



# 74LVC74A-Q100

Dual D-type flip-flop with set and reset; positive-edge trigger

Rev. 6 — 22 September 2025

Product data sheet

## 1. General description

The 74LVC74A-Q100 is a dual edge triggered D-type flip-flop with individual data (nD) inputs, clock (nCP) inputs, set (nSD) and (nRD) inputs, and complementary nQ and nQ outputs.

The set and reset are asynchronous active LOW inputs and operate independently of the clock input. Information on the data input is transferred to the nQ output on the LOW-to-HIGH transition of the clock pulse. The nD inputs must be stable one set-up time prior to the LOW-to-HIGH clock transition, for predictable operation.

Schmitt trigger action at all inputs makes the circuit highly tolerant of 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

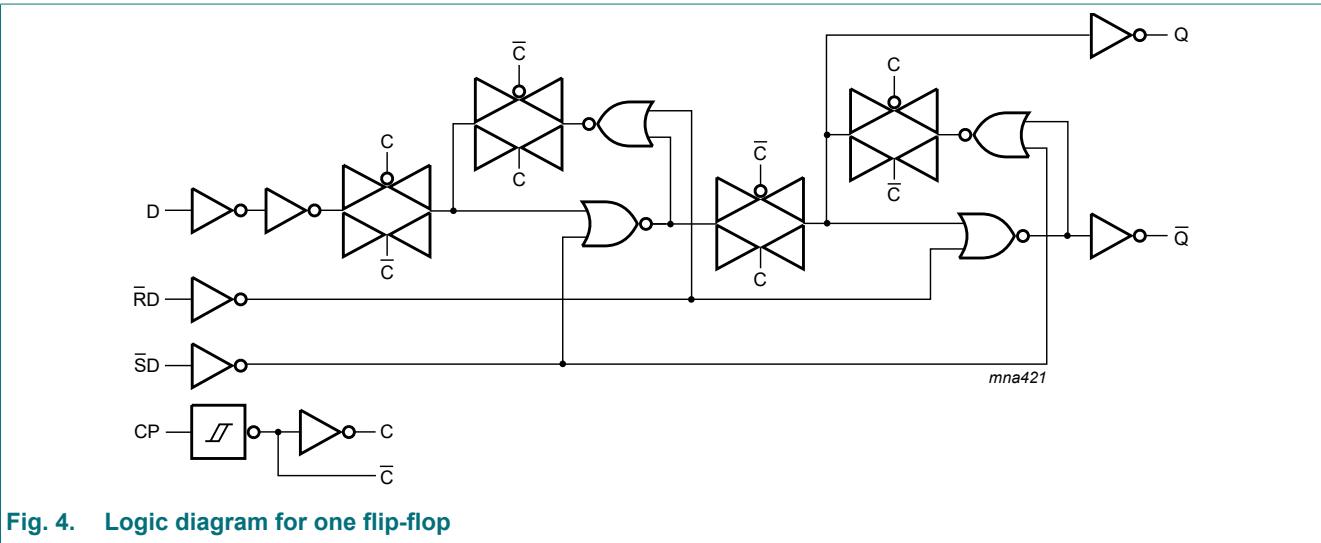
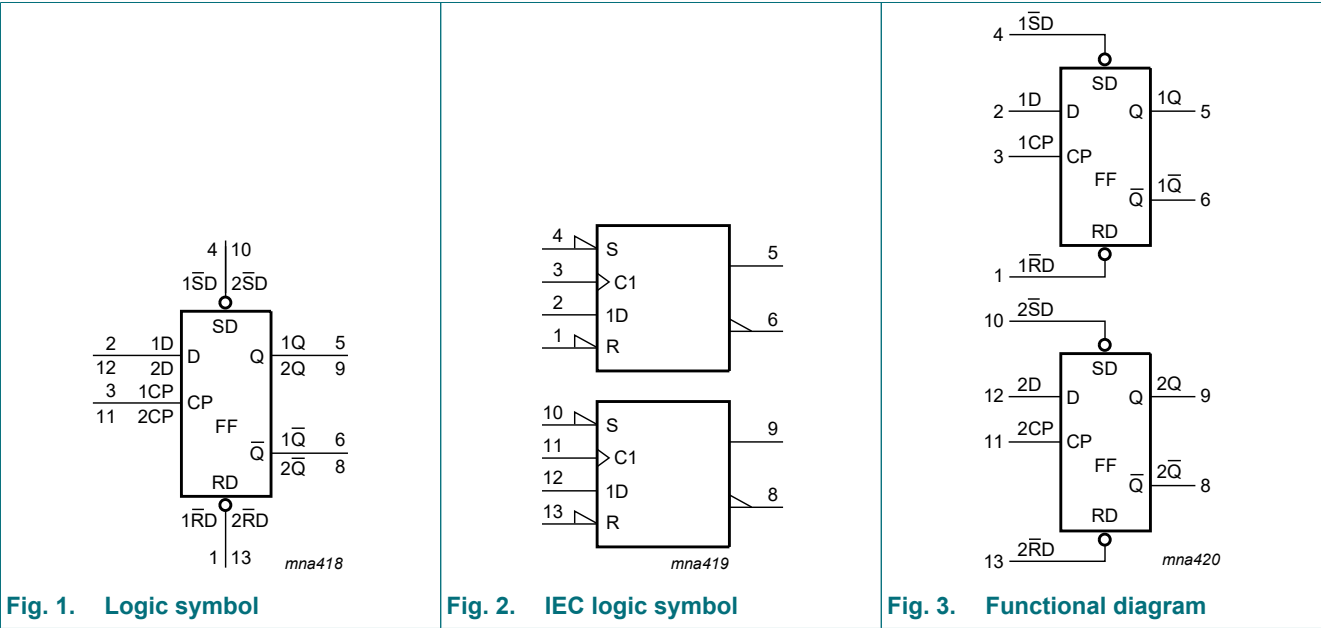
- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - Specified from -40 °C to +85 °C and from -40 °C to +125 °C
- 5 V tolerant inputs for interlacing with 5 V logic
- Wide supply voltage range from 1.2 V to 3.6 V
- CMOS low power consumption
- Direct interface with TTL levels
- Complies with JEDEC standard:
  - JESD8-7A (1.65 V to 1.95 V)
  - JESD8-5A (2.3 V to 2.7 V)
  - JESD8-C/JESD36 (2.7 V to 3.6 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
- Multiple package options
- DHVQFN package with Side-Wettable Flanks enabling Automated Optical Inspection (AOI) of solder joints

