

74ABT162244

16-bit buffer/line driver with 30 Ω series termination resistors;
3-state

Rev. 7 — 2 July 2021

Product data sheet

1. General description

The 74ABT162244 is a 16-bit buffer/line driver with 30 Ω termination resistors and 3-state outputs. The device can be used as four 4-bit buffers, two 8-bit buffers or one 16-bit buffer. The device features four output enables (1OE, 2OE, 3OE and 4OE), each controlling four of the 3-state outputs. A HIGH on nOE causes the outputs to assume a high-impedance OFF-state. This device is fully specified for partial power down applications using I_{OFF}. The I_{OFF} circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

2. Features and benefits

- Supply voltage range from 4.5 V to 5.5 V
- BiCMOS high speed and output drive
- Direct interface with TTL levels
- Power-up 3-state
- I_{OFF} circuitry provides partial Power-down mode operation
- Latch-up protection exceeds 500 mA per JESD78B class II level A
- 16-bit bus interface
- Multiple V_{CC} and GND pins minimize switching noise
- 3-state buffers
- Output capability: +12 mA and -32 mA
- Live insertion and extraction permitted
- ESD protection:
 - HBM JESD22-A114F exceeds 2000 V
 - CDM JESD22-C101-C exceeds 1000 V
- Specified from -40 °C to +85 °C

3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74ABT162244DGG	-40 °C to +85 °C	TSSOP48	plastic thin shrink small outline package; 48 leads; body width 6.1 mm	SOT362-1

