

74LV123

Dual retriggerable monostable multivibrator with reset

Rev. 8 — 4 March 2016

Product data sheet

1. General description

The 74LV123 is a low-voltage Si-gate CMOS device and is pin and function compatible with the 74HC123; 74HCT123. It is a dual retriggerable monostable multivibrator which uses three methods to control the output pulse width:

1. The basic pulse time is programmed by the selection of an external resistor (R_{EXT}) and capacitor (C_{EXT}). These are normally connected as shown in [Figure 9](#).
2. Once triggered, the basic output pulse width may be extended by retriggering the gated active LOW-going edge input ($n\bar{A}$) or the active HIGH-going edge input (nB). By repeating this process, the output pulse period ($nQ = \text{HIGH}$, $n\bar{Q} = \text{LOW}$) can be made as long as desired (see [Figure 12](#)).
3. Alternatively, an output delay can be terminated at any time by a LOW-going edge on input $n\bar{RD}$, which also inhibits the triggering (see [Figure 13](#)).

Schmitt-trigger action in the $n\bar{A}$ and nB inputs makes the circuit highly tolerant of slower input rise and fall times.

2. Features and benefits

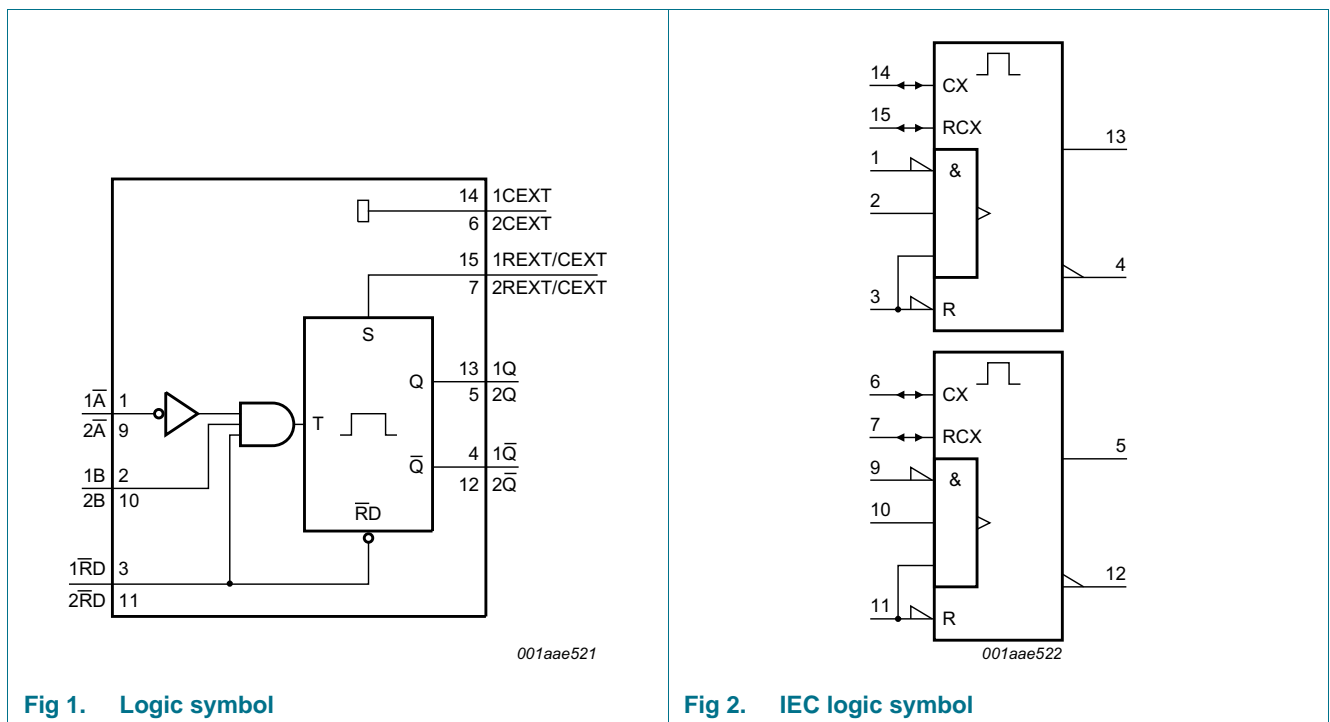
- Optimized for low-voltage applications: 1.0 V to 5.5 V
- Accepts TTL input levels between $V_{CC} = 2.7 \text{ V}$ and $V_{CC} = 3.6 \text{ V}$
- Typical output ground bounce: $< 0.8 \text{ V}$ at $V_{CC} = 3.3 \text{ V}$ and $T_{amb} = 25 \text{ }^\circ\text{C}$
- Typical HIGH-level output voltage (V_{OH}) undershoot: $> 2 \text{ V}$ at $V_{CC} = 3.3 \text{ V}$ and $T_{amb} = 25 \text{ }^\circ\text{C}$
- DC triggered from active HIGH or active LOW inputs
- Retriggerable for very long pulses up to 100 % duty factor
- Direct reset terminates output pulses
- Schmitt-trigger action on all inputs except for the reset input

3. Ordering information

Table 1. Ordering information

| Type number | Package | | | Version |
|-------------|-------------------|----------|--------------------------------------------------------------------------------------------------------------------------------|----------|
| | Temperature range | Name | Description | |
| 74LV123D | -40 °C to +125 °C | SO16 | plastic small outline package; 16 leads; body width 3.9 mm | SOT109-1 |
| 74LV123DB | -40 °C to +125 °C | SSOP16 | plastic shrink small outline package; 16 leads; body width 5.3 mm | SOT338-1 |
| 74LV123PW | -40 °C to +125 °C | TSSOP16 | plastic thin shrink small outline package; 16 leads; body width 4.4 mm | SOT403-1 |
| 74LV123BQ | -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