## 3. Ordering information

Table 1. Ordering information

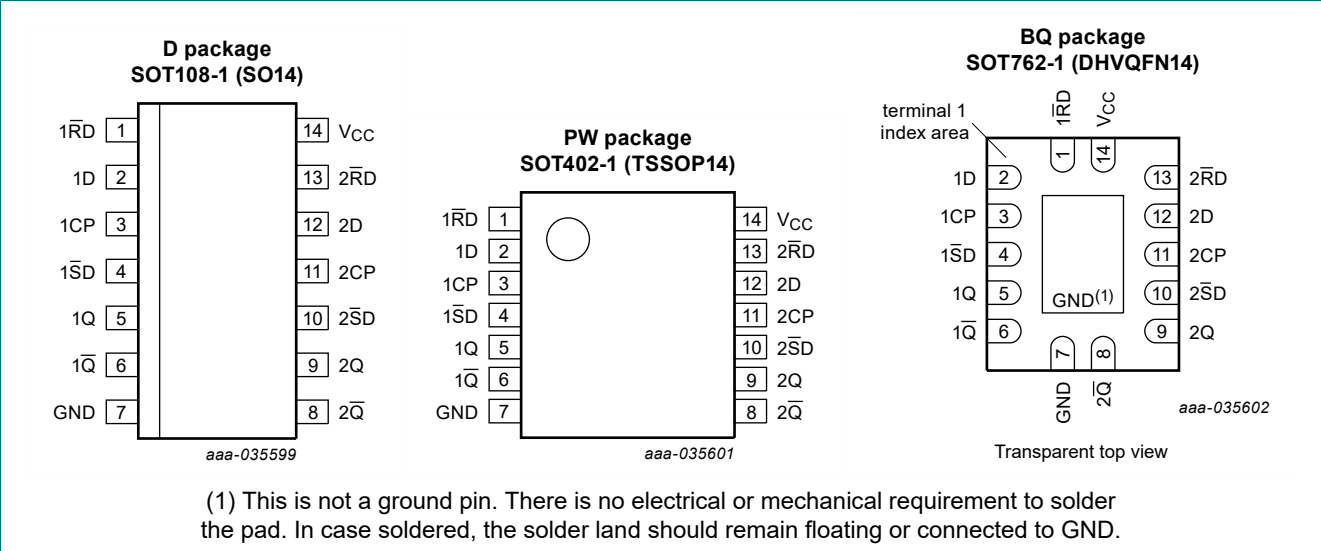
Type number	Package			
	Temperature range	Name	Description	Version
<a href="#">74LVC74AD-Q100</a>	-40 °C to +125 °C	SO14	plastic small outline package; 14 leads; body width 3.9 mm	<a href="#">SOT108-1</a>
<a href="#">74LVC74APW-Q100</a>	-40 °C to +125 °C	TSSOP14	plastic thin shrink small outline package; 14 leads; body width 4.4 mm	<a href="#">SOT402-1</a>
<a href="#">74LVC74ABQ-Q100</a>	-40 °C to +125 °C	DHVQFN14	plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 14 terminals; body 2.5 × 3 × 0.85 mm	<a href="#">SOT762-1</a>

4. Functional diagram



5. Pinning information

5.1. Pinning



5.2. Pin description

Table 2. Pin description

Symbol	Pin	Description
1RD, 2RD	1, 13	asynchronous reset-direct input (active LOW)
1D, 2D	2, 12	data input
1CP, 2CP	3, 11	clock input (LOW-to-HIGH, edge-triggered)
1SD, 2SD	4, 10	asynchronous set-direct input (active LOW)
1Q, 2Q	5, 9	true output
1Q, 2Q	6, 8	complement output
GND	7	ground (0 V)
VCC	14	supply voltage

6. Functional description

Table 3. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care

Input				Output	
nSD	nRD	nCP	nD	nQ	nQ̄
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H
H	H	L	X	nQ	nQ̄

Table 4. Function table

H = HIGH voltage level; L = LOW voltage level;  
↑ = LOW-to-HIGH transition; Q<sub>n+1</sub> = state after the next LOW-to-HIGH CP transition

Input				Output	
nSD	nRD	nCP	nD	nQ <sub>n+1</sub>	nQ̄ <sub>n+1</sub>
H	H	↑	L	L	H
H	H	↑	H	H	L

7. 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 <sub>CC</sub>	supply voltage		-0.5	+6.5	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V	-50	-	mA
V <sub>I</sub>	input voltage	[1]	-0.5	+6.5	V
I <sub>OK</sub>	output clamping current	V <sub>O</sub> > V <sub>CC</sub> or V <sub>O</sub> < 0 V	-	±50	mA
V <sub>O</sub>	output voltage	[2]	-0.5	V <sub>CC</sub> + 0.5	V
I <sub>O</sub>	output current	V <sub>O</sub> = 0 V to V <sub>CC</sub>	-	±50	mA
I <sub>CC</sub>	supply current		-	100	mA
I <sub>GND</sub>	ground current		-100	-	mA
T <sub>stg</sub>	storage temperature		-65	+150	°C
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = -40 °C to +125 °C			
		SOT108-1 (SO14) SOT402-1 (TSSOP14) SOT762-1 (DHVQFN14) [3]	-	500	mW