4. Functional diagram

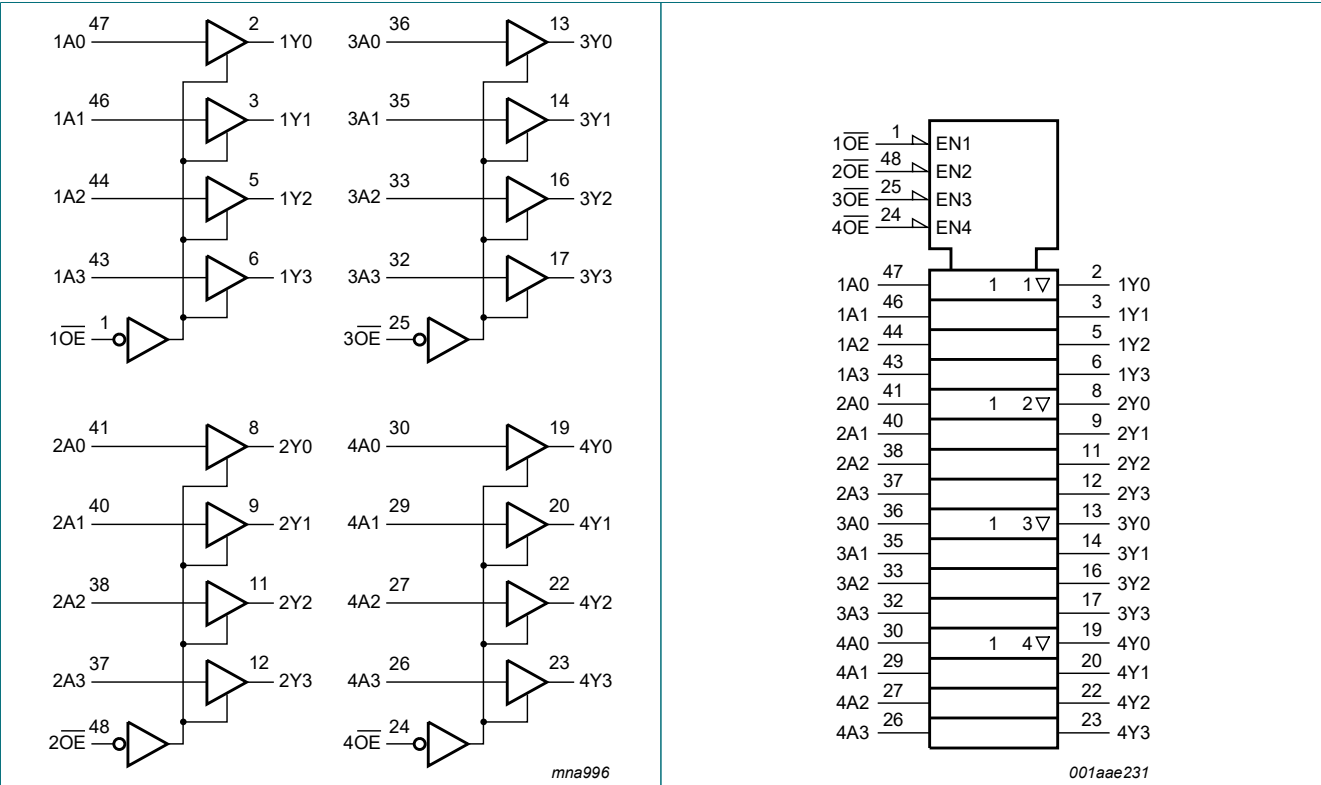


Fig. 1. Logic symbol

Fig. 2. IEC logic symbol

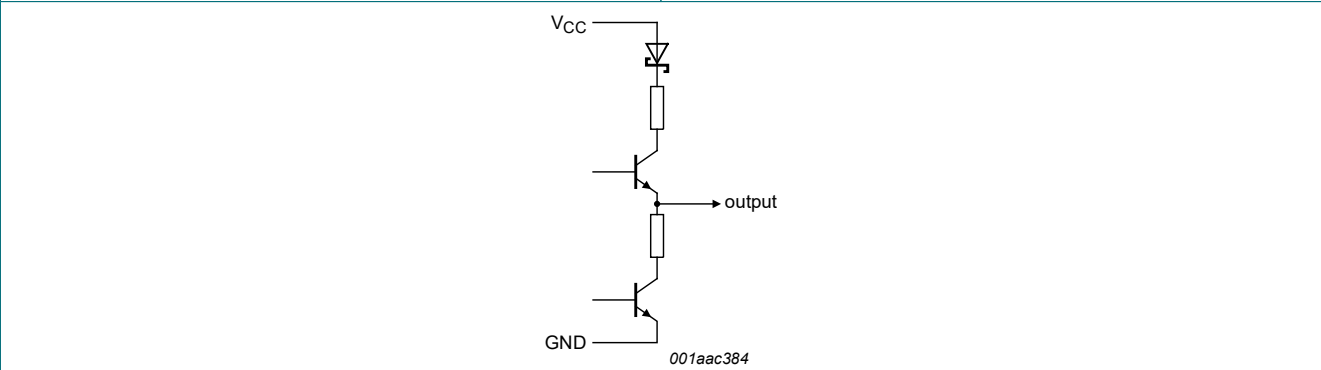


Fig. 3. Logic diagram one output

5. Pinning information

5.1. Pinning

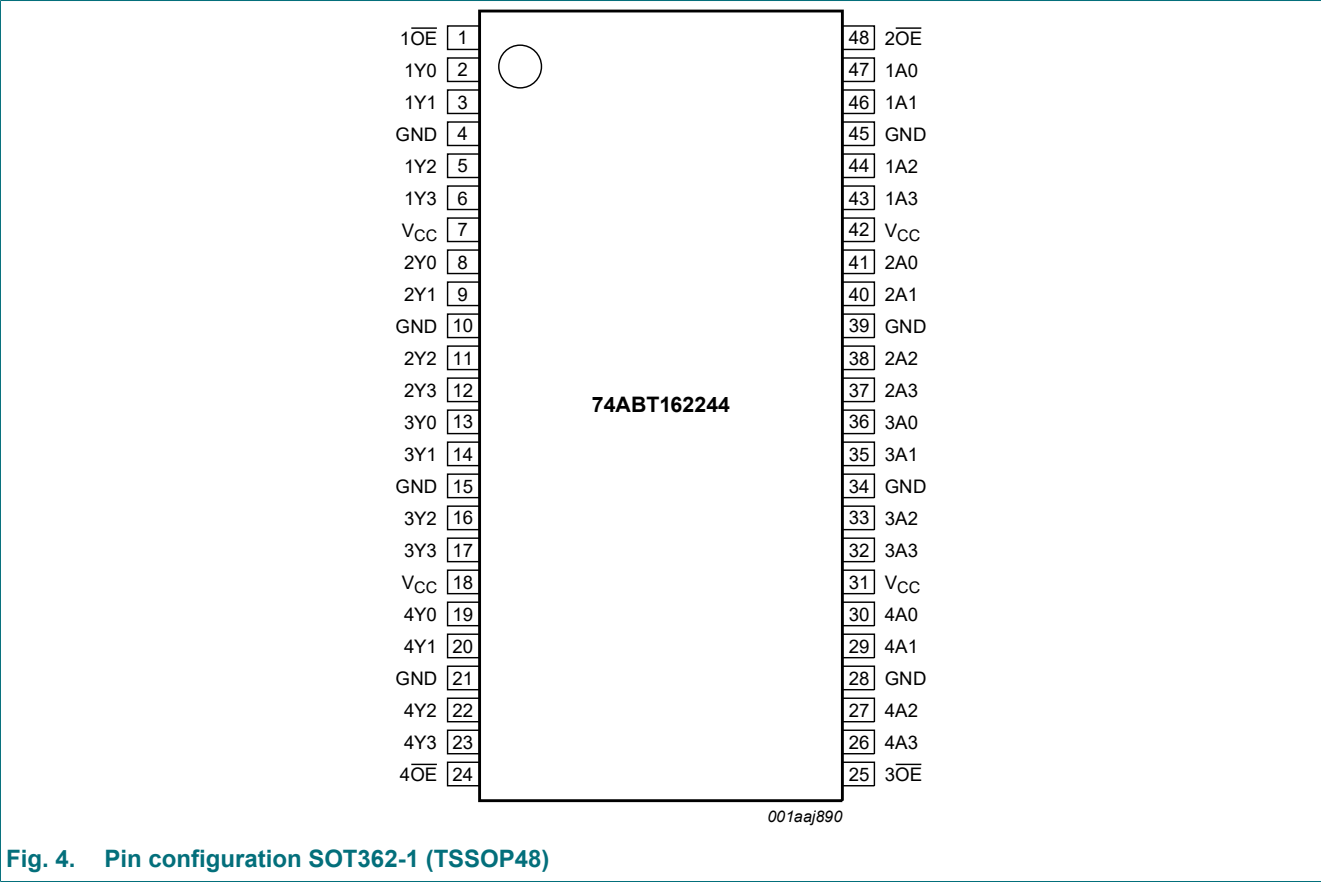


Fig. 4. Pin configuration SOT362-1 (TSSOP48)

5.2. Pin description

Table 2. Pin description

Symbol	Pin	Description
1OE, 2OE, 3OE, 4OE	1, 48, 25, 24	1 to 4 output enable (LOW active)
1Y0, 1Y1, 1Y2, 1Y3	2, 3, 5, 6	1 data output 0 to output 3
GND	4, 10, 15, 21, 28, 34, 39, 45	ground (0 V)
V _{CC}	7, 18, 31, 42	supply voltage
2Y0, 2Y1, 2Y2, 2Y3	8, 9, 11, 12	2 data output 0 to output 3
3Y0, 3Y1, 3Y2, 3Y3	13, 14, 16, 17	3 data output 0 to output 3
4Y0, 4Y1, 4Y2, 4Y3	19, 20, 22, 23	4 data output 0 to output 3
4A0, 4A1, 4A2, 4A3	30, 29, 27, 26	4 data input 0 to input 3
3A0, 3A1, 3A2, 3A3	36, 35, 33, 32	3 data input 0 to input 3
2A0, 2A1, 2A2, 2A3	41, 40, 38, 37	2 data input 0 to input 3
1A0, 1A1, 1A2, 1A3	47, 46, 44, 43	1 data input 0 to input 3

6. Functional description

Table 3. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state.

Control	Input	Output
nOE	nAn	nYn
L	L	L
L	H	H
H	X	Z

7. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	supply voltage		-0.5	+7.0	V
V_I	input voltage		[1] -1.2	+7.0	V
V_O	output voltage	output in OFF-state or HIGH-state	[1] -0.5	+5.5	V
I_{IK}	input clamping current	$V_I < 0$ V	-18	-	mA
I_{OK}	output clamping current	$V_O < 0$ V	-50	-	mA
I_O	output current	output in LOW-state	-	128	mA
		output in HIGH-state	-	-64	mA
T_j	junction temperature		[2] -	150	°C
T_{stg}	storage temperature		-65	+150	°C

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

[2] The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability.

