74AVC1T1022

1-to-4 fan-out buffer

Rev. 2 — 16 March 2017 Product data sheet

1 General description

The 74AVC1T1022 is a translating 1-to-4 fan-out buffer suitable for use in clock distribution. It has dual supplies ($V_{CC(A)}$ and $V_{CC(B)}$) for voltage translation. It also has a data input (A), four data outputs (1Yn and 2Yn) and an output enable input ($\overline{OE}$). $V_{CC(A)}$ and $V_{CC(B)}$ can be independently supplied at any voltage between 0.8 V and 3.6 V. It makes the device suitable for low voltage translation between any of the following voltages: 0.8 V, 1.2 V, 1.5 V, 1.8 V, 2.5 V and 3.3 V. The levels of A, $\overline{OE}$ and 1Yn are referenced to $V_{CC(A)}$, outputs 2Yn are referenced to $V_{CC(B)}$. This supply configuration ensures that two of the fanned out signals can be used in level shifting. A HIGH on $\overline{OE}$ causes all outputs to be pulled LOW via pull-down resistors, a LOW on $\overline{OE}$ disconnects the pull-down resistors and enables all outputs.

Schmitt trigger action at all inputs makes the circuit tolerant for slower input rise and fall time.

The I_{OFF} circuitry disables the output, preventing any damaging backflow current through the device when it is powered down.

2 Features and benefits

- Wide supply voltage range:
  - $V_{CC(A)}$: 0.8 V to 3.6 V
  - $V_{CC(B)}$: 0.8 V to 3.6 V
- Complies with JEDEC standards:
  - JESD8-12 (0.8 V to 1.3 V)
  - JESD8-11 (0.9 V to 1.65 V)
  - JESD8-7 (1.2 V to 1.95 V)
  - JESD8-5 (1.8 V to 2.7 V)
  - JESD8-B (2.7 V to 3.6 V)
- ESD protection:
  - HBM ANSI/ESDA/JEDEC JS-001 Class 3B exceeds 8 kV
  - CDM JESD22-C101E exceeds 1000 V
- Maximum data rates:
  - 380 Mbit/s (≥ 1.8 V to 3.3 V translation)
  - 200 Mbit/s (≥ 1.1 V to 3.3 V translation)
  - 200 Mbit/s (≥ 1.1 V to 2.5 V translation)
  - 200 Mbit/s (≥ 1.1 V to 1.8 V translation)
  - 150 Mbit/s (≥ 1.1 V to 1.5 V translation)
  - 100 Mbit/s (≥ 1.1 V to 1.2 V translation)
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Inputs accept voltages up to 3.6 V
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

nexperia

3 Ordering information

Table 1. Ordering information

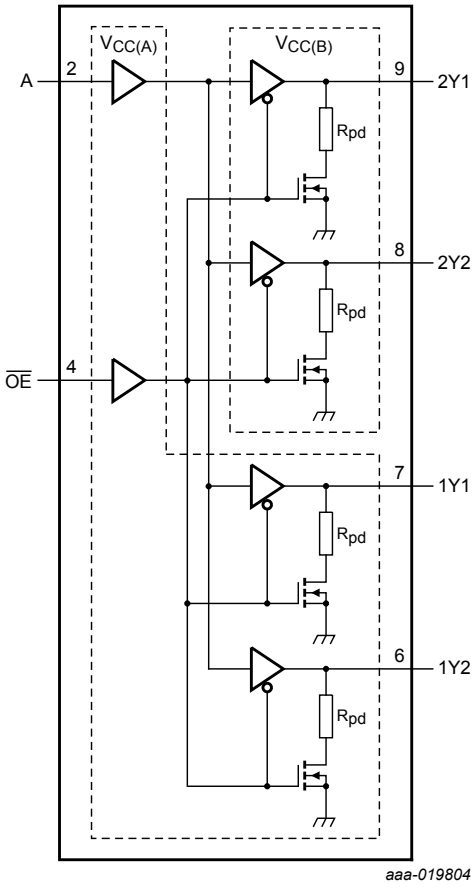
Type number	Package			
	Temperature range	Name	Description	Version
74AVC1T1022DP	-40 °C to +125 °C	TSSOP10	plastic thin shrink small outline package; 10 leads; body width 3 mm	SOT552-1
74AVC1T1022GU	-40 °C to +125 °C	XQFN10	plastic, extremely thin quad flat package; no leads; 10 terminals; body 1.40 × 1.80 × 0.50 mm	SOT1160-1

4 Marking

Table 2. Marking codes

Type number	Marking code
74AVC1T1022DP	B2
74AVC1T1022GU	B2

5 Functional diagram



Pin numbers are shown for TSSOP10 package only.

Figure 1. Logic symbol

6 Pinning information

6.1 Pinning

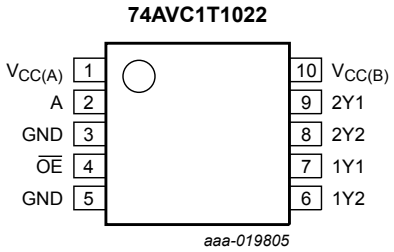


Figure 2. Pin configuration SOT552-1 (TSSOP10)

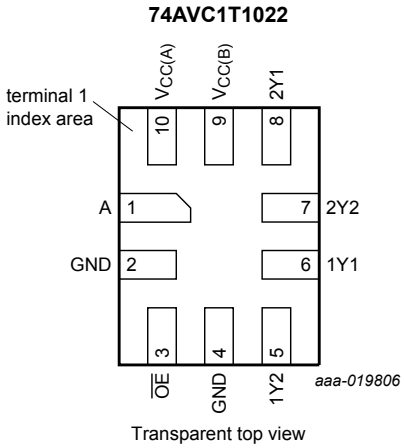


Figure 3. Pin configuration SOT1160-1 (XQFN10)

6.2 Pin description

Table 3. Pin description

Symbol	Pin		Description
	SOT552-1	SOT1160-1	
$V_{CC(A)}$	1	10	supply voltage A
A	2	1	data input (referenced to $V_{CC(A)}$)
GND[1]	3, 5	2, 4	ground (0 V)
$\overline{OE}$	4	3	output enable input (active LOW) (referenced to $V_{CC(A)}$)
1Y1, 1Y2	7, 6	6, 5	data outputs (referenced to $V_{CC(A)}$)
2Y1, 2Y2	9, 8	8, 7	data outputs (referenced to $V_{CC(B)}$)
$V_{CC(B)}$	10	9	supply voltage B

[1] All GND pins must be connected to ground (0 V).

7 Functional description

Table 4. Function table [1]

Inputs		Output
$\overline{OE}$	A	nYn
L	L	L
L	H	H
H	X	L

[1] H = HIGH voltage level;
L = LOW voltage level;
X = don't care.

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
$V_{CC(A)}$	supply voltage A		-0.5	+4.6	V
$V_{CC(B)}$	supply voltage B		-0.5	+4.6	V
V_I	input voltage	[1]	-0.5	+4.6	V
V_O	output voltage	$\overline{OE}$ = LOW [1] [2] [3]	-0.5	V_{CCO} + 0.5	V
		$\overline{OE}$ = HIGH [1]	-0.5	+4.6	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	V_O = 0 V to V_{CCO} [2]	-	±50	mA
I_{CC}	supply current	$I_{CC(A)}$ or $I_{CC(B)}$	-	100	mA
I_{GND}	ground current		-100	-	mA
T_{stg}	storage temperature		-65	+150	°C
P_{tot}	total power dissipation	T_{amb} = -40 °C to +125 °C			
		TSSOP10 package [4]	-	250	mW
		XQFN10 package	-	250	mW

[1] The minimum input voltage ratings and output voltage ratings may be exceeded if the input and output current ratings are observed.
[2] V_{CCO} is the supply voltage associated with the output port.
[3] V_{CCO} + 0.5 V should not exceed 4.6 V.
[4] For TSSOP10 package: above 125°C, the value of P_{tot} derates linearly with 8.33 mW/K.