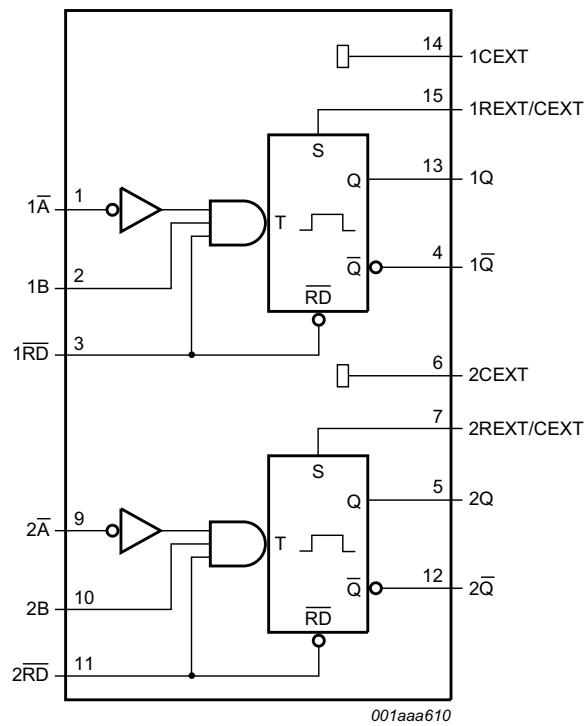


Fig 3. Functional diagram

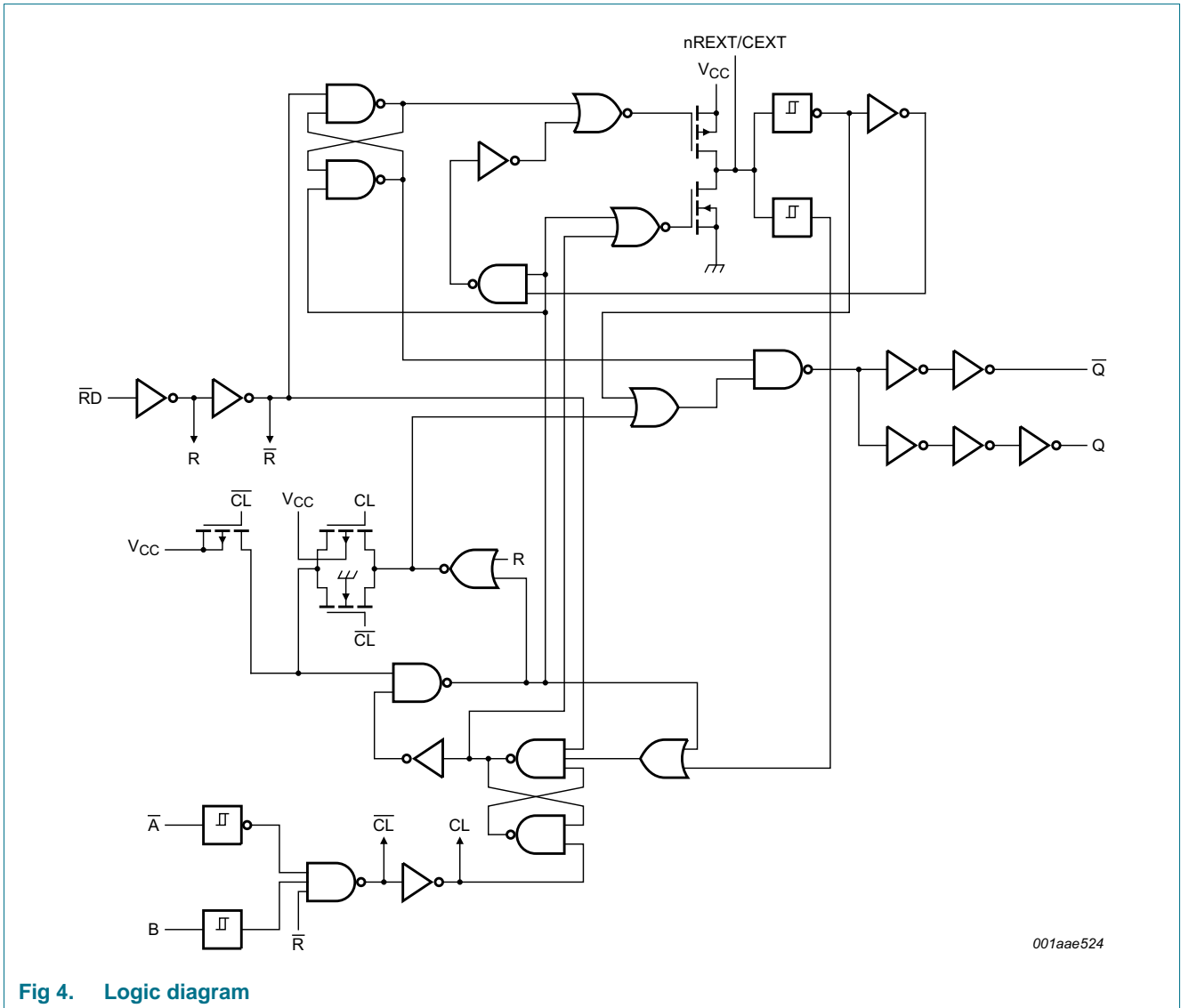
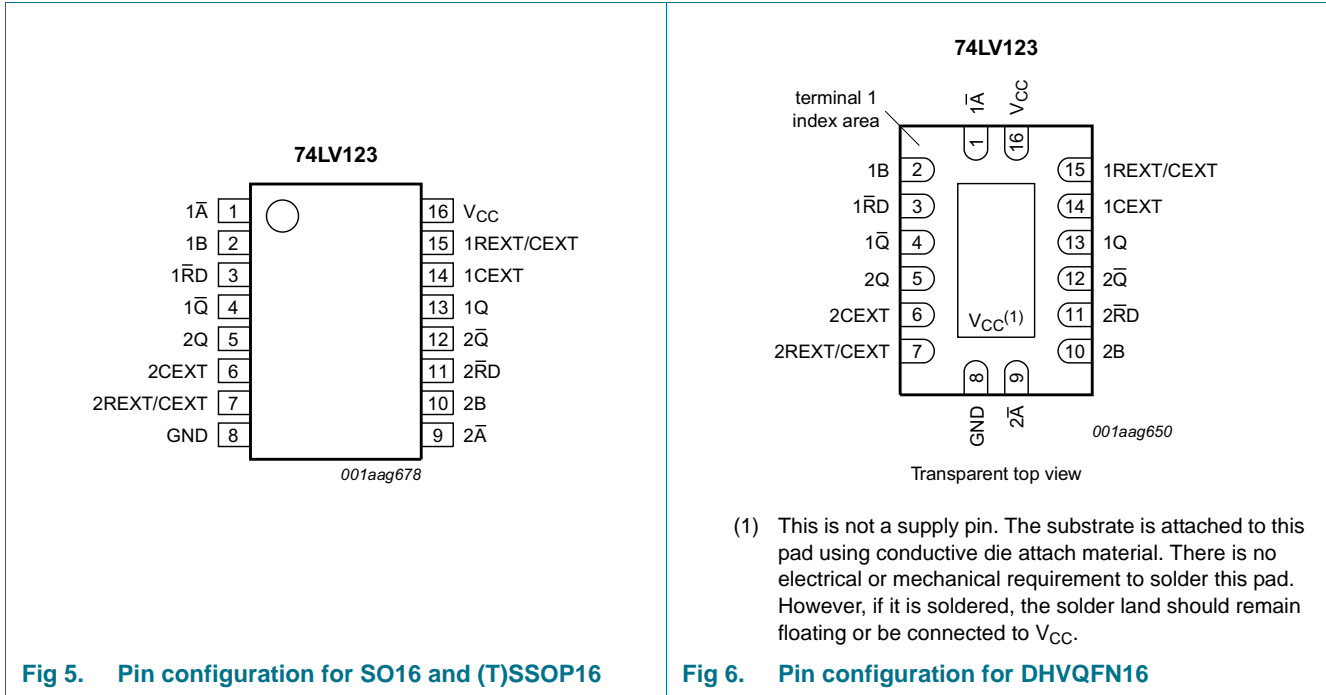


Fig 4. Logic diagram

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 |
| $1\bar{RD}$ | 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 |
| $2\bar{RD}$ | 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_{CC} | 16 | supply voltage |


6. Functional description

Table 3. Function table^[1]

| Input | | | Output | |
|-------|----|----|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| nRD | nA | nB | nQ | nQ |
| 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 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 | V |
| I_{IK} | input clamping current | $V_I < -0.5\text{ V}$ or $V_I > V_{CC} + 0.5\text{ V}$ [1] | - | ± 20 | mA |
| I_{OK} | output clamping current | $V_O < -0.5\text{ V}$ or $V_O > V_{CC} + 0.5\text{ V}$ [1] | - | ± 50 | mA |
| I_O | output current | except for pins nREXT/CEXT; $V_O = -0.5\text{ V}$ to $(V_{CC} + 0.5\text{ V})$ [1] | - | ± 25 | mA |
| I_{CC} | supply current | | - | +50 | mA |
| I_{GND} | ground current | | -50 | - | mA |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| P_{tot} | total power dissipation | $T_{amb} = -40\text{ °C}$ to $+125\text{ °C}$ | | | |
| | | SO16 package [2] | - | 500 | mW |
| | | SSOP16 package [3] | - | 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] For SO16 package: P_{tot} derates linearly with 8 mW/K above 70 °C.

[3] For SSOP16 and TSSOP16 packages: P_{tot} derates linearly with 5.5 mW/K above 60 °C.

[4] For DHVQFN16 package: P_{tot} derates linearly with 4.5 mW/K above 60 °C.

8. Recommended operating conditions

Table 5. Recommended operating conditions

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------------|-------------------------------------|-----------------------------------------------|-----|-----|----------|------|
| V_{CC} | supply voltage | [1] | 1.0 | 3.3 | 5.5 | V |
| V_I | input voltage | | 0 | - | V_{CC} | V |
| V_O | output voltage | | 0 | - | V_{CC} | V |
| T_{amb} | ambient temperature | in free air | -40 | +25 | +125 | °C |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 1.0\text{ V}$ to 2.0 V [2] | - | - | 500 | ns/V |
| | | $V_{CC} = 2.0\text{ V}$ to 2.7 V | - | - | 200 | ns/V |
| | | $V_{CC} = 2.7\text{ V}$ to 3.6 V | - | - | 100 | ns/V |
| | | $V_{CC} = 3.6\text{ V}$ to 5.5 V | - | - | 50 | ns/V |

[1] The 74LV123 is guaranteed to function down to $V_{CC} = 1.0\text{ V}$ (input levels GND or V_{CC}); [Section 9 "Static characteristics"](#) are guaranteed from $V_{CC} = 1.2\text{ V}$ to $V_{CC} = 5.5\text{ V}$.

