74LVC1G123-Q100

Single retriggerable monostable multivibrator; Schmitt trigger inputs

Rev. 5 — 14 August 2023 Product data sheet

1. General description

The 74LVC1G123-Q100 is a single retriggerable monostable multivibrator with Schmitt trigger inputs. Output pulse width is controlled by three methods:

1. The basic pulse is programmed by selection of an external resistor (R_{EXT}) and capacitor (C_{EXT}).
2. Once triggered, the basic output pulse width may be extended by retriggering the gated active LOW-going edge input ($\overline{A}$) or the active HIGH-going edge input (B). By repeating this process, the output pulse period (Q = HIGH) can be made as long as desired. Alternatively an output delay can be terminated at any time by a LOW-going edge on input $\overline{CLR}$, which also inhibits the triggering.
3. An internal connection from $\overline{CLR}$ to the input gates makes it possible to trigger the circuit by a HIGH-going signal at input $\overline{CLR}$.

Inputs can be driven from either 3.3 V or 5 V devices. This feature allows the use of these devices as translators in a mixed 3.3 V and 5 V environment. Schmitt trigger inputs, makes the circuit highly tolerant to slower input rise and fall times.

This device is fully specified for partial power-down applications using I_{OFF}. The I_{OFF} circuitry disables the output, preventing the damaging backflow current through the device when it is powered down.

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
- Wide supply voltage range from 1.65 V to 5.5 V
- High noise immunity
- ±24 mA output drive (V_{CC} = 3.0 V)
- CMOS low power consumption
- DC triggered from active HIGH or active LOW inputs
- Retriggerable for very long pulses up to 100 % duty factor
- Direct reset terminates output pulse
- Schmitt trigger on all inputs
- Complies with JEDEC standard:
  - JESD8-7 (1.65 V to 1.95 V)
  - JESD8-5 (2.3 V to 2.7 V)
  - JESD8-B/JESD36 (2.7 V to 3.6 V)
- Power-on-reset on outputs
- Latch-up performance exceeds 100 mA
- Direct interface with TTL levels
- Inputs accept voltages up to 5.5 V
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V

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3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74LVC1G123DP-Q100	-40 °C to +125 °C	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm	SOT505-2
74LVC1G123DC-Q100	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1

4. Marking

Table 2. Marking codes

Type number	Marking code[1]
74LVC1G123DP-Q100	Y3
74LVC1G123DC-Q100	Y3

[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

5. Functional diagram

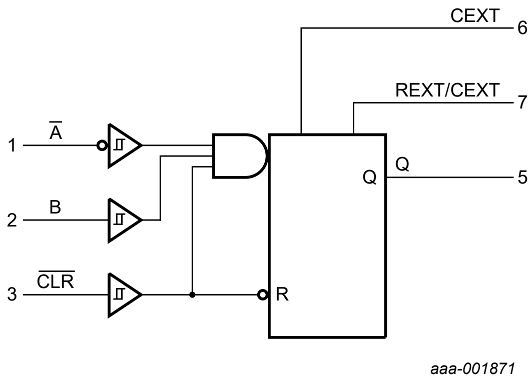


Fig. 1. Logic symbol

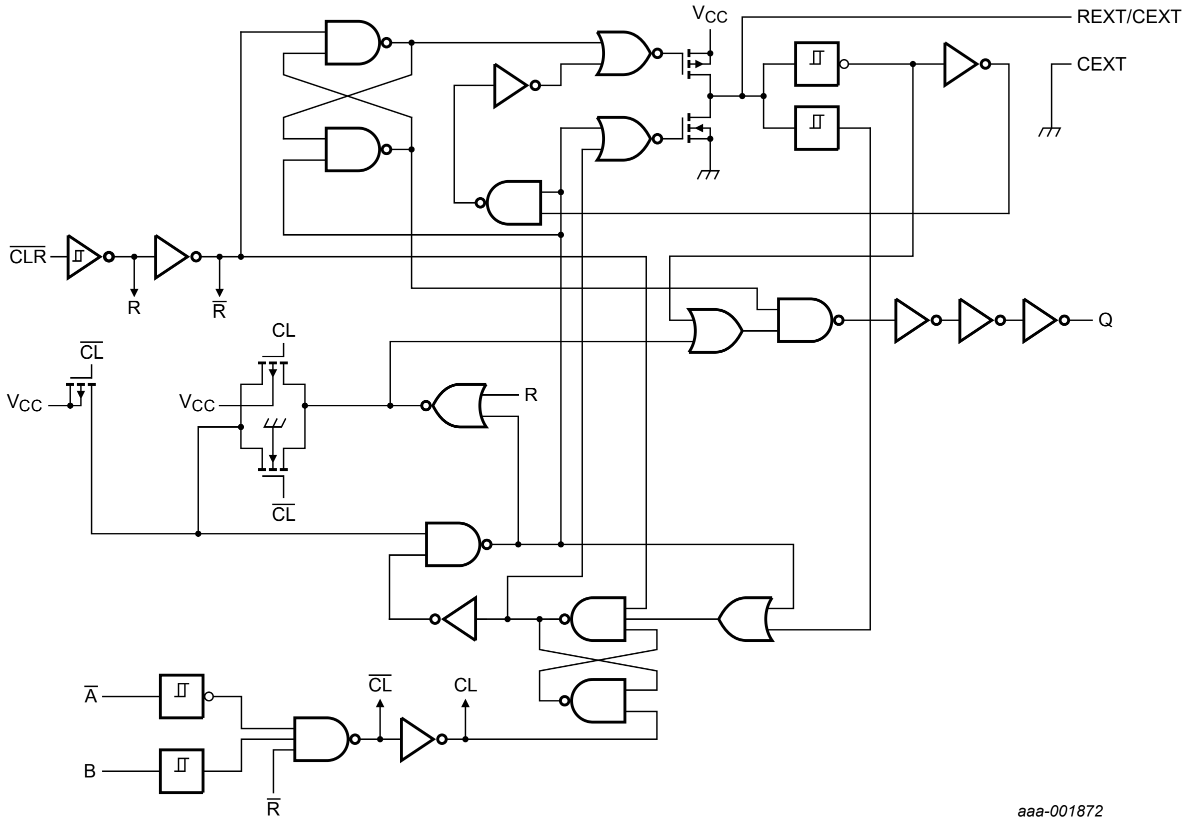


Fig. 2. Logic diagram

6. Pinning information

6.1. Pinning

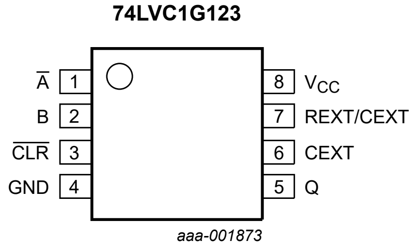


Fig. 3. Pin configuration SOT505-2 (TSSOP8) and SOT765-1 (VSSOP8)

6.2. Pin description

Table 3. Pin description

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

7. Functional description

Table 4. 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.

