74AHC244; 74AHCT244

Octal buffer/line driver; 3-state

Rev. 04 — 10 February 2006 Product data sheet

1. General description

The 74AHC244; 74AHCT244 is a high-speed Si-gate CMOS device.

The 74AHC244; 74AHCT244 has octal non-inverting buffer/line drivers with 3-state outputs. The 3-state outputs are controlled by the output enable inputs ($n\overline{OE}$). A HIGH on $n\overline{OE}$ causes the outputs to assume a high-impedance OFF-state.

2. Features

- Balanced propagation delays
- All inputs have a Schmitt-trigger action
- Inputs accepts voltages higher than V_{CC}
- For 74AHC244 only: operates with CMOS input levels
- For 74AHCT244 only: operates with TTL input levels
- ESD protection:
  - HBM EIA/JESD22-A114-C exceeds 2000 V
  - MM EIA/JESD22-A115-A exceeds 200 V
  - CDM EIA/JESD22-C101 exceeds 1000 V
- Multiple package options
- Specified from –40 °C to +85 °C and from –40 °C to +125 °C

3. Quick reference data

Table 1: Quick reference data

GND = 0 V; T_{amb} = 25 °C; $t_r = t_f$ = ≤ 3.0 ns.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
74AHC244							
t_{PHL}, t_{PLH}	propagation delay nAn to nYn	V_{CC} = 5 V; C_L = 15 pF		-	3.4	5.5	ns
C_i	input capacitance			-	3	10	pF
C_o	output capacitance			-	4.0	-	pF
C_{PD}	power dissipation capacitance	V_I = GND to V_{CC}; C_L = 50 pF; f_i = 1 MHz	[1]	-	10	-	pF

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Table 1: Quick reference data *...continued*

GND = 0 V; T_{amb} = 25 °C; $t_r = t_f$ = ≤ 3.0 ns.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
74AHCT244							
t_{PHL}, t_{PLH}	propagation delay nAn to nYn	V_{CC} = 5 V; C_L = 15 pF		-	3.5	7.4	ns
C_i	input capacitance			-	3	10	pF
C_o	output capacitance			-	4.0	-	pF
C_{PD}	power dissipation capacitance	V_I = GND to V_{CC}; C_L = 50 pF; f_i = 1 MHz	[1]	-	12	-	pF

[1] C_{PD} is used to determine the dynamic power dissipation (P_D 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_i = input frequency in MHz;
f_o = output frequency in MHz;
C_L = output load capacitance in pF;
V_{CC} = supply voltage in V.
N = number of inputs switching;
$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

4. Ordering information

Table 2: Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74AHC244				
74AHC244D	–40 °C to +125 °C	SO20	plastic small outline package; 20 leads; body width 7.5 mm	SOT163-1
74AHC244PW	–40 °C to +125 °C	TSSOP20	plastic thin shrink small outline package; 20 leads; body width 4.4 mm	SOT360-1
74AHCT244				
74AHCT244D	–40 °C to +125 °C	SO20	plastic small outline package; 20 leads; body width 7.5 mm	SOT163-1
74AHCT244PW	–40 °C to +125 °C	TSSOP20	plastic thin shrink small outline package; 20 leads; body width 4.4 mm	SOT360-1