9 Recommended operating conditions

Table 6. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC(A)}$	supply voltage A		0.8	3.6	V
$V_{CC(B)}$	supply voltage B		0.8	3.6	V
V_I	input voltage		0	3.6	V
V_O	output voltage	$\overline{OE}$ = LOW [1]	0	V_{CCO}	V
		$\overline{OE}$ = HIGH	0	3.6	V
T_{amb}	ambient temperature		-40	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CC(A)}$ =0.8 V to 3.6 V	0	200	ns/V

[1] V_{CCO} is the supply voltage associated with the output port.

10 Static characteristics

Table 7. Typical static characteristics

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

Symbol	Parameter	Conditions	T_{amb} = 25 °C			Unit
			Min	Typ	Max	
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		I_O = -1.5 mA; $V_{CC(A)} = V_{CC(B)}$ = 0.8 V	-	0.69	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		I_O = 1.5 mA; $V_{CC(A)} = V_{CC(B)}$ = 0.8 V	-	0.07	-	V
I_I	input leakage current	A, $\overline{OE}$ input; V_I = 0 V or 3.6 V; $V_{CC(A)} = V_{CC(B)}$ = 0.8 V to 3.6 V	-	±0.025	±0.25	µA
I_{OFF}	power-off leakage current	V_I or V_O = 0 V to 3.6 V; $V_{CC(B)}$ = 0 V; $V_{CC(A)}$ = 0.8 V to 3.6 V	-	±0.1	±1	µA
R_{pd}	pull-down resistance		-	50	-	kΩ
C_I	input capacitance	A, $\overline{OE}$ input; V_I = 0 V or 3.3 V; $V_{CC(A)} = V_{CC(B)}$ = 3.3 V	-	1.2	-	pF
C_O	output capacitance	nYn; V_O = 3.3 V or 0 V; $V_{CC(A)} = V_{CC(B)}$ = 3.3 V	-	4.7	-	pF

Table 8. Static characteristics

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

Symbol	Parameter	Conditions	T_{amb} = -40 °C to +85 °C		T_{amb} = -40 °C to +125 °C		Unit
			Min	Max	Min	Max	
V_{IH}	HIGH-level input voltage	A, $\overline{OE}$ input					
		$V_{CC(A)}$ = 0.8 V	0.70$V_{CC(A)}$	-	0.70$V_{CC(A)}$	-	V
		$V_{CC(A)}$ = 1.1 V to 1.95 V	0.65$V_{CC(A)}$	-	0.65$V_{CC(A)}$	-	V
		$V_{CC(A)}$ = 2.3 V to 2.7 V	1.6	-	1.6	-	V
		$V_{CC(A)}$ = 3.0 V to 3.6 V	2	-	2	-	V
V_{IL}	LOW-level input voltage	A, $\overline{OE}$ input					
		$V_{CC(A)}$ = 0.8 V	-	0.30$V_{CC(A)}$	-	0.30$V_{CC(A)}$	V
		$V_{CC(A)}$ = 1.1 V to 1.95 V	-	0.35$V_{CC(A)}$	-	0.35$V_{CC(A)}$	V
		$V_{CC(A)}$ = 2.3 V to 2.7 V	-	0.7	-	0.7	V
		$V_{CC(A)}$ = 3.0 V to 3.6 V	-	0.8	-	0.8	V
V_{OH}	HIGH-level output voltage	V_I = V_{IH} or V_{IL}					
		I_O = -100 µA; $V_{CC(A)}$ = $V_{CC(B)}$ = 0.8 V to 3.6 V [1]	V_{CCO} - 0.1	-	V_{CCO} - 0.1	-	V
		I_O = -3 mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.1 V	0.85	-	0.85	-	V
		I_O = -6 mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.4 V	1.05	-	1.05	-	V
		I_O = -8 mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.65 V	1.2	-	1.2	-	V
		I_O = -9 mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 2.3 V	1.75	-	1.75	-	V
		I_O = -12 mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 3.0 V	2.3	-	2.3	-	V
V_{OL}	LOW-level output voltage	V_I = V_{IH} or V_{IL}					
		I_O = 100 µA; $V_{CC(A)}$ = $V_{CC(B)}$ = 0.8 V to 3.6 V	-	0.1	-	0.1	V
		I_O =-3 mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.1 V	-	0.25	-	0.25	V
		I_O = 6 mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.4 V	-	0.35	-	0.35	V
		I_O = 8 mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.65 V	-	0.45	-	0.45	V
		I_O = 9 mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 2.3 V	-	0.55	-	0.55	V

Symbol	Parameter	Conditions	T_{amb} = -40 °C to +85 °C		T_{amb} = -40 °C to +125 °C		Unit
			Min	Max	Min	Max	
		I_O = 12 mA; $V_{CC(A)} = V_{CC(B)}$ = 3.0 V	-	0.7	-	0.7	V
I_I	input leakage current	A, $\overline{OE}$ input; V_I = 0 V or 3.6 V; $V_{CC(A)} = V_{CC(B)}$ = 0.8 V to 3.6 V	-	±1	-	±5	µA
I_{OFF}	power-off leakage current	1Yn; V_I or V_O = 0 V to 3.6 V; $V_{CC(A)}$ = 0 V; $V_{CC(B)}$ = 0.8 V to 3.6 V	-	±5	-	±30	µA
		2Yn; V_I or V_O = 0 V to 3.6 V; $V_{CC(B)}$ = 0 V; $V_{CC(A)}$ = 0.8 V to 3.6 V	-	±5	-	±30	µA
$I_{CC(A)}$	supply current A	V_I = 0 V or $V_{CC(A)}$; I_O = 0 A; $V_{CC(A)}$ = 0.8 V to 3.6 V; $V_{CC(B)}$ = 0.8 V to 3.6 V	-	8	-	50	µA
$I_{CC(B)}$	supply current B	V_I = 0 V or $V_{CC(A)}$; I_O = 0 A; $V_{CC(A)}$ = 0.8 V to 3.6 V; $V_{CC(B)}$ = 0.8 V to 3.6 V	-	8	-	50	µA

[1] V_{CCO} is the supply voltage associated with the output port.

11 Dynamic characteristics

Table 9. Typical power dissipation capacitance at T_{amb} = 25 °C [1] [2]

Symbol	Parameter	Conditions	$V_{CC(A)} = V_{CC(B)}$						Unit
			0.8 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	
C_{PD}	power dissipation capacitance	1Yn; outputs enabled	17.6	18.4	18.5	18.8	20.6	23.5	pF
		1Yn; outputs disabled	1.7	1.8	1.8	1.8	1.9	2.1	pF
		2Yn; outputs enabled	17.2	17.9	18.0	18.3	19.9	22.8	pF
		2Yn; outputs disabled	1.1	1.2	1.2	1.2	1.3	1.4	pF

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

[2] f_i = 10 MHz;
V_I = GND to $V_{CC(A)}$;
$t_r = t_f$ = 1 ns;
C_L = 0 pF;
R_L = ∞ Ω.

Table 10. Typical dynamic characteristics at $V_{CC(A)}$ = 0.8 V and T_{amb} = 25 °C [1]

Voltages are referenced to GND (ground = 0 V); for test circuit, see Figure 6; for waveforms, see Figure 4 and Figure 5.