Input			Output
$\overline{CLR}$	**$\overline{A}$**	**B**	**Q**
L	X	X	L
X	H	X	L[1]
X	X	L	L[1]
H	L	↑	⎍
H	↓	H	⎍
↑	L	H	⎍

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

8. Limiting values

Table 5. 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	+6.5	V
V_I	input voltage	[1]	-0.5	+6.5	V
V_O	output voltage	Active mode [1]	-0.5	V_{CC} + 0.5	V
		Power-down mode; V_{CC} = 0 V [1]	-0.5	+6.5	V
I_{IK}	input clamping current	V_I < 0 V	-50	-	mA
I_{OK}	output clamping current	V_O < 0 V or V_O > V_{CC}	-	±50	mA
I_O	output current	V_O = 0 V to V_{CC}	-	±50	mA
I_{CC}	supply current		-	100	mA
I_{GND}	ground current		-100	-	mA
T_{stg}	storage temperature		-65	+150	°C

Symbol	Parameter	Conditions	Min	Max	Unit
P_{tot}	total power dissipation	T_{amb} = -40 °C to +125 °C [2]	-	250	mW

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

[2] For SOT505-2 (TSSOP8) package: P_{tot} derates linearly with 4.6 mW/K above 96 °C.
For SOT765-1 (VSSOP8) package: P_{tot} derates linearly with 4.9 mW/K above 99 °C.

9. Recommended operating conditions

Table 6. Operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	supply voltage		1.65	5.5	V
V_I	input voltage		0	5.5	V
V_O	output voltage	Active mode	0	V_{CC}	V
		Power-down mode; V_{CC} = 0 V	0	5.5	V
T_{amb}	ambient temperature		-40	+125	°C
Δt/ΔV	input transition rise and fall rate	V_{CC} = 1.65 V to 5.5 V	-	1	ms/V

10. Static characteristics

Table 7. Static characteristics

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

Symbol	Parameter	Conditions	Min	Typ[1]	Max	Unit
T_{amb} = -40 °C to +85 °C						
V_{OH}	HIGH-level output voltage	V_I = V_{T+} or V_{T-}				
		I_O = -100 μA; V_{CC} = 1.65 V to 5.5 V	V_{CC} - 0.1	-	-	V
		I_O = -4 mA; V_{CC} = 1.65 V	1.2	-	-	V
		I_O = -8 mA; V_{CC} = 2.3 V	1.9	-	-	V
		I_O = -12 mA; V_{CC} = 2.7 V	2.2	-	-	V
		I_O = -24 mA; V_{CC} = 3.0 V	2.4	-	-	V
		I_O = -32 mA; V_{CC} = 4.5 V	3.8	-	-	V
V_{OL}	LOW-level output voltage	V_I = V_{T+} or V_{T-}				
		I_O = 100 μA; V_{CC} = 1.65 V to 5.5 V	-	-	0.1	V
		I_O = 4 mA; V_{CC} = 1.65 V	-	-	0.45	V
		I_O = 8 mA; V_{CC} = 2.3 V	-	-	0.3	V
		I_O = 12 mA; V_{CC} = 2.7 V	-	-	0.4	V
		I_O = 24 mA; V_{CC} = 3.0 V	-	-	0.55	V
		I_O = 32 mA; V_{CC} = 4.5 V	-	-	0.55	V
I_I	input leakage current	V_I = 5.5 V or GND; V_{CC} = 0 V to 5.5 V	-	-	±2	μA
I_{OFF}	power-off leakage current	V_I or V_O = 5.5 V; V_{CC} = 0 V	-	-	±2	μA

Symbol	Parameter	Conditions	Min	Typ[1]	Max	Unit
I_{CC}	supply current	V_I = 5.5 V or GND;				
		Quiescent; V_{CC} = 1.65 V to 5.5 V; I_O = 0 A	-	0.1	10	μA
		Active state; R_{EXT}/C_{EXT} = 0.5V_{CC}				
		V_{CC} = 1.65 V	-	-	80	μA
		V_{CC} = 2.3 V	-	-	130	μA
		V_{CC} = 3 V	-	-	240	μA
		V_{CC} = 4.5 V	-	-	400	μA
		V_{CC} = 5.5 V	-	-	650	μA
C_I	input capacitance		-	2.0	-	pF
T_{amb} = -40 °C to +125 °C						
V_{OH}	HIGH-level output voltage	V_I = V_{T+} or V_{T-}				
		I_O = -100 μA; V_{CC} = 1.65 V to 5.5 V	V_{CC} - 0.1	-	-	V
		I_O = -4 mA; V_{CC} = 1.65 V	1.2	-	-	V
		I_O = -8 mA; V_{CC} = 2.3 V	1.9	-	-	V
		I_O = -12 mA; V_{CC} = 2.7 V	2.2	-	-	V
		I_O = -24 mA; V_{CC} = 3.0 V	2.4	-	-	V
		I_O = -32 mA; V_{CC} = 4.5 V	3.8	-	-	V
V_{OL}	LOW-level output voltage	V_I = V_{T+} or V_{T-}				
		I_O = 100 μA; V_{CC} = 1.65 V to 5.5 V	-	-	0.1	V
		I_O = 4 mA; V_{CC} = 1.65 V	-	-	0.45	V
		I_O = 8 mA; V_{CC} = 2.3 V	-	-	0.3	V
		I_O = 12 mA; V_{CC} = 2.7 V	-	-	0.4	V
		I_O = 24 mA; V_{CC} = 3.0 V	-	-	0.55	V
		I_O = 32 mA; V_{CC} = 4.5 V	-	-	0.55	V
I_I	input leakage current	V_I = 5.5 V or GND; V_{CC} = 0 V to 5.5 V	-	-	±10	μA
I_{OFF}	power-off leakage current	V_I or V_O = 5.5 V; V_{CC} = 0 V	-	-	±10	μA
I_{CC}	supply current	V_I = 5.5 V or GND;				
		Quiescent; V_{CC} = 1.65 V to 5.5 V; I_O = 0 A	-	-	20	μA
		Active state; R_{EXT}/C_{EXT} = 0.5V_{CC}				
		V_{CC} = 1.65 V	-	-	80	μA
		V_{CC} = 2.3 V	-	-	130	μA
		V_{CC} = 3 V	-	-	240	μA
		V_{CC} = 4.5 V	-	-	400	μA
		V_{CC} = 5.5 V	-	-	650	μA

[1] All typical values are measured at T_{amb} = 25 °C.

