

# 74LVT2244

3.3 V octal buffer/line driver with 30  $\Omega$  termination resistors;  
3-state

Rev. 4 — 17 May 2021

Product data sheet

## 1. General description

The 74LVT2244 is an 8-bit buffer/line driver with 3-state outputs. The device can be used as two 4-bit buffers or one 8-bit buffer. The device features two output enables (1 $\overline{OE}$  and 2 $\overline{OE}$ ), each controlling four of the 3-state outputs. A HIGH on n $\overline{OE}$  causes the outputs to assume a high-impedance OFF-state. Bus hold data inputs eliminate the need for external pull-up resistors to define unused inputs

The 74LVT2244 is designed with 30  $\Omega$  series resistance in both the HIGH and LOW states of the output. This design reduces line noise in applications such as memory address drivers, clock drivers, and bus receivers/transmitters.

## 2. Features and benefits

- Octal bus interface
- 3-state buffers
- Wide supply voltage range from 2.7 to 3.6 V
- Overvoltage tolerant inputs to 5.5 V
- BiCMOS high speed and output drive
- Output capability: +12 mA and -12 mA
- Direct interface with TTL levels
- No bus current loading when output is tied to 5 V bus
- Bus hold on data inputs
- Power-up 3-state
- I<sub>OFF</sub> circuitry provides partial Power-down mode operation
- Live insertion and extraction permitted
- Latch-up performance exceeds 500 mA per JESD 78 Class II Level B
- ESD protection:
  - HBM JESD22-A114E exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V

## 3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74LVT2244D	-40 °C to +85 °C	SO20	plastic small outline package; 20 leads; body width 7.5 mm	SOT163-1
74LVT2244PW	-40 °C to +85 °C	TSSOP20	plastic thin shrink small outline package; 20 leads; body width 4.4 mm	SOT360-1