[2] Except for Schmitt-trigger inputs \overline{nA} and nB .

9. Static characteristics

Table 6. 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 _{IH} | HIGH-level input voltage | V _{CC} = 1.2 V | 0.9 | - | - | V |
| | | V _{CC} = 2.0 V | 1.4 | - | - | V |
| | | V _{CC} = 2.7 V to 3.6 V | 2.0 | - | - | V |
| | | V _{CC} = 4.5 V to 5.5 V | 0.7 × V _{CC} | - | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 1.2 V | - | - | 0.3 | V |
| | | V _{CC} = 2.0 V | - | - | 0.6 | V |
| | | V _{CC} = 2.7 V to 3.6 V | - | - | 0.8 | V |
| | | V _{CC} = 4.5 V to 5.5 V | - | - | 0.3 × V _{CC} | V |
| V _{OH} | HIGH-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = -100 μA; V _{CC} = 1.2 V | - | 1.2 | - | V |
| | | I _O = -100 μA; V _{CC} = 2.0 V | 1.8 | 2.0 | - | V |
| | | I _O = -100 μA; V _{CC} = 2.7 V | 2.5 | 2.7 | - | V |
| | | I _O = -100 μA; V _{CC} = 3.0 V | 2.8 | 3.0 | - | V |
| | | I _O = -100 μA; V _{CC} = 4.5 V | 4.3 | 4.5 | - | V |
| | | I _O = -6 mA; V _{CC} = 3.0 V | 2.40 | 2.82 | - | V |
| | | I _O = -12 mA; V _{CC} = 4.5 V | 3.60 | 4.20 | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = 100 μA; V _{CC} = 1.2 V | - | 0 | - | V |
| | | I _O = 100 μA; V _{CC} = 2.0 V | - | 0 | 0.2 | V |
| | | I _O = 100 μA; V _{CC} = 2.7 V | - | 0 | 0.2 | V |
| | | I _O = 100 μA; V _{CC} = 3.0 V | - | 0 | 0.2 | V |
| | | I _O = 100 μA; V _{CC} = 4.5 V | - | 0 | 0.2 | V |
| | | I _O = 6 mA; V _{CC} = 3.0 V | - | 0.25 | 0.40 | V |
| | | I _O = 12 mA; V _{CC} = 4.5 V | - | 0.35 | 0.55 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 5.5 V | - | - | 1.0 | μA |
| I _{CC} | supply current | V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 5.5 V | - | - | 20.0 | μA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} - 0.6 V; V _{CC} = 2.7 V to 3.6 V | - | - | 500 | μA |
| C _I | input capacitance | | - | 3.5 | - | pF |

Table 6. Static characteristics ...continued

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 +125 °C | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 1.2 V | 0.9 | - | - | V |
| | | V _{CC} = 2.0 V | 1.4 | - | - | V |
| | | V _{CC} = 2.7 V to 3.6 V | 2.0 | - | - | V |
| | | V _{CC} = 4.5 V to 5.5 V | 0.7 × V _{CC} | - | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 1.2 V | - | - | 0.3 | V |
| | | V _{CC} = 2.0 V | - | - | 0.6 | V |
| | | V _{CC} = 2.7 V to 3.6 V | - | - | 0.8 | V |
| | | V _{CC} = 4.5 V to 5.5 V | - | - | 0.3 × V _{CC} | V |
| V _{OH} | HIGH-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = -100 μA; V _{CC} = 1.2 V | - | - | - | V |
| | | I _O = -100 μA; V _{CC} = 2.0 V | 1.8 | - | - | V |
| | | I _O = -100 μA; V _{CC} = 2.7 V | 2.5 | - | - | V |
| | | I _O = -100 μA; V _{CC} = 3.0 V | 2.8 | - | - | V |
| | | I _O = -100 μA; V _{CC} = 4.5 V | 4.3 | - | - | V |
| | | I _O = -6 mA; V _{CC} = 3.0 V | 2.2 | - | - | V |
| I _O = -12 mA; V _{CC} = 4.5 V | 3.5 | - | - | V | | |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = 100 μA; V _{CC} = 1.2 V | - | - | - | V |
| | | I _O = 100 μA; V _{CC} = 2.0 V | - | - | 0.2 | V |
| | | I _O = 100 μA; V _{CC} = 2.7 V | - | - | 0.2 | V |
| | | I _O = 100 μA; V _{CC} = 3.0 V | - | - | 0.2 | V |
| | | I _O = 100 μA; V _{CC} = 4.5 V | - | - | 0.2 | V |
| | | I _O = 6 mA; V _{CC} = 3.0 V | - | - | 0.5 | V |
| I _O = 12 mA; V _{CC} = 4.5 V | - | - | 0.65 | V | | |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 5.5 V | - | - | 1.0 | μA |
| I _{CC} | supply current | V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 5.5 V | - | - | 160 | μA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} - 0.6 V; V _{CC} = 2.7 V to 3.6 V | - | - | 850 | μA |

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

10. Dynamic characteristics

Table 7. Dynamic characteristics

$GND = 0\text{ V}$; $t_r = t_f \leq 2.5\text{ ns}$; for test circuit see [Figure 8](#).

| Symbol | Parameter | Conditions | -40 °C to +85 °C | | | -40 °C to +125 °C | | Unit |
|---------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------|------------------|--------------------|-----|-------------------|-----|------|
| | | | Min | Typ ^[1] | Max | Min | Max | |
| Propagation delay; see Figure 7 | | | | | | | | |
| t_{pd} | propagation delay | \overline{nRD} , \overline{nA} and nB to \overline{nQ} ^[2] | | | | | | |
| | | $V_{CC} = 1.2\text{ V}$ | - | 120 | - | - | - | ns |
| | | $V_{CC} = 2.0\text{ V}$ | - | 40 | 76 | - | 92 | ns |
| | | $V_{CC} = 2.7\text{ V}$ | - | 30 | 56 | - | 68 | ns |
| | | $V_{CC} = 3.0\text{ V to }3.6\text{ V}$ | - | 25 | 48 | - | 57 | ns |
| | | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | - | 18 | 40 | - | 46 | ns |
| | | \overline{nRD} to nQ (reset) ^[2] | | | | | | |
| | | $V_{CC} = 1.2\text{ V}$ | - | 100 | - | - | - | ns |
| | | $V_{CC} = 2.0\text{ V}$ | - | 30 | 57 | - | 68 | ns |
| | | $V_{CC} = 2.7\text{ V}$ | - | 23 | 43 | - | 51 | ns |
| | | $V_{CC} = 3.0\text{ V to }3.6\text{ V}$ | - | 20 | 38 | - | 45 | ns |
| | | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | - | 14 | 31 | - | 36 | ns |
| Inputs nA, nB and nRD; see Figure 7 | | | | | | | | |
| t_w | pulse width | $\overline{nA} = \text{LOW}$ | | | | | | |
| | | $V_{CC} = 2.0\text{ V}$ | 30 | 5 | - | 40 | - | ns |
| | | $V_{CC} = 2.7\text{ V}$ | 25 | 3.5 | - | 30 | - | ns |
| | | $V_{CC} = 3.0\text{ V to }3.6\text{ V}$ | 20 | 3.0 | - | 25 | - | ns |
| | | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | 15 | 2.5 | - | 20 | - | ns |
| | | $nB = \text{HIGH}$ | | | | | | |
| | | $V_{CC} = 2.0\text{ V}$ | 30 | 13 | - | 40 | - | ns |
| | | $V_{CC} = 2.7\text{ V}$ | 25 | 8 | - | 30 | - | ns |
| | | $V_{CC} = 3.0\text{ V to }3.6\text{ V}$ | 20 | 7 | - | 25 | - | ns |
| | | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | 15 | 5 | - | 20 | - | ns |
| | | $\overline{nRD} = \text{LOW}$; see Figure 13 | | | | | | |
| | | $V_{CC} = 2.0\text{ V}$ | 35 | 6 | - | 45 | - | ns |
| | | $V_{CC} = 2.7\text{ V}$ | 30 | 5 | - | 40 | - | ns |
| | | $V_{CC} = 3.0\text{ V to }3.6\text{ V}$ | 25 | 4 | - | 30 | - | ns |
| | | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | 20 | 3 | - | 25 | - | ns |
| t_{trig} | retrigger time | nB to \overline{nA} ; see Figure 12 | | | | | | |
| | | $V_{CC} = 2.0\text{ V}$ | - | 70 | - | - | - | ns |
| | | $V_{CC} = 2.7\text{ V}$ | - | 55 | - | - | - | ns |
| | | $V_{CC} = 3.0\text{ V to }3.6\text{ V}$ | - | 45 | - | - | - | ns |
| | | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ | - | 40 | - | - | - | ns |