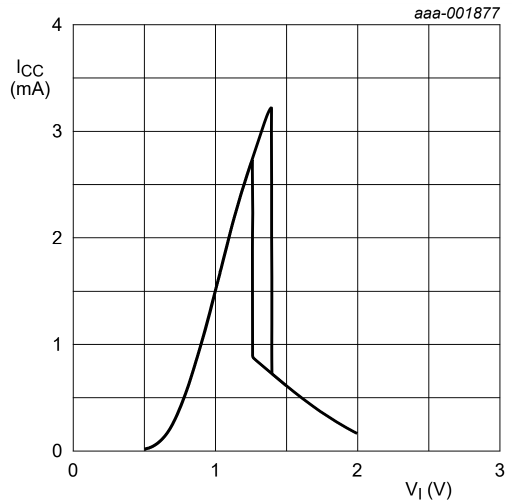
Table 8. Transfer characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 16.

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
V_{T+}	positive-going threshold voltage	$\overline{A}$, B and $\overline{CLR}$ input; see Fig. 4						
		V_{CC} = 1.65 V to 1.95 V	0.72	0.98	1.22	0.71	1.22	V
		V_{CC} = 2.3 V to 2.7 V	0.97	1.26	1.52	0.97	1.52	V
		V_{CC} = 3.0 V to 3.6 V	1.20	1.58	1.90	1.20	1.90	V
		V_{CC} = 4.5 V to 5.5 V	1.74	2.27	2.75	1.74	2.78	V
V_{T-}	negative-going threshold voltage	$\overline{A}$, B and $\overline{CLR}$ input; see Fig. 4						
		V_{CC} = 1.65 V to 1.95 V	0.56	0.81	1.04	0.56	1.04	V
		V_{CC} = 2.3 V to 2.7 V	0.83	1.09	1.33	0.82	1.33	V
		V_{CC} = 3.0 V to 3.6 V	1.08	1.40	1.70	1.08	1.72	V
		V_{CC} = 4.5 V to 5.5 V	1.61	2.07	2.53	1.61	2.57	V
V_H	hysteresis voltage	$\overline{A}$, B and $\overline{CLR}$ input; (V_{T+} - V_{T-}); see Fig. 4						
		V_{CC} = 1.65 V to 1.95 V	61	170	295	54	295	mV
		V_{CC} = 2.3 V to 2.7 V	41	174	304	41	304	mV
		V_{CC} = 3.0 V to 3.6 V	40	183	319	40	319	mV
		V_{CC} = 4.5 V to 5.5 V	32	199	363	26	363	mV

[1] Typical values are measured at T_{amb} = 25 °C and V_{CC} = 1.8 V, 2.5 V, 3.3 V and 5.0 V respectively.

10.1. Waveform transfer characteristics



V_{CC} = 3.0 V.

Fig. 4. Typical transfer characteristics

11. Dynamic characteristics

Table 9. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 16.

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
t_{pd}	propagation delay	$\overline{A}$, B to Q; see Fig. 5 [2]						
		C_L = 15 pF;						
		V_{CC} = 1.65 V to 1.95 V	2.5	7.1	16.3	2.5	17.6	ns
		V_{CC} = 2.3 V to 2.7 V	1.9	-	10.3	1.9	11.2	ns
		V_{CC} = 2.7 V	1.9	-	8.5	1.9	9.3	ns
		V_{CC} = 3.0 V to 3.6 V	1.5	-	7.6	1.5	8.3	ns
		V_{CC} = 4.5 V to 5.5 V	1.2	-	5.3	1.2	5.8	ns
		C_L = 30 pF or C_L = 50 pF						
		V_{CC} = 1.65 V to 1.95 V	2.9	7.8	17.6	2.9	19.0	ns
		V_{CC} = 2.3 V to 2.7 V	2.2	-	11.3	2.2	12.3	ns
		V_{CC} = 2.7 V	2.7	-	10.5	2.7	11.4	ns
		V_{CC} = 3.0 V to 3.6 V	2.0	-	9.5	2.0	10.3	ns
		V_{CC} = 4.5 V to 5.5 V	1.5	-	6.7	1.5	7.2	ns
		$\overline{CLR}$ to Q; see Fig. 5						
		C_L = 15 pF;						
		V_{CC} = 1.65 V to 1.95 V	3.0	6.9	16.2	3.0	17.4	ns
		V_{CC} = 2.3 V to 2.7 V	2.2	-	9.6	2.2	10.5	ns
		V_{CC} = 2.7 V	2.2	-	8.2	2.2	8.9	ns
		V_{CC} = 3.0 V to 3.6 V	2.0	-	7.3	2.0	8.0	ns
		V_{CC} = 4.5 V to 5.5 V	1.5	-	5.1	1.5	5.5	ns
		C_L = 30 pF or C_L = 50 pF						
		V_{CC} = 1.65 V to 1.95 V	3.3	7.5	17.2	3.8	18.6	ns
		V_{CC} = 2.3 V to 2.7 V	2.5	-	10.3	2.0	11.2	ns
		V_{CC} = 2.7 V	2.8	-	9.3	2.8	10.2	ns
		V_{CC} = 3.0 V to 3.6 V	1.5	-	8.4	1.5	9.2	ns
		V_{CC} = 4.5 V to 5.5 V	1.5	-	6.0	1.5	6.6	ns
t_{pd}	propagation delay	$\overline{CLR}$ to Q (trigger); see Fig. 5 [2]						
		C_L = 15 pF;						
		V_{CC} = 1.65 V to 1.95 V	2.7	7.6	17.4	2.7	18.9	ns
		V_{CC} = 2.3 V to 2.7 V	2.1	-	11.0	2.1	12.0	ns
		V_{CC} = 2.7 V	2.1	-	9.2	2.1	10.0	ns
		V_{CC} = 3.0 V to 3.6 V	1.7	-	8.2	1.7	8.9	ns
		V_{CC} = 4.5 V to 5.5 V	1.4	-	5.9	1.4	6.4	ns
		C_L = 30 pF or C_L = 50 pF						
		V_{CC} = 1.65 V to 1.95 V	3.1	8.3	18.8	3.3	20.3	ns
		V_{CC} = 2.3 V to 2.7 V	2.5	-	12.0	2.5	13.1	ns
		V_{CC} = 2.7 V	2.8	-	11.1	2.8	12.1	ns
		V_{CC} = 3.0 V to 3.6 V	2.0	-	10.1	2.0	11.0	ns
		V_{CC} = 4.5 V to 5.5 V	1.5	-	7.1	1.5	7.7	ns

