



# 74LVC08A

## Quad 2-input AND gate

Rev. 12 — 2 May 2025

Product data sheet

## 1. General description

The 74LVC08A is a quad 2-input AND gate. Inputs can be driven from either 3.3 V or 5 V devices. This feature allows the use of these devices as translators in mixed 3.3 V and 5 V applications.

Schmitt-trigger action at all inputs makes the circuit tolerant of slower input rise and fall times.

## 2. Features and benefits

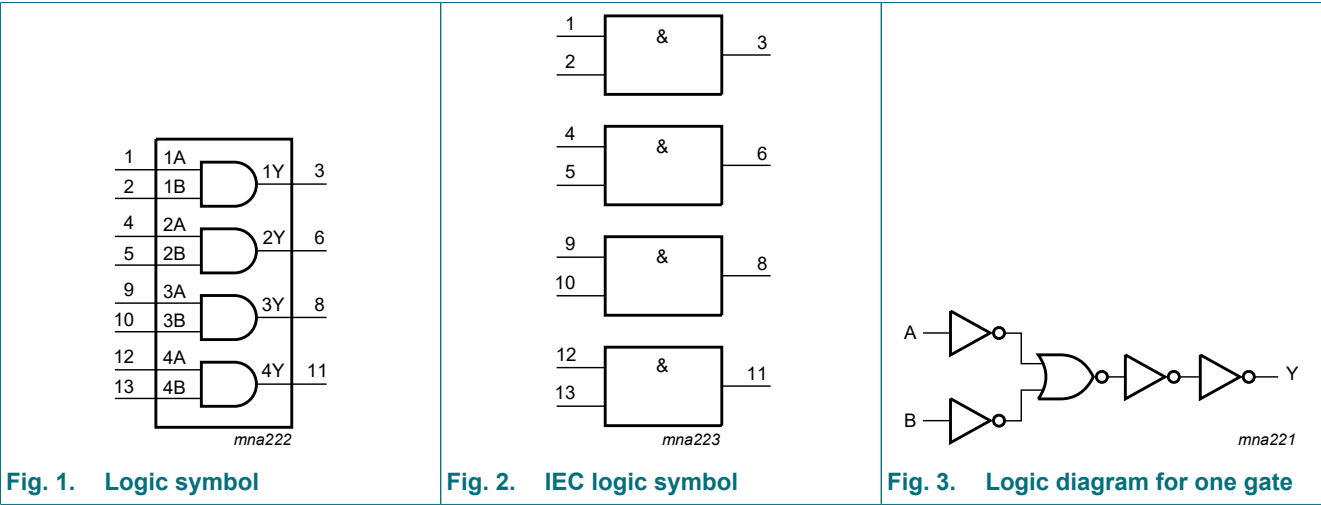
- Overvoltage tolerant inputs to 5.5 V
- Wide supply voltage range from 1.2 V to 3.6 V
- CMOS low power consumption
- Direct interface with TTL levels
- Complies with JEDEC standard:
  - JESD8-7A (1.65 V to 1.95 V)
  - JESD8-5A (2.3 V to 2.7 V)
  - JESD8-C/JESD36 (2.7 V to 3.6 V)
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

## 3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
<a href="#">74LVC08AD</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="#">74LVC08APW</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="#">74LVC08ABQ</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>
<a href="#">74LVC08ABZ</a>	-40 °C to +125 °C	DHXQFN14	plastic, leadless dual in-line compatible thermal enhanced extreme thin quad flat package; no leads; 14 terminals; 0.4 mm pitch; body 2 mm × 2 mm × 0.48 mm	<a href="#">SOT8014-1</a>

4. Functional diagram



5. Pinning information

5.1. Pinning

**D package**  
**SOT108-1 (SO14)**

aaa-036070

**PW package**  
**SOT402-1 (TSSOP14)**

aaa-036071

**BQ package**  
**SOT762-1 (DHVQFN14)**

aaa-036072

Transparent top view

**BZ package**  
**SOT8014-1 (DHXQFN14)**

aaa-041206

Transparent top view

(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
1A, 2A, 3A, 4A	1, 4, 9, 12	data input
1B, 2B, 3B, 4B	2, 5, 10, 13	data input
1Y, 2Y, 3Y, 4Y	3, 6, 8, 11	data output
GND	7	ground (0 V)
V <sub>CC</sub>	14	supply voltage