[1] The minimum input voltage ratings may be exceeded if the input current ratings are observed.  
[2] The output voltage ratings may be exceeded if the output current ratings are observed.  
[3] For SOT108-1 (SO14) package: P<sub>tot</sub> derates linearly with 10.1 mW/K above 100 °C.  
For SOT402-1 (TSSOP14) package: P<sub>tot</sub> derates linearly with 7.3 mW/K above 81 °C.  
For SOT762-1 (DHVQFN14) package: P<sub>tot</sub> derates linearly with 9.6 mW/K above 98 °C.

8. Recommended operating conditions

Table 6. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CC</sub>	supply voltage	for maximum speed performance	1.65	-	3.6	V
		for low-voltage applications	1.2	-	3.6	V
V <sub>I</sub>	input voltage		0	-	5.5	V
V <sub>O</sub>	output voltage		0	-	V <sub>CC</sub>	V
T <sub>amb</sub>	ambient temperature		-40	-	+125	°C
Δt/ΔV	input transition rise and fall rate	V <sub>CC</sub> = 1.65 V to 2.7 V	0	-	20	ns/V
		V <sub>CC</sub> = 2.7 V to 3.6 V	0	-	10	ns/V

9. Static characteristics

Table 7. Static characteristics

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

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 1.2 V	1.08	-	-	1.08	-	V
		V <sub>CC</sub> = 1.65 V to 1.95 V	0.65V <sub>CC</sub>	-	-	0.65V <sub>CC</sub>	-	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	-	-	1.7	-	V
		V <sub>CC</sub> = 2.7 V to 3.6 V	2.0	-	-	2.0	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 1.2 V	-	-	0.12	-	0.12	V
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	-	0.35V <sub>CC</sub>	-	0.35V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	-	0.7	V
		V <sub>CC</sub> = 2.7 V to 3.6 V	-	-	0.8	-	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>						
		I <sub>O</sub> = -100 μA; V <sub>CC</sub> = 1.65 V to 3.6 V	V <sub>CC</sub> - 0.2	-	-	V <sub>CC</sub> - 0.3	-	V
		I <sub>O</sub> = -4 mA; V <sub>CC</sub> = 1.65 V	1.2	-	-	1.05	-	V
		I <sub>O</sub> = -8 mA; V <sub>CC</sub> = 2.3 V	1.8	-	-	1.65	-	V
		I <sub>O</sub> = -12 mA; V <sub>CC</sub> = 2.7 V	2.2	-	-	2.05	-	V
		I <sub>O</sub> = -18 mA; V <sub>CC</sub> = 3.0 V	2.4	-	-	2.25	-	V
		I <sub>O</sub> = -24 mA; V <sub>CC</sub> = 3.0 V	2.2	-	-	2.0	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>						
		I <sub>O</sub> = 100 μA; V <sub>CC</sub> = 1.65 V to 3.6 V	-	-	0.2	-	0.3	V
		I <sub>O</sub> = 4 mA; V <sub>CC</sub> = 1.65 V	-	-	0.45	-	0.65	V
		I <sub>O</sub> = 8 mA; V <sub>CC</sub> = 2.3 V	-	-	0.6	-	0.8	V
		I <sub>O</sub> = 12 mA; V <sub>CC</sub> = 2.7 V	-	-	0.4	-	0.6	V
I <sub>I</sub>	input leakage current	V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = 5.5 V or GND	-	±0.1	±5	-	±20	μA
		V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A	-	0.1	10	-	40	μA

Dual D-type flip-flop with set and reset; positive-edge trigger

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
$\Delta I_{CC}$	additional supply current	per input pin; $V_{CC} = 2.7\text{ V to }3.6\text{ V}$ ; $V_I = V_{CC} - 0.6\text{ V}$ ; $I_O = 0\text{ A}$	-	5	500	-	5000	$\mu\text{A}$
$C_I$	input capacitance	$V_{CC} = 0\text{ V to }3.6\text{ V}$ ; $V_I = \text{GND to }V_{CC}$	-	4.0	-	-	-	pF

[1] All typical values are measured at  $V_{CC} = 3.3\text{ V}$  (unless stated otherwise) and  $T_{amb} = 25\text{ °C}$ .

10. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V). For test circuit see Fig. 7.

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
$t_{pd}$	propagation delay	nCP to nQ, n $\overline{Q}$ ; see Fig. 5 [2]						
		$V_{CC} = 1.2\text{ V}$	-	15	-	-	-	ns
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.0	5.0	10.3	1.0	11.9	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.8	2.9	5.8	1.8	6.7	ns
		$V_{CC} = 2.7\text{ V}$	1.0	2.7	6.0	1.0	7.5	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	2.6	5.2	1.0	6.5	ns
		nSD to nQ, n $\overline{Q}$ ; see Fig. 6						
		$V_{CC} = 1.2\text{ V}$	-	15	-	-	-	ns
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	0.5	4.0	10.6	0.5	12.2	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	2.4	6.1	1.0	7.1	ns
		$V_{CC} = 2.7\text{ V}$	1.0	2.9	6.4	1.0	8.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	2.2	5.4	1.0	7.0	ns
		nRD to nQ, n $\overline{Q}$ ; see Fig. 6						
		$V_{CC} = 1.2\text{ V}$	-	15	-	-	-	ns
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	0.5	4.1	10.7	0.5	12.4	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	2.4	6.1	1.0	7.1	ns
		$V_{CC} = 2.7\text{ V}$	1.0	3.0	6.4	1.0	8.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	2.2	5.4	1.0	7.0	ns
$t_W$	pulse width	clock HIGH or LOW; see Fig. 5						
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	5.0	-	-	5.0	-	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	4.0	-	-	4.0	-	ns
		$V_{CC} = 2.7\text{ V}$	3.3	-	-	4.5	-	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	3.3	1.3	-	4.5	-	ns
		set or reset LOW; see Fig. 6						
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	5.0	-	-	5.0	-	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	4.0	-	-	4.0	-	ns
		$V_{CC} = 2.7\text{ V}$	3.3	-	-	4.5	-	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	3.3	1.7	-	4.5	-	ns