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
t_W	pulse width	input $\overline{A}$ LOW; B HIGH; see Fig. 5 and Fig. 6						
		V_{CC} = 1.65 V to 1.95 V	8.0	-	-	8.0	-	ns
		V_{CC} = 2.3 V to 2.7 V	4.0	-	-	4.0	-	ns
		V_{CC} = 2.7 V	3.0	-	-	3.0	-	ns
		V_{CC} = 3.0 V to 3.6 V	3.0	-	-	3.0	-	ns
		V_{CC} = 4.5 V to 5.5 V	2.5	-	-	2.5	-	ns
		input $\overline{CLR}$ LOW; see Fig. 5 and Fig. 7						
		V_{CC} = 1.65 V to 1.95 V	8.0	-	-	8.0	-	ns
		V_{CC} = 2.3 V to 2.7 V	4.0	-	-	4.0	-	ns
		V_{CC} = 2.7 V	3.0	-	-	3.0	-	ns
		V_{CC} = 3.0 V to 3.6 V	3.0	-	-	3.0	-	ns
		V_{CC} = 4.5 V to 5.5 V	2.5	-	-	2.5	-	ns
t_W	pulse width	output Q HIGH; see Fig. 5, Fig. 6 and Fig. 7; R_{EXT} = 10 kΩ [3]						
		C_{EXT} = 100 pF						
		V_{CC} = 1.65 V to 1.95 V	-	1.4	2.2	-	2.2	μs
		V_{CC} = 2.3 V to 2.7 V	-	1.3	1.8	-	1.8	μs
		V_{CC} = 2.7 V	-	1.2	1.8	-	1.8	μs
		V_{CC} = 3.0 V to 3.6 V	-	1.2	1.8	-	1.8	μs
		V_{CC} = 4.5 V to 5.5 V	-	1.2	1.8	-	1.8	μs
		C_{EXT} = 0.01 μF [3]						
		V_{CC} = 1.65 V to 1.95 V	-	100	110	-	110	μs
		V_{CC} = 2.3 V to 2.7 V	-	100	110	-	110	μs
		V_{CC} = 2.7 V	-	100	110	-	110	μs
		V_{CC} = 3.0 V to 3.6 V	-	100	110	-	110	μs
		V_{CC} = 4.5 V to 5.5 V	-	100	110	-	110	μs
		C_{EXT} = 0.1 μF [3]						
		V_{CC} = 1.65 V to 1.95 V	-	1.0	1.05	-	1.05	ms
		V_{CC} = 2.7 V	-	1.0	1.05	-	1.05	ms
		V_{CC} = 3.0 V to 3.6 V	-	1.0	1.05	-	1.05	ms
		V_{CC} = 3.0 V to 3.6 V	-	1.0	1.05	-	1.05	ms
		V_{CC} = 4.5 V to 5.5 V	-	1.0	1.05	-	1.05	ms

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
t_{rtrig}	retrigger time	$\overline{A}$, B; see Fig. 6						
		C_{EXT} = 100 pF; R_{EXT} = 5 kΩ						
		V_{CC} = 1.65 V to 1.95 V	-	174	-	-	-	ns
		V_{CC} = 2.3 V to 2.7 V	-	59	-	-	-	ns
		C_{EXT} = 100 pF; R_{EXT} = 1 kΩ						
		V_{CC} = 3.0 V to 3.6 V	-	32	-	-	-	ns
		V_{CC} = 4.5 V to 5.5 V	-	20	-	-	-	ns
		C_{EXT} = 100 μF; R_{EXT} = 5 kΩ						
		V_{CC} = 1.65 V to 1.95 V	-	14	-	-	-	ms
		V_{CC} = 2.3 V to 2.7 V	-	10	-	-	-	ms
		C_{EXT} = 100 μF; R_{EXT} = 1 kΩ						
		V_{CC} = 3.0 V to 3.6 V	-	10	-	-	-	ms
		V_{CC} = 4.5 V to 5.5 V	-	8	-	-	-	ms
R_{ext}	external resistance	see Fig. 10, Fig. 11 and Fig. 12						
		V_{CC} = 2.0 V	5	-	-	-	-	kΩ
		V_{CC} ≥ 3.0 V	1	-	-	-	-	kΩ
C_{ext}	external capacitance	V_{CC} = 5.0 V; see Fig. 10, Fig. 11 and Fig. 12	-	-	-	-	-	pF
C_{PD}	power dissipation capacitance	V_I = GND to V_{CC}; C_{EXT} = 0 pF;						
		R_{EXT} = 5 kΩ						
		V_{CC} = 1.8 V	-	35	-	-	-	pF
		V_{CC} = 2.5 V	-	35	-	-	-	pF
		R_{EXT} = 1 kΩ						
		V_{CC} = 3.3 V	-	27	-	-	-	pF
		V_{CC} = 5.0 V	-	29	-	-	-	pF

[1] Typical values are measured at T_{amb} = 25 °C and V_{CC} = 1.8 V, 2.5 V, 3.3 V and 5.0 V respectively.

[2] t_{pd} is the same as t_{PHL} and t_{PLH}

[3] For other R_{EXT} and C_{EXT} combinations see Fig. 10, Fig. 11 and Fig. 12. If C_{EXT} > 10 nF, the next formula is valid.

