

# 74AVC2T245-Q100

2-bit dual supply translating transceiver with configurable voltage translation; 3-state

Rev. 2 — 2 July 2024

Product data sheet

## 1. General description

The 74AVC2T245-Q100 is a 2-bit, dual supply transceiver that enables bidirectional level translation. The device can be used as two 1-bit transceivers or as a 2-bit transceiver. It features two 2-bit input-output ports (An and Bn) and direction control inputs (DIRn), an output enable input ( $\overline{OE}$ ) and dual supply pins ( $V_{CC(A)}$  and  $V_{CC(B)}$ ). Both  $V_{CC(A)}$  and  $V_{CC(B)}$  can be supplied at any voltage between 0.8 V and 3.6 V making the device suitable for translating between any of the low voltage nodes (0.8 V, 1.2 V, 1.5 V, 1.8 V, 2.5 V and 3.3 V). Pins An,  $\overline{OE}$  and DIRn are referenced to  $V_{CC(A)}$  and pins Bn are referenced to  $V_{CC(B)}$ . A HIGH on DIRn allows transmission from An to Bn and a LOW on DIRn allows transmission from Bn to An. The output enable input ( $\overline{OE}$ ) can be used to disable the outputs so the buses are effectively isolated.

The device is fully specified for partial power-down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output, preventing any damaging backflow current through the device when it is powered down. In suspend mode when either  $V_{CC(A)}$  or  $V_{CC(B)}$  are at GND level, both An and Bn are in the high-impedance OFF-state.

This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

## 2. Features and benefits

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - Specified from -40 °C to +85 °C and from -40 °C to +125 °C
- 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)
- Maximum data rates:
  - 380 Mbit/s ( $\geq 1.8$  V to 3.3 V translation)
  - 200 Mbit/s ( $\geq 1.1$  V to 3.3 V translation)
  - 200 Mbit/s ( $\geq 1.1$  V to 2.5 V translation)
  - 200 Mbit/s ( $\geq 1.1$  V to 1.8 V translation)
  - 150 Mbit/s ( $\geq 1.1$  V to 1.5 V translation)
  - 100 Mbit/s ( $\geq 1.1$  V to 1.2 V translation)
- Suspend mode
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Inputs accept voltages up to 3.6 V
- $I_{OFF}$  circuitry provides partial Power-down mode operation
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 3B exceeds 8000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V

3. Ordering information

Table 1. Ordering information

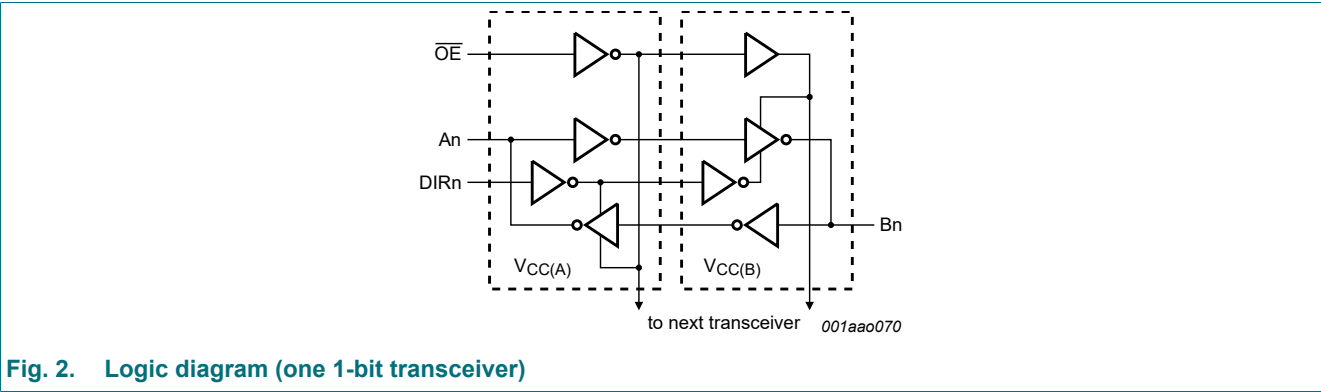
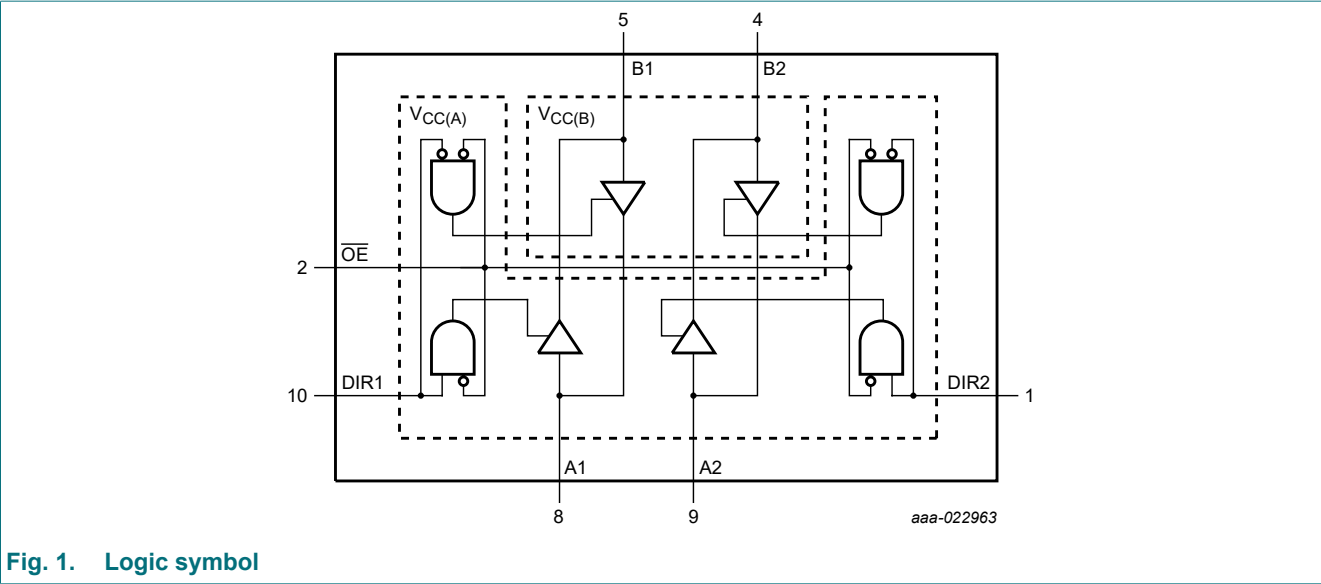
Type number	Package			
	Temperature range	Name	Description	Version
74AVC2T245GU-Q100	-40 °C to +125 °C	XQFN10	plastic, extremely thin quad flat package; no leads; 10 terminals; body 1.40 × 1.80 × 0.50 mm	<a href="#">SOT1160-1</a>