### 4. Functional diagram

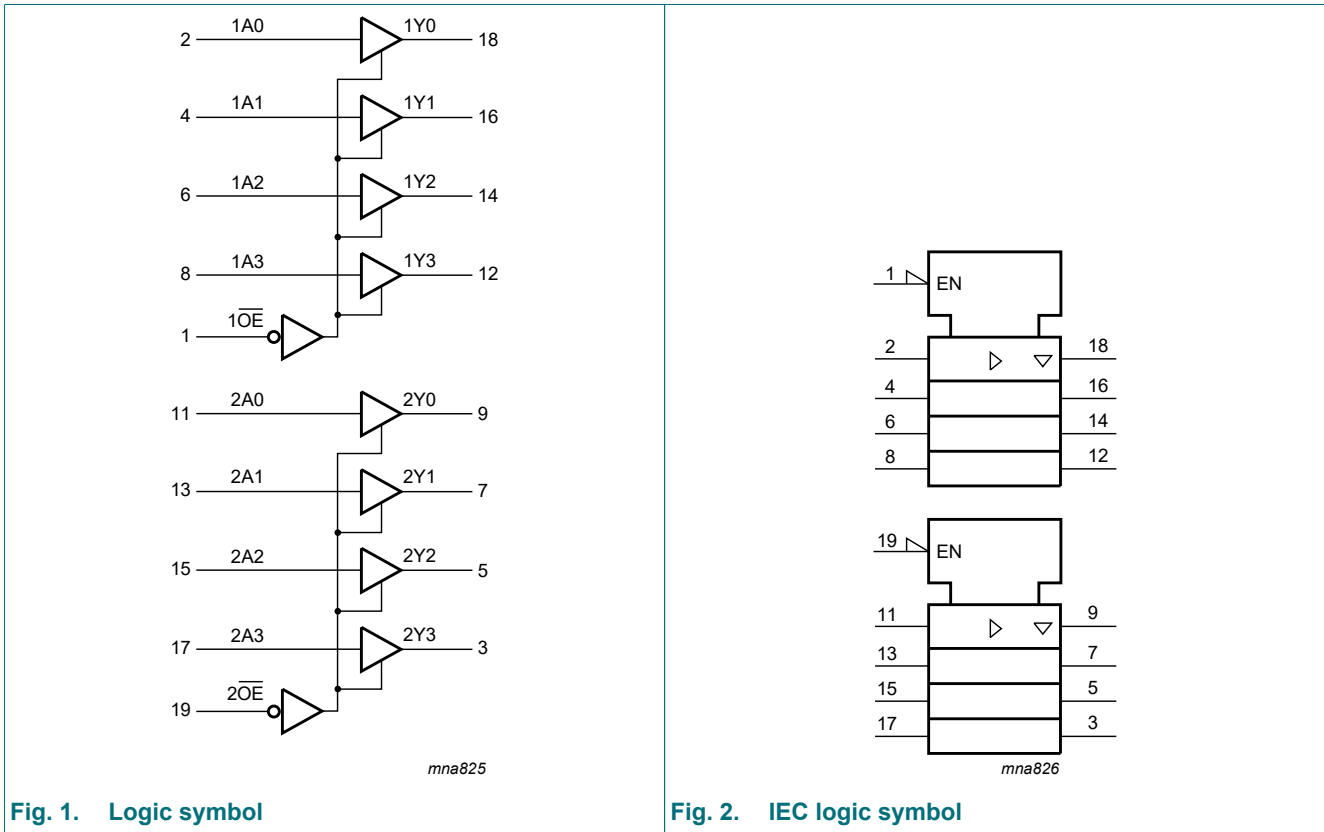


Fig. 1. Logic symbol

Fig. 2. IEC logic symbol

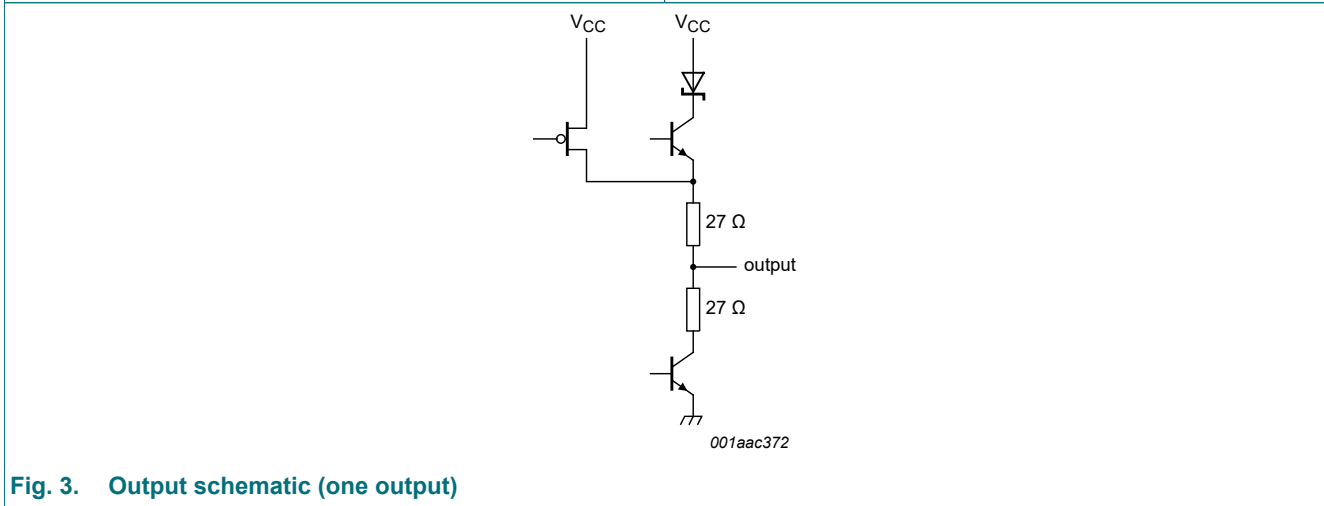


Fig. 3. Output schematic (one output)