6. Functional description

Table 3. Function selection

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

Input		Output
nA	nB	nY
L	X	L
X	L	L
H	H	H

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 <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	output HIGH or LOW-state [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
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = -40 °C to +125 °C			
		SOT108-1 (SO14) [3] SOT402-1 (TSSOP14) SOT762-1 (DHVQFN14)	-	500	mW
		SOT8014-1 (DHXQFN14) [4]	-	250	mW
T <sub>stg</sub>	storage temperature		-65	+150	°C

- [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.  
[4] For SOT8014-1 (DHXQFN14) package: P<sub>tot</sub> derates linearly with 8.7 mW/K above 121 °C.

8. Recommended operating conditions

Table 5. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CC</sub>	supply voltage		1.65	-	3.6	V
		functional	1.2	-	-	V
V <sub>I</sub>	input voltage		0	-	5.5	V
V <sub>O</sub>	output voltage	output HIGH or LOW-state	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 6. 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>O</sub> = 24 mA; V <sub>CC</sub> = 3.0 V	-	-	0.55	-	0.8	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
I <sub>CC</sub>	supply current	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
ΔI <sub>CC</sub>	additional supply current	per input pin; V <sub>CC</sub> = 2.7 V to 3.6 V; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A	-	5	500	-	5000	µA
C <sub>I</sub>	input capacitance	V <sub>CC</sub> = 0 V to 3.6 V; V <sub>I</sub> = GND to V <sub>CC</sub>	-	4.0	-	-	-	pF

[1] All typical values are measured at V<sub>CC</sub> = 3.3 V (unless stated otherwise) and T<sub>amb</sub> = 25 °C.