5. Functional diagram

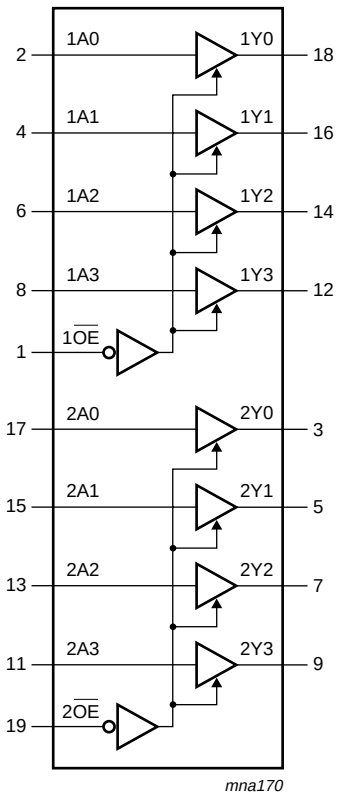


Fig 1. Functional diagram

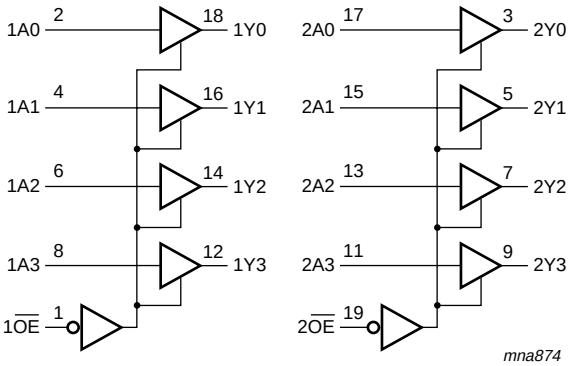


Fig 2. Logic symbol

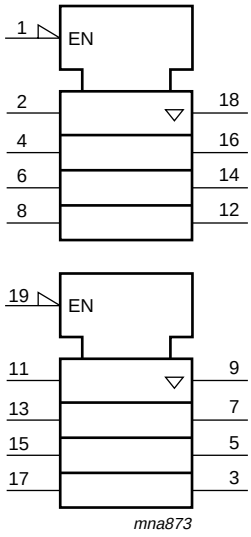


Fig 3. IEC logic symbol

6. Pinning information

6.1 Pinning

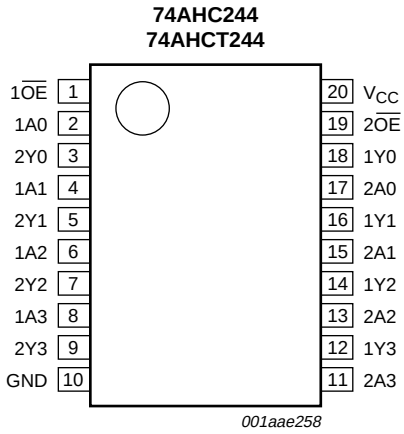


Fig 4. Pin configuration SO20 and TSSOP20

6.2 Pin description

Table 3: Pin description

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

7. Functional description

7.1 Function table

Table 4: Function table [1]

Control	Input	Output
$n\overline{OE}$	nAn	nYn
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.

8. 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_{CC}	supply voltage			–0.5	+7.0	V
V_I	input voltage			–0.5	+7.0	V
I_{IK}	input clamping current	$V_I < –0.5$ V	[1]	-	–20	mA
I_{OK}	output clamping current	$V_O < –0.5$ V or $V_O > V_{CC} + 0.5$ V	[1]	-	±20	mA
I_O	output current	V_O = –0.5 V to (V_{CC} + 0.5 V)		-	±25	mA
I_{CC}	quiescent supply current			-	75	mA
I_{GND}	ground current			-	–75	mA
T_{stg}	storage temperature			–65	+150	°C
P_{tot}	total power dissipation	T_{amb} = –40 °C to +125 °C				
	SO20 package		[2]	-	500	mW
	TSSOP20 package		[3]	-	500	mW

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

[2] P_{tot} derates linearly with 8 mW/K above 70 °C.

[3] P_{tot} derates linearly with 5.5 mW/K above 60 °C.

9. Recommended operating conditions

Table 6: Recommended operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
74AHC244						
V_{CC}	supply voltage		2.0	5.0	5.5	V
V_I	input voltage		0	-	5.5	V
V_O	output voltage		0	-	V_{CC}	V
T_{amb}	ambient temperature		–40	+25	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	V_{CC} = 3.3 V ± 0.3 V	-	-	100	ns/V
		V_{CC} = 5 V ± 0.5 V	-	-	20	ns/V
74AHCT244						
V_{CC}	supply voltage		4.5	5.0	5.5	V
V_I	input voltage		0	-	5.5	V
V_O	output voltage		0	-	V_{CC}	V
T_{amb}	ambient temperature		–40	+25	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	V_{CC} = 5 V ± 0.5 V	-	-	20	ns/V

10. Static characteristics

Table 7: Static characteristics 74AHC244

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = 25 °C						
V_{IH}	HIGH-state input voltage	V_{CC} = 2.0 V	1.5	-	-	V
		V_{CC} = 3.0 V	2.1	-	-	V
		V_{CC} = 5.5 V	3.85	-	-	V
V_{IL}	LOW-state input voltage	V_{CC} = 2.0 V	-	-	0.5	V
		V_{CC} = 3.0 V	-	-	0.9	V
		V_{CC} = 5.5 V	-	-	1.65	V
V_{OH}	HIGH-state output voltage	V_I = V_{IH} or V_{IL}				
		I_O = –50 µA; V_{CC} = 2.0 V	1.9	2.0	-	V
		I_O = –50 µA; V_{CC} = 3.0 V	2.9	3.0	-	V
		I_O = –50 µA; V_{CC} = 4.5 V	4.4	4.5	-	V
		I_O = –4.0 mA; V_{CC} = 3.0 V	2.58	-	-	V
		I_O = –8.0 mA; V_{CC} = 4.5 V	3.94	-	-	V
V_{OL}	LOW-state output voltage	V_I = V_{IH} or V_{IL}				
		I_O = 50 µA; V_{CC} = 2.0 V	-	0	0.1	V
		I_O = 50 µA; V_{CC} = 3.0 V	-	0	0.1	V
		I_O = 50 µA; V_{CC} = 4.5 V	-	0	0.1	V
		I_O = 4 mA; V_{CC} = 3.0 V	-	-	0.36	V
		I_O = 8 mA; V_{CC} = 4.5 V	-	-	0.36	V