Symbol	Parameter	Conditions	$V_{CC(B)}$						Unit
			0.8 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	
t_{pd}	propagation delay	A to 1Yn	23	23	23	23	23	23	ns
		A to 2Yn	23	14	12	12	12	12	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	20	20	20	20	20	20	ns
		$\overline{OE}$ to 2Yn	20	14	13	13	12	13	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	25	25	25	25	25	25	ns
		$\overline{OE}$ to 2Yn	25	14	13	12	12	12	ns

[1] t_{pd} is the same as t_{PLH} and t_{PHL};
t_{dis} is the same as t_{PLZ} and t_{PHZ};
t_{en} is the same as t_{PZL} and t_{PZH}.

Table 11. Typical dynamic characteristics at $V_{CC(B)}$ = 0.8 V and T_{amb} = 25 °C [1]

Voltages are referenced to GND (ground = 0 V); for test circuit, see Figure 6; for waveforms, see Figure 4 and Figure 5.

Symbol	Parameter	Conditions	$V_{CC(A)}$						Unit
			0.8 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	
t_{pd}	propagation delay	A to 1Yn	23	7.3	5.1	4.2	3.1	2.7	ns
		A to 2Yn	23	17	16	16	16	16	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	20	7.0	5.1	4.8	3.7	3.5	ns
		$\overline{OE}$ to 2Yn	20	14	14	13	13	13	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	25	7.9	5.5	4.4	3.3	2.8	ns
		$\overline{OE}$ to 2Yn	25	20	19	19	18	18	ns

[1] t_{pd} is the same as t_{PLH} and t_{PHL};
t_{dis} is the same as t_{PLZ} and t_{PHZ};
t_{en} is the same as t_{PZL} and t_{PZH}.

Table 12. Dynamic characteristics for temperature range -40 °C to +85 °C and -40 °C to +125 °C

Voltages are referenced to GND (ground = 0 V); for test circuit, see Figure 6.

Symbol	Parameter	Conditions	$V_{CC(A)} = V_{CC(B)}$					Unit
			1.2 V ± 0.1 V	1.5 V ± 0.1 V	1.8 V ± 0.15 V	2.5 V ± 0.2 V	3.3 V ± 0.3 V	
			Max	Max	Max	Max	Max	
T_{amb} = 25 °C								
$t_{sk(o)}$	output skew time	between any output	0.5	0.3	0.2	0.2	0.1	ns
T_{amb} = -40 °C to +85 °C								
$t_{sk(o)}$	output skew time	between any output	0.7	0.4	0.3	0.2	0.2	ns
T_{amb} = -40 °C to +125 °C								
$t_{sk(o)}$	output skew time	between any output	0.9	0.5	0.4	0.3	0.2	ns

Table 13. Dynamic characteristics for temperature range 25 °C [1]

Voltages are referenced to GND (ground = 0 V); for test circuit, see Figure 6; for waveforms, see Figure 4 and Figure 5.

Symbol	Parameter	Conditions	$V_{CC(B)}$										Unit
			1.2 V ± 0.1 V		1.5 V ± 0.1 V		1.8 V ± 0.15 V		2.5 V ± 0.2 V		3.3 V ± 0.3 V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$V_{CC(A)}$ = 1.1 V to 1.3 V													
t_{pd}	propagation delay	A to 1Yn	2.0	13.5	2.0	13.5	2.0	13.5	2.0	13.5	2.0	13.5	ns
		A to 2Yn	2.0	13.5	1.8	10.0	1.6	8.8	1.5	7.8	1.4	7.5	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	2.2	12.6	2.2	12.6	2.2	12.6	2.2	12.6	2.2	12.6	ns
		$\overline{OE}$ to 2Yn	2.2	12.6	1.9	10.3	2.0	10.2	1.8	9.2	2.1	10.0	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	2.2	14.5	2.2	14.5	2.2	14.5	2.2	14.5	2.2	14.5	ns
		$\overline{OE}$ to 2Yn	2.2	14.5	1.9	10.5	1.7	9.2	1.5	8.0	1.5	7.6	ns
$V_{CC(A)}$ = 1.4 V to 1.6 V													
t_{pd}	propagation delay	A to 1Yn	1.6	8.4	1.6	8.4	1.6	8.4	1.6	8.4	1.6	8.4	ns
		A to 2Yn	1.8	12.0	1.6	8.4	1.4	7.2	1.3	5.9	1.2	5.4	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	1.8	8.1	1.8	8.1	1.8	8.1	1.8	8.1	1.8	8.1	ns
		$\overline{OE}$ to 2Yn	2.1	10.6	1.8	8.1	1.9	8.0	1.6	6.9	1.9	7.7	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	1.7	8.7	1.7	8.7	1.7	8.7	1.7	8.7	1.7	8.7	ns
		$\overline{OE}$ to 2Yn	2.0	12.7	1.7	8.7	1.5	7.5	1.4	6.0	1.3	5.5	ns
$V_{CC(A)}$ = 1.65 V to 1.95 V													
t_{pd}	propagation delay	A to 1Yn	1.3	6.6	1.3	6.6	1.3	6.6	1.3	6.6	1.3	6.6	ns
		A to 2Yn	1.8	11.4	1.5	7.8	1.3	6.6	1.1	5.2	1.1	4.7	ns

Symbol	Parameter	Conditions	$V_{CC(B)}$										Unit
			1.2 V ± 0.1 V		1.5 V ± 0.1 V		1.8 V ± 0.15 V		2.5 V ± 0.2 V		3.3 V ± 0.3 V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
t_{dis}	disable time	$\overline{OE}$ to 1Yn	1.8	7.4	1.8	7.4	1.8	7.4	1.8	7.4	1.8	7.4	ns
		$\overline{OE}$ to 2Yn	2.0	10.1	1.7	7.6	1.8	7.4	1.5	6.2	1.8	7.0	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	1.4	6.8	1.4	6.8	1.4	6.8	1.4	6.8	1.4	6.8	ns
		$\overline{OE}$ to 2Yn	1.9	12.2	1.6	8.2	1.4	6.8	1.2	5.4	1.1	4.8	ns
$V_{CC(A)}$ = 2.3 V to 2.7 V													
t_{pd}	propagation delay	A to 1Yn	1.1	4.6	1.1	4.6	1.1	4.6	1.1	4.6	1.1	4.6	ns
		A to 2Yn	1.7	10.8	1.4	7.2	1.2	5.9	1.1	4.6	1.0	4.1	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	1.4	5.6	1.4	5.6	1.4	5.6	1.4	5.6	1.4	5.6	ns
		$\overline{OE}$ to 2Yn	1.9	9.6	1.6	6.9	1.7	6.8	1.4	5.6	1.7	6.3	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	1.1	4.8	1.1	4.8	1.1	4.8	1.1	4.8	1.1	4.8	ns
		$\overline{OE}$ to 2Yn	1.8	11.6	1.5	7.7	1.3	6.3	1.1	4.8	1.0	4.2	ns
$V_{CC(A)}$ = 3.0 V to 3.6 V													
t_{pd}	propagation delay	A to 1Yn	0.9	3.9	0.9	3.9	0.9	3.9	0.9	3.9	0.9	3.9	ns
		A to 2Yn	1.6	10.6	1.4	7.0	1.2	5.7	1.0	4.4	0.9	3.9	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	1.6	6.0	1.6	6.0	1.6	6.0	1.6	6.0	1.6	6.0	ns
		$\overline{OE}$ to 2Yn	1.9	9.3	1.5	6.8	1.6	6.6	1.3	5.3	1.6	6.0	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	1.0	4.0	1.0	4.0	1.0	4.0	1.0	4.0	1.0	4.0	ns
		$\overline{OE}$ to 2Yn	1.8	11.3	1.4	7.4	1.3	6.0	1.1	4.6	1.0	4.0	ns

[1] t_{pd} is the same as t_{PLH} and t_{PHL};
t_{dis} is the same as t_{PLZ} and t_{PHZ};
t_{en} is the same as t_{PZL} and t_{PZH}.