## 5. Pinning information

### 5.1. Pinning

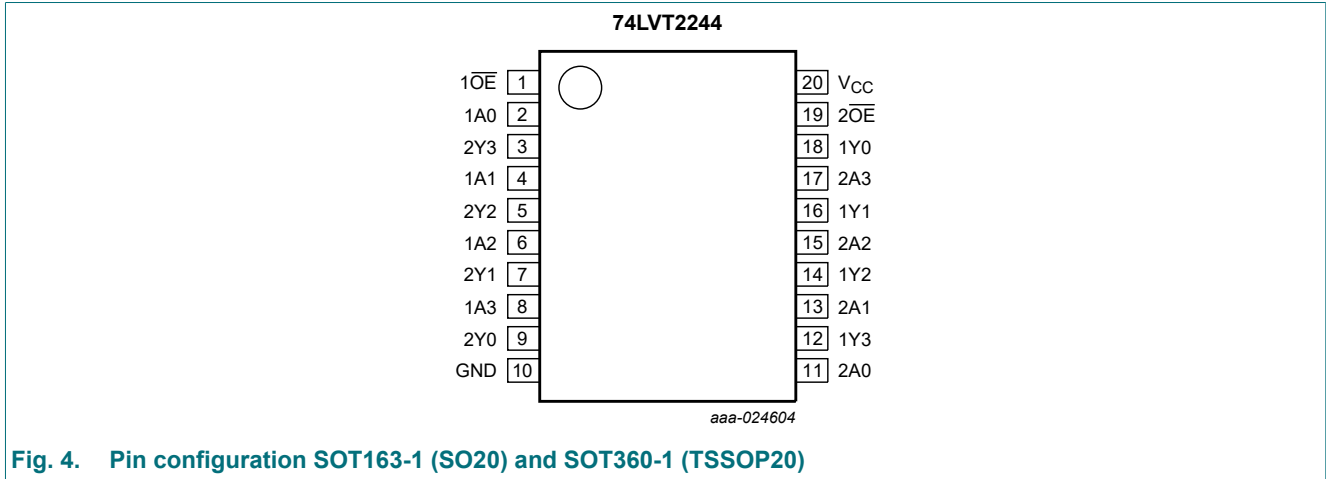


Fig. 4. Pin configuration SOT163-1 (SO20) and SOT360-1 (TSSOP20)

### 5.2. Pin description

Table 2. Pin description

Symbol	Pin	Description
1OE, 2OE	1, 19	output enable input (active low)
1A0, 1A1, 1A2, 1A3	2, 4, 6, 8	data input
2Y0, 2Y1, 2Y2, 2Y3	9, 7, 5, 3	data output
GND	10	ground (0 V)
2A0, 2A1, 2A2, 2A3	11, 13, 15, 17	data input
1Y0, 1Y1, 1Y2, 1Y3,	18, 16, 14, 12	data output
V <sub>CC</sub>	20	supply voltage

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

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		-0.5	+4.6	V
$V_I$	input voltage	[1]	-0.5	+7.0	V
$V_O$	output voltage	output in OFF-state or HIGH-state [1]	-0.5	+7.0	V
$I_{IK}$	input clamping current	$V_I < 0$ V	-50	-	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
$T_{stg}$	storage temperature		-65	+150	$^{\circ}$ C
$T_j$	junction temperature	[2]	-	+150	$^{\circ}$ C
$P_{tot}$	total power dissipation	$T_{amb} = -40$ to $+85$ $^{\circ}$ C		500	mW

[1] The input and output negative voltage ratings may be exceeded if the input and output clamp 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. The maximum junction temperature of this integrated circuit should not exceed 150  $^{\circ}$ C.