Table 7: Static characteristics 74AHC244 *…continued*

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{LI}	input leakage current	$V_I = V_{CC}$ or GND; V_{CC} = 5.5 V	-	-	0.1	µA
I_{OZ}	OFF-state output current	$V_I = V_{IH}$ or V_{IL}; $V_O = V_{CC}$ or GND; V_{CC} = 5.5 V	-	-	±0.25	µA
I_{CC}	quiescent supply current	$V_I = V_{CC}$ or GND; I_O = 0 A; V_{CC} = 5.5 V	-	-	4.0	µA
C_i	input capacitance		-	3	10	pF
C_o	output capacitance		-	4.0	-	pF
T_{amb} = –40 °C to +85 °C						
V_{IH}	HIGH-state input voltage	V_{CC} = 2.0 V	1.5	-	-	V
		V_{CC} = 3.0 V	2.1	-	-	V
		V_{CC} = 5.5 V	3.85	-	-	V
V_{IL}	LOW-state input voltage	V_{CC} = 2.0 V	-	-	0.5	V
		V_{CC} = 3.0 V	-	-	0.9	V
		V_{CC} = 5.5 V	-	-	1.65	V
V_{OH}	HIGH-state output voltage	$V_I = V_{IH}$ or V_{IL}				
		I_O = –50 µA; V_{CC} = 2.0 V	1.9	-	-	V
		I_O = –50 µA; V_{CC} = 3.0 V	2.9	-	-	V
		I_O = –50 µA; V_{CC} = 4.5 V	4.4	-	-	V
		I_O = –4.0 mA; V_{CC} = 3.0 V	2.48	-	-	V
		I_O = –8.0 mA; V_{CC} = 4.5 V	3.8	-	-	V
V_{OL}	LOW-state output voltage	$V_I = V_{IH}$ or V_{IL}				
		I_O = 50 µA; V_{CC} = 2.0 V	-	-	0.1	V
		I_O = 50 µA; V_{CC} = 3.0 V	-	-	0.1	V
		I_O = 50 µA; V_{CC} = 4.5 V	-	-	0.1	V
		I_O = 4 mA; V_{CC} = 3.0 V	-	-	0.44	V
		I_O = 8 mA; V_{CC} = 4.5 V	-	-	0.44	V
I_{LI}	input leakage current	$V_I = V_{CC}$ or GND; V_{CC} = 5.5 V	-	-	1.0	µA
I_{OZ}	OFF-state output current	$V_I = V_{IH}$ or V_{IL}; $V_O = V_{CC}$ or GND; V_{CC} = 5.5 V	-	-	±2.5	µA
I_{CC}	quiescent supply current	$V_I = V_{CC}$ or GND; I_O = 0 A; V_{CC} = 5.5 V	-	-	40	µA
C_i	input capacitance		-	-	10	pF
T_{amb} = –40 °C to +125 °C						
V_{IH}	HIGH-state input voltage	V_{CC} = 2.0 V	1.5	-	-	V
		V_{CC} = 3.0 V	2.1	-	-	V
		V_{CC} = 5.5 V	3.85	-	-	V
V_{IL}	LOW-state input voltage	V_{CC} = 2.0 V	-	-	0.5	V
		V_{CC} = 3.0 V	-	-	0.9	V
		V_{CC} = 5.5 V	-	-	1.65	V

Table 7: Static characteristics 74AHC244 *…continued*

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OH}	HIGH-state output voltage	$V_I = V_{IH}$ or V_{IL}				
		I_O = –50 µA; V_{CC} = 2.0 V	1.9	-	-	V
		I_O = –50 µA; V_{CC} = 3.0 V	2.9	-	-	V
		I_O = –50 µA; V_{CC} = 4.5 V	4.4	-	-	V
		I_O = –4.0 mA; V_{CC} = 3.0 V	2.40	-	-	V
		I_O = –8.0 mA; V_{CC} = 4.5 V	3.70	-	-	V
V_{OL}	LOW-state output voltage	$V_I = V_{IH}$ or V_{IL}				
		I_O = 50 µA; V_{CC} = 2.0 V	-	-	0.1	V
		I_O = 50 µA; V_{CC} = 3.0 V	-	-	0.1	V
		I_O = 50 µA; V_{CC} = 4.5 V	-	-	0.1	V
		I_O = 4 mA; V_{CC} = 3.0 V	-	-	0.55	V
		I_O = 8 mA; V_{CC} = 4.5 V	-	-	0.55	V
I_{LI}	input leakage current	$V_I = V_{CC}$ or GND; V_{CC} = 5.5 V	-	-	2.0	µA
I_{OZ}	OFF-state output current	$V_I = V_{IH}$ or V_{IL}; $V_O = V_{CC}$ or GND; V_{CC} = 5.5 V	-	-	±10.0	µA
I_{CC}	quiescent supply current	$V_I = V_{CC}$ or GND; I_O = 0 A; V_{CC} = 5.5 V	-	-	80	µA
C_i	input capacitance		-	-	10	pF