## Dual D-type flip-flop with set and reset; positive-edge trigger

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
$t_{\text{rec}}$	recovery time	set or reset; see Fig. 6						
		$V_{\text{CC}} = 1.65 \text{ V to } 1.95 \text{ V}$	1.5	-	-	1.5	-	ns
		$V_{\text{CC}} = 2.3 \text{ V to } 2.7 \text{ V}$	1.5	-	-	1.5	-	ns
		$V_{\text{CC}} = 2.7 \text{ V}$	1.5	-	-	1.0	-	ns
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	+1.0	-3.0	-	1.0	-	ns
$t_{\text{su}}$	set-up time	nD to nCP; see Fig. 5						
		$V_{\text{CC}} = 1.65 \text{ V to } 1.95 \text{ V}$	3.0	-	-	3.0	-	ns
		$V_{\text{CC}} = 2.3 \text{ V to } 2.7 \text{ V}$	2.5	-	-	2.5	-	ns
		$V_{\text{CC}} = 2.7 \text{ V}$	2.2	-	-	2.2	-	ns
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	2.0	0.8	-	2.0	-	ns
$t_{\text{h}}$	hold time	nD to nCP; see Fig. 5						
		$V_{\text{CC}} = 1.65 \text{ V to } 1.95 \text{ V}$	2.0	-	-	2.0	-	ns
		$V_{\text{CC}} = 2.3 \text{ V to } 2.7 \text{ V}$	1.5	-	-	1.5	-	ns
		$V_{\text{CC}} = 2.7 \text{ V}$	1.0	-	-	1.0	-	ns
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	+1.0	-0.2	-	1.0	-	ns
$f_{\text{max}}$	maximum frequency	nCP; see Fig. 5						
		$V_{\text{CC}} = 1.65 \text{ V to } 1.95 \text{ V}$	100	-	-	80	-	MHz
		$V_{\text{CC}} = 2.3 \text{ V to } 2.7 \text{ V}$	125	-	-	100	-	MHz
		$V_{\text{CC}} = 2.7 \text{ V}$	150	-	-	120	-	MHz
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	150	250	-	120	-	MHz
$t_{\text{sk(o)}}$	output skew time	$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$ [3]	-	-	1.0	-	1.5	ns
$C_{\text{PD}}$	power dissipation capacitance	per flip-flop; $V_{\text{I}} = \text{GND to } V_{\text{CC}}$ [4]						
		$V_{\text{CC}} = 1.65 \text{ V to } 1.95 \text{ V}$	-	12.4	-	-	-	pF
		$V_{\text{CC}} = 2.3 \text{ V to } 2.7 \text{ V}$	-	16.0	-	-	-	pF
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	-	19.1	-	-	-	pF

[1] Typical values are measured at  $T_{\text{amb}} = 25 \text{ °C}$  and  $V_{\text{CC}} = 1.2 \text{ V}, 1.8 \text{ V}, 2.5 \text{ V}, 2.7 \text{ V}$  and  $3.3 \text{ V}$  respectively.

[2]  $t_{\text{pd}}$  is the same as  $t_{\text{PLH}}$  and  $t_{\text{PHL}}$ .

[3] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.

[4]  $C_{\text{PD}}$  is used to determine the dynamic power dissipation ( $P_{\text{D}}$  in  $\mu\text{W}$ ).

$P_{\text{D}} = C_{\text{PD}} \times V_{\text{CC}}^2 \times f_{\text{i}} \times N + \Sigma(C_{\text{L}} \times V_{\text{CC}}^2 \times f_{\text{o}})$  where:

$f_{\text{i}}$  = input frequency in MHz;  $f_{\text{o}}$  = output frequency in MHz

