74ABT244

Octal buffer/line driver; 3-state

Rev. 3 — 6 October 2017 Product data sheet

1 General description

The 74ABT244 high-performance BiCMOS device combines low static and dynamic power dissipation with high speed and high output drive.

The 74ABT244 device is an octal buffer that is ideal for driving bus lines. The device features two output enables ($1\overline{OE}$ and $2\overline{OE}$), each controlling four of the 3-state outputs.

2 Features and benefits

- Octal bus interface
- 3-State buffers
- Output capability: +64 mA/–32 mA
- Power-up 3-State
- Live insertion capability
- Inputs are disabled during 3-state mode
- Latch-up protection exceeds 500 mA per JESD78 class II level A
- ESD protection:
  - HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V
- Specified from -40 °C to +85 °C

3 Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74ABT244D	-40 °C to +85 °C	SO20	plastic small outline package; 20 leads; body width 7.5 mm	SOT163-1
74ABT244DB	-40 °C to +85 °C	SSOP20	plastic shrink small outline package; 20 leads; body width 5.3 mm	SOT339-1
74ABT244PW	-40 °C to +85 °C	TSSOP20	plastic thin shrink small outline package; 20 leads; body width 4.4 mm	SOT360-1

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4 Functional diagram

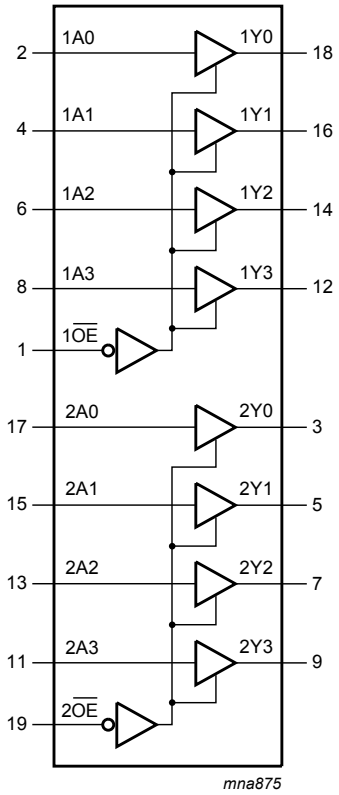


Figure 1. Logic symbol

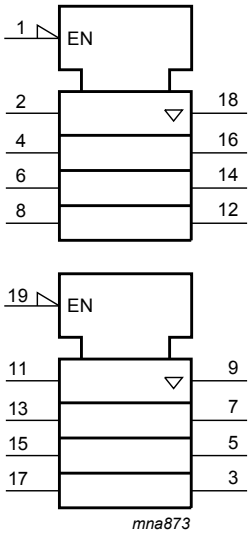


Figure 2. IEC logic symbol

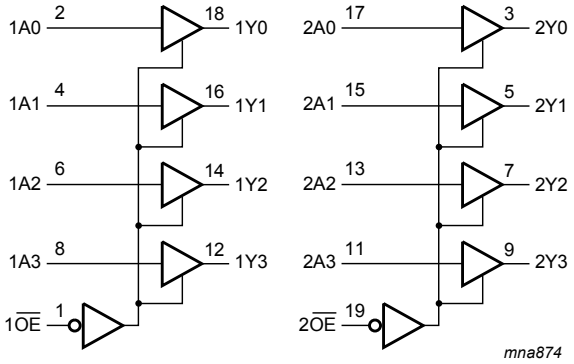


Figure 3. Functional diagram

5 Pinning information

5.1 Pinning

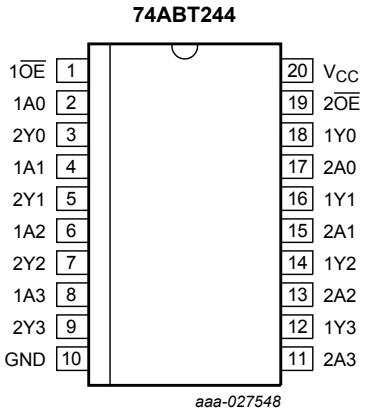


Figure 4. Pin configuration for SO20

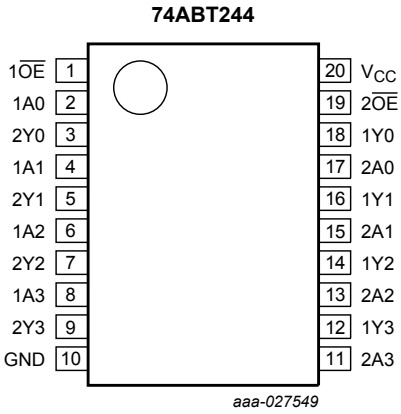


Figure 5. Pin configuration for (T)SSOP20

5.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
1A0, 1A1, 1A2, 1A3	2, 4, 6, 8	data input
1Y0, 1Y1, 1Y2, 1Y3	18, 16, 14, 12	data output
2A0, 2A1, 2A2, 2A3	17, 15, 13, 11	data input
2Y0, 2Y1, 2Y2, 2Y3	3, 5, 7, 9	data output
$1\overline{OE}$, $2\overline{OE}$	1, 19	output enable input (active LOW)
GND	10	ground (0 V)
V_{CC}	20	supply voltage

6 Functional description

Table 3. Function table [1]

Input		Output
$n\overline{OE}$	nAn	nYn
L	L	L
L	H	H
H	X	Z

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