8. Recommended operating conditions

Table 5. Operating conditions

Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CC}	supply voltage		4.5	-	5.5	V
V_I	input voltage		0	-	V_{CC}	V
V_{IH}	HIGH-level input voltage		2.0	-	-	V
V_{IL}	LOW-level Input voltage		-	-	0.8	V
I_{OH}	HIGH-level output current		-32	-	-	mA
I_{OL}	LOW-level output current		-	-	12	mA
$\Delta t/\Delta V$	input transition rise and fall rate		-	-	10	ns/V
T_{amb}	ambient temperature	in free air	-40	-	+85	°C

9. Static characteristics

Table 6. Static characteristics

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		Unit
			Min	Typ	Max	Min	Max	
V_{IK}	input clamping voltage	$V_{CC} = 4.5 \text{ V}$; $I_{IK} = -18 \text{ mA}$	-	-0.9	-1.2	-	-1.2	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IL}$ or V_{IH}						
		$V_{CC} = 4.5 \text{ V}$; $I_{OH} = -3 \text{ mA}$	2.5	2.9	-	2.5	-	V
		$V_{CC} = 5.0 \text{ V}$; $I_{OH} = -3 \text{ mA}$	3.0	3.4	-	3.0	-	V
		$V_{CC} = 4.5 \text{ V}$; $I_{OH} = -32 \text{ mA}$	2.0	2.4	-	2.0	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IL}$ or V_{IH}						
		$V_{CC} = 4.5 \text{ V}$; $I_{OL} = 8 \text{ mA}$	-	-	0.65	-	0.65	V
		$V_{CC} = 4.5 \text{ V}$; $I_{OL} = 12 \text{ mA}$	-	-	0.80	-	0.80	V
I_I	input leakage current	$V_{CC} = 5.5 \text{ V}$; $V_I = V_{CC}$ or GND	-	± 0.01	± 1.0	-	± 1.0	μA
I_{OFF}	power-off leakage current	$V_{CC} = 0 \text{ V}$; V_I or $V_O \leq 4.5 \text{ V}$	-	± 5.0	± 100	-	± 100	μA
$I_{O(pu/pd)}$	power-up/power-down output current	$V_{CC} = 2.0 \text{ V}$; $V_O = 0.5 \text{ V}$; $V_I = \text{GND}$ or V_{CC} ; $n\overline{OE} = \text{HIGH}$ [1]	-	± 5.0	± 50	-	± 50	μA
I_{OZ}	OFF-state output current	$V_{CC} = 5.5 \text{ V}$; $V_I = V_{IL}$ or V_{IH}						
		output HIGH-state at $V_O = 5.5 \text{ V}$	-	0.1	10	-	10	μA
		output LOW-state at $V_O = 0 \text{ V}$	-	-0.1	-10	-	-10	μA
I_{CEX}	output high leakage current	HIGH-state; $V_O = 5.5 \text{ V}$; $V_{CC} = 5.5 \text{ V}$; $V_I = \text{GND}$ or V_{CC}	-	5.0	50	-	50	μA
I_O	output current	$V_{CC} = 5.5 \text{ V}$; $V_O = 2.5 \text{ V}$ [2]	-50	-100	-180	-50	-180	mA
I_{CC}	supply current	$V_{CC} = 5.5 \text{ V}$; $V_I = \text{GND}$ or V_{CC}						
		outputs HIGH-state	-	0.50	1.0	-	1.0	mA
		outputs LOW-state	-	10	19	-	19	mA
		outputs 3-state	-	0.50	1.0	-	1.0	mA
ΔI_{CC}	additional supply current	per input pin; $V_{CC} = 5.5 \text{ V}$; one input at 3.4 V and other inputs at V_{CC} or GND [3] [4]	-	100	250	-	250	μA
C_I	input capacitance	$V_I = 0 \text{ V}$ or V_{CC}	-	3	-	-	-	pF
$C_{I/O}$	input/output capacitance	outputs disabled; $V_O = 0 \text{ V}$ or V_{CC}	-	7	-	-	-	pF

[1] This parameter is valid for any V_{CC} between 0 V and 2.1 V, with a transition time of up to 10 ms.