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

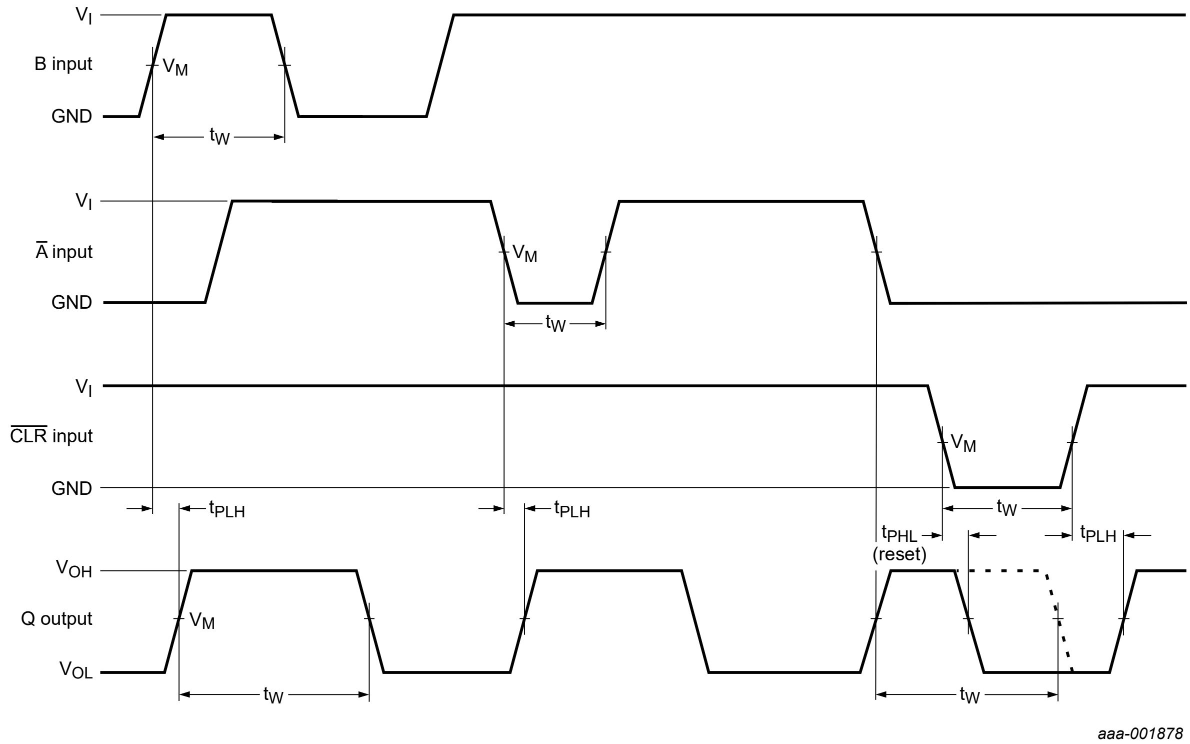
t_W = typical output pulse width in ns;

R_{EXT} = external resistor in kΩ;

C_{EXT} = external capacitor in pF;

K = constant = 1; see Fig. 13 for typical "K" factor as function of V_{CC}.

11.1. Waveforms, graphs and test circuit



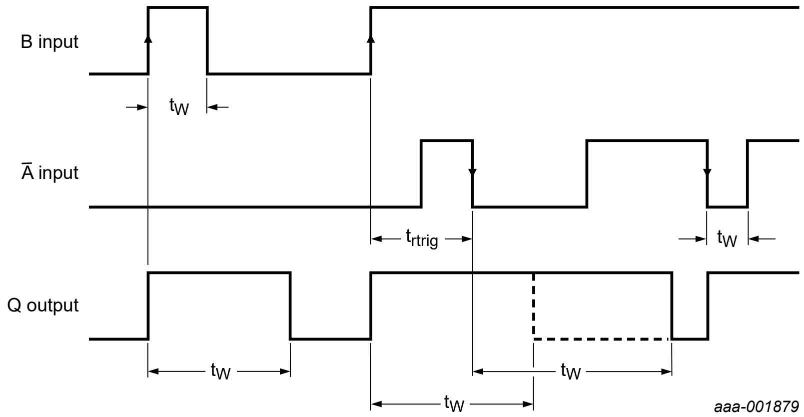
Measurement points are given in Table 10.

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

Fig. 5. Propagation delays from inputs ($\overline{A}$, B, $\overline{CLR}$) to output (Q)

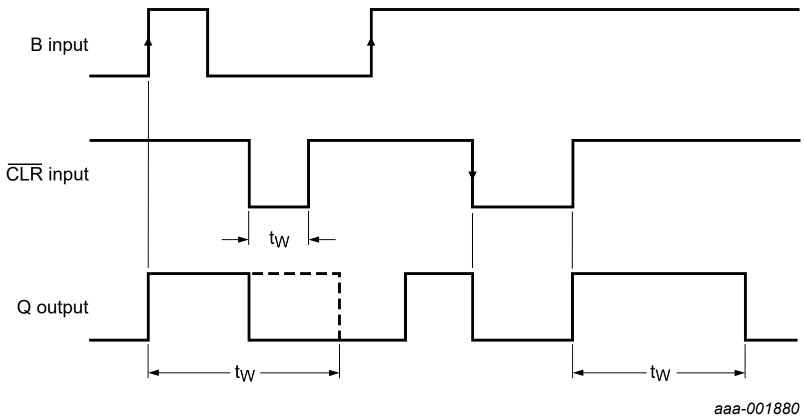
Table 10. Measurement points

Supply voltage	Input	Output
V_{CC}	V_M	V_M
1.65 V to 1.95 V	$0.5V_{CC}$	$0.5V_{CC}$
2.3 V to 2.7 V	$0.5V_{CC}$	$0.5V_{CC}$
2.7 V	1.5 V	1.5 V
3.0 V to 3.6 V	1.5 V	1.5 V
4.5 V to 5.5 V	$0.5V_{CC}$	$0.5V_{CC}$