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	+7.0	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
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. The maximum junction temperature of this integrated circuit should not exceed 150 °C.

8 Recommended operating conditions

Table 5. Operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CC}	supply voltage		4.5	-	5.5	V
V_I	input voltage		0	-	V_{CC}	V
I_{OH}	HIGH-level output current		-32	-	-	mA
I_{OL}	LOW-level output current		-	-	64	mA
$\Delta t/\Delta V$	input transition rise and fall rate		0	-	5	ns/V
T_{amb}	ambient temperature	in free air	-40	-	+85	°C

9 Static characteristics

Table 6. Static characteristics

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

Symbol	Parameter	Conditions	T_{amb} = 25 °C			T_{amb} = −45 °C to +85 °C		Unit
			Min	Typ	Max	Min	Max	
V_{IK}	input clamping voltage	V_{CC} = 4.5 V; I_{IK} = -18 mA	-1.2	-0.9	-	-1.2	-	V
V_{IH}	HIGH-level input voltage		2.0	-	-	2.0	-	V
V_{IL}	LOW-level input voltage		-	-	0.8	-	0.8	V
V_{OH}	HIGH-level output voltage	V_{CC} = 4.5 V; V_I = V_{IL} or V_{IH}						
		I_{OH} = -3 mA	2.5	2.9	-	2.5	-	V
		I_{OH} = -32 mA	2.0	2.4	-	2.0	-	V
		V_{CC} = 5.0 V; V_I = V_{IL} or V_{IH}						
		I_{OH} = -3 mA	3.0	3.4	-	3.0	-	V
V_{OL}	LOW-level output voltage	V_{CC} = 4.5 V; V_I = V_{IL} or V_{IH}; I_{OL} = 64 mA	-	0.42	0.55	-	0.55	V
I_I	input leakage current	V_{CC} = 5.5 V; V_I = GND or 5.5 V	-	±0.01	±1.0	-	±1.0	µA
I_{OFF}	power-off leakage current	V_{CC} = 0 V; V_O or V_I ≤ 4.5 V	-	±5.0	±100	-	±100	µA
$I_{O(pu/pd)}$	power-up/ power-down output current	V_{CC} = 2.0 V; V_O = 0.5 V; V_I = GND or V_{CC}; n$\overline{OE}$ = don't care [1]	-	±5.0	±50	-	±50	µA
I_{OZ}	OFF-state output current	V_{CC} = 5.5 V; V_I = V_{IL} or V_{IH}						
		output HIGH-state at V_O = 2.7 V	-	5.0	50	-	50	µA
		output LOW-state at V_O = 0.5 V	-	-5.0	-50	-	-50	µA
I_{CEX}	output high leakage current	V_{CC} = 5.5 V; V_O = 5.5 V; V_I = GND or V_{CC}	-	5.0	50	-	50	µA
I_O	output current	V_{CC} = 5.5 V; V_O = 2.5 V [2]	-40	-100	-180	-40	-180	mA
I_{CC}	supply current	V_{CC} = 5.5 V; V_I = GND or V_{CC}						
		outputs HIGH-state	-	50	250	-	250	µA
		outputs LOW-state	-	24	30	-	30	mA
		outputs disabled	-	50	250	-	250	µA

