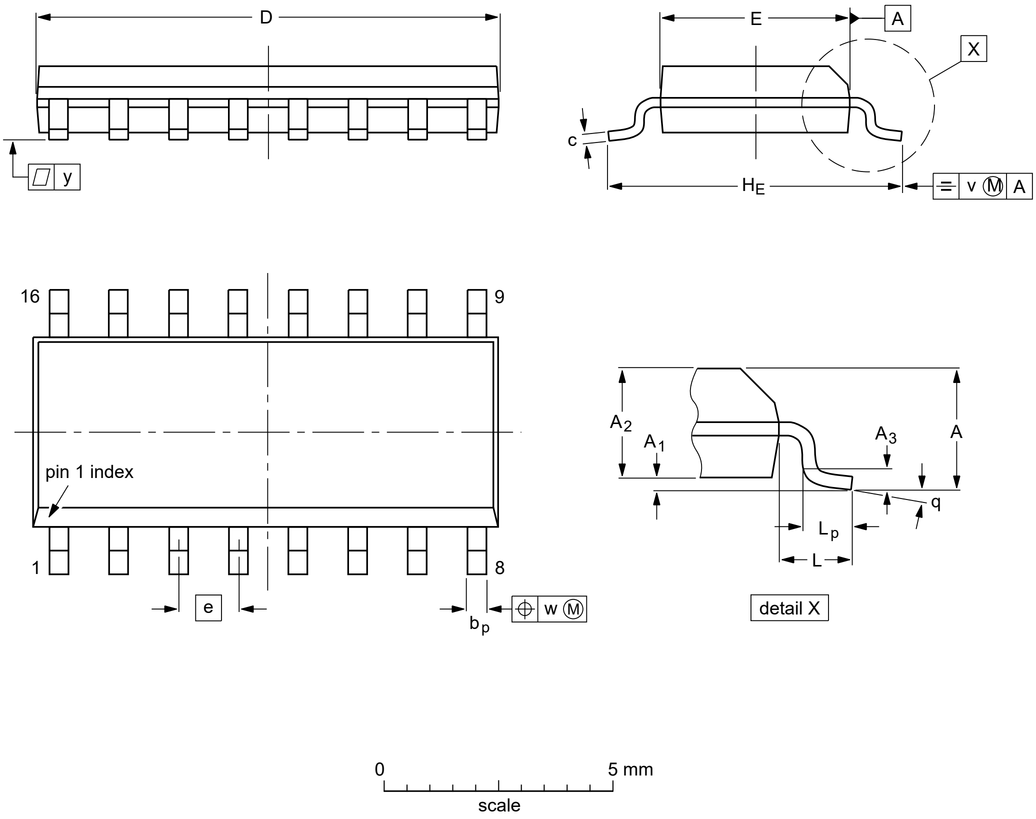
Fig. 10. Test circuit for measuring switching times