$\overline{CLR}$ = HIGH

Fig. 6. Output pulse control using retrigger pulse



$\overline{A}$ = LOW

Fig. 7. Output pulse control using reset input $\overline{CLR}$

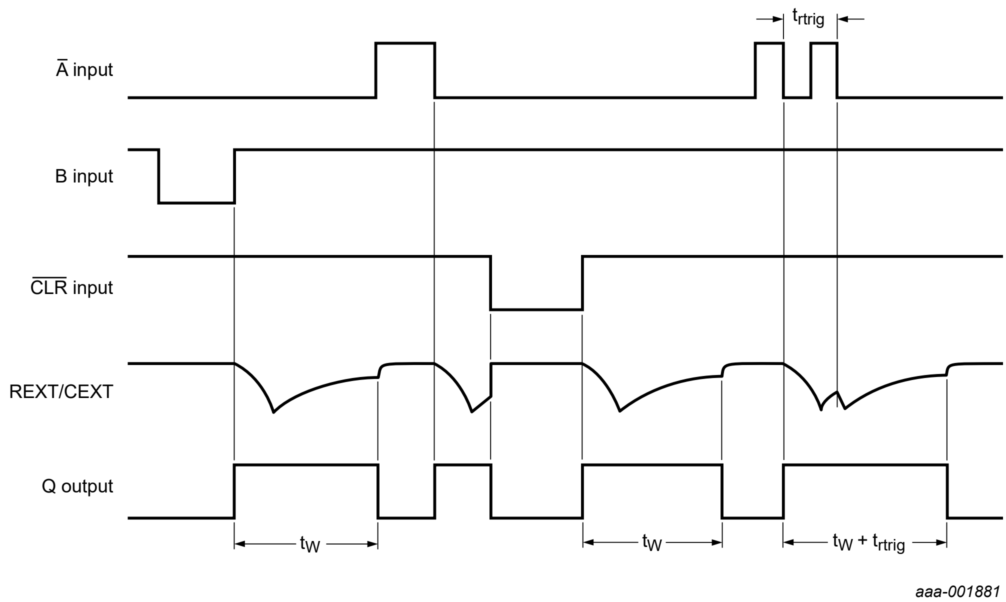


Fig. 8. Input and output timing

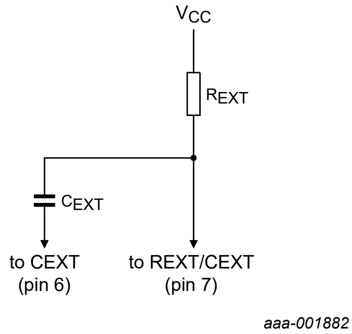
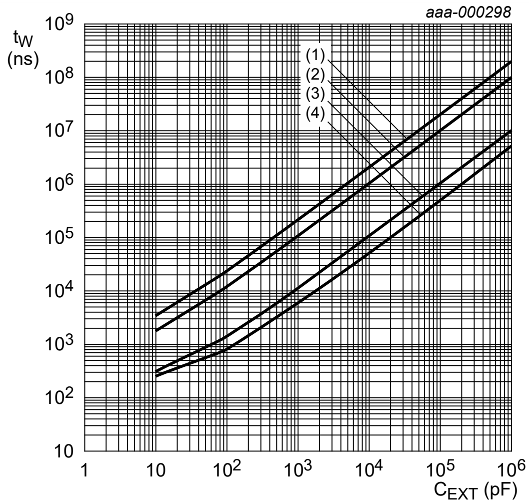


Fig. 9. Timing component connections



V_{CC} = 1.8 V; T_{amb} = 25 °C.

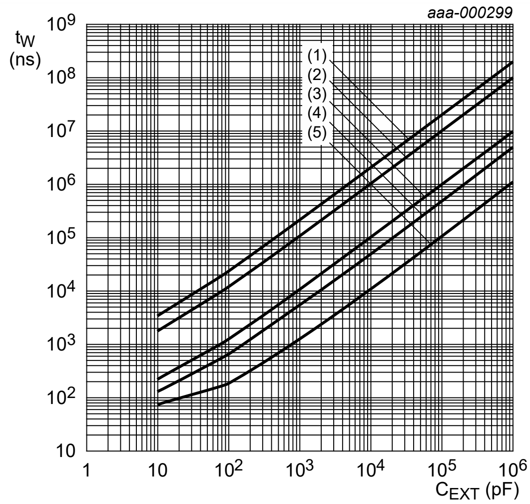
(1) R_{EXT} = 200 kΩ

(2) R_{EXT} = 100 kΩ

(3) R_{EXT} = 10 kΩ

(4) R_{EXT} = 5 kΩ

Fig. 10. Typical output pulse width as a function of the external capacitor value



V_{CC} = 3.3 V; T_{amb} = 25 °C.

(1) R_{EXT} = 200 kΩ

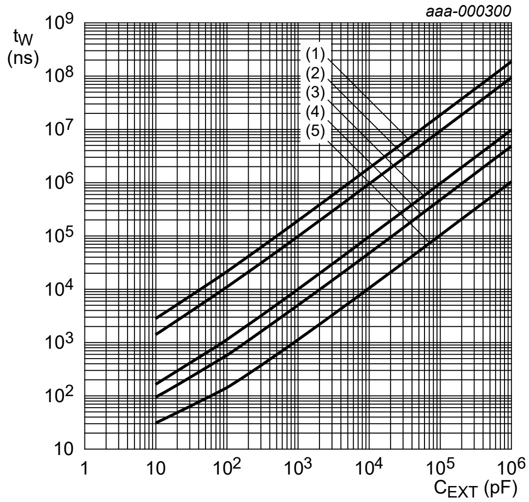
(2) R_{EXT} = 100 kΩ

(3) R_{EXT} = 10 kΩ

(4) R_{EXT} = 5 kΩ

(5) R_{EXT} = 1 kΩ

Fig. 11. Typical output pulse width as a function of the external capacitor value



V_{CC} = 5.0 V; T_{amb} = 25 °C.