Table 8: Static characteristics 74AHCT244

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = 25 °C						
V_{IH}	HIGH-state input voltage	V_{CC} = 4.5 V to 5.5 V	2.0	-	-	V
V_{IL}	LOW-state input voltage	V_{CC} = 4.5 V to 5.5 V	-	-	0.8	V
V_{OH}	HIGH-state output voltage	$V_I = V_{IH}$ or V_{IL}				
		I_O = –50 µA; V_{CC} = 4.5 V	4.4	4.5	-	V
		I_O = –8.0 mA; V_{CC} = 4.5 V	3.94	-	-	V
V_{OL}	LOW-state output voltage	$V_I = V_{IH}$ or V_{IL}				
		I_O = 50 µA; V_{CC} = 4.5 V	-	0	0.1	V
		I_O = 8 mA; V_{CC} = 4.5 V	-	-	0.36	V
I_{LI}	input leakage current	$V_I = V_{CC}$ or GND; V_{CC} = 5.5 V	-	-	0.1	µA
I_{OZ}	OFF-state output current	$V_I = V_{IH}$ or V_{IL}; V_{CC} = 5.5 V; $V_O = V_{CC}$ or GND per input pin; other pins at V_{CC} or GND; I_O = 0 A	-	-	±0.25	µA
I_{CC}	quiescent supply current	$V_I = V_{CC}$ or GND; I_O = 0 A; V_{CC} = 5.5 V	-	-	4.0	µA
ΔI_{CC}	additional quiescent supply current	$V_I = V_{CC}$ – 2.1 V; I_O = 0 A; other pins at V_{CC} or GND; V_{CC} = 4.5 V to 5.5 V	-	-	1.35	mA
C_i	input capacitance		-	3	10	pF
C_o	output capacitance		-	4.0	-	pF

Table 8: Static characteristics 74AHCT244 *…continued*

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = –40 °C to +85 °C						
V_{IH}	HIGH-state input voltage	V_{CC} = 4.5 V to 5.5 V	2.0	-	-	V
V_{IL}	LOW-state input voltage	V_{CC} = 4.5 V to 5.5 V	-	-	0.8	V
V_{OH}	HIGH-state output voltage	V_I = V_{IH} or V_{IL}				
		I_O = –50 μA; V_{CC} = 4.5 V	4.4	-	-	V
		I_O = –8.0 mA; V_{CC} = 4.5 V	3.8	-	-	V
V_{OL}	LOW-state output voltage	V_I = V_{IH} or V_{IL}				
		I_O = 50 μA; V_{CC} = 4.5 V	-	-	0.1	V
		I_O = 8 mA; V_{CC} = 4.5 V	-	-	0.44	V
I_{LI}	input leakage current	V_I = V_{CC} or GND; V_{CC} = 5.5 V	-	-	1.0	μA
I_{OZ}	OFF-state output current	V_I = V_{IH} or V_{IL}; V_{CC} = 5.5 V; V_O = V_{CC} or GND per input pin; other pins at V_{CC} or GND; I_O = 0 A	-	-	±2.5	μA
I_{CC}	quiescent supply current	V_I = V_{CC} or GND; I_O = 0 A; V_{CC} = 5.5 V	-	-	40	μA
ΔI_{CC}	additional quiescent supply current	V_I = V_{CC} – 2.1 V; I_O = 0 A; other pins at V_{CC} or GND; V_{CC} = 4.5 V to 5.5 V	-	-	1.5	mA
C_i	input capacitance		-	-	10	pF
T_{amb} = –40 °C to +125 °C						
V_{IH}	HIGH-state input voltage	V_{CC} = 4.5 V to 5.5 V	2.0	-	-	V
V_{IL}	LOW-state input voltage	V_{CC} = 4.5 V to 5.5 V	-	-	0.8	V
V_{OH}	HIGH-state output voltage	V_I = V_{IH} or V_{IL}				
		I_O = –50 μA; V_{CC} = 4.5 V	4.4	-	-	V
		I_O = –8.0 mA; V_{CC} = 4.5 V	3.70	-	-	V
V_{OL}	LOW-state output voltage	V_I = V_{IH} or V_{IL}				
		I_O = 50 μA; V_{CC} = 4.5 V	-	-	0.1	V
		I_O = 8 mA; V_{CC} = 4.5 V	-	-	0.55	V
I_{LI}	input leakage current	V_I = V_{CC} or GND; V_{CC} = 5.5 V	-	-	2.0	μA
I_{OZ}	OFF-state output current	V_I = V_{IH} or V_{IL}; V_{CC} = 5.5 V; V_O = V_{CC} or GND per input pin; other pins at V_{CC} or GND; I_O = 0 A	-	-	±10.0	μA
I_{CC}	quiescent supply current	V_I = V_{CC} or GND; I_O = 0 A; V_{CC} = 5.5 V	-	-	80	μA
ΔI_{CC}	additional quiescent supply current	V_I = V_{CC} – 2.1 V; I_O = 0 A; other pins at V_{CC} or GND; V_{CC} = 4.5 V to 5.5 V	-	-	1.5	mA
C_i	input capacitance		-	-	10	pF