Table 7. Dynamic characteristics ...continued
 $GND = 0\text{ V}$; $t_r = t_f \leq 2.5\text{ ns}$; for test circuit see [Figure 8](#).

| Symbol | Parameter | Conditions | -40 °C to +85 °C | | | -40 °C to +125 °C | | Unit |
|----------------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------|------------------|--------------------|------|-------------------|-----|------|
| | | | Min | Typ ^[1] | Max | Min | Max | |
| Outputs; nQ = LOW and nQ = HIGH, see Figure 7 | | | | | | | | |
| t _w | pulse width | C _{EXT} = 100 nF; R _{EXT} = 10 kΩ | | | | | | |
| | | V _{CC} = 2.0 V | - | 470 | - | - | - | ns |
| | | V _{CC} = 2.7 V | - | 460 | - | - | - | ns |
| | | V _{CC} = 3.0 V to 3.6 V | - | 450 | - | - | - | ns |
| | | V _{CC} = 4.5 V to 5.5 V | - | 430 | - | - | - | ns |
| | | C _{EXT} = 0 pF; R _{EXT} = 5 kΩ | | | | | | |
| | | V _{CC} = 2.0 V | - | 100 | - | - | - | ns |
| | | V _{CC} = 2.7 V | - | 90 | - | - | - | ns |
| | | V _{CC} = 3.0 V to 3.6 V | - | 80 | - | - | - | ns |
| V _{CC} = 4.5 V to 5.5 V | - | 70 | - | - | - | ns | | |
| External components | | | | | | | | |
| R _{EXT} | external resistance | see Figure 11 ^[3] | | | | | | |
| | | V _{CC} = 1.2 V | 10 | - | 1000 | - | - | kΩ |
| | | V _{CC} = 2.0 V | 5 | - | 1000 | - | - | kΩ |
| | | V _{CC} = 2.7 V | 3 | - | 1000 | - | - | kΩ |
| | | V _{CC} = 3.0 V to 3.6 V | 2 | - | 1000 | - | - | kΩ |
| | | V _{CC} = 4.5 V to 5.5 V | 2 | - | 1000 | - | - | kΩ |
| C _{EXT} | external capacitance | see Figure 11 ^[3] ^[4] | | | | | | |
| | | V _{CC} = 1.2 V | - | - | - | - | - | pF |
| | | V _{CC} = 2.0 V | - | - | - | - | - | pF |
| | | V _{CC} = 2.7 V | - | - | - | - | - | pF |
| | | V _{CC} = 3.0 V to 3.6 V | - | - | - | - | - | pF |
| | | V _{CC} = 4.5 V to 5.5 V | - | - | - | - | - | pF |
| Dynamic power dissipation | | | | | | | | |
| C _{PD} | power dissipation capacitance | V _{CC} = 3.3 V; V _I = GND to V _{CC} ^[5] | - | 60 | - | - | - | pF |

[1] All typical values are measured at T_{amb} = 25 °C and nominal supply values (V_{CC} = 3.3 V and 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 other R_{EXT} and C_{EXT} combinations see [Figure 11](#) and [Section 12.1.1 "Basic timing"](#).

[4] C_{EXT} has no limits.

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

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$ 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;

N = number of inputs switching;

Σ(C_L × V_{CC}² × f_o) = sum of the outputs.

11. Waveforms

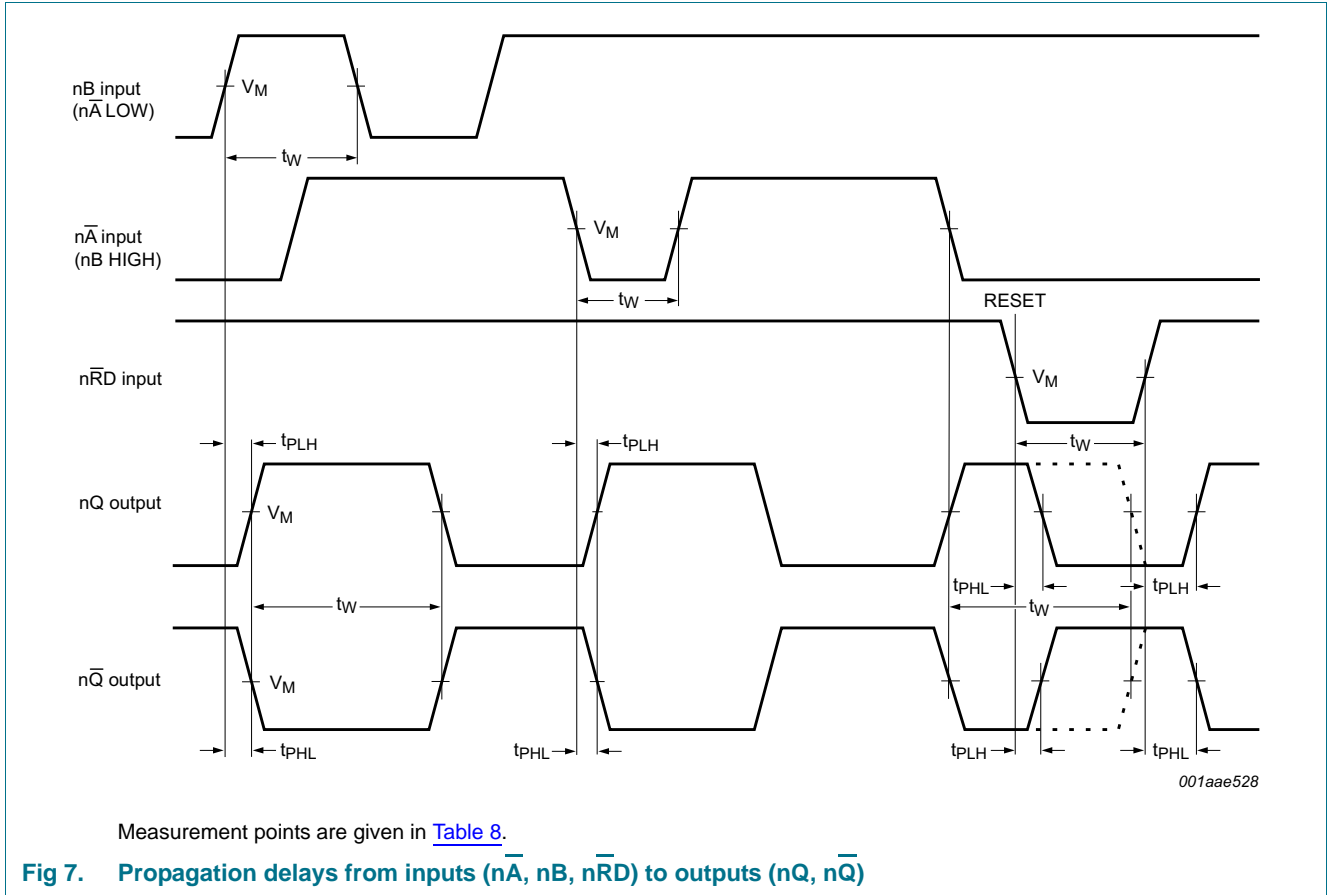


Table 8. Measurement points

| V_{CC} | V_M |
|--------------|---------------------|
| $\geq 2.7 V$ | 1.5 V |
| $< 2.7 V$ | $0.5 \times V_{CC}$ |