From $V_{CC} = 2.1 \text{ V}$ to $V_{CC} = 5 \text{ V} \pm 10 \%$, a transition time of up to 100 μs is permitted.

[2] Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

[3] This is the increase in supply current for each input at 3.4 V.

[4] This data sheet limit may vary among suppliers.

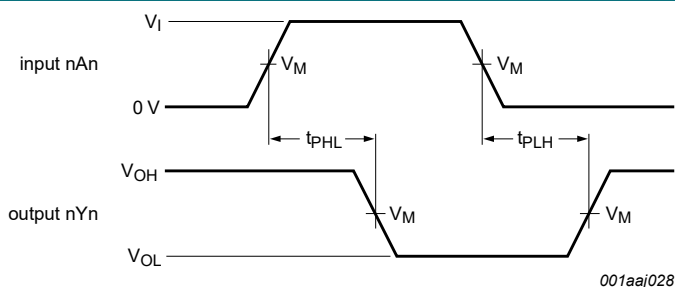
10. Dynamic characteristics

Table 7. Dynamic characteristics

$GND = 0\text{ V}$. For test circuit, see Fig. 7.

Symbol	Parameter	Conditions	25 °C; $V_{CC} = 5.0\text{ V}$			-40 °C to +85 °C; $V_{CC} = 5.0\text{ V} \pm 0.5\text{ V}$		Unit
			Min	Typ	Max	Min	Max	
t_{PLH}	LOW to HIGH propagation delay	nAn to nYn, see Fig. 5	1.0	1.8	2.4	1.0	2.7	ns
t_{PHL}	HIGH to LOW propagation delay	nAn to nYn, see Fig. 5	1.6	3.2	4.0	1.6	4.4	ns
t_{PZH}	OFF-state to HIGH propagation delay	n $\overline{OE}$ to nYn; see Fig. 6	1.2	2.7	3.5	1.2	4.3	ns
t_{PZL}	OFF-state to LOW propagation delay	n $\overline{OE}$ to nYn; see Fig. 6	2.6	5.0	6.2	2.6	7.3	ns
t_{PHZ}	HIGH to OFF-state propagation delay	n $\overline{OE}$ to nYn; see Fig. 6	1.5	3.0	3.8	1.5	4.5	ns
t_{PLZ}	LOW to OFF-state propagation delay	n $\overline{OE}$ to nYn; see Fig. 6	1.3	2.6	3.3	1.3	4.6	ns