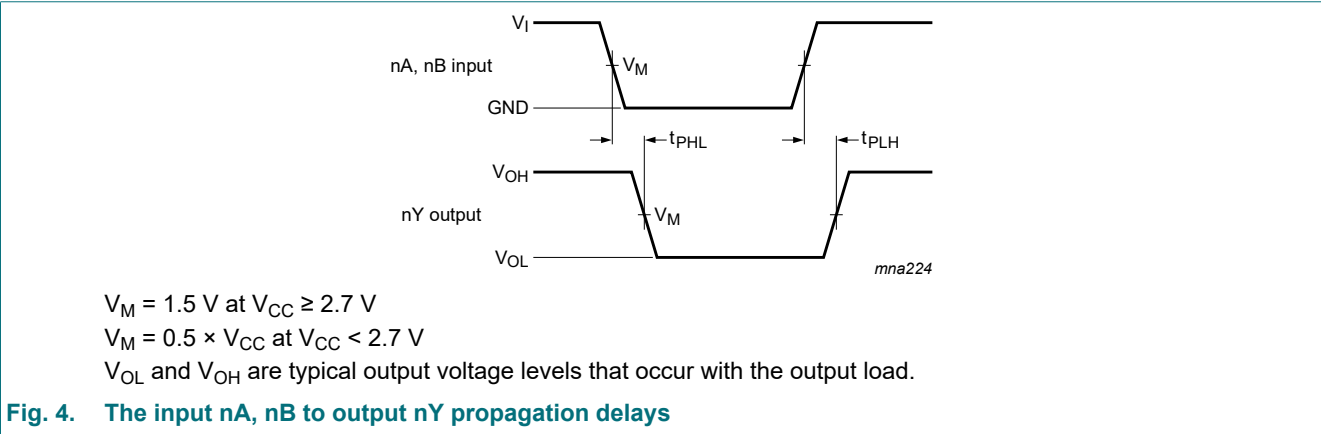
10. Dynamic characteristics

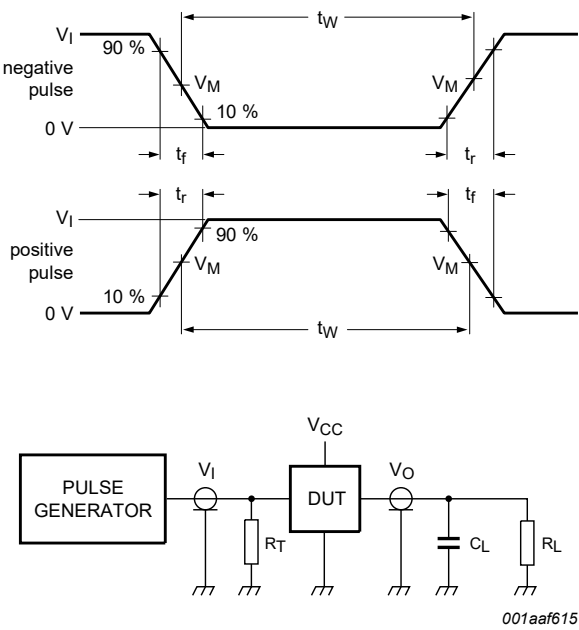
**Table 7. Dynamic characteristics**  
 Voltages are referenced to GND (ground = 0 V). For test circuit see Fig. 5.

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ [1]	Max	Min	Max	
t <sub>pd</sub>	propagation delay	nA, nB to nY; see Fig. 4 [2]						
		V <sub>CC</sub> = 1.2 V	-	11.0	-	-	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	0.5	4.2	9.0	0.5	10.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	2.5	6.9	1.0	8.0	ns
		V <sub>CC</sub> = 2.7 V	1.5	2.5	4.8	1.5	5.6	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	2.3	4.1	1.0	4.8	ns
t <sub>sk(o)</sub>	output skew time	V <sub>CC</sub> = 3.0 V to 3.6 V [3]	-	-	1.0	-	1.5	ns
C <sub>PD</sub>	power dissipation capacitance	per gate; V <sub>I</sub> = GND to V <sub>CC</sub> [4]						
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	4.4	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	7.7	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	10.5	-	-	-	pF

- [1] Typical values are measured at T<sub>amb</sub> = 25 °C and V<sub>CC</sub> = 1.2 V, 1.8 V, 2.5 V, 2.7 V, and 3.3 V respectively.
- [2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.
- [3] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.
- [4] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> 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<sub>i</sub> = input frequency in MHz, f<sub>o</sub> = output frequency in MHz  
 C<sub>L</sub> = output load capacitance in pF  
 V<sub>CC</sub> = supply voltage in Volts  
 N = number of inputs switching  
 $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

10.1. Waveforms and test circuit





Test data is given in [Table 8](#). 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. 5. Test circuit for measuring switching times

Table 8. Test data

Supply voltage	Input		Load	
	$V_I$	$t_r, t_f$	$C_L$	$R_L$
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