11. Dynamic characteristics

Table 9: Dynamic characteristics 74AHC244

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
T_{amb} = 25 °C [1]							
t_{PHL}, t_{PLH}	propagation delay nAn to nYn	V_{CC} = 3.0 V to 3.6 V; see Figure 5					
		C_L = 15 pF		-	5.0	8.4	ns
		C_L = 50 pF			7.0	11.9	ns
		V_{CC} = 4.5 V to 5.5 V; see Figure 5					
		C_L = 15 pF		-	3.4	5.5	ns
		C_L = 50 pF			5.0	7.5	ns
t_{PZL}, t_{PZH}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 3.0 V to 3.6 V; see Figure 6					
		C_L = 15 pF		-	6.5	10.6	ns
		C_L = 50 pF		-	7.5	14.1	ns
		V_{CC} = 4.5 V to 5.5 V; see Figure 6					
		C_L = 15 pF		-	4.0	7.3	ns
		C_L = 50 pF		-	5.5	9.3	ns
t_{PLZ}, t_{PHZ}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 3.0 V to 3.6 V; see Figure 6					
		C_L = 15 pF		-	5.5	9.7	ns
		C_L = 50 pF		-	4.8	7.2	ns
		V_{CC} = 4.5 V to 5.5 V; see Figure 6					
		C_L = 15 pF		-	4.8	7.2	ns
		C_L = 50 pF		-	7.0	9.2	ns
C_{PD}	power dissipation capacitance	V_I = GND to V_{CC}; C_L = 50 pF; f_i = 1 MHz	[2]	-	10	-	pF
T_{amb} = −40 °C to +85 °C							
t_{PHL}, t_{PLH}	propagation delay nAn to nYn	V_{CC} = 3.0 V to 3.6 V; see Figure 5					
		C_L = 15 pF		1.0	-	10.0	ns
		C_L = 50 pF		1.0	-	13.5	ns
		V_{CC} = 4.5 V to 5.5 V; see Figure 5					
		C_L = 15 pF		1.0	-	6.5	ns
		C_L = 50 pF		1.0	-	8.5	ns
t_{PZL}, t_{PZH}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 3.0 V to 3.6 V; see Figure 6					
		C_L = 15 pF		1.0	-	12.5	ns
		C_L = 50 pF		1.0	-	16.0	ns
		V_{CC} = 4.5 V to 5.5 V; see Figure 6					
		C_L = 15 pF		1.0	-	8.5	ns
		C_L = 50 pF		1.0	-	10.5	ns

Table 9: Dynamic characteristics 74AHC244 *...continued*

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PLZ}, t_{PHZ}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 3.0 V to 3.6 V; see Figure 6				
		C_L = 15 pF	1.0	-	11.0	ns
		C_L = 50 pF	1.0	-	16.0	ns
		V_{CC} = 4.5 V to 5.5 V; see Figure 6				
		C_L = 15 pF	1.0	-	8.5	ns
		C_L = 50 pF	1.0	-	10.5	ns
T_{amb} = −40 °C to +125 °C						
t_{PHL}, t_{PLH}	propagation delay nAn to nYn	V_{CC} = 3.0 V to 3.6 V; see Figure 5				
		C_L = 15 pF	1.0	-	10.5	ns
		C_L = 50 pF	1.0	-	15.0	ns
		V_{CC} = 4.5 V to 5.5 V; see Figure 5				
		C_L = 15 pF	1.0	-	7.0	ns
		C_L = 50 pF	1.0	-	9.5	ns
t_{PZL}, t_{PZH}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 3.0 V to 3.6 V; see Figure 6				
		C_L = 15 pF	1.0	-	13.5	ns
		C_L = 50 pF	1.0	-	18.0	ns
		V_{CC} = 4.5 V to 5.5 V; see Figure 6				
		C_L = 15 pF	1.0	-	9.5	ns
		C_L = 50 pF	1.0	-	12.0	ns
t_{PLZ}, t_{PHZ}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 3.0 V to 3.6 V; see Figure 6				
		C_L = 15 pF	1.0	-	12.5	ns
		C_L = 50 pF	1.0	-	17.5	ns
		V_{CC} = 4.5 V to 5.5 V; see Figure 6				
		C_L = 15 pF	1.0	-	9.0	ns
		C_L = 50 pF	1.0	-	11.5	ns

[1] Typical values are measured at nominal supply voltage (V_{CC} = 3.3 V and V_{CC} = 5.0 V).