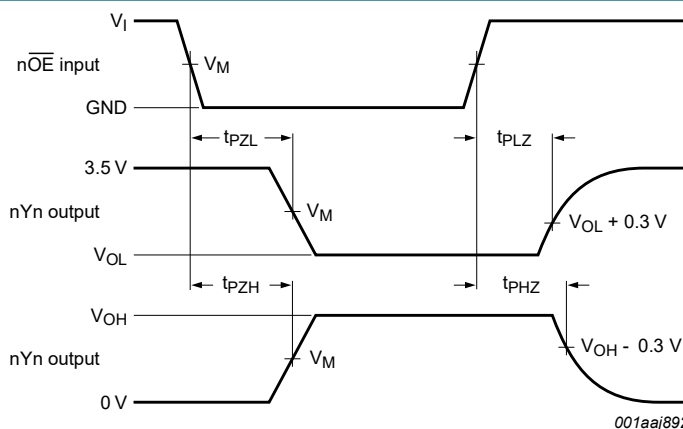
10.1. Waveforms and test circuit



$V_M = 1.5\text{ V}$

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

Fig. 5. Input (nAn) to output (nYn) propagation delay



$V_M = 1.5\text{ V}$

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

Fig. 6. 3-state output enable and disable times

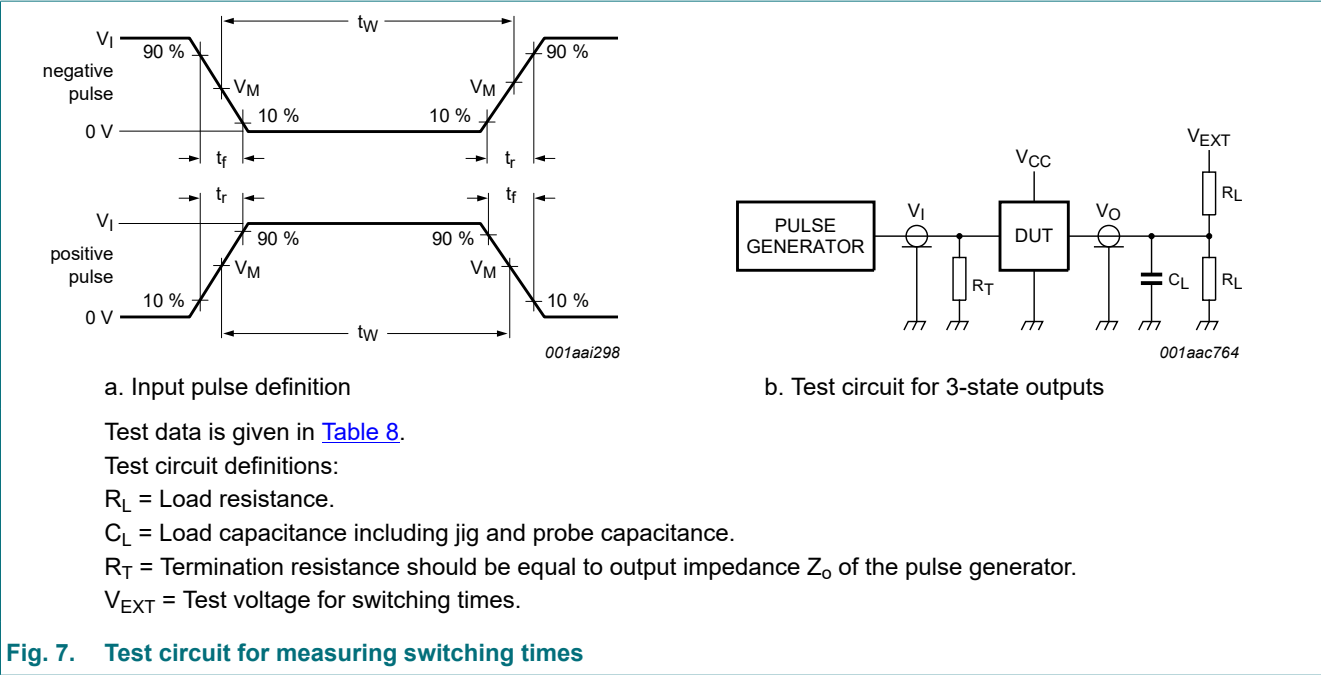


Fig. 7. Test circuit for measuring switching times

Table 8. Test data

Input				Load		V_{EXT}		
V_I	f_i	t_W	t_r, t_f	C_L	R_L	t_{PHZ}, t_{PZH}	t_{PLZ}, t_{PZL}	t_{PLH}, t_{PHL}
3.0 V	1 MHz	500 ns	2.5 ns	50 pF	500 Ω	open	7.0 V	open