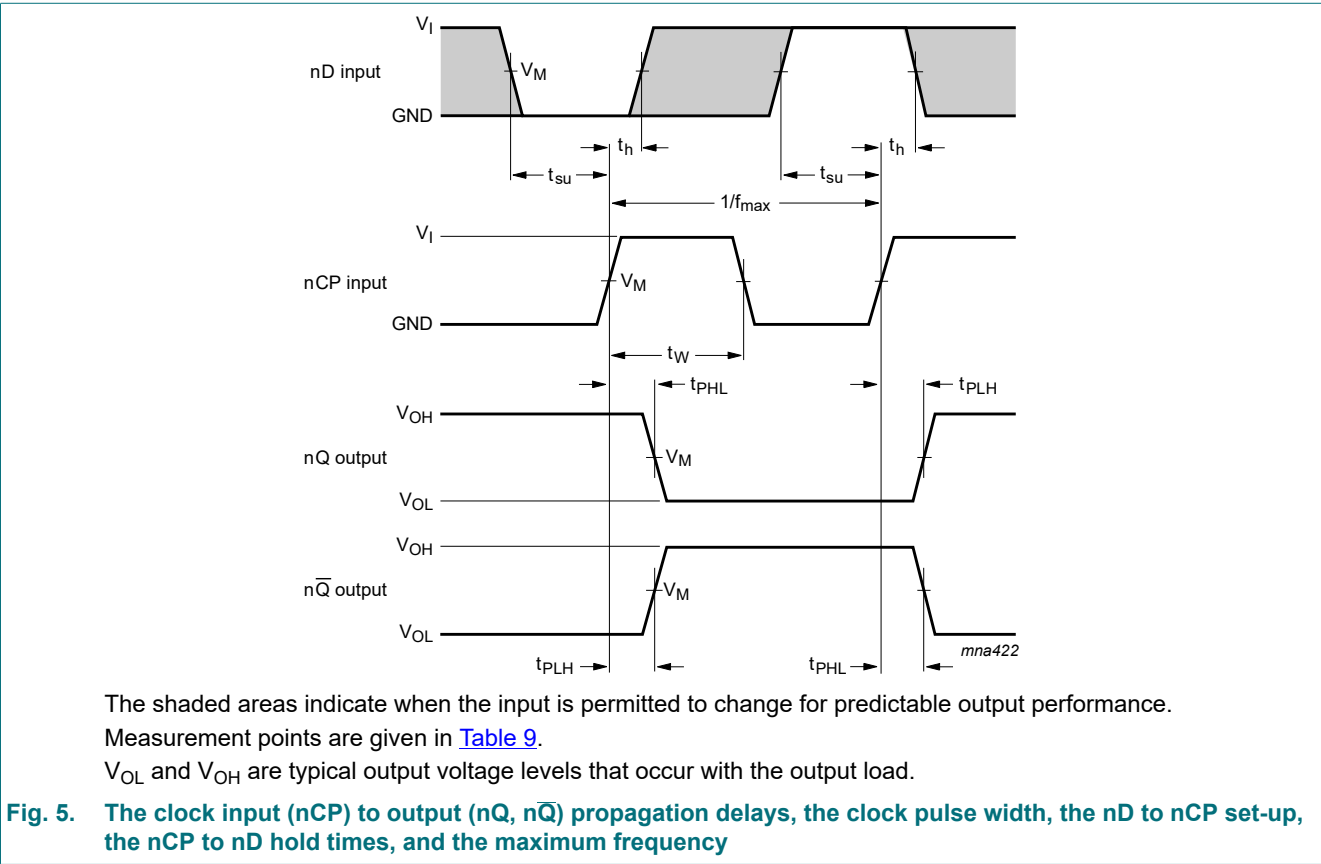
$C_{\text{L}}$  = output load capacitance in pF

$V_{\text{CC}}$  = supply voltage in Volts

$N$  = number of inputs switching

$\Sigma(C_{\text{L}} \times V_{\text{CC}}^2 \times f_{\text{o}})$  = sum of the outputs

10.1. Waveforms and test circuit





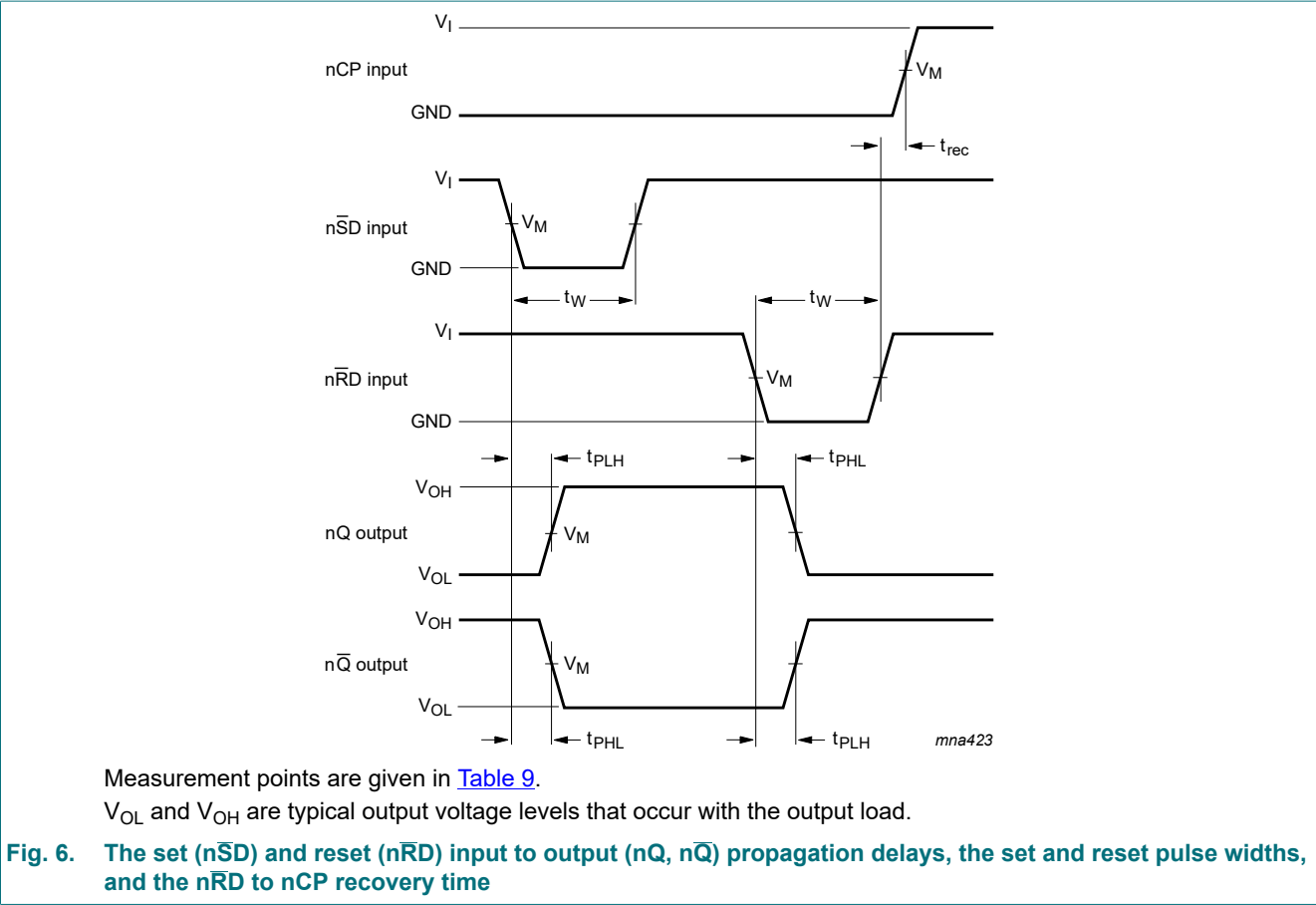
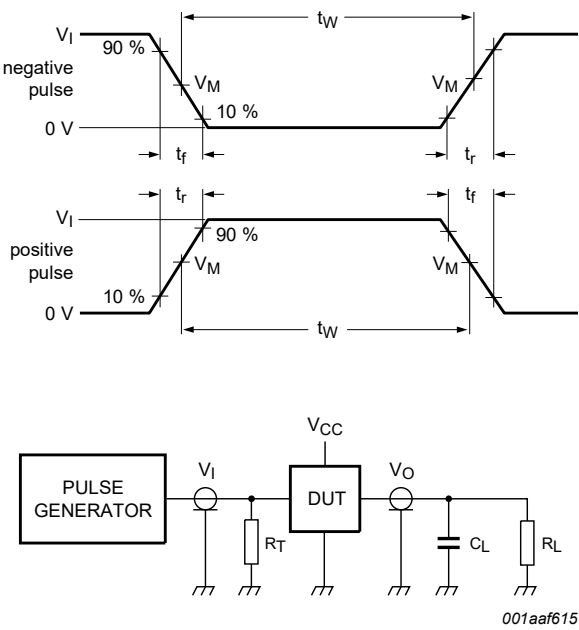