Table 14. Dynamic characteristics for temperature range -40 °C to +85 °C [1]

Voltages are referenced to GND (ground = 0 V); for test circuit, see Figure 6; for waveforms, see Figure 4 and Figure 5.

Symbol	Parameter	Conditions	$V_{CC(B)}$										Unit
			1.2 V ± 0.1 V		1.5 V ± 0.1 V		1.8 V ± 0.15 V		2.5 V ± 0.2 V		3.3 V ± 0.3 V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$V_{CC(A)}$ = 1.1 V to 1.3 V													
t_{pd}	propagation delay	A to 1Yn	0.9	14.7	0.9	14.7	0.9	14.7	0.9	14.7	0.9	14.7	ns
		A to 2Yn	0.9	14.7	0.8	11.2	0.7	9.9	0.6	8.8	0.6	8.5	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	1.0	14.7	1.0	14.7	1.0	14.7	1.0	14.7	1.0	14.7	ns
		$\overline{OE}$ to 2Yn	1.0	14.7	0.9	12.2	0.9	12.1	0.8	10.8	1.0	11.7	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	1.0	15.8	1.0	15.8	1.0	15.8	1.0	15.8	1.0	15.8	ns

Symbol	Parameter	Conditions	$V_{CC(B)}$										Unit
			1.2 V ± 0.1 V		1.5 V ± 0.1 V		1.8 V ± 0.15 V		2.5 V ± 0.2 V		3.3 V ± 0.3 V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
		$\overline{OE}$ to 2Yn	1.0	15.8	0.8	11.8	0.8	10.3	0.7	8.9	0.7	8.5	ns
$V_{CC(A)}$ = 1.4 V to 1.6 V													
t_{pd}	propagation delay	A to 1Yn	0.7	9.5	0.7	9.5	0.7	9.5	0.7	9.5	0.7	9.5	ns
		A to 2Yn	0.8	13.2	0.7	9.5	0.6	8.2	0.5	6.7	0.5	6.2	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	0.8	9.7	0.8	9.7	0.8	9.7	0.8	9.7	0.8	9.7	ns
		$\overline{OE}$ to 2Yn	0.9	12.4	0.8	9.7	0.8	9.7	0.7	8.3	0.9	9.0	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	0.7	9.9	0.7	9.9	0.7	9.9	0.7	9.9	0.7	9.9	ns
		$\overline{OE}$ to 2Yn	0.9	14.0	0.7	9.9	0.7	8.5	0.6	6.9	0.6	6.2	ns
$V_{CC(A)}$ = 1.65 V to 1.95 V													
t_{pd}	propagation delay	A to 1Yn	0.6	7.6	0.6	7.6	0.6	7.6	0.6	7.6	0.6	7.6	ns
		A to 2Yn	0.8	12.5	0.7	8.9	0.6	7.6	0.5	6.1	0.5	5.4	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	0.8	8.8	0.8	8.8	0.8	8.8	0.8	8.8	0.8	8.8	ns
		$\overline{OE}$ to 2Yn	0.9	11.7	0.8	9.0	0.8	8.8	0.7	7.4	0.8	8.2	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	0.6	7.9	0.6	7.9	0.6	7.9	0.6	7.9	0.6	7.9	ns
		$\overline{OE}$ to 2Yn	0.8	13.5	0.7	9.3	0.6	7.9	0.6	6.3	0.5	5.6	ns
$V_{CC(A)}$ = 2.3 V to 2.7 V													
t_{pd}	propagation delay	A to 1Yn	0.5	5.4	0.5	5.4	0.5	5.4	0.5	5.4	0.5	5.4	ns
		A to 2Yn	0.8	12.0	0.6	8.3	0.6	6.9	0.5	5.4	0.4	4.7	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	0.6	6.5	0.6	6.5	0.6	6.5	0.6	6.5	0.6	6.5	ns
		$\overline{OE}$ to 2Yn	0.9	11.0	0.7	8.3	0.8	8.0	0.6	6.5	0.8	7.2	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	0.5	5.5	0.5	5.5	0.5	5.5	0.5	5.5	0.5	5.5	ns
		$\overline{OE}$ to 2Yn	0.8	12.8	0.7	8.7	0.6	7.3	0.5	5.5	0.5	4.8	ns
$V_{CC(A)}$ = 3.0 V to 3.6 V													
t_{pd}	propagation delay	A to 1Yn	0.4	4.4	0.4	4.4	0.4	4.4	0.4	4.4	0.4	4.4	ns
		A to 2Yn	0.8	11.6	0.6	8.0	0.5	6.5	0.5	5.1	0.4	4.4	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	0.7	6.9	0.7	6.9	0.7	6.9	0.7	6.9	0.7	6.9	ns
		$\overline{OE}$ to 2Yn	0.9	10.8	0.7	8.0	0.7	7.7	0.6	6.2	0.7	6.9	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	0.5	4.5	0.5	4.5	0.5	4.5	0.5	4.5	0.5	4.5	ns
		$\overline{OE}$ to 2Yn	0.8	12.5	0.6	8.4	0.6	6.9	0.5	5.2	0.5	4.5	ns

[1] t_{pd} is the same as t_{PLH} and t_{PHL};
t_{dis} is the same as t_{PLZ} and t_{PHZ};
t_{en} is the same as t_{PZL} and t_{PZH}.

Table 15. Dynamic characteristics for temperature range -40 °C to +125 °C [1]

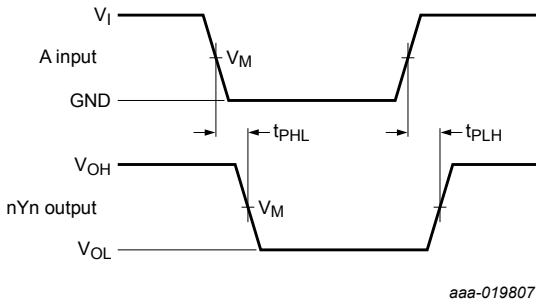
Voltages are referenced to GND (ground = 0 V); for test circuit, see Figure 6; for waveforms, see Figure 4 and Figure 5.