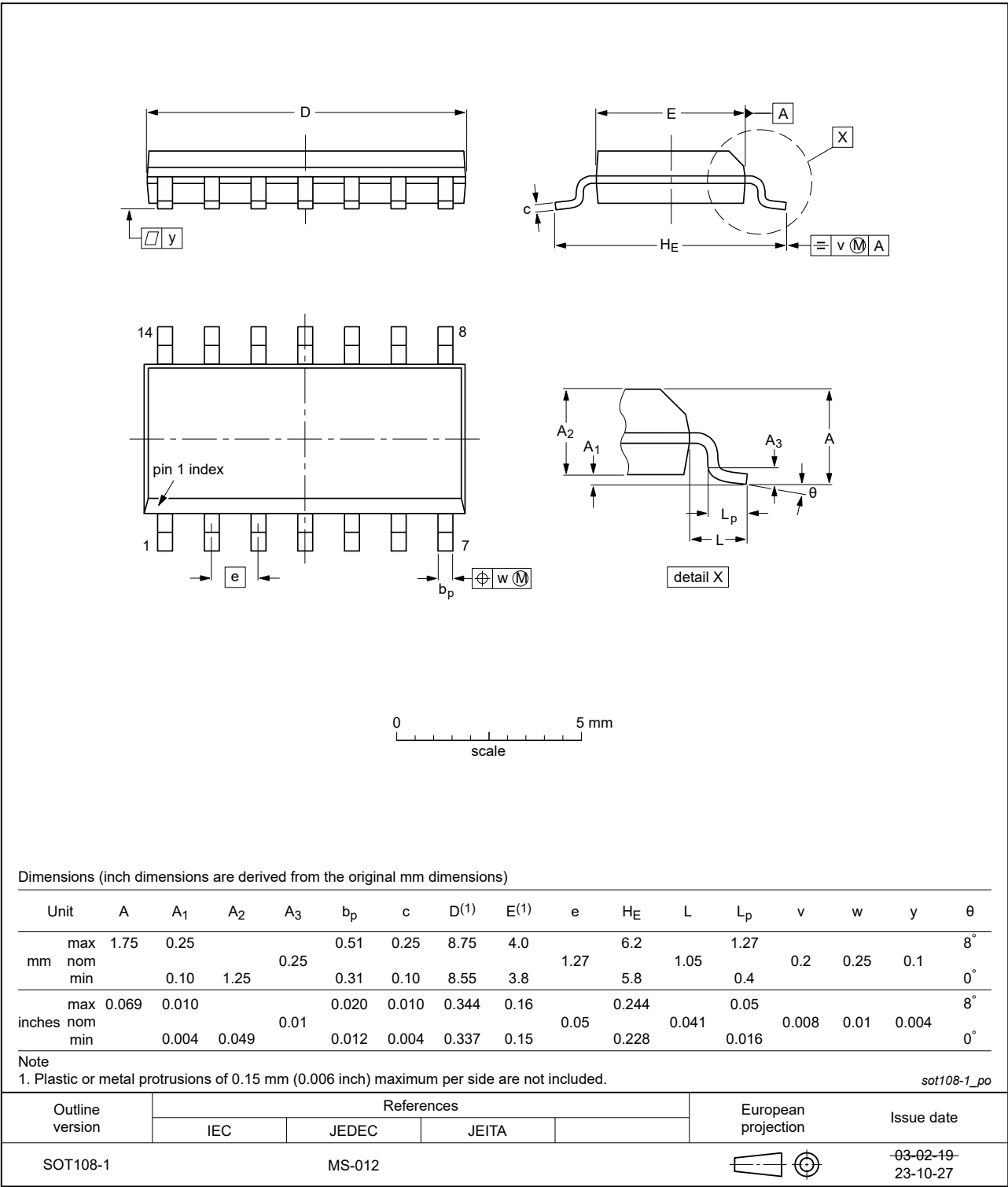


Fig. 6. Package outline SOT108-1 (SO14)