Table 9. Measurement points

Supply voltage	Input		Output
$V_{CC}$	$V_I$	$V_M$	$V_M$
1.2 V	$V_{CC}$	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
1.65 V to 1.95 V	$V_{CC}$	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.3 V to 2.7 V	$V_{CC}$	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.7 V	2.7 V	1.5 V	1.5 V
3.0 V to 3.6 V	2.7 V	1.5 V	1.5 V



Test data is given in [Table 10](#).  
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.

Fig. 7. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	Input		Load	
$V_{CC}$	$V_I$	$t_r, t_f$	$C_L$	$R_L$
1.2 V	$V_{CC}$	$\leq 2$ ns	30 pF	1 k $\Omega$
1.65 V to 1.95 V	$V_{CC}$	$\leq 2$ ns	30 pF	1 k $\Omega$
2.3 V to 2.7 V	$V_{CC}$	$\leq 2$ ns	30 pF	500 $\Omega$
2.7 V	2.7 V	$\leq 2.5$ ns	50 pF	500 $\Omega$
3.0 V to 3.6 V	2.7 V	$\leq 2.5$ ns	50 pF	500 $\Omega$

11. Package outline

SO14: plastic small outline package; 14 leads; body width 3.9 mm

SOT108-1

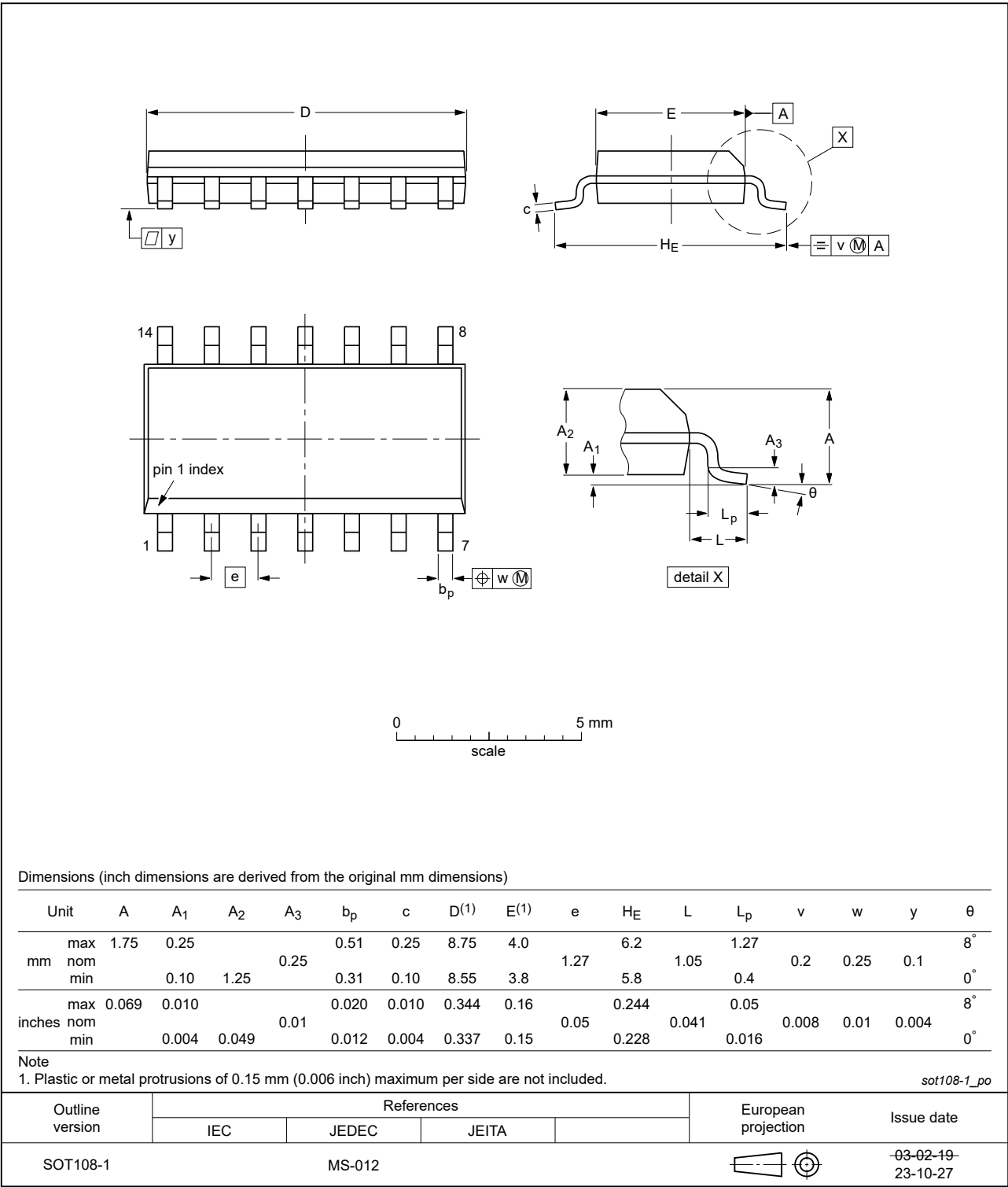


Fig. 8. Package outline SOT108-1 (SO14)

TSSOP14: plastic thin shrink small outline package; 14 leads; body width 4.4 mm

SOT402-1

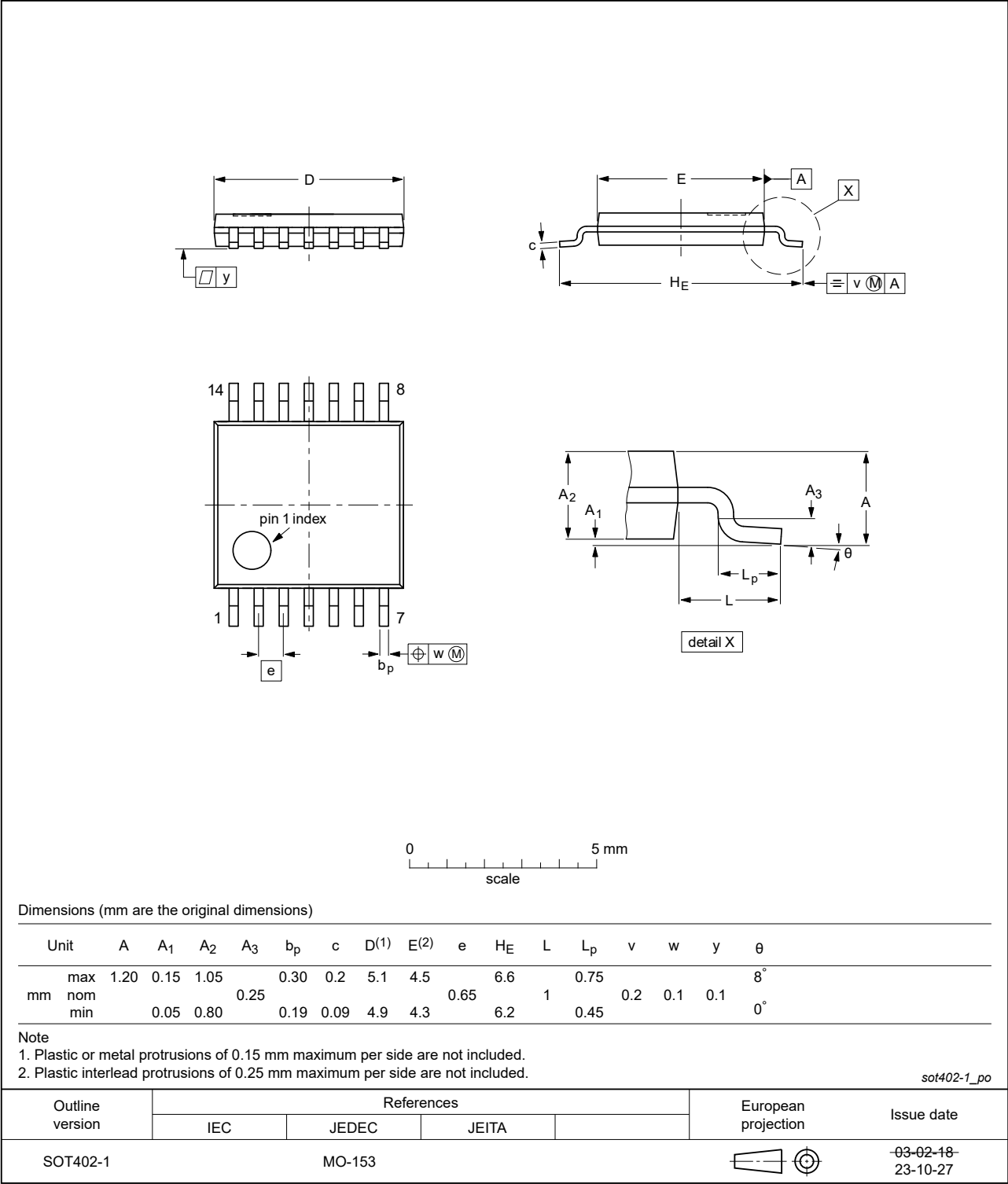
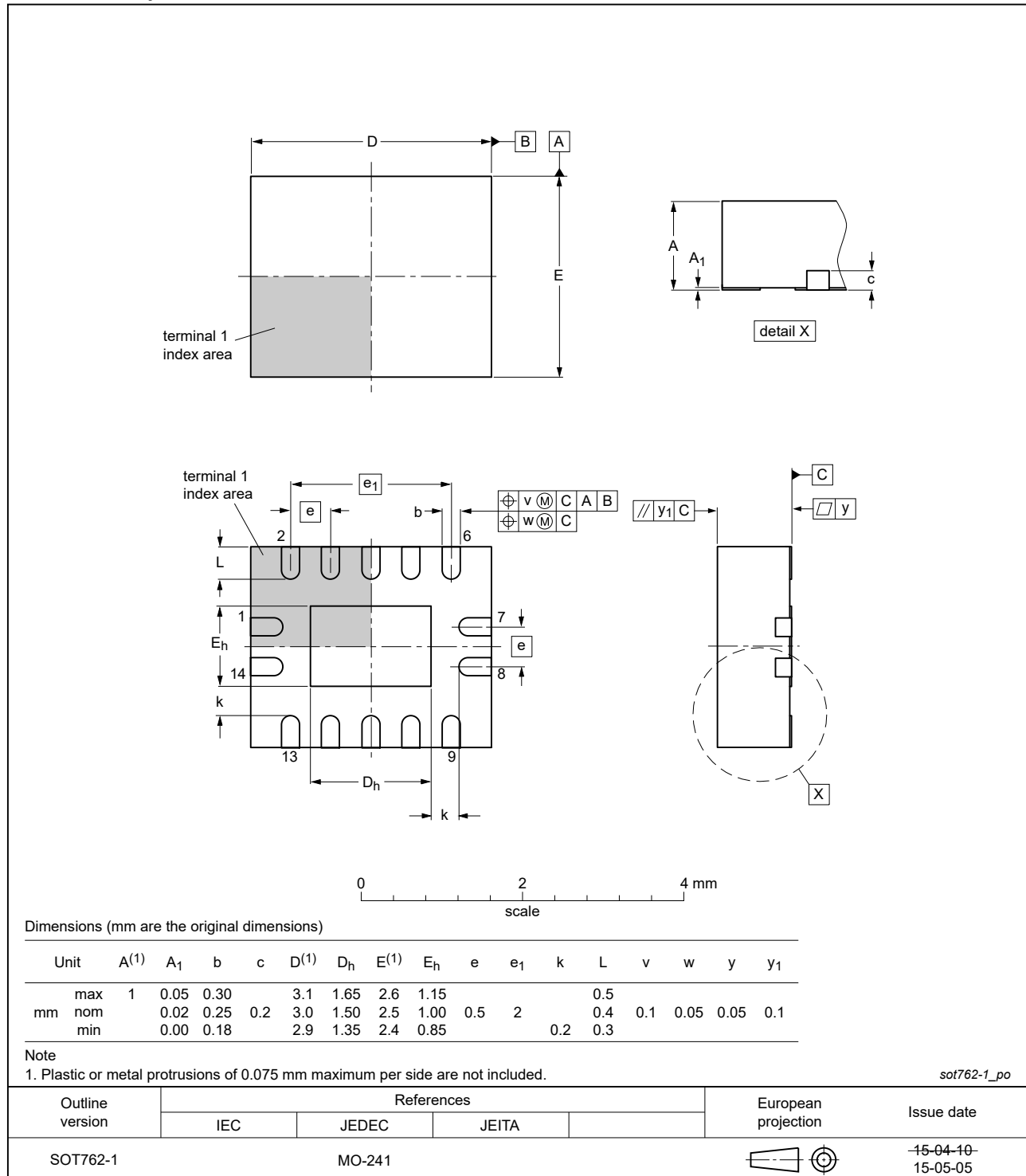