Symbol	Parameter	Conditions	$V_{CC(B)}$										Unit
			1.2 V ± 0.1 V		1.5 V ± 0.1 V		1.8 V ± 0.15 V		2.5 V ± 0.2 V		3.3 V ± 0.3 V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$V_{CC(A)}$ = 1.1 V to 1.3 V													
t_{pd}	propagation delay	A to 1Yn	0.9	15.7	0.9	15.7	0.9	15.7	0.9	15.7	0.9	15.7	ns
		A to 2Yn	0.9	15.7	0.8	12.1	0.7	10.8	0.6	9.7	0.6	9.3	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	1.0	16.5	1.0	16.5	1.0	16.5	1.0	16.5	1.0	16.5	ns
		$\overline{OE}$ to 2Yn	1.0	16.5	0.9	13.8	0.9	13.7	0.8	12.3	1.0	13.1	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	1.0	16.9	1.0	16.9	1.0	16.9	1.0	16.9	1.0	16.9	ns
		$\overline{OE}$ to 2Yn	1.0	16.9	0.8	12.9	0.8	11.4	0.7	9.7	0.7	9.2	ns
$V_{CC(A)}$ = 1.4 V to 1.6 V													
t_{pd}	propagation delay	A to 1Yn	0.7	10.4	0.7	10.4	0.7	10.4	0.7	10.4	0.7	10.4	ns
		A to 2Yn	0.8	14.1	0.7	10.4	0.6	9.0	0.5	7.3	0.5	6.8	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	0.8	11.0	0.8	11.0	0.8	11.0	0.8	11.0	0.8	11.0	ns
		$\overline{OE}$ to 2Yn	0.9	14.0	0.8	11.0	0.8	11.0	0.7	9.5	0.9	10.2	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	0.7	10.9	0.7	10.9	0.7	10.9	0.7	10.9	0.7	10.9	ns
		$\overline{OE}$ to 2Yn	0.9	15.1	0.7	10.9	0.7	9.3	0.6	7.6	0.6	6.8	ns
$V_{CC(A)}$ = 1.65 V to 1.95 V													
t_{pd}	propagation delay	A to 1Yn	0.6	8.3	0.6	8.3	0.6	8.3	0.6	8.3	0.6	8.3	ns
		A to 2Yn	0.8	13.6	0.7	9.7	0.6	8.3	0.5	6.7	0.5	6.0	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	0.8	10.0	0.8	10.0	0.8	10.0	0.8	10.0	0.8	10.0	ns
		$\overline{OE}$ to 2Yn	0.9	13.4	0.8	10.2	0.8	10.0	0.7	8.4	0.8	9.2	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	0.6	8.7	0.6	8.7	0.6	8.7	0.6	8.7	0.6	8.7	ns
		$\overline{OE}$ to 2Yn	0.9	14.5	0.7	10.2	0.6	8.7	0.6	6.9	0.5	6.2	ns
$V_{CC(A)}$ = 2.3 V to 2.7 V													
t_{pd}	propagation delay	A to 1Yn	0.5	5.9	0.5	5.9	0.5	5.9	0.5	5.9	0.5	5.9	ns
		A to 2Yn	0.8	12.9	0.6	9.1	0.6	7.6	0.5	5.9	0.4	5.2	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	0.6	7.5	0.6	7.5	0.6	7.5	0.6	7.5	0.6	7.5	ns
		$\overline{OE}$ to 2Yn	0.9	12.5	0.7	9.4	0.8	9.1	0.6	7.5	0.8	8.2	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	0.5	6.1	0.5	6.1	0.6	6.1	0.6	6.1	0.6	6.1	ns
		$\overline{OE}$ to 2Yn	0.8	13.7	0.7	9.5	0.6	8.0	0.5	6.1	0.5	5.3	ns
$V_{CC(A)}$ = 3.0 V to 3.6 V													
t_{pd}	propagation delay	A to 1Yn	0.4	4.9	0.4	4.9	0.4	4.9	0.4	4.9	0.4	4.9	ns
		A to 2Yn	0.8	12.5	0.6	8.7	0.5	7.2	0.5	5.6	0.4	4.9	ns
t_{dis}	disable time	$\overline{OE}$ to 1Yn	0.7	7.7	0.7	7.7	0.7	7.7	0.7	7.7	0.7	7.7	ns

Symbol	Parameter	Conditions	$V_{CC(B)}$										Unit
			1.2 V ± 0.1 V		1.5 V ± 0.1 V		1.8 V ± 0.15 V		2.5 V ± 0.2 V		3.3 V ± 0.3 V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
		$\overline{OE}$ to 2Yn	0.9	12.1	0.7	9.1	0.7	8.8	0.6	7.1	0.7	7.7	ns
t_{en}	enable time	$\overline{OE}$ to 1Yn	0.5	4.9	0.5	4.9	0.5	4.9	0.5	4.9	0.5	4.9	ns
		$\overline{OE}$ to 2Yn	0.8	13.4	0.6	9.2	0.6	7.6	0.5	5.7	0.5	4.9	ns

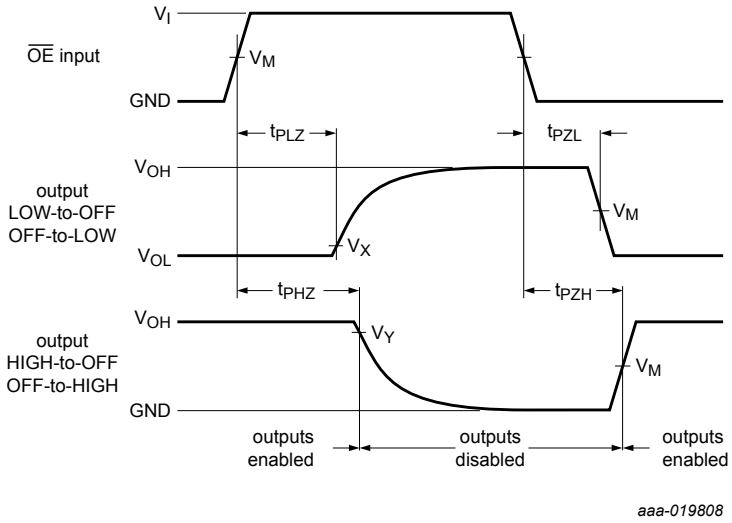
[1] t_{pd} is the same as t_{PLH} and t_{PHL};
t_{dis} is the same as t_{PLZ} and t_{PHZ};
t_{en} is the same as t_{PZL} and t_{PZH}.

11.1 Waveforms and test circuit



Measurement points are given in Table 16.
V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Figure 4. The data input (A) to output (nYn) propagation delay times



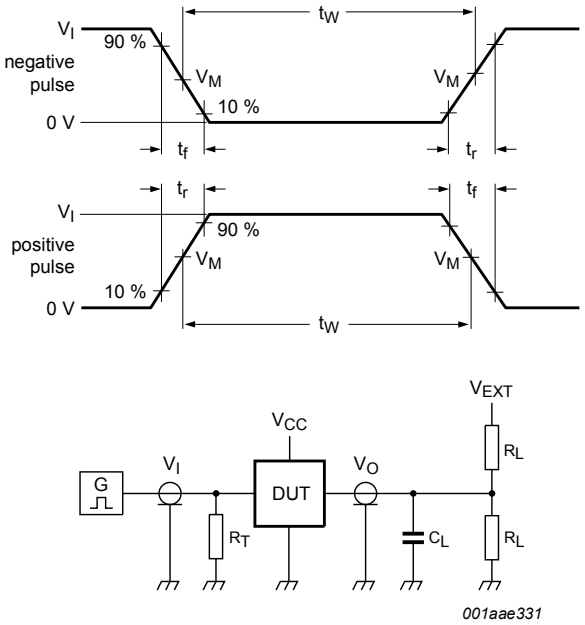
Measurement points are given in Table 16.
V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Figure 5. Enable and disable times

Table 16. Measurement points

Supply voltage	Input	Output		
$V_{CC(A)}$, $V_{CC(B)}$	V_M	V_M[1]	V_X	V_Y
0.8 V to 1.6 V	$0.5V_{CC(A)}$	$0.5V_{CCO}$	V_{OL} + 0.1 V	V_{OH} - 0.1 V
1.65 V to 2.7 V	$0.5V_{CC(A)}$	$0.5V_{CCO}$	V_{OL} + 0.15 V	V_{OH} - 0.15 V
3.0 V to 3.6 V	$0.5V_{CC(A)}$	$0.5V_{CCO}$	V_{OL} + 0.3 V	V_{OH} - 0.3 V

[1] V_{CCO} is the supply voltage associated with the output port.



Test data is given in Table 17

R_L = Load resistance.

C_L = Load capacitance including jig and probe capacitance.

R_T = Termination resistance.

V_{EXT} = External voltage for measuring switching times.