4. Marking

Table 2. Marking codes

Type number	Marking code
74AVC2T245GU-Q100	B3

5. Functional diagram



6. Pinning information

6.1. Pinning

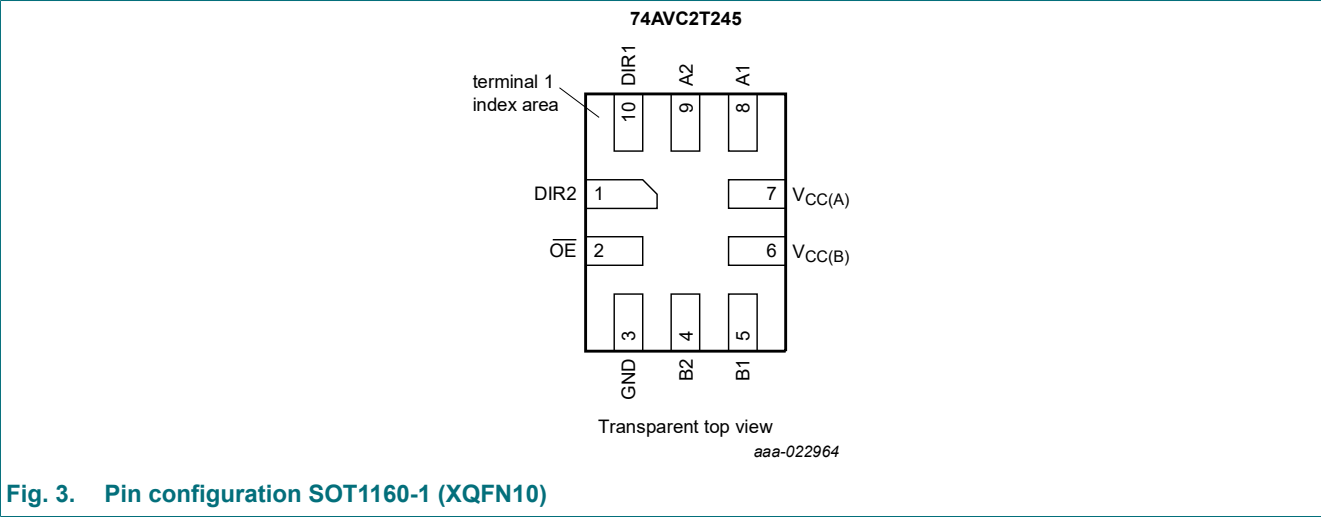


Fig. 3. Pin configuration SOT1160-1 (XQFN10)

6.2. Pin description

Table 3. Pin description

Symbol	Pin	Description
DIR1, DIR2	10, 1	direction control
$\overline{\text{OE}}$	2	output enable input (active LOW)
V <sub>CC(B)</sub>	6	supply voltage B (Bn inputs are referenced to V <sub>CC(B)</sub> )
V <sub>CC(A)</sub>	7	supply voltage A (An, $\overline{\text{OE}}$ and DIRn inputs are referenced to V <sub>CC(A)</sub> )
A1, A2	8, 9	data input or output
B1, B2	5, 4	data input or output
GND	3	ground (0 V)

7. Functional description

Table 4. Function table

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

Supply voltage	Input		Input/output	
V <sub>CC(A)</sub> , V <sub>CC(B)</sub>	$\overline{\text{OE}}$ [1]	DIRn[1]	An[1]	Bn[1]
0.8 V to 3.6 V	L	L	An = Bn	input
0.8 V to 3.6 V	L	H	input	Bn = An
0.8 V to 3.6 V	H	X	Z	Z
GND[2]	X	X	Z	Z

[1] The An, DIRn and  $\overline{\text{OE}}$  input circuit is referenced to V<sub>CC(A)</sub>; The Bn input circuit is referenced to V<sub>CC(B)</sub>.  
[2] If at least one of V<sub>CC(A)</sub> or V<sub>CC(B)</sub> is at GND level, the device goes into suspend mode.