Symbol	Parameter	Conditions	T_{amb} = 25 °C			T_{amb} = −45 °C to +85 °C		Unit
			Min	Typ	Max	Min	Max	
ΔI_{CC}	additional supply current	per input pin; V_{CC} = 5.5 V						
		outputs enabled; one data input at 3.4 V and other inputs at V_{CC} or GND [3]	-	0.5	1.5	-	1.5	mA
		outputs disabled; one data input at 3.4 V and other inputs at V_{CC} or GND [3]	-	50	250	-	250	µA
		outputs disabled; one enable input at 3.4 V and other inputs at V_{CC} or GND [3]	-	0.5	1.5	-	1.5	mA
C_I	input capacitance	V_I = 0 V or V_{CC}	-	4	-	-	-	pF
C_O	output capacitance	outputs disabled; V_O = 0 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 V to V_{CC} = 5 V ± 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.

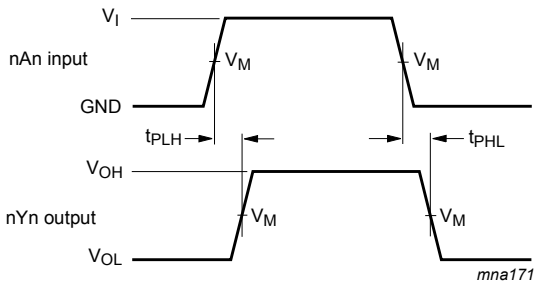
10 Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 8.

Symbol	Parameter	Conditions	T_{amb} = 25 °C; V_{CC} = 5.0 V			T_{amb} = −40 °C to 85 °C; V_{CC} = 5.0 V ± 0.5 V		Unit
			Min	Typ	Max	Min	Max	
t_{PLH}	LOW to HIGH propagation delay	nAn to nYn; see Figure 6	1.0	2.6	4.1	1.0	4.6	ns
t_{PHL}	HIGH to LOW propagation delay	nAn to nYn; see Figure 6	1.0	2.9	4.2	1.0	4.6	ns
t_{PZH}	OFF-state to HIGH propagation delay	$n\overline{OE}$ to nYn; see Figure 7	1.1	3.1	4.6	1.1	5.1	ns
t_{PZL}	OFF-state to LOW propagation delay	$n\overline{OE}$ to nYn; see Figure 7	2.1	4.1	5.6	2.1	6.1	ns
t_{PHZ}	HIGH to OFF-state propagation delay	$n\overline{OE}$ to nYn; see Figure 7	2.1	4.1	5.6	2.1	6.6	ns
t_{PLZ}	LOW to OFF-state propagation delay	$n\overline{OE}$ to nYn; see Figure 7	1.7	2.7	5.2	1.7	5.7	ns

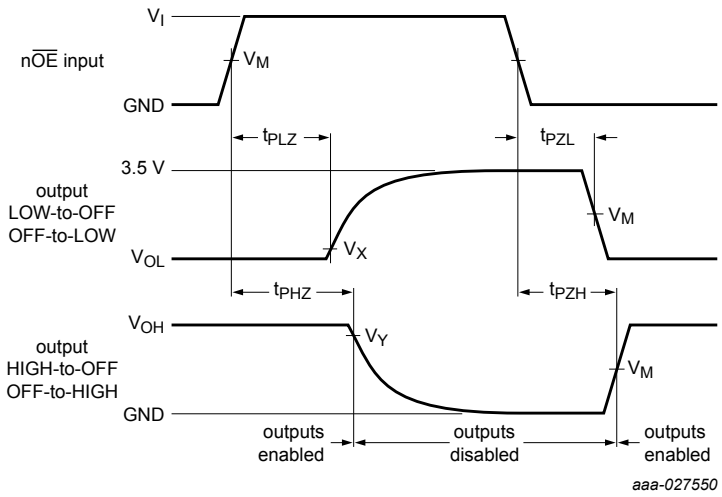
10.1 Waveforms and test circuit



Measurement points are given in Table 8.