Figure 6. Test circuit for measuring switching times

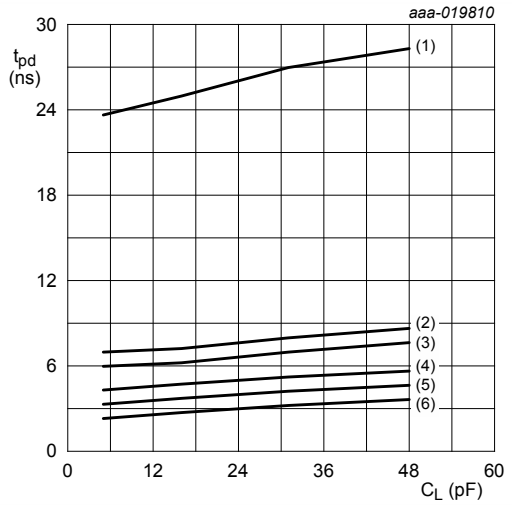
Table 17. Test data

Supply voltage	Input		Load		V_{EXT}		
$V_{CC(A)}$, $V_{CC(B)}$	V_I	$\Delta t/\Delta V$[1]	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}[2]
0.8 V to 1.6 V	$V_{CC(A)}$	≤ 1.0 ns/V	15 pF	2 kΩ	open	GND	$2V_{CCO}$
1.65 V to 2.7 V	$V_{CC(A)}$	≤ 1.0 ns/V	15 pF	2 kΩ	open	GND	$2V_{CCO}$
3.0 V to 3.6 V	$V_{CC(A)}$	≤ 1.0 ns/V	15 pF	2 kΩ	open	GND	$2V_{CCO}$

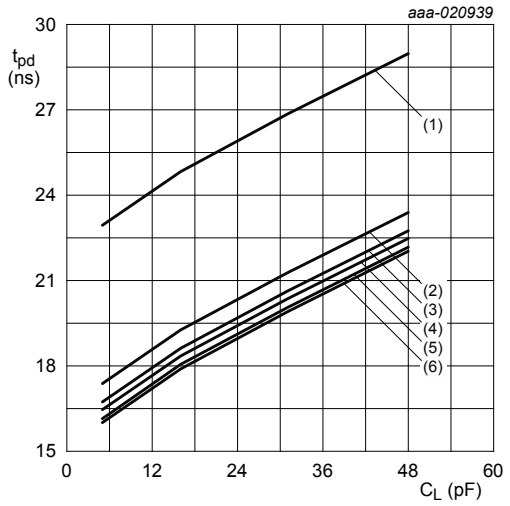
[1] dV/dt ≥ 1.0 V/ns

[2] V_{CCO} is the supply voltage associated with the output port.

12 Typical propagation delay characteristics



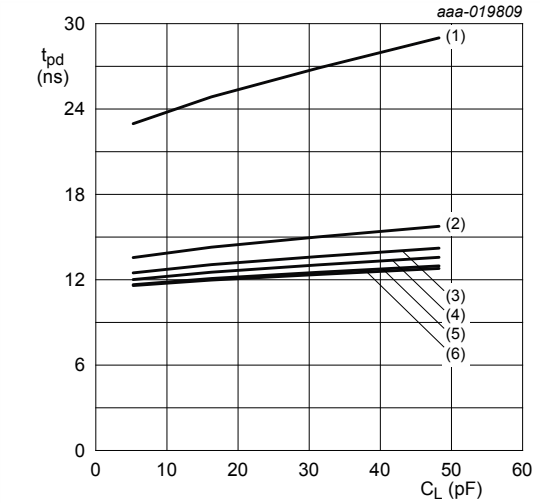
a. Propagation delay (A to 1Yn)



b. Propagation delay (A to 2Yn); $V_{CC(B)}$ = 0.8 V

(1) $V_{CC(A)}$ = 0.8 V.
(2) $V_{CC(A)}$ = 1.2 V.
(3) $V_{CC(A)}$ = 1.5 V.
(4) $V_{CC(A)}$ = 1.8 V.
(5) $V_{CC(A)}$ = 2.5 V.
(6) $V_{CC(A)}$ = 3.3 V.

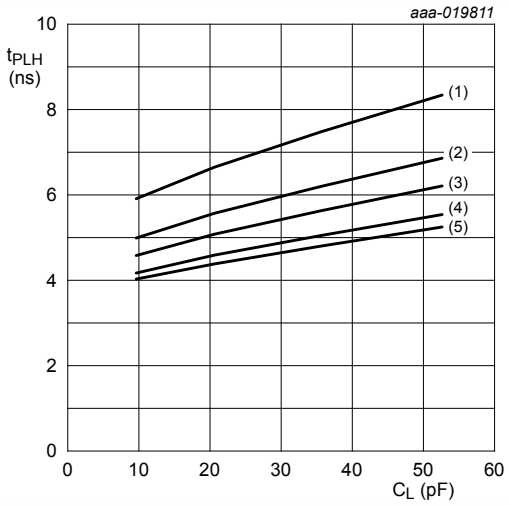
Figure 7. Typical propagation delay versus load capacitance; T_{amb} = 25 °C



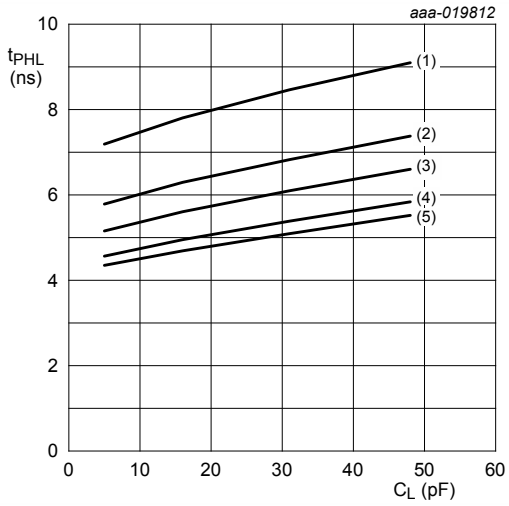
a. Propagation delay (A to 2Yn); $V_{CC(A)}$ = 0.8 V

(1) $V_{CC(B)}$ = 0.8 V.
(2) $V_{CC(B)}$ = 1.2 V.
(3) $V_{CC(B)}$ = 1.5 V.
(4) $V_{CC(B)}$ = 1.8 V.
(5) $V_{CC(B)}$ = 2.5 V.
(6) $V_{CC(B)}$ = 3.3 V.

Figure 8. Typical propagation delay versus load capacitance; T_{amb} = 25 °C



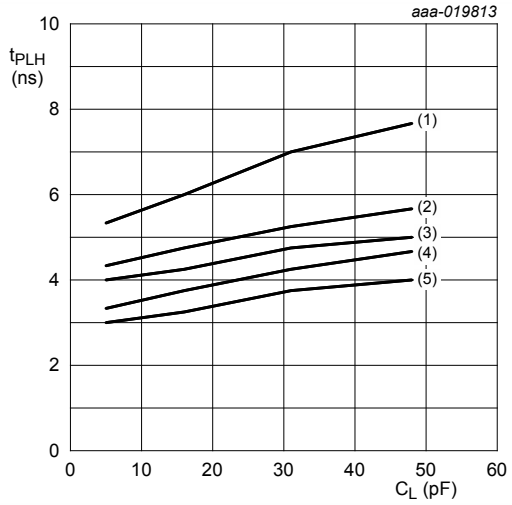
a. LOW to HIGH propagation delay (A to 2Yn); $V_{CC(A)}$ = 1.2 V



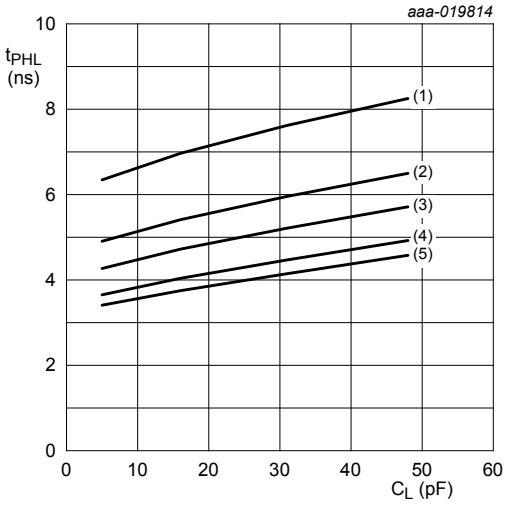
b. HIGH to LOW propagation delay (A to 2Yn); $V_{CC(A)}$ = 1.2 V

(1) $V_{CC(B)}$ = 1.2 V.
(2) $V_{CC(B)}$ = 1.5 V.
(3) $V_{CC(B)}$ = 1.8 V.
(4) $V_{CC(B)}$ = 2.5 V.
(5) $V_{CC(B)}$ = 3.3 V.