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

SOT402-1

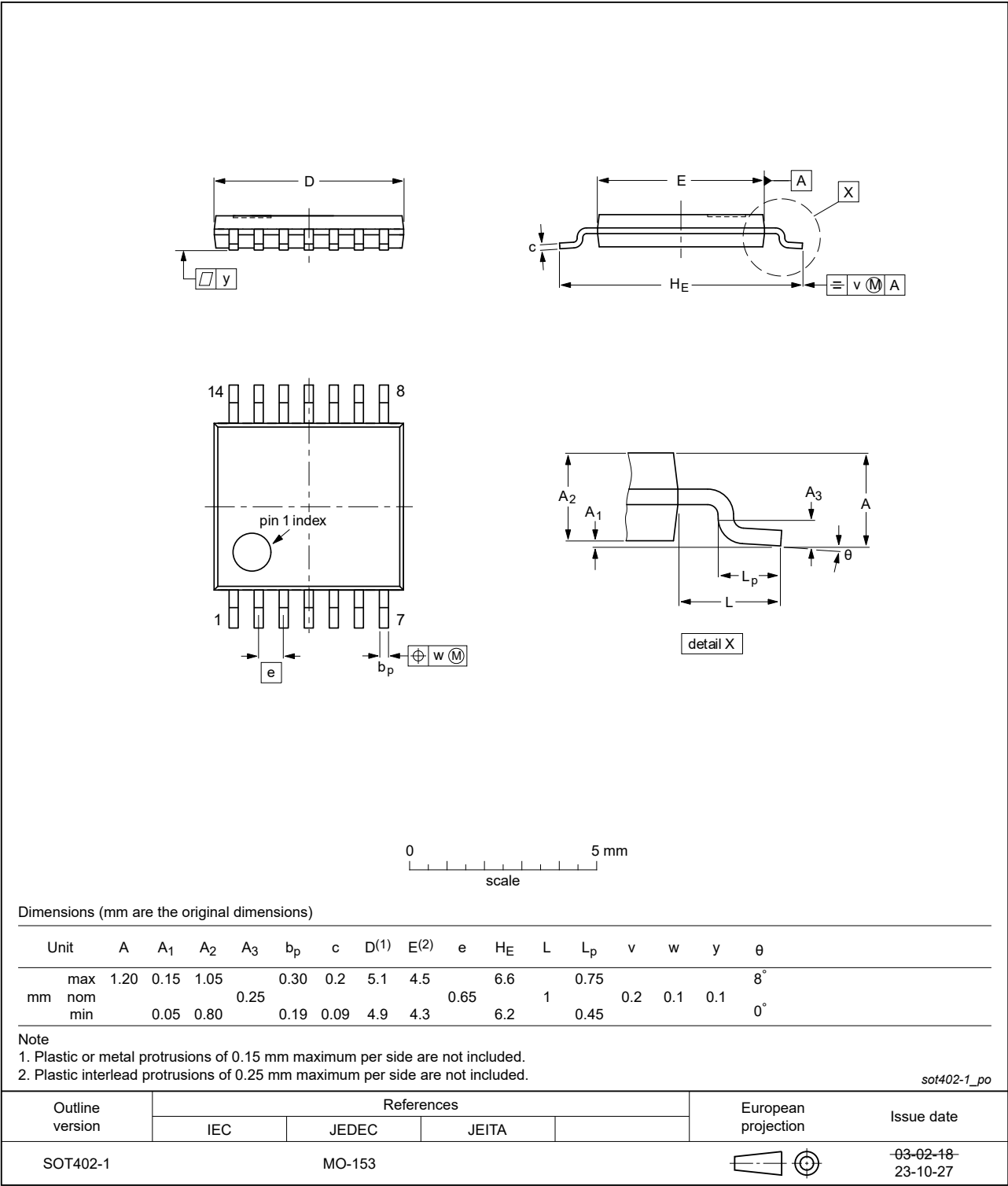


Fig. 7. Package outline SOT402-1 (TSSOP14)