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

11. 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°

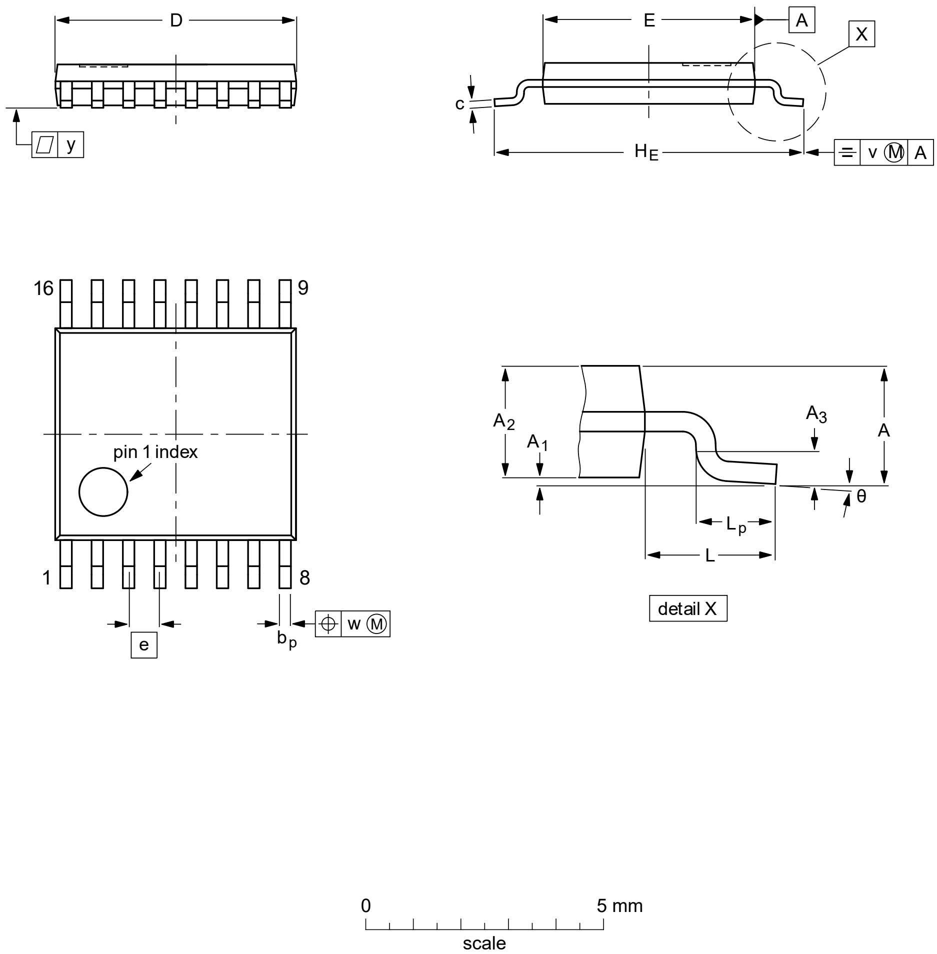
Note
1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

sot109-1_po

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

Fig. 11. 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	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

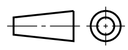
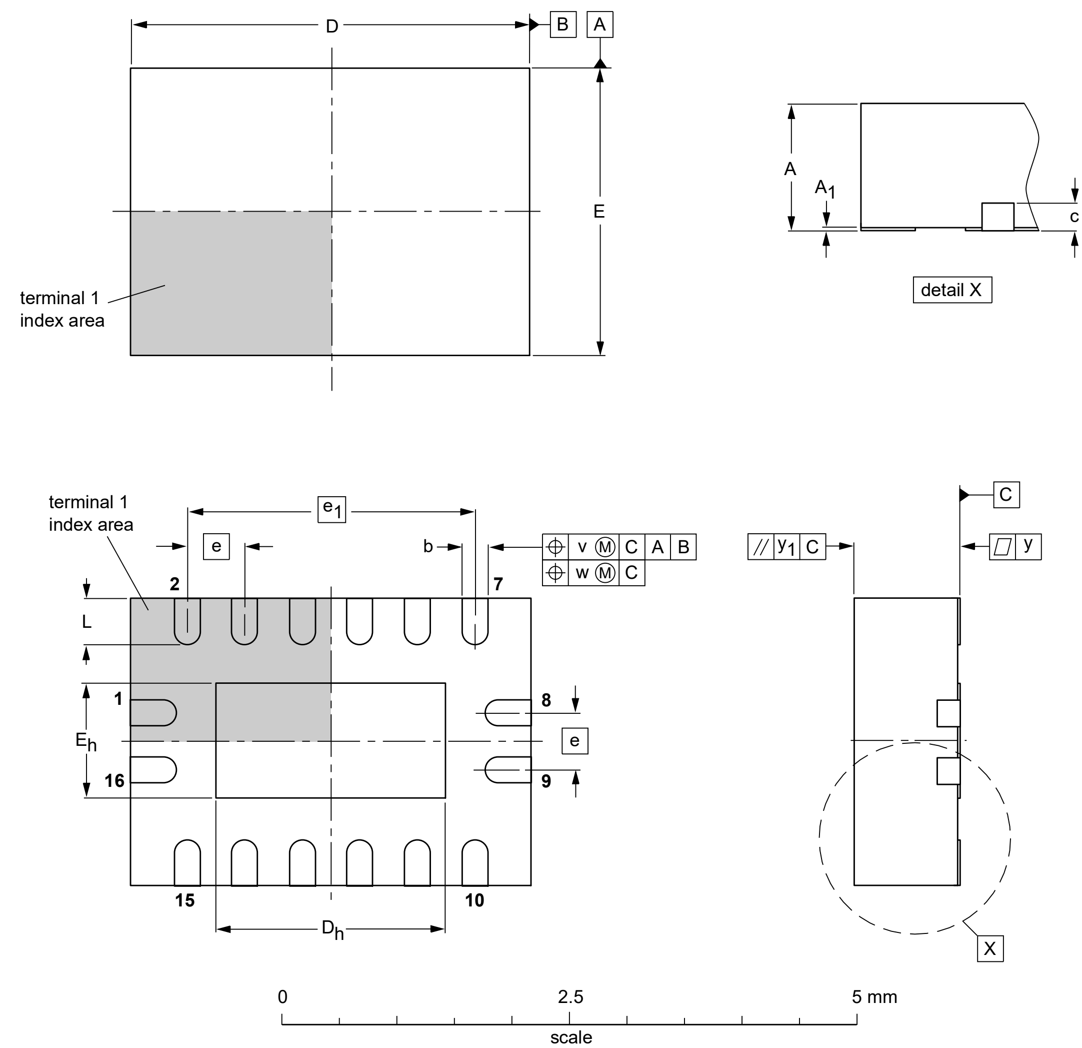
Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT403-1		MO-153				~~03-02-18~~ 23-10-27