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

Figure 6. Input (nAn) to output (nYn) propagation delays



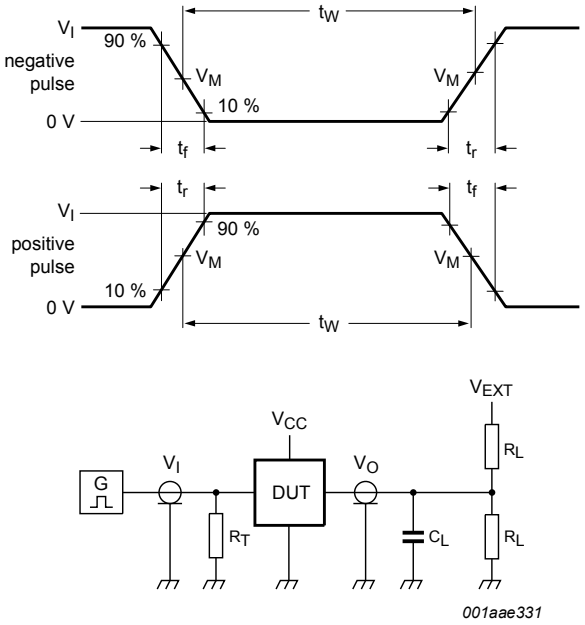
Measurement points are given in Table 8.

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

Figure 7. 3-state enable and disable propagation delays

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



Test data is given in Table 9.

Definitions 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.

V_{EXT} = Test voltage for switching times.

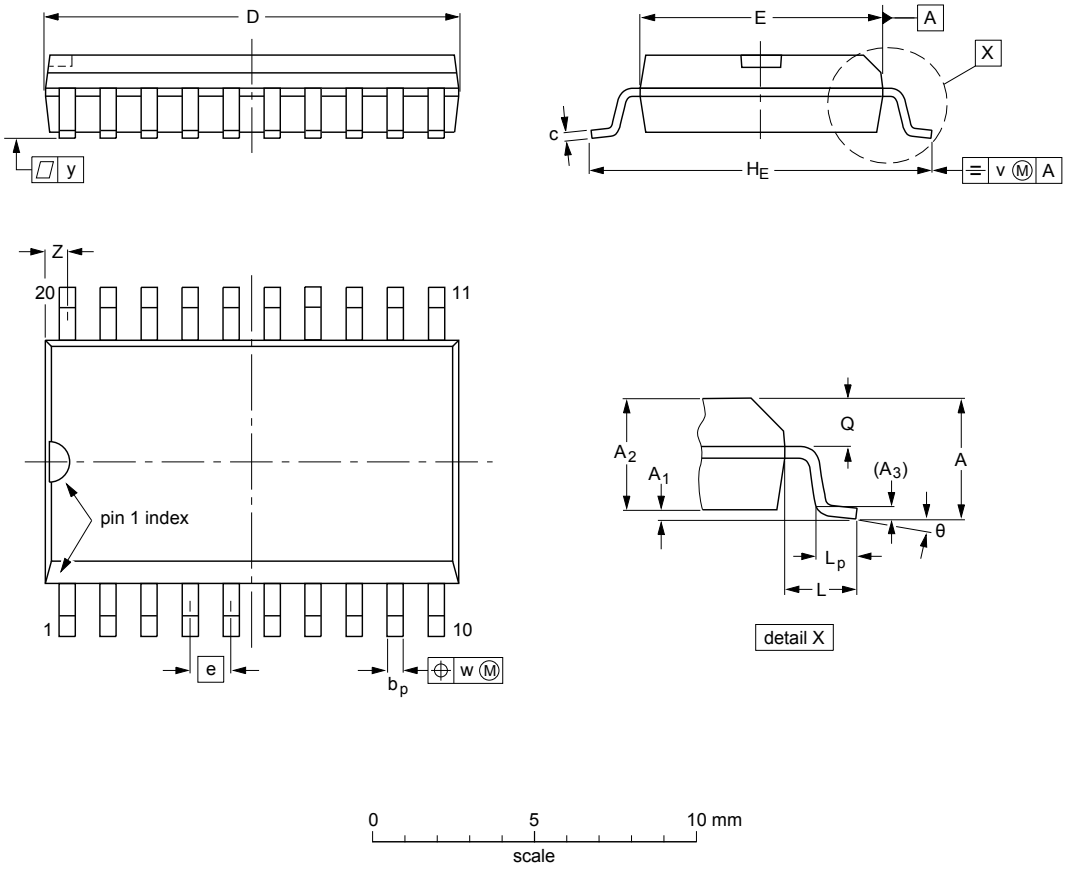
Figure 8. Test circuit for measuring switching times