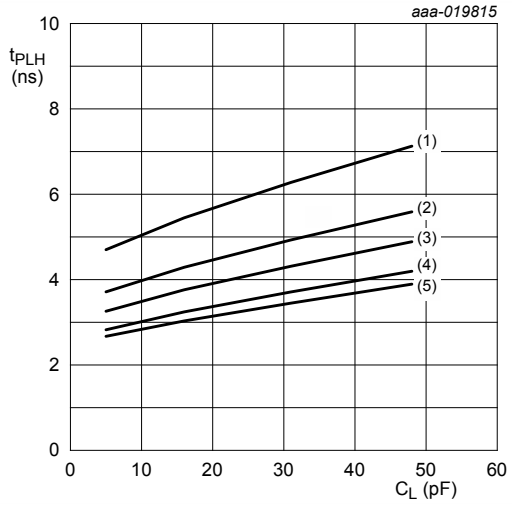
Figure 9. Typical propagation delay versus load capacitance; T_{amb} = 25 °C



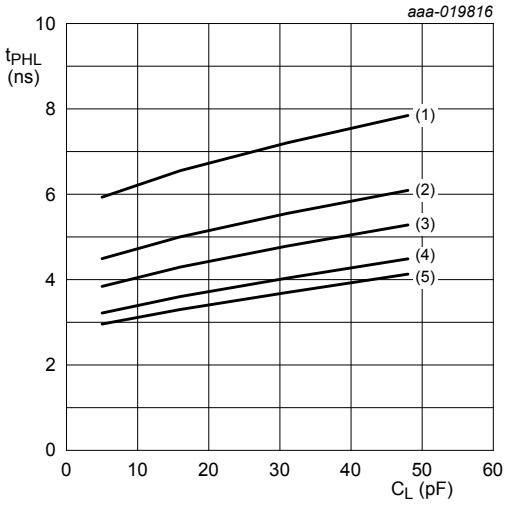
a. LOW to HIGH propagation delay (A to 2Yn);
$V_{CC(A)}$ = 1.5 V



b. HIGH to LOW propagation delay (A to 2Yn);
$V_{CC(A)}$ = 1.5 V



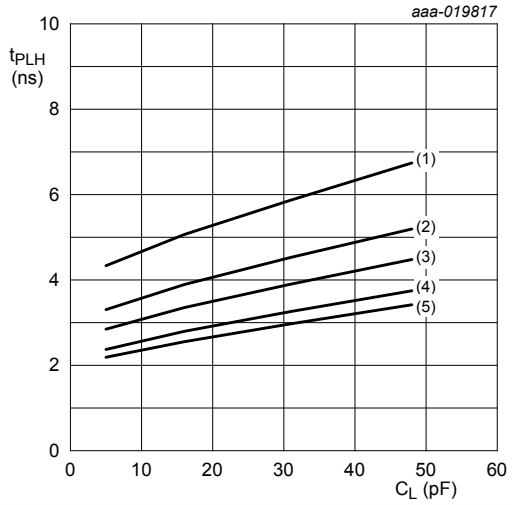
c. LOW to HIGH propagation delay (A to 2Yn);
$V_{CC(A)}$ = 1.8 V



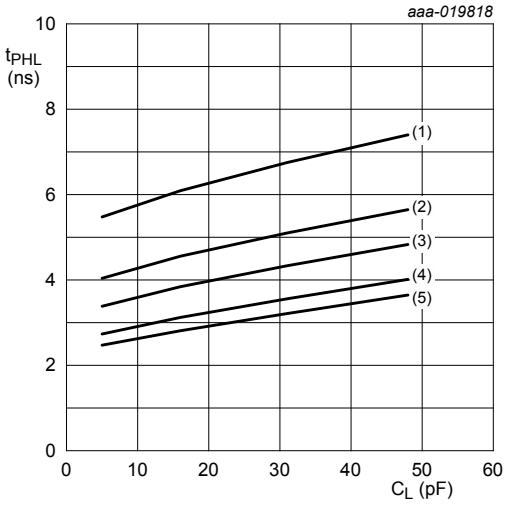
d. HIGH to LOW propagation delay (A to 2Yn);
$V_{CC(A)}$ = 1.8 V

(1) $V_{CC(B)}$ = 1.2 V.
(2) $V_{CC(B)}$ = 1.5 V.
(3) $V_{CC(B)}$ = 1.8 V.
(4) $V_{CC(B)}$ = 2.5 V.
(5) $V_{CC(B)}$ = 3.3 V.

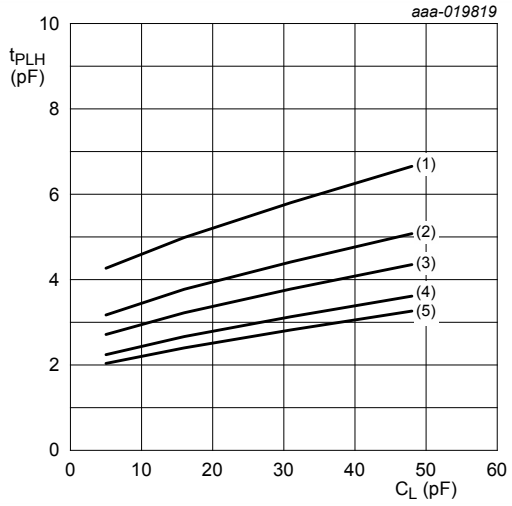
Figure 10. Typical propagation delay versus load capacitance; T_{amb} = 25 °C



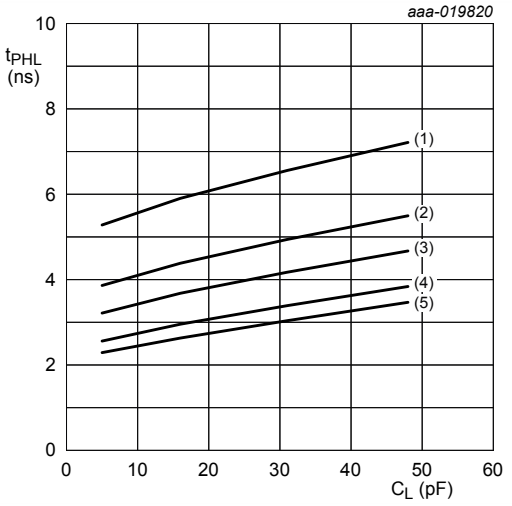
a. LOW to HIGH propagation delay (A to 2Yn);
$V_{CC(A)}$ = 2.5 V