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 <sub>CC(A)</sub>	supply voltage A		-0.5	+4.6	V
V <sub>CC(B)</sub>	supply voltage B		-0.5	+4.6	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V	-50	-	mA
V <sub>I</sub>	input voltage	[1]	-0.5	+4.6	V
I <sub>OK</sub>	output clamping current	V <sub>O</sub> < 0 V	-50	-	mA
V <sub>O</sub>	output voltage	Active mode [1] [2] [3]	-0.5	V <sub>CCO</sub> + 0.5	V
		Suspend or 3-state mode [1]	-0.5	+4.6	V
I <sub>O</sub>	output current	V <sub>O</sub> = 0 V to V <sub>CCO</sub> [2]	-	±50	mA
I <sub>CC</sub>	supply current	I <sub>CC(A)</sub> or I <sub>CC(B)</sub>	-	100	mA
I <sub>GND</sub>	ground current		-100	-	mA
T <sub>stg</sub>	storage temperature		-65	+150	°C
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = -40 °C to +125 °C [4]	-	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<sub>CCO</sub> is the supply voltage associated with the output port.
- [3] V<sub>CCO</sub> + 0.5 V should not exceed 4.6 V.
- [4] For SOT1160-1 (XQFN10) package: P<sub>tot</sub> derates linearly with 7.1 mW/K above 115 °C.

9. Recommended operating conditions

Table 6. Recommended operating conditions

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

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CC(A)</sub>	supply voltage A		0.8	3.6	V
V <sub>CC(B)</sub>	supply voltage B		0.8	3.6	V
V <sub>I</sub>	input voltage		0	3.6	V
V <sub>O</sub>	output voltage	Active mode [1]	0	V <sub>CCO</sub>	V
		Suspend or 3-state mode	0	3.6	V
T <sub>amb</sub>	ambient temperature		-40	+125	°C
Δt/ΔV	input transition rise and fall rate	V <sub>CCI</sub> = 0.8 V to 3.6 V [2]	-	5	ns/V

- [1] V<sub>CCO</sub> is the supply voltage associated with the output port.
- [2] V<sub>CCI</sub> is the supply voltage associated with the input port.

10. Static characteristics

Table 7. Typical static characteristics at T<sub>amb</sub> = 25 °C [1] [2]

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = -1.5 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 0.8 V	-	0.69	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 1.5 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 0.8 V	-	0.07	-	V
I <sub>I</sub>	input leakage current	DIRn, $\overline{\text{OE}}$ input; V <sub>I</sub> = 0 V or 3.6 V; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 0.8 V to 3.6 V	-	±0.025	±0.25	µA
I <sub>OZ</sub>	OFF-state output current	A or B port; V <sub>O</sub> = 0 V or V <sub>CCO</sub> ; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 3.6 V [3]	-	±0.5	±2.5	µA
		suspend mode A port; V <sub>O</sub> = 0 V or V <sub>CCO</sub> ; V <sub>CC(A)</sub> = 3.6 V; V <sub>CC(B)</sub> = 0 V [3]	-	±0.5	±2.5	µA
		suspend mode B port; V <sub>O</sub> = 0 V or V <sub>CCO</sub> ; V <sub>CC(A)</sub> = 0 V; V <sub>CC(B)</sub> = 3.6 V [3]	-	±0.5	±2.5	µA
I <sub>OFF</sub>	power-off leakage current	V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V	-	±0.1	±1	µA
		A port; V <sub>CC(A)</sub> = 0 V; V <sub>CC(B)</sub> = 0.8 V to 3.6 V	-	±0.1	±1	µA
		B port; V <sub>CC(B)</sub> = 0 V; V <sub>CC(A)</sub> = 0.8 V to 3.6 V	-	±0.1	±1	µA
C <sub>I</sub>	input capacitance	DIRn, $\overline{\text{OE}}$ input; V <sub>I</sub> = 0 V or 3.3 V; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 3.3 V	-	2.0	-	pF
C <sub>I/O</sub>	input/output capacitance	A and B port; V <sub>O</sub> = 3.3 V or 0 V; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 3.3 V	-	4.0	-	pF

[1] V<sub>CCO</sub> is the supply voltage associated with the output port.  
[2] V<sub>CCI</sub> is the supply voltage associated with the data input port.  
[3] For I/O ports, the parameter I<sub>OZ</sub> includes the input leakage current.

Table 8. Static characteristics [1] [2]

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

Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
V <sub>IH</sub>	HIGH-level input voltage	data input					
		V <sub>CCI</sub> = 0.8 V	0.70V <sub>CCI</sub>	-	0.70V <sub>CCI</sub>	-	V
		V <sub>CCI</sub> = 1.1 V to 1.95 V	0.65V <sub>CCI</sub>	-	0.65V <sub>CCI</sub>	-	V
		V <sub>CCI</sub> = 2.3 V to 2.7 V	1.6	-	1.6	-	V
		V <sub>CCI</sub> = 3.0 V to 3.6 V	2	-	2	-	V
		DIRn, $\overline{\text{OE}}$ input					
		V <sub>CC(A)</sub> = 0.8 V	0.70V <sub>CC(A)</sub>	-	0.70V <sub>CC(A)</sub>	-	V
		V <sub>CC(A)</sub> = 1.1 V to 1.95 V	0.65V <sub>CC(A)</sub>	-	0.65V <sub>CC(A)</sub>	-	V
		V <sub>CC(A)</sub> = 2.3 V to 2.7 V	1.6	-	1.6	-	V
		V <sub>CC(A)</sub> = 3.0 V to 3.6 V	2	-	2	-	V