Fig. 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**



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. 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:	• Fig. 11, Fig. 12: Aligned SO and TSSOP package outline drawings to JEDEC MS-012 and MO-153.			
74AHC_AHCT123A v.6	20230904	Product data sheet	-	74AHC_AHCT123A v.5
Modifications:	• Section 2: ESD specification updated according to the latest JEDEC standard.			
74AHC_AHCT123A v.5	20200617	Product data sheet	-	74AHC_AHCT123A v.4
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 updated.			
74AHC_AHCT123A v.4	20111108	Product data sheet	-	74AHC_AHCT123A v.3
Modifications:	• Legal pages updated.			
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".

[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.

Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Nexperia does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Nexperia sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Nexperia and its customer, unless Nexperia and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Nexperia product is deemed to offer functions and qualities beyond those described in the Product data sheet.

Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Nexperia does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Nexperia takes no responsibility for the content in this document if provided by an information source outside of Nexperia.

In no event shall Nexperia be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Nexperia's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of Nexperia.

Right to make changes — Nexperia reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Nexperia products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Nexperia product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Nexperia and its suppliers accept no liability for inclusion and/or use of Nexperia products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. Nexperia makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using Nexperia products, and Nexperia accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Nexperia product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Nexperia does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Nexperia products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Nexperia does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — Nexperia products are sold subject to the general terms and conditions of commercial sale, as published at http://www.nexperia.com/profile/terms, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Nexperia hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Nexperia products by customer.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific Nexperia product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Nexperia accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Nexperia's warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond Nexperia's specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Nexperia for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond Nexperia's standard warranty and Nexperia's product specifications.

Translations — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

Contents

For more information, please visit: http://www.nexperia.com
For sales office addresses, please send an email to: salesaddresses@nexperia.com
Date of release: 28 February 2024

OUR CERTIFICATE

DiGi provide top-quality products and perfect service for customer worldwide through standardization, technological innovation and continuous improvement. DiGi through third-party certification, we striciy control the quality of products and services. Welcome your RFQ to Email: Info@DiGi-Electronics.com

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.