b. HIGH to LOW propagation delay (A to 2Yn);
$V_{CC(A)}$ = 2.5 V



c. LOW to HIGH propagation delay (A to 2Yn);
$V_{CC(A)}$ = 3.3 V



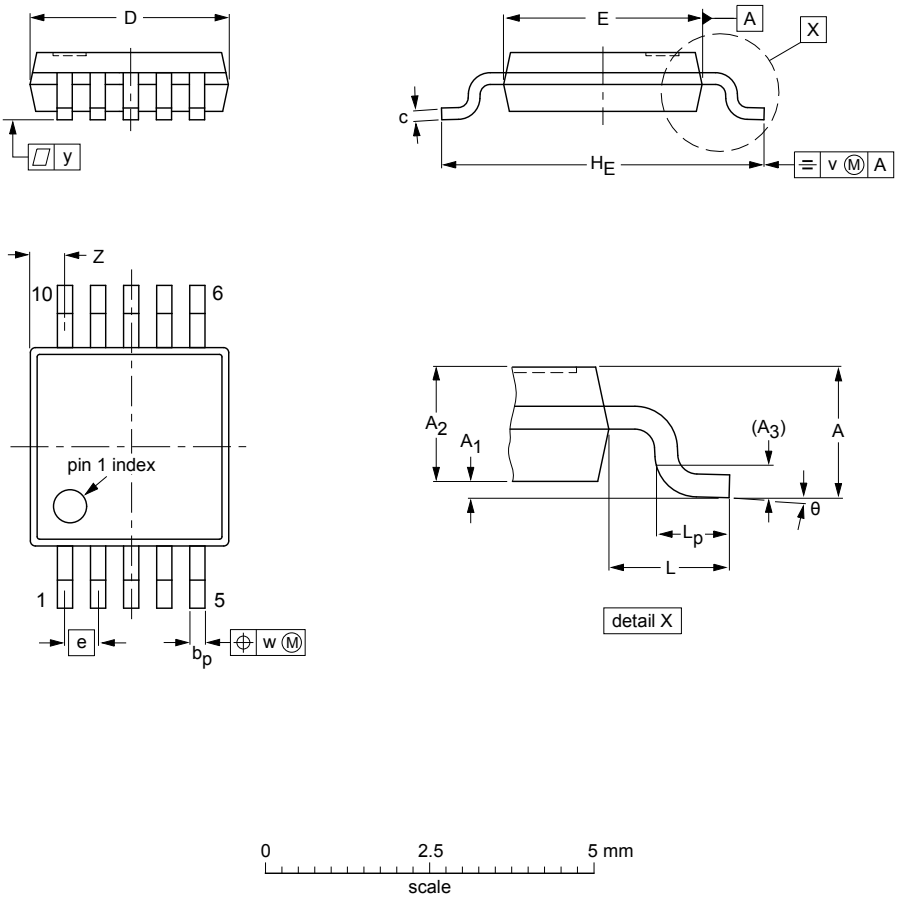
d. HIGH to LOW propagation delay (A to 2Yn);
$V_{CC(A)}$ = 3.3 V

(1) $V_{CC(B)}$ = 1.2 V.
(2) $V_{CC(B)}$ = 1.5 V.
(3) $V_{CC(B)}$ = 1.8 V.
(4) $V_{CC(B)}$ = 2.5 V.
(5) $V_{CC(B)}$ = 3.3 V.

Figure 11. Typical propagation delay versus load capacitance; T_{amb} = 25 °C

13 Package outline

TSSOP10: plastic thin shrink small outline package; 10 leads; body width 3 mm **SOT552-1**



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	v	w	y	$Z^{(1)}$	θ
mm	1.1	0.15 0.05	0.95 0.80	0.25	0.30 0.15	0.23 0.15	3.1 2.9	3.1 2.9	0.5	5.0 4.8	0.95	0.7 0.4	0.1	0.1	0.1	0.67 0.34	6° 0°

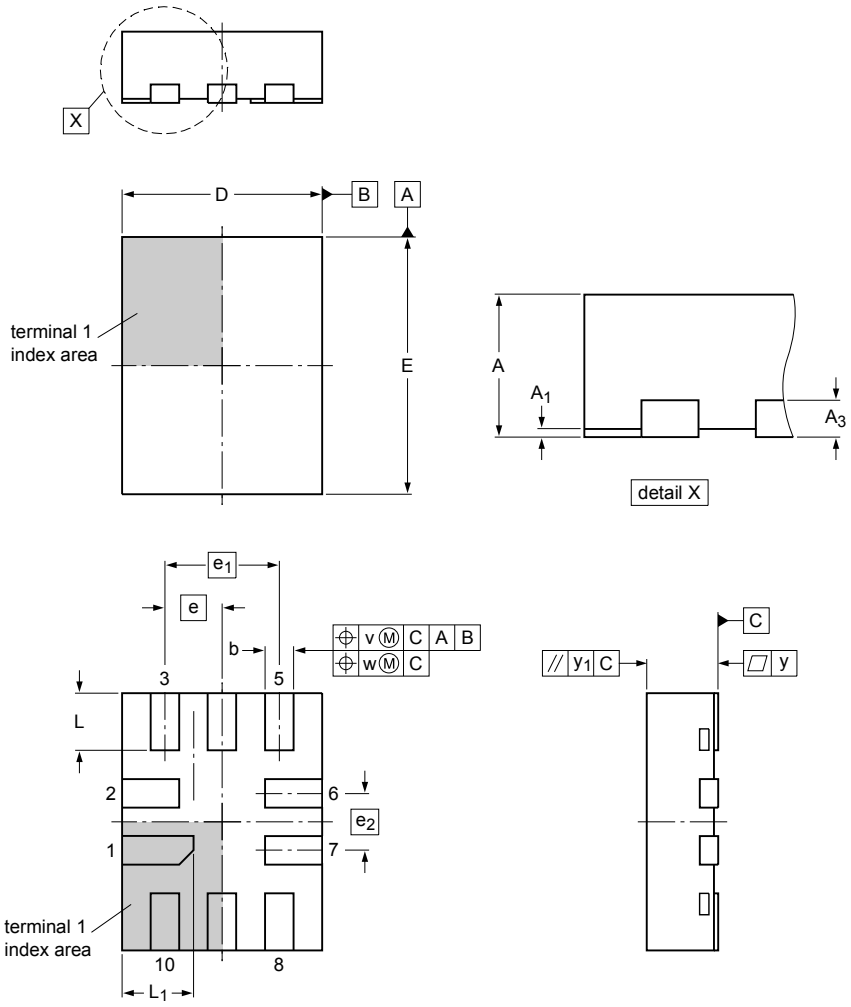
Notes

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT552-1						~~99-07-29~~ 03-02-18

Figure 12. Package outline SOT552-1 (TSSOP10)

XQFN10: plastic, extremely thin quad flat package; no leads; 10 terminals; body 1.40 x 1.80 x 0.50 mm **SOT1160-1**



Dimensions

Unit[1]		A	A_1	A_3	b	D	E	e	e_1	e_2	L	L_1	v	w	y	y_1
mm	max	0.5	0.05		0.25	1.5	1.9				0.45	0.55				
	nom			0.127	0.20	1.4	1.8	0.4	0.8	0.4	0.40	0.50	0.1	0.05	0.05	0.05
	min		0.00		0.15	1.3	1.7				0.35	0.45				

Note
1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

sot1160-1_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT1160-1	- - -	- - -	- - -		~~09-12-28~~ 09-12-29

Figure 13. Package outline SOT1160-1 (XQFN10)

14 Abbreviations

Table 18. Abbreviations

Acronym	Description
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model

15 Revision history

Table 19. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AVC1T1022 v.2	20170316	Product data sheet	-	74AVC1T1022 v.1
Modifications:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate.			
74AVC1T1022 v.1	20151207	Product data sheet	-	-

16 Legal information

16.1 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".
[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 URL http://www.nexperia.com.

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