## 8. Recommended operating conditions

**Table 5. Operating conditions**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CC}$	supply voltage		2.7	-	3.6	V
$V_I$	input voltage		0	-	5.5	V
$I_{OH}$	HIGH-level output current		-	-	-12	mA
$I_{OL}$	LOW-level output current		-	-	12	mA
$T_{amb}$	ambient temperature	in free-air	-40	-	+85	$^{\circ}$ C
$\Delta t/\Delta V$	input transition rise and fall rate	outputs enabled	-	-	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	T <sub>amb</sub> = -40 °C to +85 °C			Unit
			Min	Typ [1]	Max	
V <sub>IK</sub>	input clamping voltage	V <sub>CC</sub> = 2.7 V; I <sub>IK</sub> = -18 mA	-1.2	-0.9	-	V
V <sub>IH</sub>	HIGH-level input voltage		2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage		-	-	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>CC</sub> = 3.0 V; I <sub>OH</sub> = -12 mA	2.0	2.5	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>CC</sub> = 3.0 V; I <sub>OL</sub> = 12 mA	-	-	0.8	V
I <sub>I</sub>	input leakage current	all input pins				
		V <sub>CC</sub> = 0 V or 3.6 V; V <sub>I</sub> = 5.5 V	-	1	10	μA
		control pins				
		V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = V <sub>CC</sub> or GND	-	±0.1	±1	μA
		data pins [2]				
		V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = V <sub>CC</sub> V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = 0 V	-	0.1	1	μA
I <sub>OFF</sub>	power-off leakage current	V <sub>CC</sub> = 0 V; V <sub>I</sub> or V <sub>O</sub> = 0 V to 4.5 V	-	1	±100	μA
I <sub>BHL</sub>	bus hold LOW current	V <sub>CC</sub> = 3 V; V <sub>I</sub> = 0.8 V [3]	75	150	-	μA
I <sub>BHH</sub>	bus hold HIGH current	V <sub>CC</sub> = 3 V; V <sub>I</sub> = 2.0 V	-	-150	-75	μA
I <sub>BHLO</sub>	bus hold LOW overdrive current	nAn input; V <sub>CC</sub> = 0 V to 3.6 V; V <sub>I</sub> = 3.6 V	500	-	-	μA
I <sub>BHHO</sub>	bus hold HIGH overdrive current	nAn input; V <sub>CC</sub> = 0 V to 3.6 V; V <sub>I</sub> = 3.6 V	-	-	-500	μA
I <sub>EX</sub>	external current	nYn output in HIGH-state when V <sub>O</sub> > V <sub>CC</sub> ; V <sub>O</sub> = 5.5 V; V <sub>CC</sub> = 3.0 V	-	60	125	μA
I <sub>O(pu/pd)</sub>	power-up/power-down output current	V <sub>CC</sub> ≤ 1.2 V; V <sub>O</sub> = 0.5 V to V <sub>CC</sub> ; V <sub>I</sub> = GND or V <sub>CC</sub> ; nOE = don't care [4]	-	±1	±100	μA
I <sub>OZ</sub>	OFF-state output current	V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		V <sub>O</sub> = 3.0 V	-	1	5	μA
		V <sub>O</sub> = 0.5 V	-5	-1	-	μA
I <sub>CC</sub>	supply current	V <sub>CC</sub> = 3.6 V; V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A				
		output HIGH	-	0.12	0.19	mA
		output LOW	-	3	12	mA
		outputs disabled [5]	-	0.12	0.19	mA
ΔI <sub>CC</sub>	additional supply current	per input pin; V <sub>CC</sub> = 3.0 V to 3.6 V; one input at V <sub>CC</sub> - 0.6 V and other inputs at V <sub>CC</sub> or GND [6]	-	0.1	0.2	mA
C <sub>I</sub>	input capacitance	V <sub>I</sub> = 0 V or 3.0 V	-	4	-	pF
C <sub>O</sub>	output capacitance	outputs disabled; V <sub>O</sub> = 0 V or 3.0 V	-	7	-	pF

[1] All typical values are at T<sub>amb</sub> = 25 °C.

[2] Unused pins at V<sub>CC</sub> or GND.

[3] This is the bus hold overdrive current required to force the input to the opposite logic state.

[4] This parameter is valid for any V<sub>CC</sub> between 0 V and 1.2 V with a transition time of up to 10 ms. From V<sub>CC</sub> = 1.2 V to V<sub>CC</sub> = 3.3 V ± 0.3 V a transition time of 100 μs is permitted. This parameter is valid for T<sub>amb</sub> = 25 °C only.

[5] I<sub>CC</sub> is measured with outputs pulled to V<sub>CC</sub> or GND.

[6] This is the increase in supply current for each input at the specified voltage level other than V<sub>CC</sub> or GND.