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}
3.0 V	≤ 1 MHz	500 ns	≤ 2.5 ns	50 pF	500 Ω	open	7 V	open

11 Package outline

SO20: plastic small outline package; 20 leads; body width 7.5 mm **SOT163-1**



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	D (1)	E (1)	e	H_E	L	L_p	Q	v	w	y	Z (1)	θ
mm	2.65	0.3 0.1	2.45 2.25	0.25	0.49 0.36	0.32 0.23	13.0 12.6	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8° 0°
inches	0.1	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.51 0.49	0.30 0.29	0.05	0.419 0.394	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	

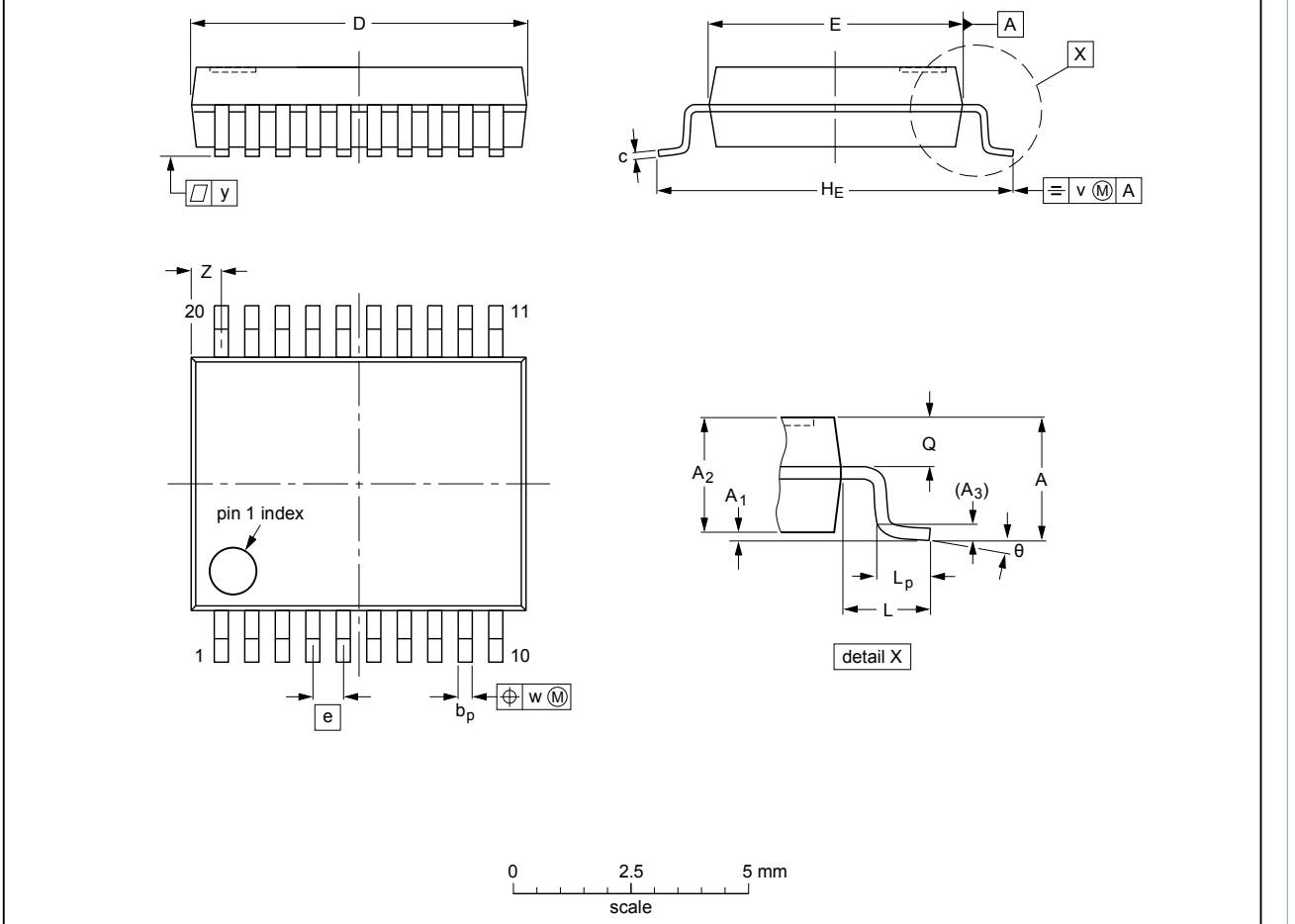
Note

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT163-1	075E04	MS-013				~~99-12-27~~ 03-02-19