[2] C_{PD} is used to determine the dynamic power dissipation (P_D 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_i = input frequency in MHz;
f_o = output frequency in MHz;
C_L = output load capacitance in pF;
V_{CC} = supply voltage in V.
N = number of inputs switching;
$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

Table 10: Dynamic characteristics 74AHCT244

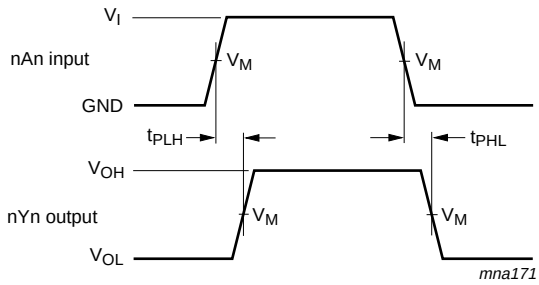
Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 7.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
T_{amb} = 25 °C [1]							
t_{PHL}, t_{PLH}	propagation delay nAn to nYn	V_{CC} = 4.5 V to 5.5 V; see Figure 5					
		C_L = 15 pF		-	3.5	7.4	ns
		C_L = 50 pF		-	5.0	8.4	ns
t_{PZL}, t_{PZH}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 4.5 V to 5.5 V; see Figure 6					
		C_L = 15 pF		-	3.5	10.4	ns
		C_L = 50 pF		-	5.5	11.4	ns
t_{PLZ}, t_{PHZ}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 4.5 V to 5.5 V; see Figure 6					
		C_L = 15 pF		-	5.0	9.4	ns
		C_L = 50 pF		-	7.0	11.4	ns
C_{PD}	power dissipation capacitance	V_I = GND to V_{CC}; C_L = 50 pF; f_i = 1 MHz	[2]	-	12	-	pF
T_{amb} = −40 °C to +85 °C							
t_{PHL}, t_{PLH}	propagation delay nAn to nYn	V_{CC} = 4.5 V to 5.5 V; see Figure 5					
		C_L = 15 pF		1.0	-	8.5	ns
		C_L = 50 pF		1.0	-	9.5	ns
t_{PZL}, t_{PZH}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 4.5 V to 5.5 V; see Figure 6					
		C_L = 15 pF		1.0	-	12.0	ns
		C_L = 50 pF		1.0	-	13.0	ns
t_{PLZ}, t_{PHZ}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 4.5 V to 5.5 V; see Figure 6					
		C_L = 15 pF		1.0	-	10.0	ns
		C_L = 50 pF		1.0	-	13.0	ns
T_{amb} = −40 °C to +125 °C							
t_{PHL}, t_{PLH}	propagation delay nAn to nYn	V_{CC} = 4.5 V to 5.5 V; see Figure 5					
		C_L = 15 pF		1.0	-	9.5	ns
		C_L = 50 pF		1.0	-	10.5	ns
t_{PZL}, t_{PZH}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 4.5 V to 5.5 V; see Figure 6					
		C_L = 15 pF		1.0	-	13.0	ns
		C_L = 50 pF		1.0	-	14.5	ns
t_{PLZ}, t_{PHZ}	propagation delay $n\overline{OE}$ to nYn	V_{CC} = 4.5 V to 5.5 V; see Figure 6					
		C_L = 15 pF		1.0	-	12.0	ns
		C_L = 50 pF		1.0	-	14.5	ns

[1] Typical values are measured at nominal supply voltage (V_{CC} = 5.0 V).

[2] C_{PD} is used to determine the dynamic power dissipation (P_D 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_i = input frequency in MHz;
f_o = output frequency in MHz;
C_L = output load capacitance in pF;
V_{CC} = supply voltage in V.
N = number of inputs switching;
$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

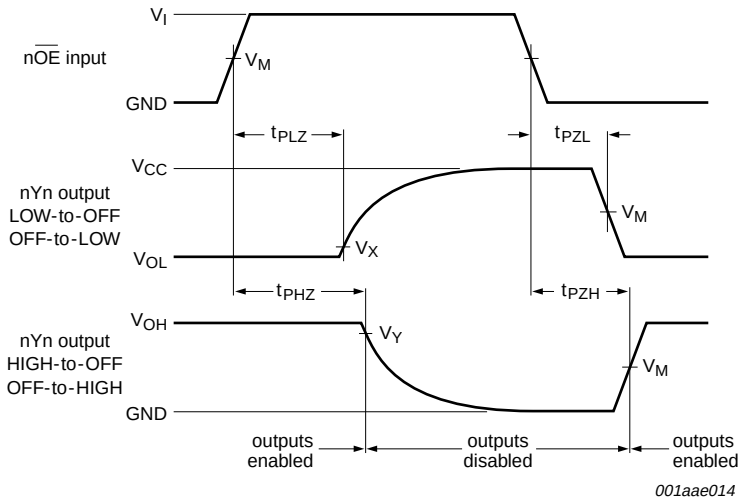
12. Waveforms



Measurement points are given in Table 11.