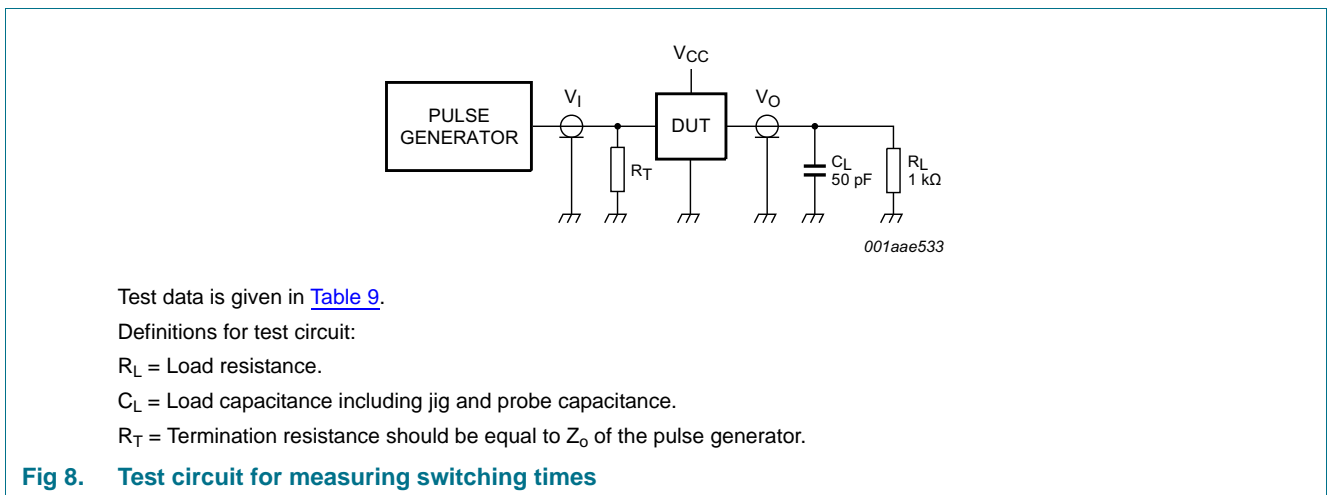


Table 9. Test data

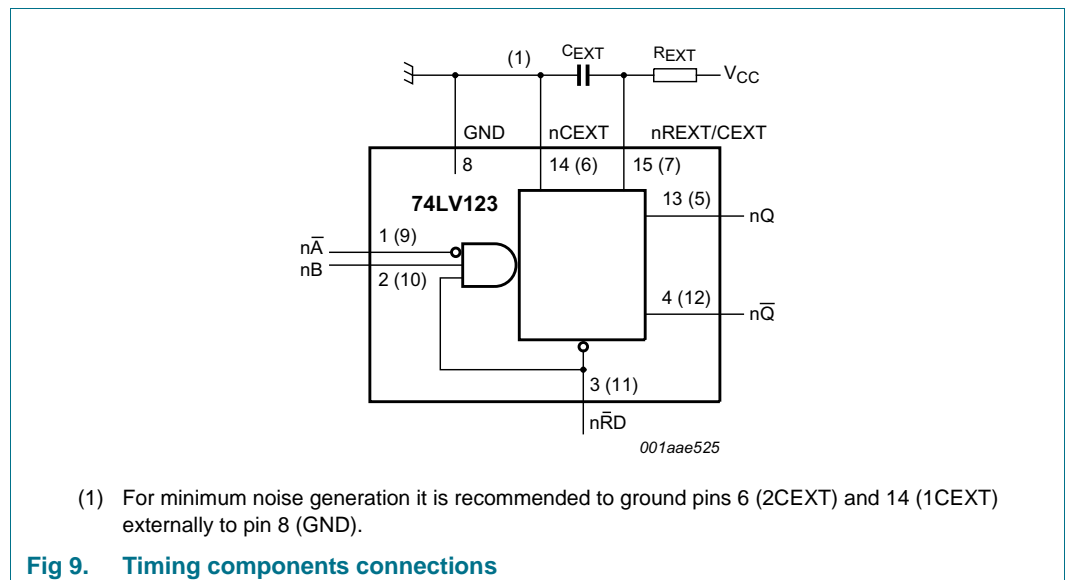
| Supply voltage | Input | | Load | | Test |
|-----------------|-----------------|---------------------------------|----------------|----------------|-------------------------------------|
| V _{CC} | V _I | t _r , t _f | C _L | R _L | |
| < 2.7 V | V _{CC} | ≤ 2.5 ns | 50 pF | 1 kΩ | t _{PHL} , t _{PLH} |
| 2.7 V to 3.6 V | 2.7 V | ≤ 2.5 ns | 50 pF | 1 kΩ | t _{PHL} , t _{PLH} |
| ≥ 4.5 V | V _{CC} | ≤ 2.5 ns | 50 pF | 1 kΩ | t _{PHL} , t _{PLH} |

12. Application information

12.1 Timing components

12.1.1 Basic timing

The basic output pulse width is essentially determined by the values of the external timing components R_{EXT} and C_{EXT}.



If C_{EXT} > 10 nF, the following formula is valid: t_W = K × R_{EXT} × C_{EXT} (typ.) where:

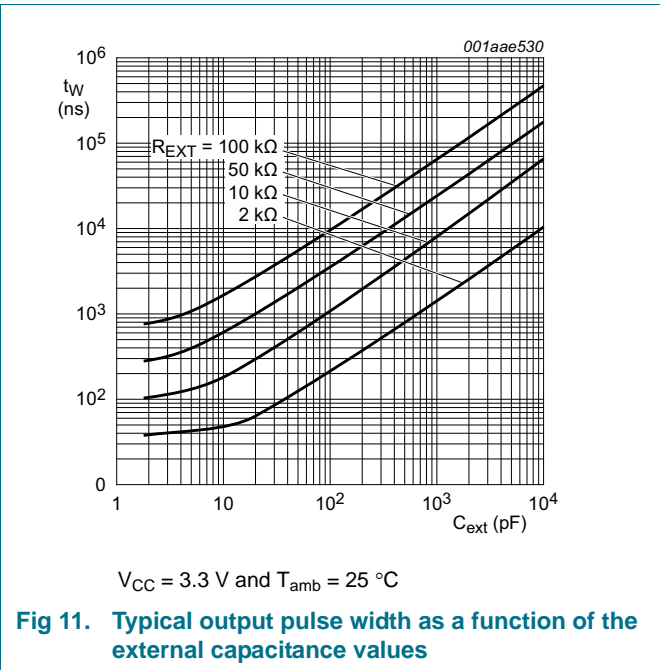
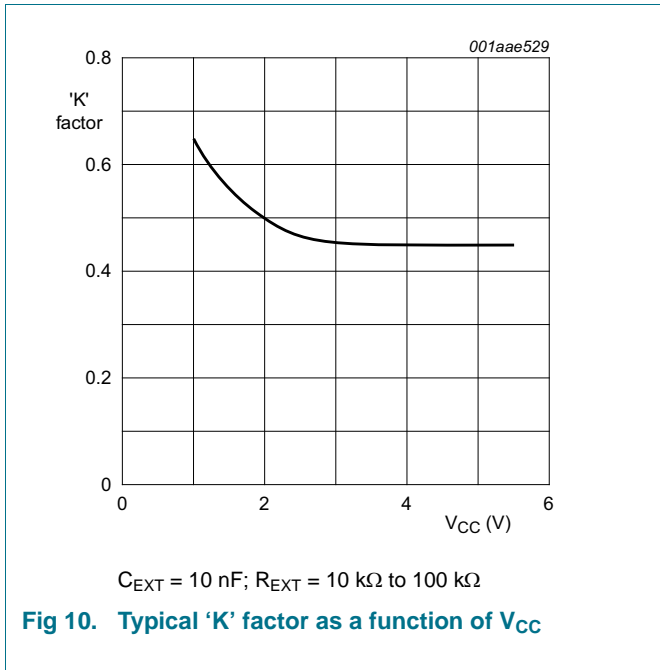
t_W = output pulse width in ns

R_{EXT} = external resistor in kΩ

C_{EXT} = external capacitor in pF

K = constant: this is 0.45 for V_{CC} = 5.0 V and 0.48 for V_{CC} = 2.0 V (see [Figure 10](#))

The inherent test jig and pin capacitance at pin 15 and pin 7 (nREXT/CEXT) is approximately 7 pF.