## 2-bit dual supply translating transceiver with configurable voltage translation; 3-state

Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
V <sub>IL</sub>	LOW-level input voltage	data input					
		V <sub>CCI</sub> = 0.8 V	-	0.30V <sub>CCI</sub>	-	0.30V <sub>CCI</sub>	V
		V <sub>CCI</sub> = 1.1 V to 1.95 V	-	0.35V <sub>CCI</sub>	-	0.35V <sub>CCI</sub>	V
		V <sub>CCI</sub> = 2.3 V to 2.7 V	-	0.7	-	0.7	V
		V <sub>CCI</sub> = 3.0 V to 3.6 V	-	0.8	-	0.8	V
		DIRn, $\overline{\text{OE}}$ input					
		V <sub>CC(A)</sub> = 0.8 V	-	0.30V <sub>CC(A)</sub>	-	0.30V <sub>CC(A)</sub>	V
		V <sub>CC(A)</sub> = 1.1 V to 1.95 V	-	0.35V <sub>CC(A)</sub>	-	0.35V <sub>CC(A)</sub>	V
		V <sub>CC(A)</sub> = 2.3 V to 2.7 V	-	0.7	-	0.7	V
		V <sub>CC(A)</sub> = 3.0 V to 3.6 V	-	0.8	-	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>					
		I <sub>O</sub> = -100 $\mu$ A; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 0.8 V to 3.6 V	V <sub>CCO</sub> - 0.1	-	V <sub>CCO</sub> - 0.1	-	V
		I <sub>O</sub> = -3 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 1.1 V	0.85	-	0.85	-	V
		I <sub>O</sub> = -6 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 1.4 V	1.05	-	1.05	-	V
		I <sub>O</sub> = -8 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 1.65 V	1.2	-	1.2	-	V
		I <sub>O</sub> = -9 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 2.3 V	1.75	-	1.75	-	V
		I <sub>O</sub> = -12 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 3.0 V	2.3	-	2.3	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>					
		I <sub>O</sub> = 100 $\mu$ A; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 0.8 V to 3.6 V	-	0.1	-	0.1	V
		I <sub>O</sub> = 3 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 1.1 V	-	0.25	-	0.25	V
		I <sub>O</sub> = 6 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 1.4 V	-	0.35	-	0.35	V
		I <sub>O</sub> = 8 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 1.65 V	-	0.45	-	0.45	V
		I <sub>O</sub> = 9 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 2.3 V	-	0.55	-	0.55	V
		I <sub>O</sub> = 12 mA; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 3.0 V	-	0.7	-	0.7	V
I <sub>I</sub>	input leakage current	DIRn, $\overline{\text{OE}}$ input; V <sub>I</sub> = 0 V or 3.6 V; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 0.8 V to 3.6 V	-	±1	-	±5	$\mu$ A
I <sub>OZ</sub>	OFF-state output current	A or B port; V <sub>O</sub> = 0 V or V <sub>CCO</sub> ; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 3.6 V [3]	-	±5	-	±30	$\mu$ A
		suspend mode A port; V <sub>O</sub> = 0 V or V <sub>CCO</sub> ; V <sub>CC(A)</sub> = 3.6 V; V <sub>CC(B)</sub> = 0 V [3]	-	±5	-	±30	$\mu$ A
		suspend mode B port; V <sub>O</sub> = 0 V or V <sub>CCO</sub> ; V <sub>CC(A)</sub> = 0 V; V <sub>CC(B)</sub> = 3.6 V [3]	-	±5	-	±30	$\mu$ A
I <sub>OFF</sub>	power-off leakage current	A port; V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC(A)</sub> = 0 V; V <sub>CC(B)</sub> = 0.8 V to 3.6 V	-	±5	-	±30	$\mu$ A
		B port; V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC(B)</sub> = 0 V; V <sub>CC(A)</sub> = 0.8 V to 3.6 V	-	±5	-	±30	$\mu$ A

2-bit dual supply translating transceiver with configurable voltage translation; 3-state

Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
I <sub>CC</sub>	supply current	A port; V <sub>I</sub> = 0 V or V <sub>CCI</sub> ; I <sub>O</sub> = 0 A					
		V <sub>CC(A)</sub> = 0.8 V to 3.6 V; V <sub>CC(B)</sub> = 0.8 V to 3.6 V	-	10	-	55	µA
		V <sub>CC(A)</sub> = 1.1 V to 3.6 V; V <sub>CC(B)</sub> = 1.1 V to 3.6 V	-	8	-	50	µA
		V <sub>CC(A)</sub> = 3.6 V; V <sub>CC(B)</sub> = 0 V	-	8	-	50	µA
		V <sub>CC(A)</sub> = 0 V; V <sub>CC(B)</sub> = 3.6 V	-2	-	-12	-	µA
		B port; V <sub>I</sub> = 0 V or V <sub>CCI</sub> ; I <sub>O</sub> = 0 A					
		V <sub>CC(A)</sub> = 0.8 V to 3.6 V; V <sub>CC(B)</sub> = 0.8 V to 3.6 V	-	10	-	55	µA
		V <sub>CC(A)</sub> = 1.1 V to 3.6 V; V <sub>CC(B)</sub> = 1.1 V to 3.6 V	-	8	-	50	µA
		V <sub>CC(A)</sub> = 3.6 V; V <sub>CC(B)</sub> = 0 V	-2	-	-12	-	µA
		V <sub>CC(A)</sub> = 0 V; V <sub>CC(B)</sub> = 3.6 V	-	8	-	50	µA
		A plus B port (I <sub>CC(A)</sub> + I <sub>CC(B)</sub> ); I <sub>O</sub> = 0 A; V <sub>I</sub> = 0 V or V <sub>CCI</sub> ; V <sub>CC(A)</sub> = 0.8 V to 3.6 V; V <sub>CC(B)</sub> = 0.8 V to 3.6 V	-	20	-	70	µA
		A plus B port (I <sub>CC(A)</sub> + I <sub>CC(B)</sub> ); I <sub>O</sub> = 0 A; V <sub>I</sub> = 0 V or V <sub>CCI</sub> ; V <sub>CC(A)</sub> = 1.1 V to 3.6 V; V <sub>CC(B)</sub> = 1.1 V to 3.6 V	-	16	-	65	µA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = 3.0 V; V <sub>CC(A)</sub> = V <sub>CC(B)</sub> = 3.6 V	-	500	-	650	µA

- [1] V<sub>CCO</sub> is the supply voltage associated with the output port.
- [2] V<sub>CCI</sub> is the supply voltage associated with the data input port.
- [3] For I/O ports, the parameter I<sub>OZ</sub> includes the input leakage current.

Table 9. Typical total supply current (I<sub>CC(A)</sub> + I<sub>CC(B)</sub>)

V <sub>CC(A)</sub>	V <sub>CC(B)</sub>							Unit
	0 V	0.8 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	
0 V	0	0.1	0.1	0.1	0.1	0.1	0.1	µA
0.8 V	0.1	0.1	0.1	0.1	0.1	0.3	1.6	µA
1.2 V	0.1	0.1	0.1	0.1	0.1	0.1	0.8	µA
1.5 V	0.1	0.1	0.1	0.1	0.1	0.1	0.4	µA
1.8 V	0.1	0.1	0.1	0.1	0.1	0.1	0.2	µA
2.5 V	0.1	0.3	0.1	0.1	0.1	0.1	0.1	µA
3.3 V	0.1	1.6	0.8	0.4	0.2	0.1	0.1	µA

11. Dynamic characteristics

Table 10. Typical power dissipation capacitance at  $V_{CC(A)} = V_{CC(B)}$  and  $T_{amb} = 25\text{ }^{\circ}\text{C}$  [1] [2]

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

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	A port: (direction An to Bn); output enabled	0.2	0.2	0.2	0.2	0.3	0.6	pF
		A port: (direction An to Bn); output disabled	0.2	0.2	0.2	0.2	0.3	0.6	pF
		A port: (direction Bn to An); output enabled	9	9	9	10	12	14	pF
		A port: (direction Bn to An); output disabled	0.6	0.7	0.7	0.7	0.8	0.9	pF
		B port: (direction An to Bn); output enabled	9	9	9	10	12	14	pF
		B port: (direction An to Bn); output disabled	0.6	0.7	0.7	0.7	0.8	0.9	pF
		B port: (direction Bn to An); output enabled	0.2	0.2	0.2	0.2	0.3	0.6	pF
		B port: (direction Bn to An); output disabled	0.2	0.2	0.2	0.2	0.3	0.6	pF

[1]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).

$$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$$
 where:

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

$C_L$  = 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 the outputs.

[2]  $f_i = 10\text{ MHz}$ ;  $V_i = \text{GND to } V_{CC}$ ;  $t_r = t_f = 1\text{ ns}$ ;  $C_L = 0\text{ pF}$ ;  $R_L = \infty\text{ }\Omega$ .

Table 11. Typical dynamic characteristics at  $V_{CC(A)} = 0.8\text{ V}$  and  $T_{amb} = 25\text{ }^{\circ}\text{C}$  [1]

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 6; for waveforms see Fig. 4 and Fig. 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	An to Bn	17.5	8.0	7.0	6.7	6.6	6.7	ns
		Bn to An	17.6	14.8	14.4	14.2	14.0	13.8	ns
$t_{dis}$	disable time	$\overline{OE}$ to An	17.0	17.0	17.0	17.0	17.0	17.0	ns
		$\overline{OE}$ to Bn	19.7	10.9	9.8	10.0	9.3	9.9	ns
$t_{en}$	enable time	$\overline{OE}$ to An	30.3	30.2	30.2	30.2	30.1	30.1	ns
		$\overline{OE}$ to Bn	34.3	22.7	21.5	21.0	21.1	21.5	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  $t_{PZH}$ .