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

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



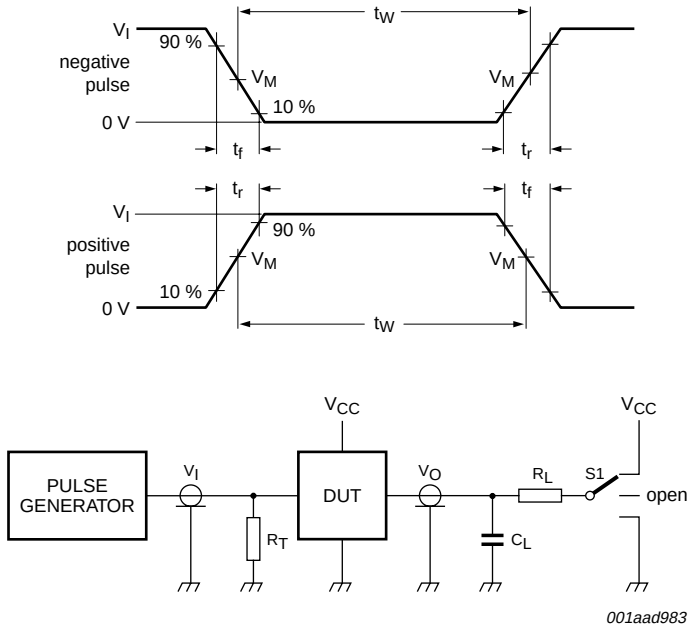
Measurement points are given in Table 11.

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

Fig 6. 3-state enable and disable times

Table 11: Measurement points

Type	Input	Output		
	V_M	V_M	V_X	V_Y
74AHC244	$0.5V_{CC}$	$0.5V_{CC}$	V_{OL} + 0.3 V	V_{OH} − 0.3 V
74AHCT244	1.5 V	$0.5V_{CC}$	V_{OL} + 0.3 V	V_{OH} − 0.3 V



Test data is given in Table 12.

Definitions test circuit:

R_T = Termination resistance should be equal to output impedance Z_o of the pulse generator

C_L = Load capacitance including jig and probe capacitance

R_L = Load resistor

S1 = Test selection switch

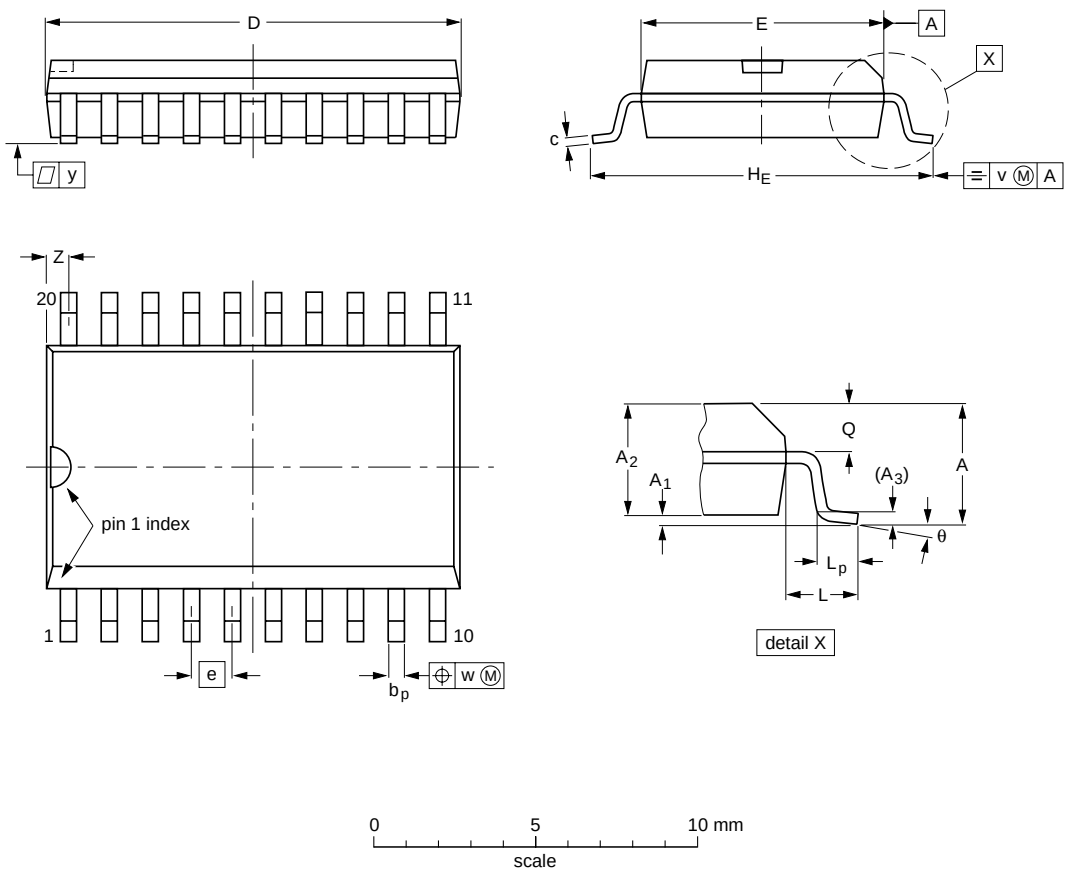
Fig 7. Load circuitry for switching times