(1) R_{EXT} = 200 kΩ

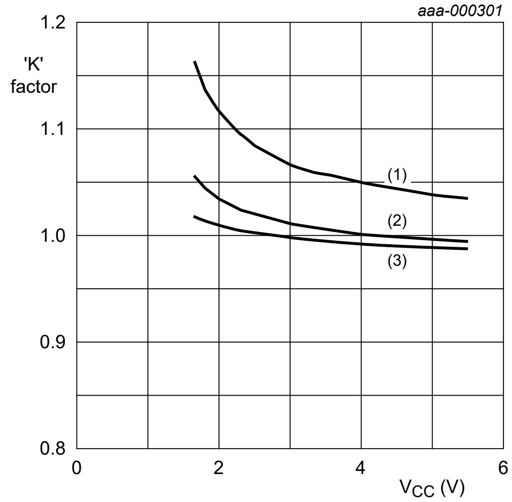
(2) R_{EXT} = 100 kΩ

(3) R_{EXT} = 10 kΩ

(4) R_{EXT} = 5 kΩ

(5) R_{EXT} = 1 kΩ

Fig. 12. Typical output pulse width as a function of the external capacitor value



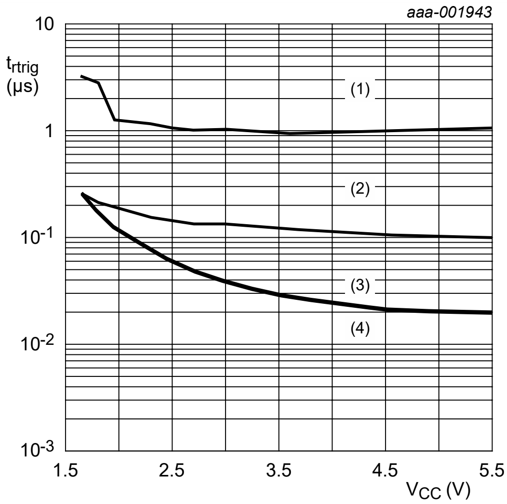
R_{EXT} = 10 kΩ; T_{amb} = 25 °C.

(1) C_{EXT} = 1000 pF

(2) C_{EXT} = 0.01 μF

(3) C_{EXT} = 0.1 μF

Fig. 13. Typical 'K' factor as function of V_{CC}



T_{amb} = 25 °C.

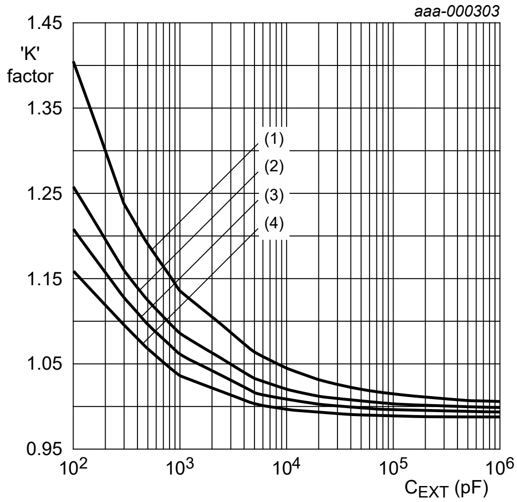
(1) C_{EXT} = 0.01 μF

(2) C_{EXT} = 1000 pF

(3) C_{EXT} = 100 pF

(4) C_{EXT} = 10 pF

Fig. 14. Minimum retrigger time as function of the supply voltage



R_{EXT} = 10 kΩ; T_{amb} = 25 °C.

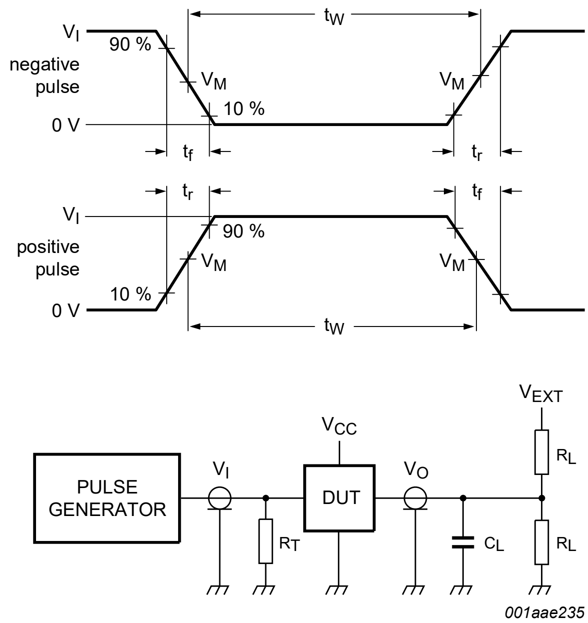
(1) V_{CC} = 1.8 V

(2) V_{CC} = 2.5 V

(3) V_{CC} = 3.3 V

(4) V_{CC} = 5.0 V

Fig. 15. Typical ‘K’ factor as function of C_{EXT}



Test data is given in Table 11.

Definitions for test circuit:

R_L = Load resistance.

C_L = Load capacitance including jig and probe capacitance.

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

V_{EXT} = Test voltage for switching times.

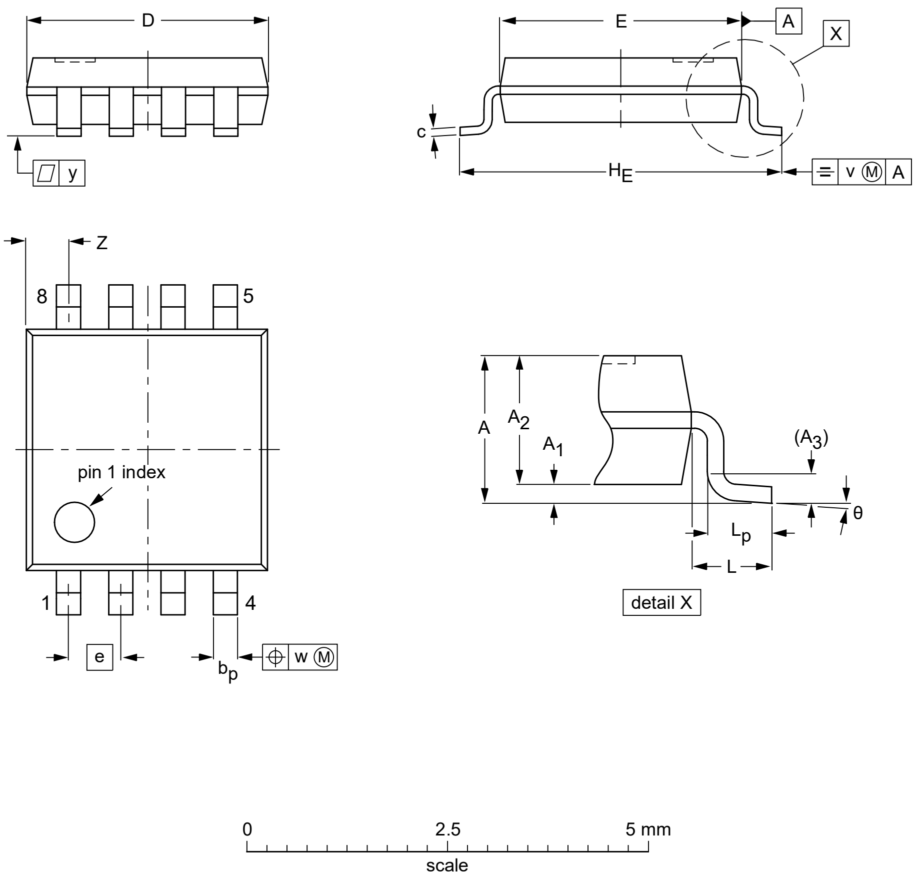
Fig. 16. Test circuit for measuring switching times