2-bit dual supply translating transceiver with configurable voltage translation; 3-state

Table 12. Typical dynamic characteristics at  $V_{CC(B)} = 0.8\text{ V}$  and  $T_{amb} = 25\text{ }^{\circ}\text{C}$  [1]  
Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 6; for waveforms see Fig. 4 and Fig. 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	An to Bn	17.5	14.8	14.3	14.1	13.9	13.8	ns
		Bn to An	17.6	8.0	7.1	6.8	6.6	6.7	ns
$t_{dis}$	disable time	$\overline{OE}$ to An	17.0	5.8	4.1	4.0	2.9	3.4	ns
		$\overline{OE}$ to Bn	19.7	15.6	15.0	14.7	14.4	14.1	ns
$t_{en}$	enable time	$\overline{OE}$ to An	30.3	6.2	4.1	3.1	2.2	1.8	ns
		$\overline{OE}$ to Bn	34.3	18.1	17.2	16.8	16.5	16.3	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  $t_{PZH}$ .

2-bit dual supply translating transceiver with configurable voltage translation; 3-state

Table 13. Dynamic characteristics for temperature range -40 °C to +85 °C [1]  
Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 6; for waveforms see Fig. 4 and Fig. 5.

Symbol	Parameter	Conditions	V <sub>CC(B)</sub>										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 <sub>CC(A)</sub> = 1.1 V to 1.3 V													
t <sub>pd</sub>	propagation delay	An to Bn	1.1	9.2	1.1	6.9	0.9	5.9	0.9	5.3	0.8	5.2	ns
		Bn to An	1.1	9.2	1	8.5	1	8.2	0.9	8.2	0.8	8	ns
t <sub>dis</sub>	disable time	OE to An	2.4	10	2.4	10	2.4	10	2.4	10	2.4	10	ns
		OE to Bn	2.7	10.8	2.3	8.4	2.5	8	2.1	7	2.6	7.8	ns
t <sub>en</sub>	enable time	OE to An	1.5	12.4	1.5	12.4	1.5	12.4	1.5	12.4	1.5	12.4	ns
		OE to Bn	1.9	12.6	1.7	9.3	1.6	8	1.5	6.9	1.4	6.7	ns
V <sub>CC(A)</sub> = 1.4 V to 1.6 V													
t <sub>pd</sub>	propagation delay	An to Bn	1	8.5	1	5.5	0.9	4.7	0.9	3.8	0.8	3.5	ns
		Bn to An	1.1	6.9	1	5.5	1	5.3	0.9	5	0.8	4.8	ns
t <sub>dis</sub>	disable time	OE to An	2	6.3	2	6.3	2	6.3	2	6.3	2	6.3	ns
		OE to Bn	2.6	9.8	2.2	6.7	2.5	6.5	2	5.4	2.5	6	ns
t <sub>en</sub>	enable time	OE to An	1.2	6.8	1.2	6.8	1.2	6.8	1.2	6.8	1.2	6.8	ns
		OE to Bn	1.7	11	1.5	6.8	1.4	5.8	1.3	4.8	1.3	4.4	ns
V <sub>CC(A)</sub> = 1.65 V to 1.95 V													
t <sub>pd</sub>	propagation delay	An to Bn	1	8.2	1	5.3	0.9	4.4	0.8	3.4	0.7	3.2	ns
		Bn to An	0.9	5.9	0.9	4.7	0.9	4.4	0.8	4.1	0.7	3.9	ns
t <sub>dis</sub>	disable time	OE to An	2.1	5.9	2.1	5.9	2.1	5.9	2.1	5.9	2.1	5.9	ns
		OE to Bn	2.4	9.5	2.1	6.4	2.3	6.2	1.8	5	2.3	5.6	ns
t <sub>en</sub>	enable time	OE to An	1.1	5.3	1.1	5.3	1.1	5.3	1.1	5.3	1.1	5.3	ns
		OE to Bn	1.6	10.5	1.4	6.3	1.3	5.3	1.2	4.3	1.1	3.9	ns
V <sub>CC(A)</sub> = 2.3 V to 2.7 V													
t <sub>pd</sub>	propagation delay	An to Bn	0.9	8.2	0.9	5	0.8	4.1	0.7	3.1	0.6	2.7	ns
		Bn to An	0.9	5.3	0.9	3.8	0.8	3.4	0.7	3.1	0.6	3	ns
t <sub>dis</sub>	disable time	OE to An	1.5	4.3	1.5	4.3	1.5	4.3	1.5	4.3	1.5	4.3	ns
		OE to Bn	2.3	9	1.9	6	2.2	5.8	1.6	4.6	2.1	5.1	ns
t <sub>en</sub>	enable time	OE to An	0.9	3.6	0.9	3.6	0.9	3.6	0.9	3.6	0.9	3.6	ns
		OE to Bn	1.3	10	1.3	5.8	1.2	4.8	1.1	3.7	1.1	3.3	ns
V <sub>CC(A)</sub> = 3.0 V to 3.6 V													
t <sub>pd</sub>	propagation delay	An to Bn	0.8	8	0.8	4.8	0.7	3.9	0.6	3	0.5	2.6	ns
		Bn to An	0.8	5.2	0.8	3.5	0.7	3.2	0.6	2.7	0.5	2.6	ns
t <sub>dis</sub>	disable time	OE to An	1.9	4.7	1.9	4.7	1.9	4.7	1.9	4.7	1.9	4.7	ns
		OE to Bn	2.2	8.6	1.9	5.8	2	5.6	1.5	4.4	2	5	ns
t <sub>en</sub>	enable time	OE to An	0.9	2.9	0.9	2.9	0.9	2.9	0.9	2.9	0.9	2.9	ns
		OE to Bn	1.5	9.8	1.4	5.6	1.2	4.6	1.1	3.5	1.1	3.1	ns

[1] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>; t<sub>dis</sub> is the same as t<sub>PLZ</sub> and t<sub>PHZ</sub>; t<sub>en</sub> is the same as t<sub>PZL</sub> and t<sub>PZH</sub>.