Fig. 9. Package outline SOT402-1 (TSSOP14)

**DHVQFN14: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 14 terminals; body 2.5 x 3 x 0.85 mm**

**SOT762-1**



**Fig. 10. Package outline SOT762-1 (DHVQFN14)**

12. Abbreviations

Table 11. 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 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVC74A_Q100 v.6	20250922	Product data sheet	-	74LVC74A_Q100 v.5
Modifications:	<ul style="list-style-type: none"><li>• Updates made to <a href="#">Table 3</a>.</li></ul>			
74LVC74A_Q100 v.5	20240222	Product data sheet	-	74LVC74A_Q100 v.4
Modifications:	<ul style="list-style-type: none"><li>• <a href="#">Fig. 8</a>, <a href="#">Fig. 9</a>: Aligned SO and TSSOP package outline drawings to JEDEC MS-012 and MO-153.</li></ul>			
74LVC74A_Q100 v.4	20230824	Product data sheet	-	74LVC74A_Q100 v.3
Modifications:	<ul style="list-style-type: none"><li>• <a href="#">Section 2</a>: ESD specification updated according to the latest JEDEC standard.</li></ul>			
74LVC74A_Q100 v.3	20200618	Product data sheet	-	74LVC74A_Q100 v.2
Modifications:	<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• <a href="#">Section 1</a> and <a href="#">Section 2</a> updated.</li><li>• <a href="#">Table 5</a>: Derating values for P<sub>tot</sub> total power dissipation have been updated.</li><li>• <a href="#">Table 10</a> corrected (errata).</li><li>• Package outline drawing of SOT762-1 (<a href="#">Fig. 10</a>) updated.</li></ul>			
74LVC74A_Q100 v.2	20130405	Product data sheet	-	74LVC74A_Q100 v.1
Modifications:	<ul style="list-style-type: none"><li>• <a href="#">Section 2</a>: removed redundant temperature range.</li></ul>			
74LVC74A_Q100 v.1	20130326	Product data sheet	-	-

## 14. Legal information

### Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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