12.1.2 Retrigger timing

The time to retrigger the monostable multivibrator depends on the values of R_{EXT} and C_{EXT} . The output pulse width will only be extended when the time between the active going edges of the trigger pulses meets the minimum retrigger time. If $C_{EXT} > 10 \text{ pF}$, the next formula for the set-up time of a retrigger pulse is valid:

at $V_{CC} = 5.0 \text{ V}$: $t_{trig} = 30 + 0.19R_{EXT} \times C_{EXT}^{0.9} + 13 \times R_{EXT}^{1.05}$ (typ.)

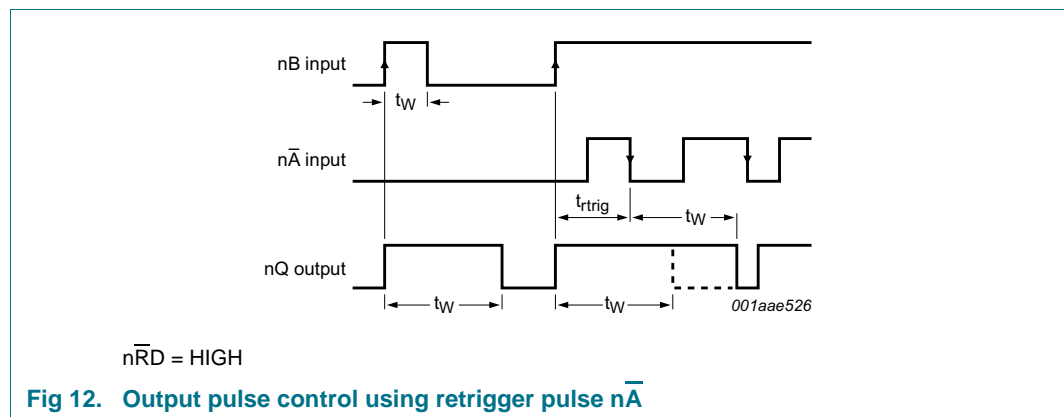
at $V_{CC} = 3.0 \text{ V}$: $t_{trig} = 41 + 0.15R_{EXT} \times C_{EXT}^{0.9} \times 1 \times R_{EXT}$ (typ.)

where:

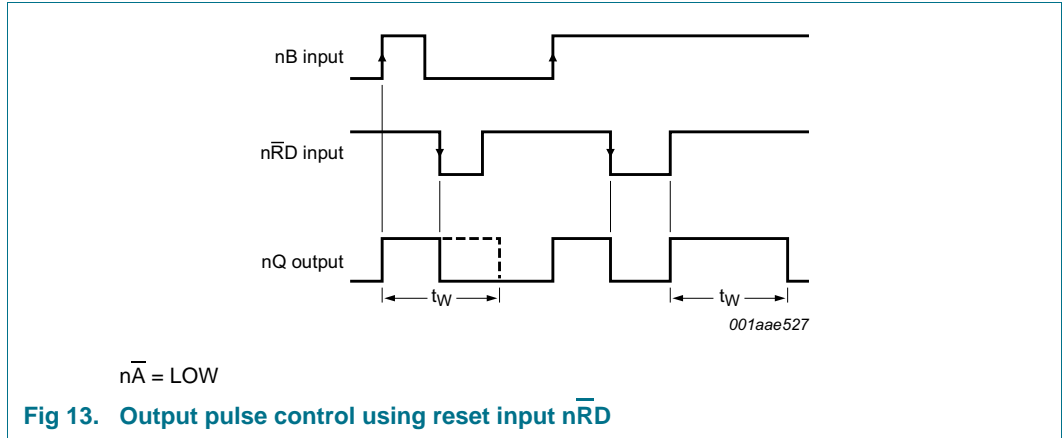
t_{trig} = retrigger time in ns

C_{EXT} = external capacitor in pF

R_{EXT} = external resistor in k Ω



12.1.3 Reset timing



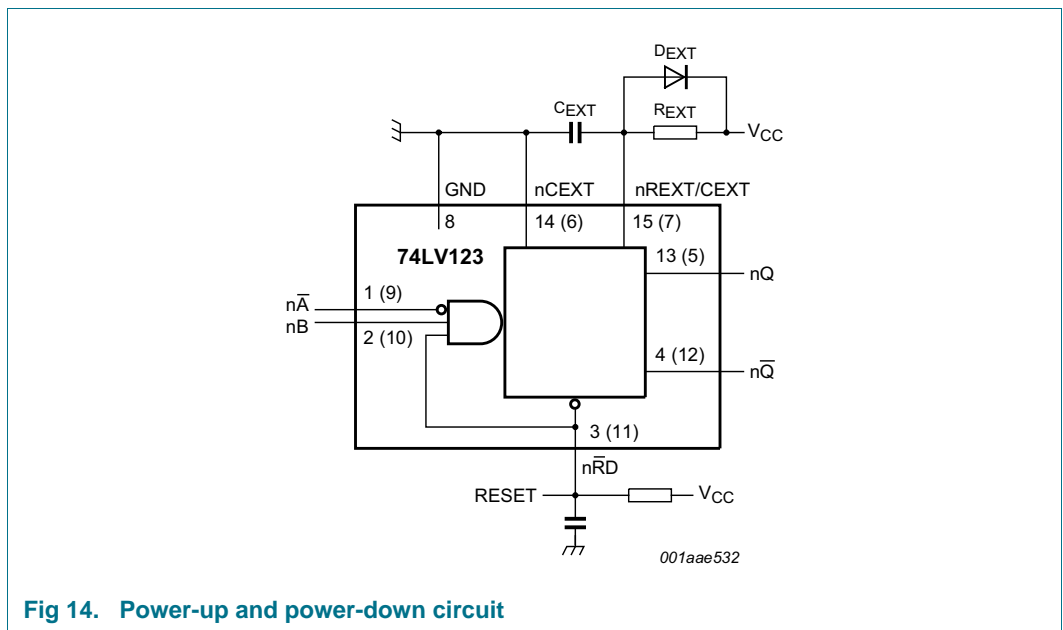
12.2 Power considerations

12.2.1 Power-up

When the monostable multivibrator is powered-up, it may produce an output pulse with a pulse width defined by the values of R_{EXT} and C_{EXT} . This output pulse can be eliminated using the RC circuit on pin \bar{nRD} shown in [Figure 14](#).

12.2.2 Power-down

A large capacitor (C_{EXT}) may cause problems when powering-down the monostable due to the energy stored in this capacitor. When a system containing this device is powered-down or a rapid decrease of V_{CC} to zero occurs, the monostable may sustain damage, due to the capacitor discharging through the input protection diodes. To avoid this possibility, connect a damping diode D_{EXT} (preferably a germanium or Schottky type diode) able to withstand large current surges - see [Figure 14](#).