Figure 9. Package outline SOT163-1 (SO20)

SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm **SOT339-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(1)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	2	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	7.4 7.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	0.9 0.5	8^o 0^o

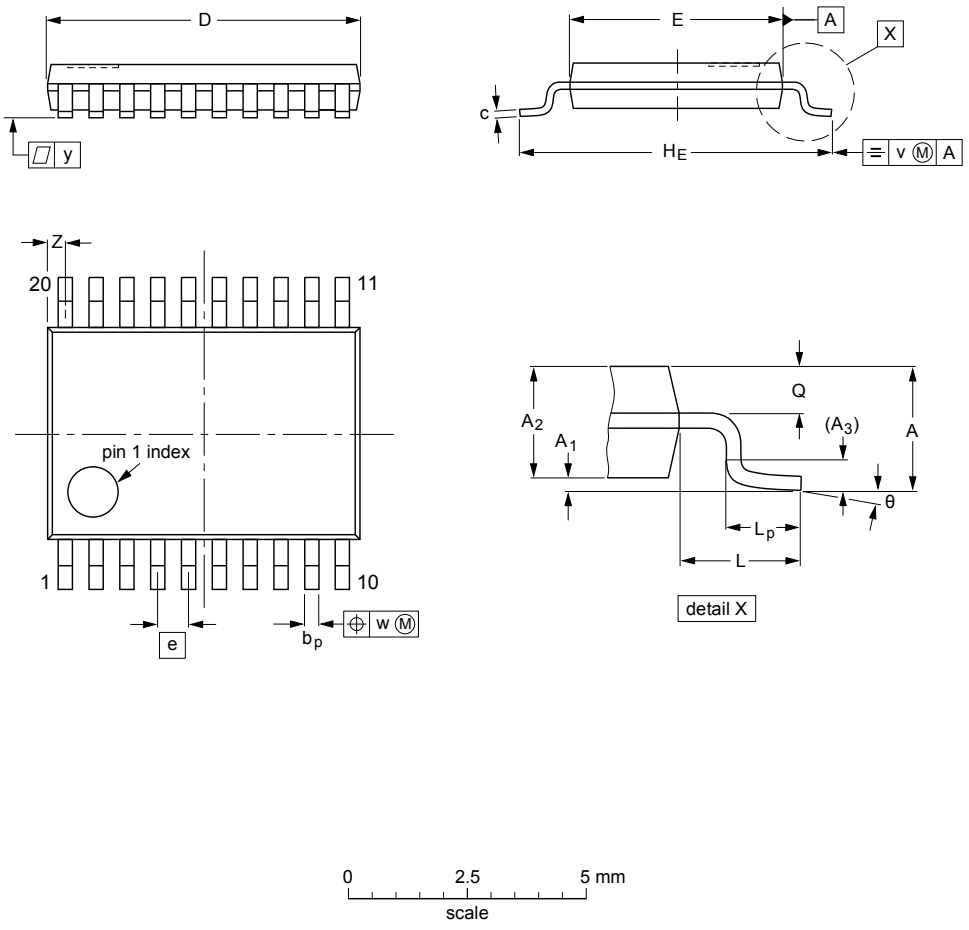
Note

1. Plastic or metal protrusions of 0.2 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT339-1		MO-150				~~99-12-27~~ 03-02-19

Figure 10. Package outline SOT339-1 (SSOP20)

TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm **SOT360-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	D (1)	E (2)	e	H_E	L	L_p	Q	v	w	y	Z (1)	θ
mm	1.1	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	6.6 6.4	4.5 4.3	0.65	6.6 6.2	1	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.5 0.2	8^o 0^o

Notes

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT360-1		MO-153				~~99-12-27~~ 03-02-19

Figure 11. 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
MIL	Military
MM	Machine Model

13 Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74ABT244 v.3	20171006	Product data sheet	-	74ABT244 v.2
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. • Type number 74ABT244N removed from data sheet.			
74ABT244 v.2	19980116	Product specification	-	74ABT244 v.1
74ABT244 v.1	19950906	Product specification	-	-

14 Legal information

14.1 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".
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