11. Package outline

TSSOP48: plastic thin shrink small outline package; 48 leads; body width 6.1 mm

SOT362-1

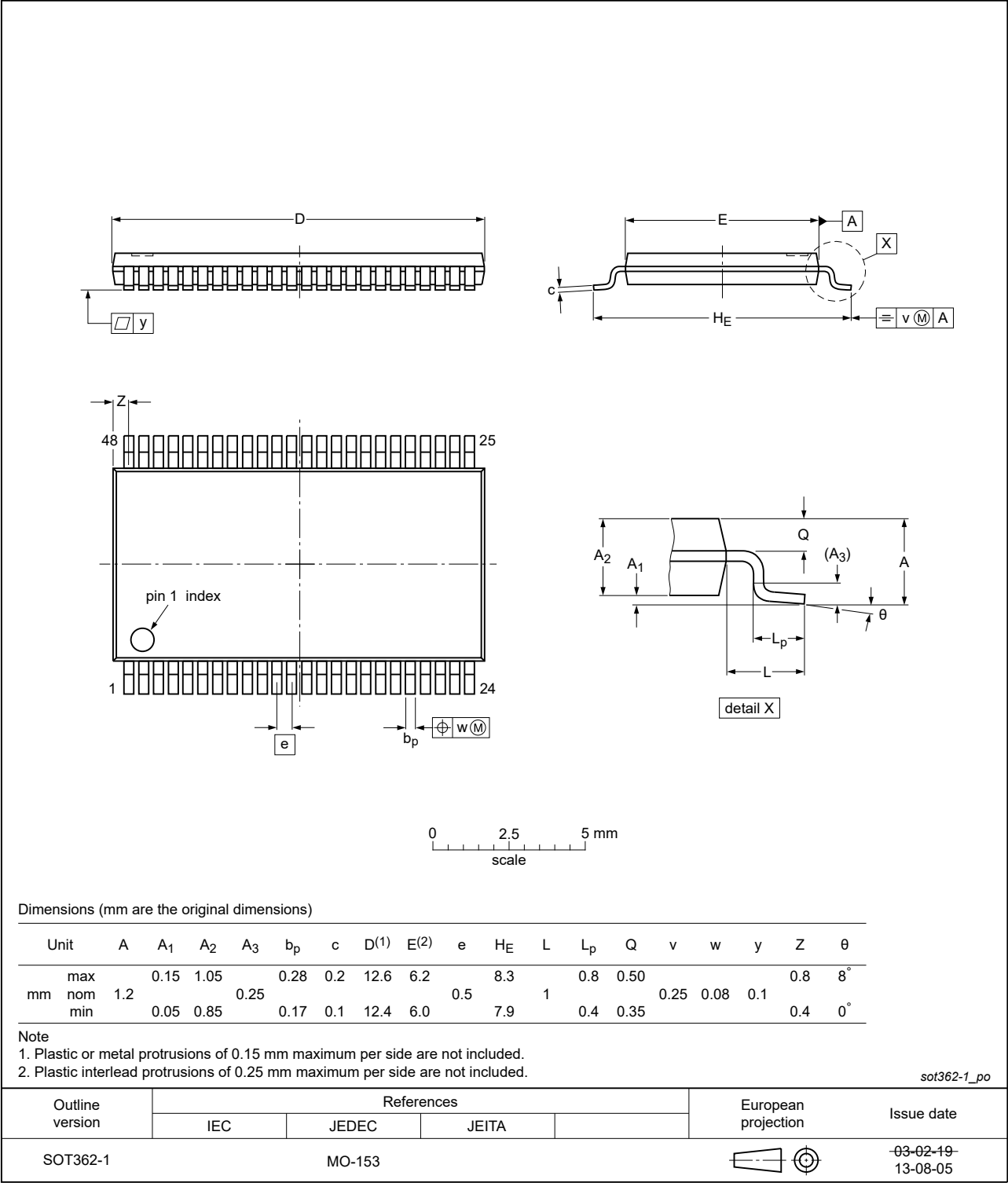


Fig. 8. Package outline SOT362-1 (TSSOP48)

12. Abbreviations

Table 9. Abbreviations

Acronym	Description
BiCMOS	Bipolar Complementary Metal Oxide Semiconductor
CDM	Charged Device Model
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
74ABT162244 v.7	20210702	Product data sheet	-	74ABT162244 v.6
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. Fig. 8: Package outline drawing SOT362-1 (TSSOP48) updated. - Type number 74ABT162244DL (SOT370-1/SSOP48) removed. Section 1 and Section 2 updated.			
74ABT162244 v.6	20111103	Product data sheet	-	74ABT162244 v.5
Modifications:	Legal pages updated			
74ABT162244 v.5	20100525	Product data sheet	-	74ABT162244 v.4
74ABT162244 v.4	20090409	Product data sheet	-	74ABT_H162244 v.3
74ABT_H162244 v.3	19981022	Product specification	-	74ABT_H162244 v.2
74ABT_H162244 v.2	19980225	Product specification	-	74ABT_H162244 v.1
74ABT_H162244 v.1	19961023	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>.

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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.....	9
13. Revision history.....	9
14. Legal information.....	10

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Date of release: 2 July 2021