## 10. Dynamic characteristics

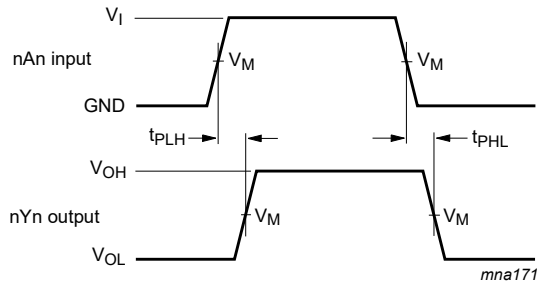
**Table 7. Dynamic characteristics**

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

Symbol	Parameter	Conditions	$T_{amb} = -40\text{ }^{\circ}\text{C to }+85\text{ }^{\circ}\text{C}$			Unit
			Min	Typ [1]	Max	
$t_{PLH}$	LOW to HIGH propagation delay	$nA_n$ to $nY_n$ ; see Fig. 5				
		$V_{CC} = 2.7\text{ V}$	-	-	5.3	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1	2.9	4.4	ns
$t_{PHL}$	HIGH to LOW propagation delay	$nA_n$ to $nY_n$ ; see Fig. 5				
		$V_{CC} = 2.7\text{ V}$	-	-	4.4	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1	2.9	4.1	ns
$t_{PZH}$	OFF-state to HIGH propagation delay	$n\overline{OE}$ to $nY_n$ ; see Fig. 6				
		$V_{CC} = 2.7\text{ V}$	-	-	7.7	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1	3.7	5.9	ns
$t_{PZL}$	OFF-state to LOW propagation delay	$n\overline{OE}$ to $nY_n$ ; see Fig. 6				
		$V_{CC} = 2.7\text{ V}$	-	-	6.2	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.1	3.7	5.5	ns
$t_{PHZ}$	HIGH to OFF-state propagation delay	$n\overline{OE}$ to $nY_n$ ; see Fig. 6				
		$V_{CC} = 2.7\text{ V}$	-	-	6.8	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.9	4.3	6.1	ns
$t_{PLZ}$	LOW to OFF-state propagation delay	$n\overline{OE}$ to $nY_n$ ; see Fig. 6				
		$V_{CC} = 2.7\text{ V}$	-	-	4.5	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.8	3.3	4.5	ns

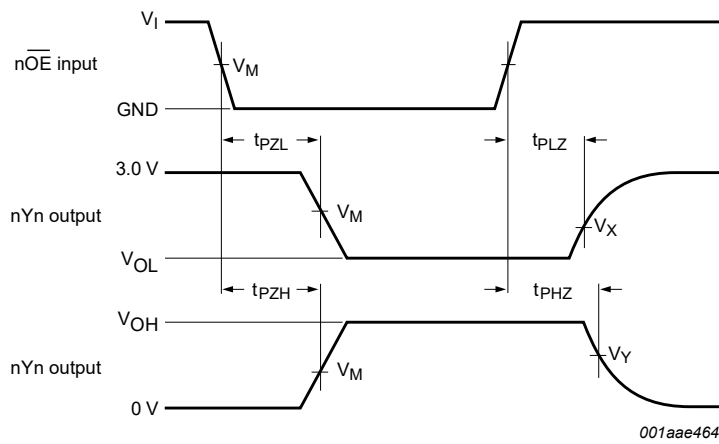
[1] All typical values are at  $V_{CC} = 3.3\text{ V}$  and  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .

10.1. Waveforms and test circuit



Measurement points are given in [Table 8](#).  
 $V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

**Fig. 5. Propagation delay input (nAn) to output (nYn) propagation delays**



Measurement points are given in [Table 8](#).  
 $V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

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

**Table 8. Measurement points**

Input	Output		
$V_M$	$V_M$	$V_X$	$V_Y$
1.5 V	1.5 V	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$