13. Package outline

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

SOT109-1

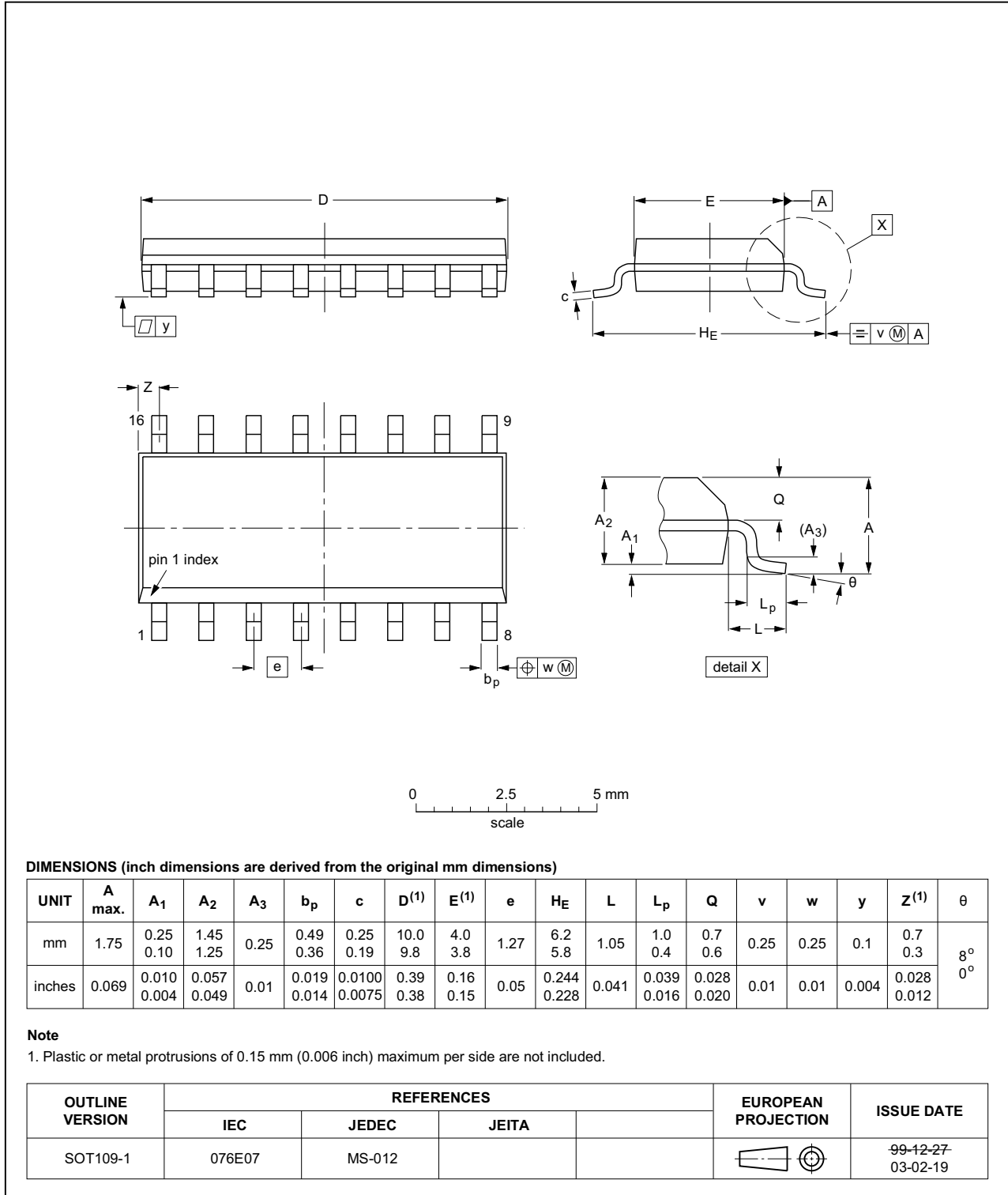


Fig 15. Package outline SOT109-1 (SO16)

SSOP16: plastic shrink small outline package; 16 leads; body width 5.3 mm

SOT338-1

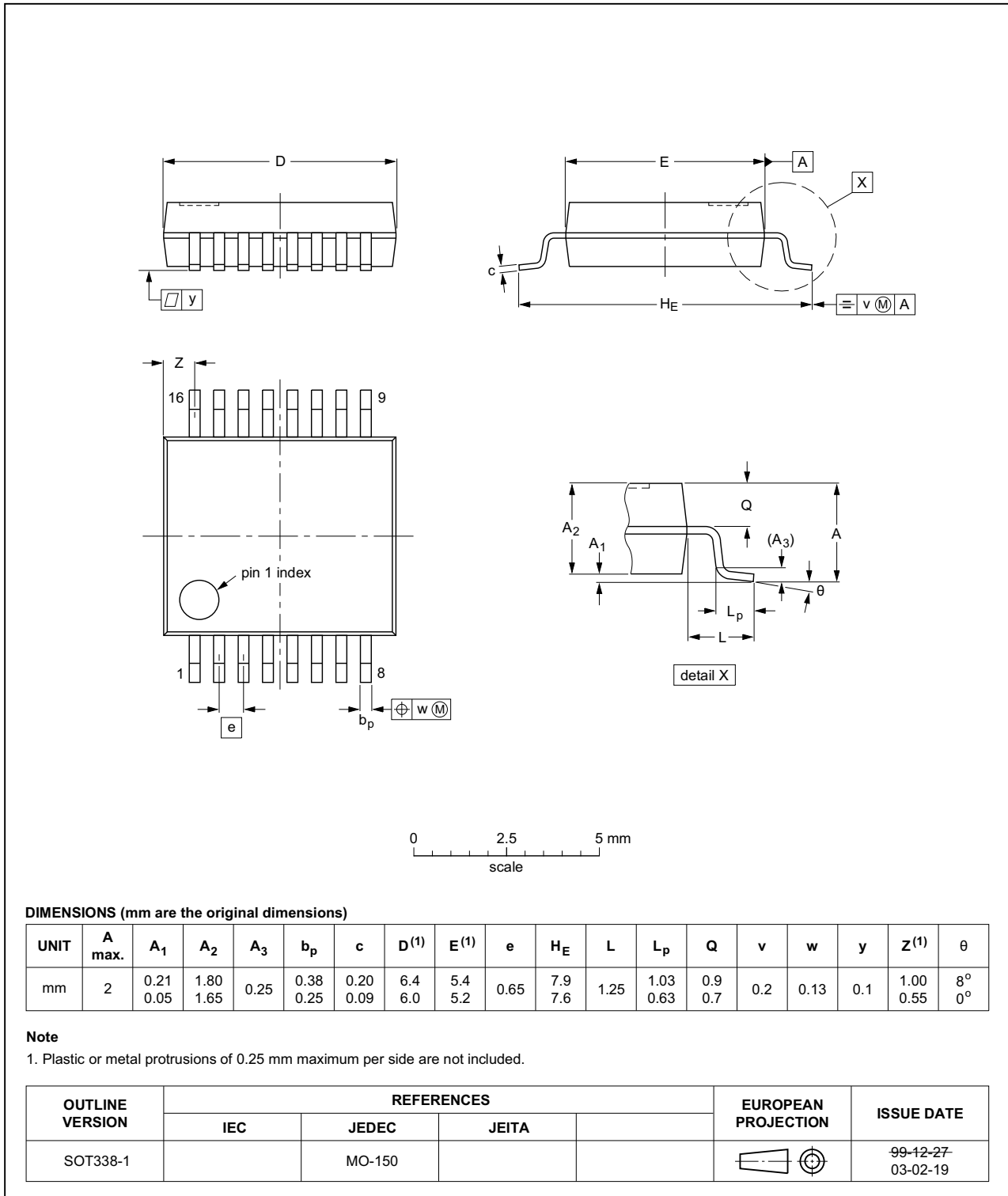


Fig 16. Package outline SOT338-1 (SSOP16)