## 2-bit dual supply translating transceiver with configurable voltage translation; 3-state

Table 14. Dynamic characteristics for temperature range -40 °C to +125 °C [1]

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

Symbol	Parameter	Conditions	V <sub>CC(B)</sub>										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 <sub>CC(A)</sub> = 1.1 V to 1.3 V													
t <sub>pd</sub>	propagation delay	An to Bn	1.1	9.7	1.1	7.3	0.9	6.3	0.9	5.6	0.8	5.5	ns
		Bn to An	1.1	9.7	1	8.9	1	8.6	0.9	8.6	0.8	8.4	ns
t <sub>dis</sub>	disable time	OE to An	2.4	10.5	2.4	10.5	2.4	10.5	2.4	10.5	2.4	10.5	ns
		OE to Bn	2.7	11.6	2.3	9.1	2.5	8.6	2.1	7.5	2.6	8.4	ns
t <sub>en</sub>	enable time	OE to An	1.5	13	1.5	13	1.5	13	1.5	13	1.5	13	ns
		OE to Bn	1.9	13	1.7	9.6	1.6	8.4	1.5	7.2	1.4	7	ns
V <sub>CC(A)</sub> = 1.4 V to 1.6 V													
t <sub>pd</sub>	propagation delay	An to Bn	1	8.9	1	5.7	0.9	4.9	0.9	4	0.8	3.7	ns
		Bn to An	1.1	7.3	1	5.7	1	5.5	0.9	5.2	0.8	5.1	ns
t <sub>dis</sub>	disable time	OE to An	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	ns
		OE to Bn	2.6	10.2	2.2	7.1	2.5	6.9	2	5.7	2.5	6.3	ns
t <sub>en</sub>	enable time	OE to An	1.2	7.3	1.2	7.3	1.2	7.3	1.2	7.3	1.2	7.3	ns
		OE to Bn	1.7	11.4	1.5	7.1	1.4	6.1	1.3	5.1	1.3	4.7	ns
V <sub>CC(A)</sub> = 1.65 V to 1.95 V													
t <sub>pd</sub>	propagation delay	An to Bn	1	8.6	1	5.5	0.9	4.6	0.8	3.6	0.7	3.4	ns
		Bn to An	0.9	6.3	0.9	4.9	0.9	4.6	0.8	4.3	0.7	4.1	ns
t <sub>dis</sub>	disable time	OE to An	2.1	6.2	2.1	6.2	2.1	6.2	2.1	6.2	2.1	6.2	ns
		OE to Bn	2.4	10	2.1	6.8	2.3	6.6	1.8	5.3	2.3	5.9	ns
t <sub>en</sub>	enable time	OE to An	1.1	5.7	1.1	5.7	1.1	5.7	1.1	5.7	1.1	5.7	ns
		OE to Bn	1.6	11	1.4	6.7	1.3	5.7	1.2	4.6	1.1	4.2	ns
V <sub>CC(A)</sub> = 2.3 V to 2.7 V													
t <sub>pd</sub>	propagation delay	An to Bn	0.9	8.6	0.9	5.2	0.8	4.3	0.7	3.3	0.6	2.9	ns
		Bn to An	0.9	5.6	0.9	4	0.8	3.6	0.7	3.3	0.6	3.2	ns
t <sub>dis</sub>	disable time	OE to An	1.5	4.6	1.5	4.6	1.5	4.6	1.5	4.6	1.5	4.6	ns
		OE to Bn	2.3	9.5	1.9	6.4	2.2	6.1	1.6	4.9	2.1	5.4	ns
t <sub>en</sub>	enable time	OE to An	0.9	3.9	0.9	3.9	0.9	3.9	0.9	3.9	0.9	3.9	ns
		OE to Bn	1.3	10.5	1.3	6.2	1.2	5.1	1.1	4	1.1	3.6	ns
V <sub>CC(A)</sub> = 3.0 V to 3.6 V													
t <sub>pd</sub>	propagation delay	An to Bn	0.8	8.4	0.8	5.1	0.7	4.1	0.6	3.2	0.5	2.7	ns
		Bn to An	0.8	5.5	0.8	3.7	0.7	3.4	0.6	2.9	0.5	2.7	ns
t <sub>dis</sub>	disable time	OE to An	1.9	5	1.9	5	1.9	5	1.9	5	1.9	5	ns
		OE to Bn	2.2	9	1.9	6.2	2	5.9	1.5	4.7	2	5.2	ns
t <sub>en</sub>	enable time	OE to An	0.9	3.1	0.9	3.1	0.9	3.1	0.9	3.1	0.9	3.1	ns
		OE to Bn	1.5	10.2	1.4	5.9	1.2	5	1.1	3.7	1.1	3.3	ns

[1] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>; t<sub>dis</sub> is the same as t<sub>PLZ</sub> and t<sub>PHZ</sub>; t<sub>en</sub> is the same as t<sub>PZL</sub> and t<sub>PZH</sub>.