3.3 V octal buffer/line driver with 30 Ω termination resistors; 3-state

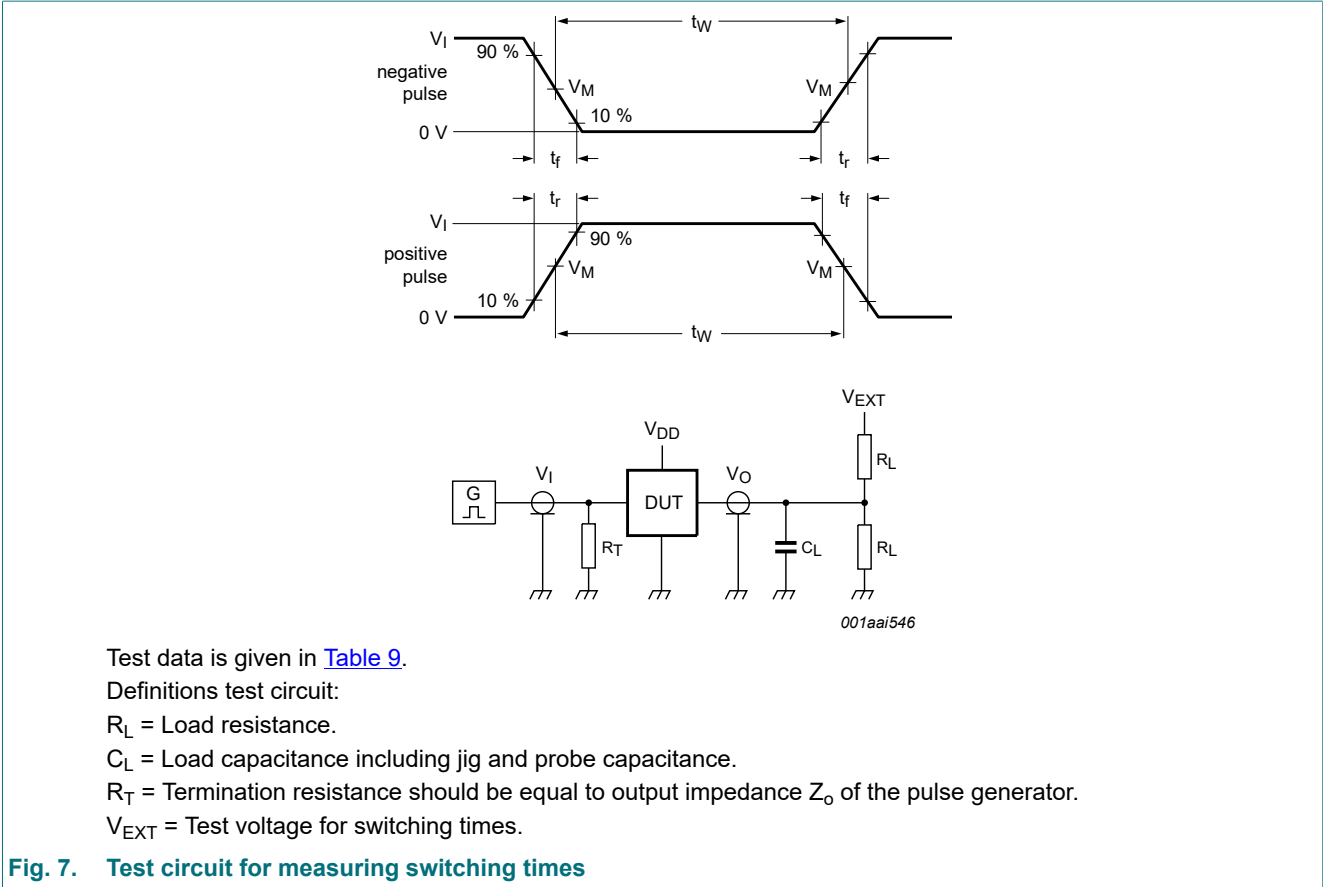


Table 9. Test data

Input				Load		$V_{EXT}$		
$V_I$	$f_i$	$t_W$	$t_r, t_f$	$C_L$	$R_L$	$t_{PHZ}, t_{PZH}$	$t_{PLZ}, t_{PZL}$	$t_{PLH}, t_{PHL}$
2.7 V	$\leq 10$ MHz	500 ns	$\leq 2.5$ ns	50 pF	500 Ω	GND	6 V	open



### 11. Package outline

SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1



Fig. 8. Package outline SOT163-1 (SO20)

TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm

SOT360-1

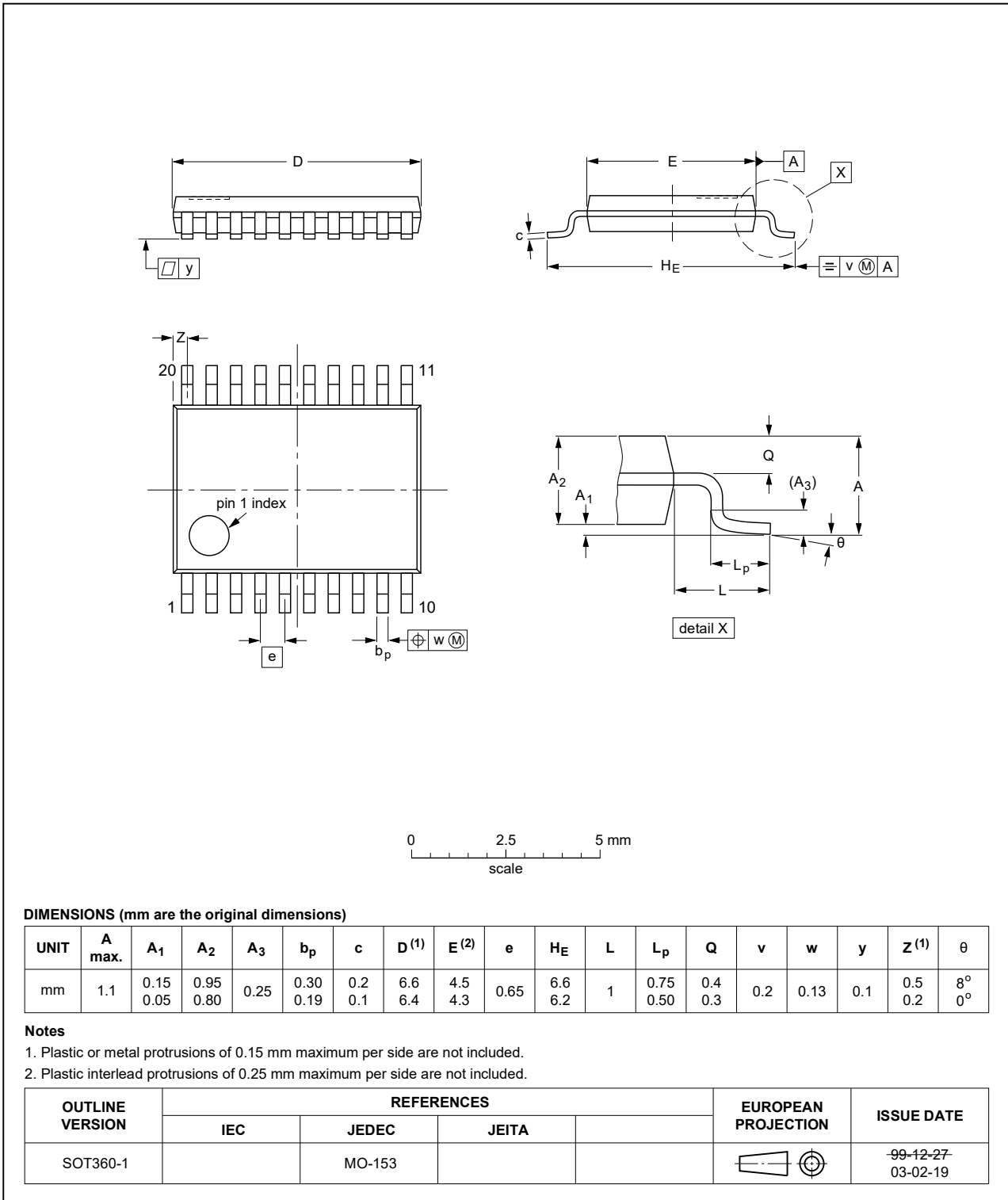


Fig. 9. Package outline SOT360-1 (TSSOP20)

## 12. Abbreviations

Table 10. Abbreviations

Acronym	Description
BiCMOS	Bipolar Complementary Metal Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
MM	Machine Model
TTL	Transistor-Transistor Logic

## 13. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVT2244 v.4	20210517	Product data sheet	-	74LVT2244 v.3
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>Type number 74LVT2244DB (SOT339-1 / SSOP20) removed.</li> <li><a href="#">Section 1</a> and <a href="#">Section 2</a> updated.</li> <li><a href="#">Section 7</a>: Derating values for <math>P_{tot}</math> total power dissipation removed (errata).</li> </ul>			
74LVT2244 v.3	20160901	Product data sheet	-	74LVT2244 v.2
Modifications:	<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul>			
74LVT2244 v.2	19980219	Product specification	-	74LVT2244 v.1
74LVT2244 v.1	19960828	Product specification	-	-

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### 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.
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