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

SOT403-1

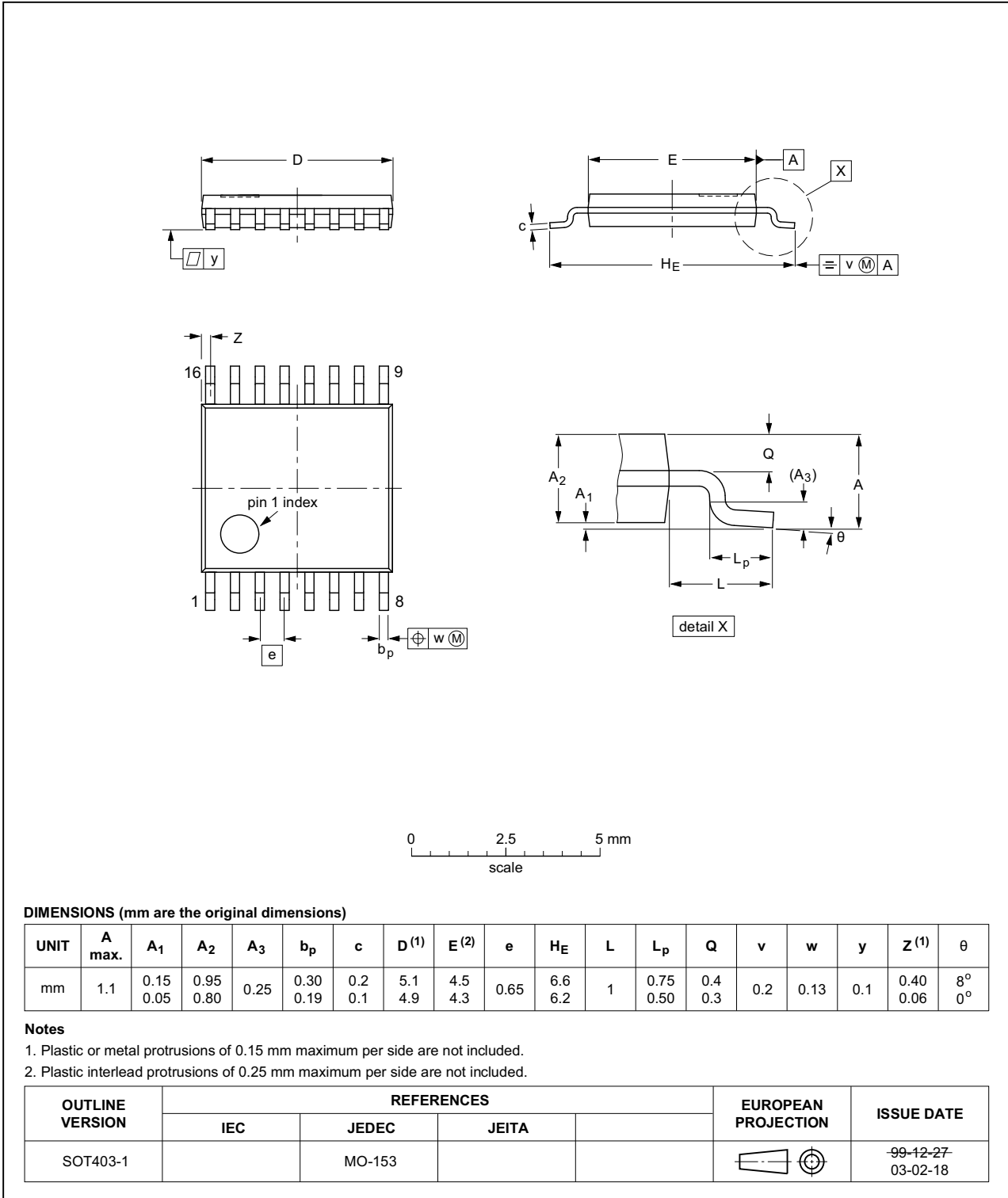


Fig 17. Package outline SOT403-1 (TSSOP16)

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

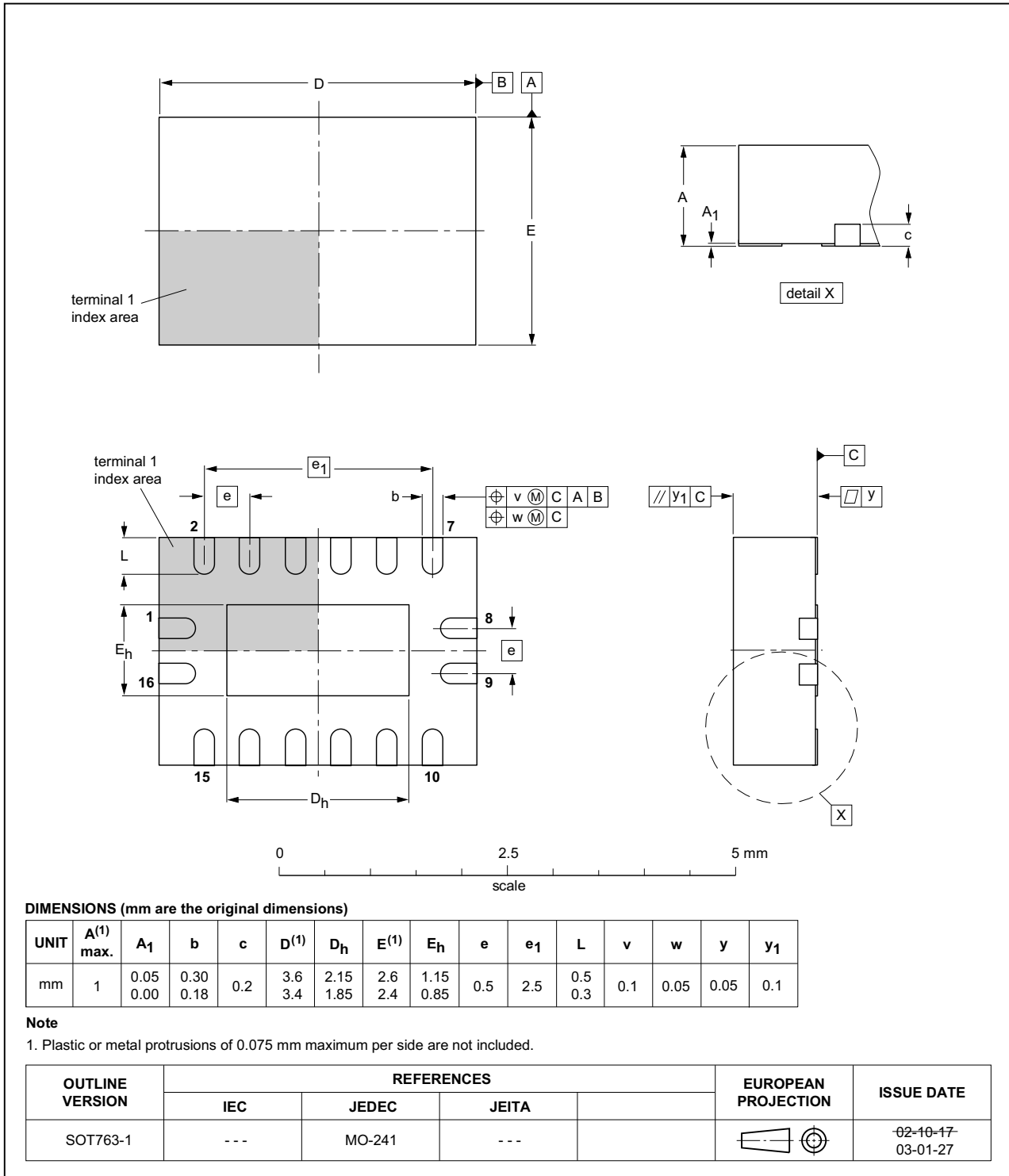


Fig 18. Package outline SOT763-1 (DHVQFN16)

14. Abbreviations

Table 10. Abbreviations

| Acronym | Description |
|---------|-----------------------------------------|
| CMOS | Complementary Metal Oxide Semiconductor |
| DUT | Device Under Test |

15. Revision history

Table 11. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| 74LV123 v.8 | 20160304 | Product data sheet | - | 74LV123 v.7 |
| Modifications: | <ul style="list-style-type: none"> Type numbers 74LV123N (SOT38-4) removed. | | | |
| 74LV123 v.7 | 20111212 | Product data sheet | - | 74LV123 v.6 |
| Modifications: | <ul style="list-style-type: none"> Legal pages updated. | | | |
| 74LV123 v.6 | 20110826 | Product data sheet | - | 74LV123 v.5 |
| 74LV123 v.5 | 20071108 | Product data sheet | - | 74LV123 v.4 |
| 74LV123 v.4 | 20070919 | Product specification | - | 74LV123 v.3 |
| 74LV123 v.3 | 20030313 | Product specification | - | 74LV123 v.2 |
| 74LV123 v.2 | 19980420 | Product specification | - | 74LV123 v.1 |
| 74LV123 v.1 | 19970204 | Product specification | - | - |

16. Legal information

16.1 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.nexperia.com>.

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