Table 12: Test data

Type	Input		Load		S1 position		
	V_I	t_r, t_f	C_L	R_L	t_{PHL}, t_{PLH}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
74AHC244	V_{CC}	3.0 ns	15 pF, 50 pF	1 kΩ	open	GND	V_{CC}
74AHCT244	3.0 V	3.0 ns	15 pF, 50 pF	1 kΩ	open	GND	V_{CC}

13. 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^o 0^o
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	

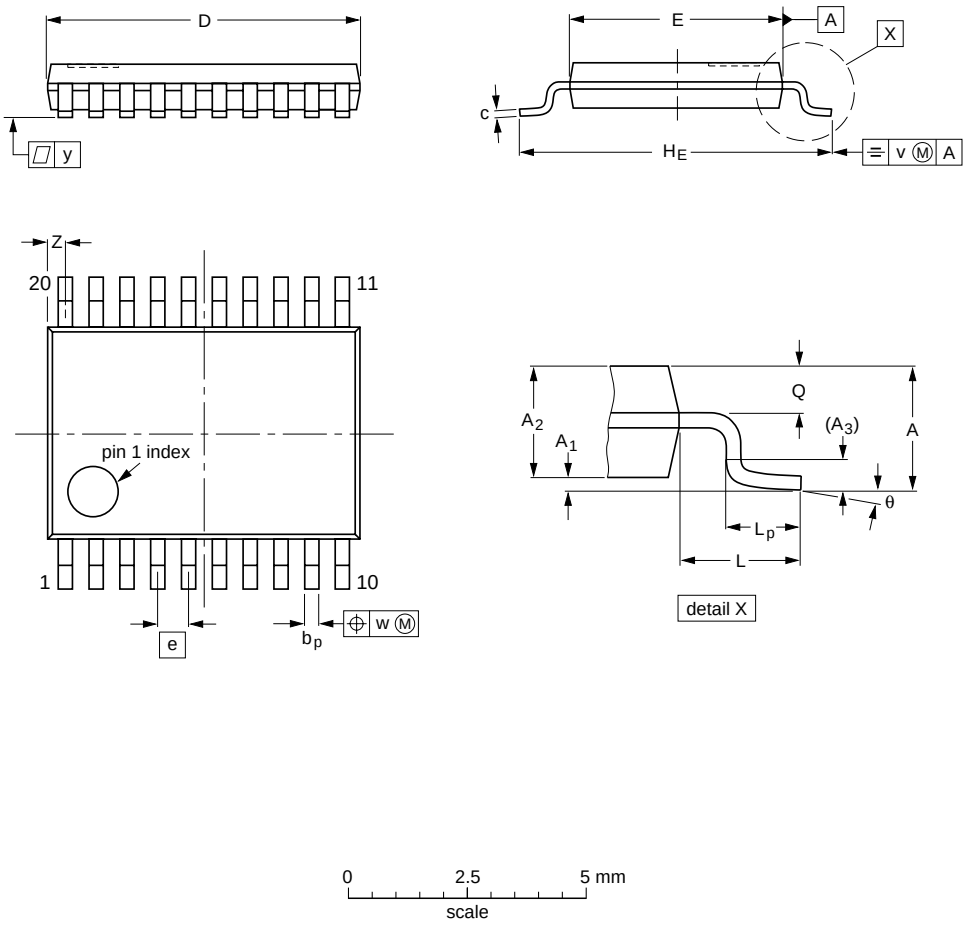
Note

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

Fig 8. Package outline SOT163-1 (SO20)

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

Fig 9. Package outline SOT360-1 (TSSOP20)

14. Abbreviations

Table 13: Abbreviations

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

15. Revision history

Table 14: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
74AHC_AHCT244_4	20060210	Product data sheet		-	74AHC_AHCT244_3
Modifications:	• The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors. • Table 2: Removed column North America (in previous version).				
74AHC_AHCT244_3	19990928	Product specification	-	9397 750 06296	74AHC_AHCT244_2
74AHC_AHCT244_2	19990224	Product specification	-	9397 750 05343	74AHC_AHCT244_1
74AHC_AHCT244_1	19980921	Product specification	-	9397 750 04254	-

16. Data sheet status

Level	Data sheet status [1]	Product status [2] [3]	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

17. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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21. Contents

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