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

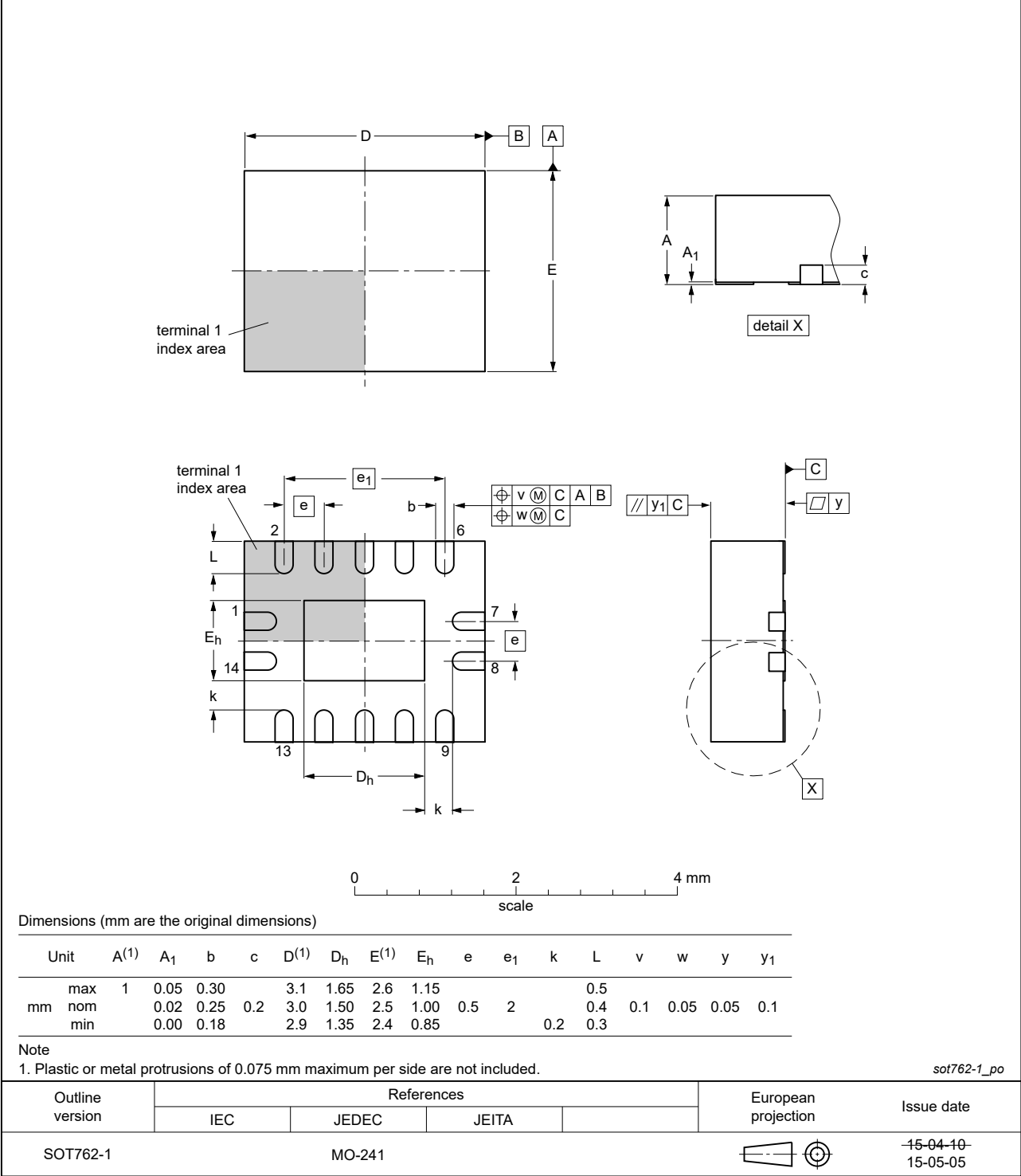


Fig. 8. Package outline SOT762-1 (DHVQFN14)

DHXQFN14: plastic, leadless dual in-line compatible thermal enhanced extreme thin quad flat package;  
no leads; 14 terminals; 0.4 mm pitch; body 2 mm x 2 mm x 0.48 mm