Table 11. Test data

Supply voltage	Input		Load		V_{EXT}
V_{CC}	V_I	t_r, t_f	C_L	R_L	t_{PLH}, t_{PHL}
1.65 V to 1.95 V	V_{CC}	≤ 2.0 ns	15 pF	1 MΩ	open
2.3 V to 2.7 V	V_{CC}	≤ 2.0 ns	15 pF	1 MΩ	open
2.7 V	2.7 V	≤ 2.5 ns	15 pF	1 MΩ	open
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	15 pF	1 MΩ	open
4.5 V to 5.5 V	V_{CC}	≤ 2.5 ns	15 pF	1 MΩ	open
1.65 V to 1.95 V	V_{CC}	≤ 2.0 ns	30 pF	1 kΩ	open
2.3 V to 2.7 V	V_{CC}	≤ 2.0 ns	30 pF	500 Ω	open
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open
4.5 V to 5.5 V	V_{CC}	≤ 2.5 ns	50 pF	500 Ω	open

12. Package outline

TSSOP8: plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm SOT505-2



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	D(1)	E(1)	e	H_E	L	L_p	v	w	y	Z(1)	θ
mm	1.1	0.15 0.00	0.95 0.75	0.25	0.38 0.22	0.18 0.08	3.1 2.9	3.1 2.9	0.65	4.1 3.9	0.5	0.47 0.33	0.2	0.13	0.1	0.70 0.35	8° 0°

Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

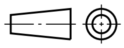
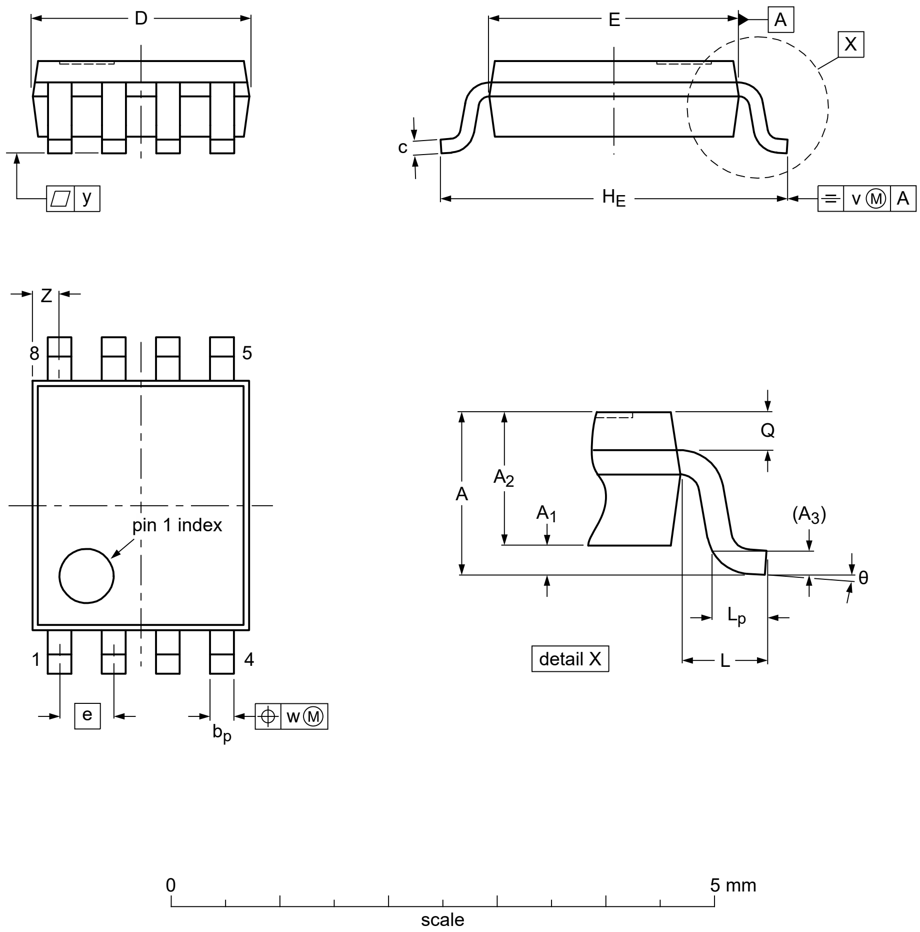
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT505-2		- - -				02-01-16

Fig. 17. Package outline SOT505-2 (TSSOP8)

VSSOP8: plastic very thin shrink small outline package; 8 leads; body width 2.3 mm **SOT765-1**



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
	max		0.15	0.85		0.27	0.23	2.1	2.4		3.2		0.40	0.21				0.4	8°
mm	nom	1			0.12					0.5		0.4			0.2	0.08	0.1		
	min		0.00	0.60		0.17	0.08	1.9	2.2		3.0		0.15	0.19				0.1	0°

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

sot765-1_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT765-1		MO-187				~~07-06-02~~ 16-05-31

Fig. 18. Package outline SOT765-1 (VSSOP8)

13. Abbreviations

Table 12. 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

14. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVC1G123_Q100 v.5	20230814	Product data sheet	-	74LVC1G123_Q100 v.4
Modifications:	• Section 2: ESD specification updated according to the latest JEDEC standard.			
74LVC1G123_Q100 v.4	20210420	Product data sheet	-	74LVC1G123_Q100 v.3
Modifications:	• Section 8: Derating values for P_{tot} total power dissipation have been updated.			
74LVC1G123_Q100 v.3	20181102	Product data sheet	-	74LVC1G123_Q100 v.2
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.			
74LVC1G123_Q100 v.2	20160613	Product data sheet	-	74LVC1G123_Q100 v.1
Modifications:	• Fig. 18, package outline drawing for SOT765-1 has changed			
74LVC1G123_Q100 v.1	20140310	Product data sheet	-	-

15. 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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