SOT8014-1

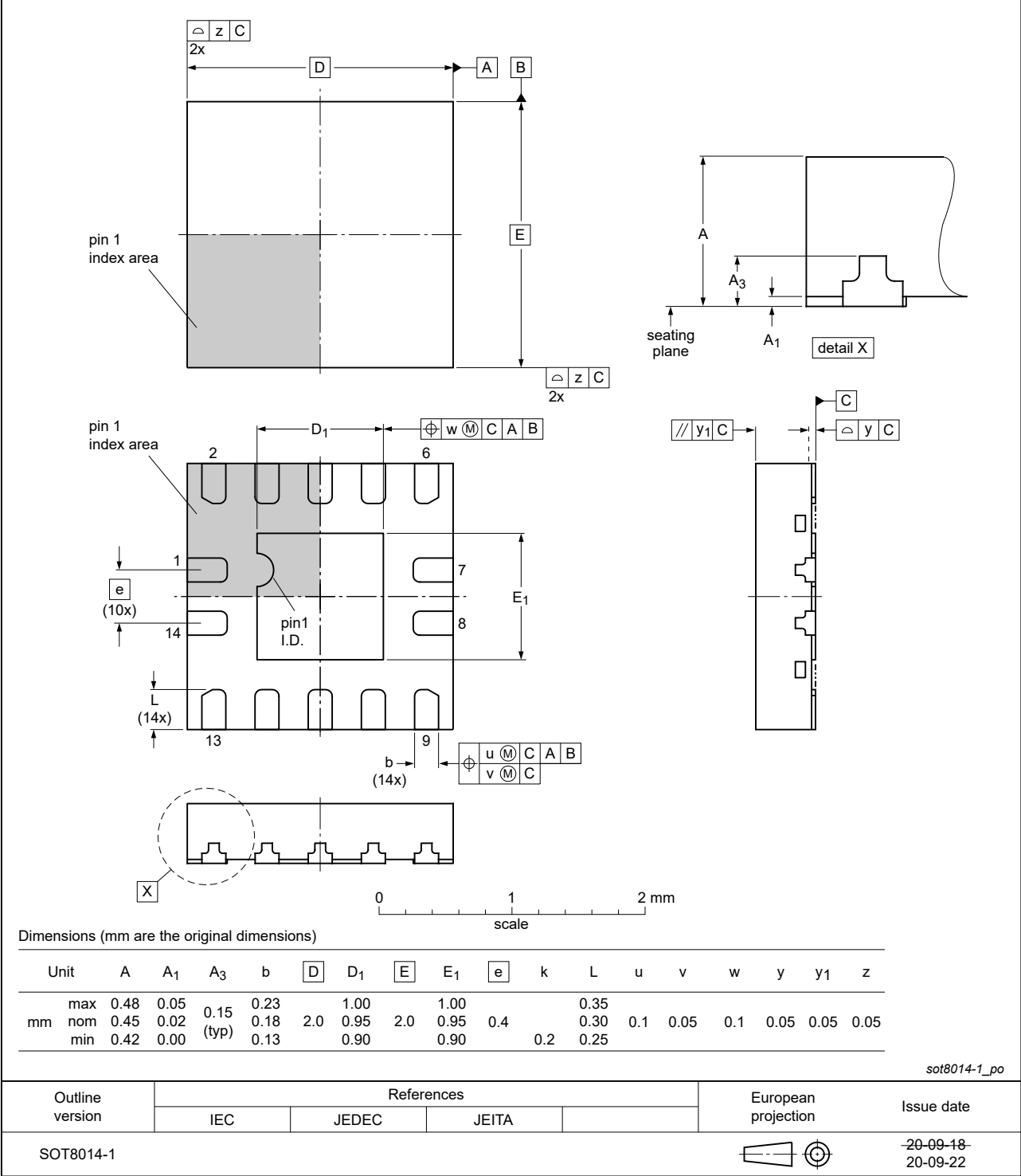


Fig. 9. Package outline SOT8014-1 (DHXQFN14)

12. Abbreviations

Table 9. 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 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVC08A v.12	20250502	Product data sheet	-	74LVC08A v.11
Modifications:	• Type number 74LVC08ABZ (SOT8014-1/DHXQFN14) added.			
74LVC08A v.11	20240208	Product data sheet	-	74LVC08A v.10
Modifications:	• <a href="#">Fig. 6</a> , <a href="#">Fig. 7</a> : Aligned SO and TSSOP package outline drawings to JEDEC MS-012 and MO-153.			
74LVC08A v.10	20230802	Product data sheet	-	74LVC08A v.9
Modifications:	• <a href="#">Section 2</a> : ESD specification updated according to the latest JEDEC standard.			
74LVC08A v.9	20210917	Product data sheet	-	74LVC08A v.8
Modifications:	• Type number 74LVC08ADB (SOT337-1/SSOP14) removed. • <a href="#">Section 1</a> updated.			
74LVC08A v.8	20200402	Product data sheet	-	74LVC08A v.7
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. • <a href="#">Table 4</a> : Derating values for P <sub>tot</sub> total power dissipation updated.			
74LVC08A v.7	20160419	Product data sheet		74LVC08A v.6
Modifications:	• <a href="#">Table 2</a> : Pin description for 1A to 4A inputs and 1Y to 4Y outputs swapped (errata).			
74LVC08A v.6	20111216	Product data sheet		74LVC08A v.5
Modifications:	• The format of this document has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • <a href="#">Table 4</a> , <a href="#">Table 5</a> , <a href="#">Table 6</a> , <a href="#">Table 7</a> and <a href="#">Table 8</a> : values added for lower voltage ranges.			
74LVC08A v.5	20030224	Product specification	-	74LVC08A v.4
74LVC08A v.4	20021030	Product specification	-	74LVC08A v.3
74LVC08A v.3	20020308	Product specification	-	74LVC08A v.2
74LVC08A v.2	19970630	Product specification	-	74LVC08A v.1
74LVC08A v.1	19970630	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.
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Product [short] data sheet	Production	This document contains the product specification.

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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Ordering information..... 1

4. Functional diagram..... 2

5. Pinning information..... 3

5.1. Pinning..... 3

5.2. Pin description..... 3

6. Functional description..... 4

7. Limiting values..... 4

8. Recommended operating conditions..... 4

9. Static characteristics..... 5

10. Dynamic characteristics..... 6

10.1. Waveforms and test circuit..... 6

11. Package outline..... 8

12. Abbreviations..... 12

13. Revision history..... 12

14. Legal information..... 13

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