11.1. Waveforms and test circuit

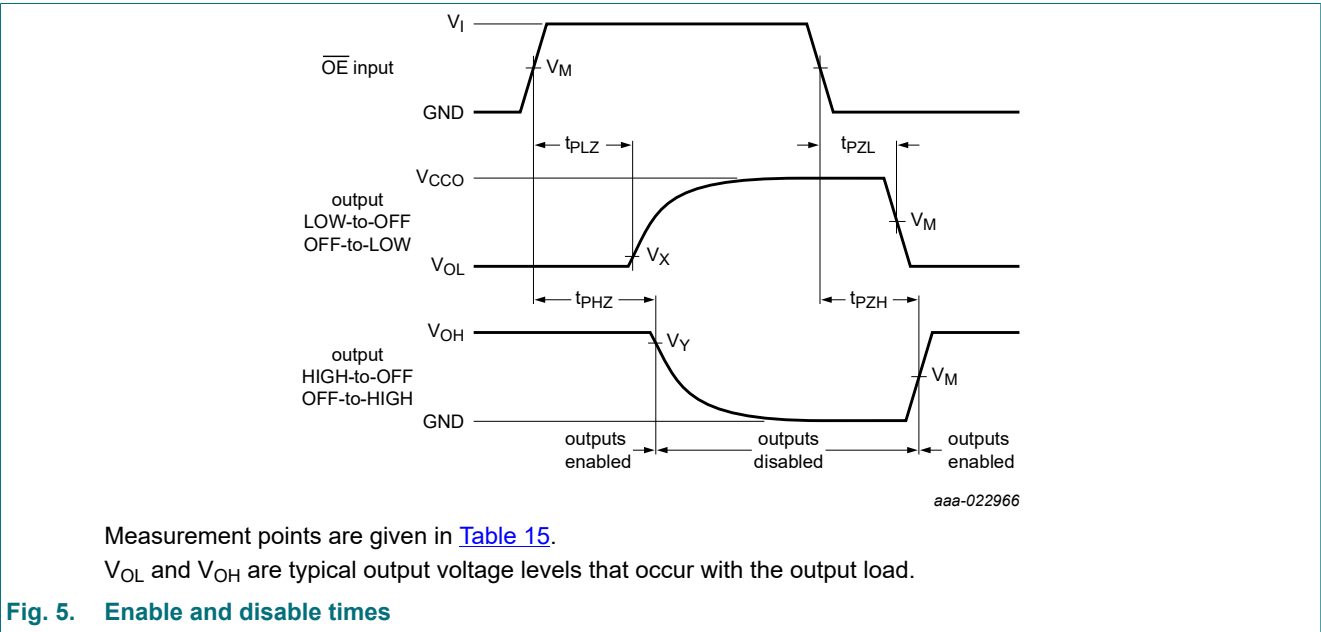
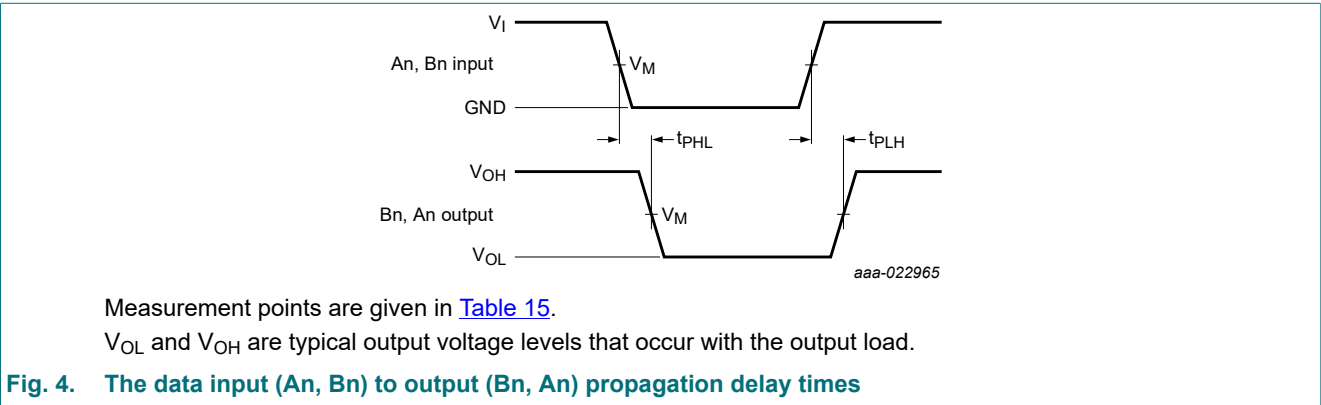


Table 15. Measurement points

Supply voltage	Input [1]	Output [2]		
$V_{CC(A)}, V_{CC(B)}$	$V_M$	$V_M$	$V_X$	$V_Y$
0.8 V to 1.6 V	$0.5V_{CCI}$	$0.5V_{CCO}$	$V_{OL} + 0.1\text{ V}$	$V_{OH} - 0.1\text{ V}$
1.65 V to 2.7 V	$0.5V_{CCI}$	$0.5V_{CCO}$	$V_{OL} + 0.15\text{ V}$	$V_{OH} - 0.15\text{ V}$
3.0 V to 3.6 V	$0.5V_{CCI}$	$0.5V_{CCO}$	$V_{OL} + 0.3\text{ V}$	$V_{OH} - 0.3\text{ V}$

[1]  $V_{CCI}$  is the supply voltage associated with the data input port.  
[2]  $V_{CCO}$  is the supply voltage associated with the output port.

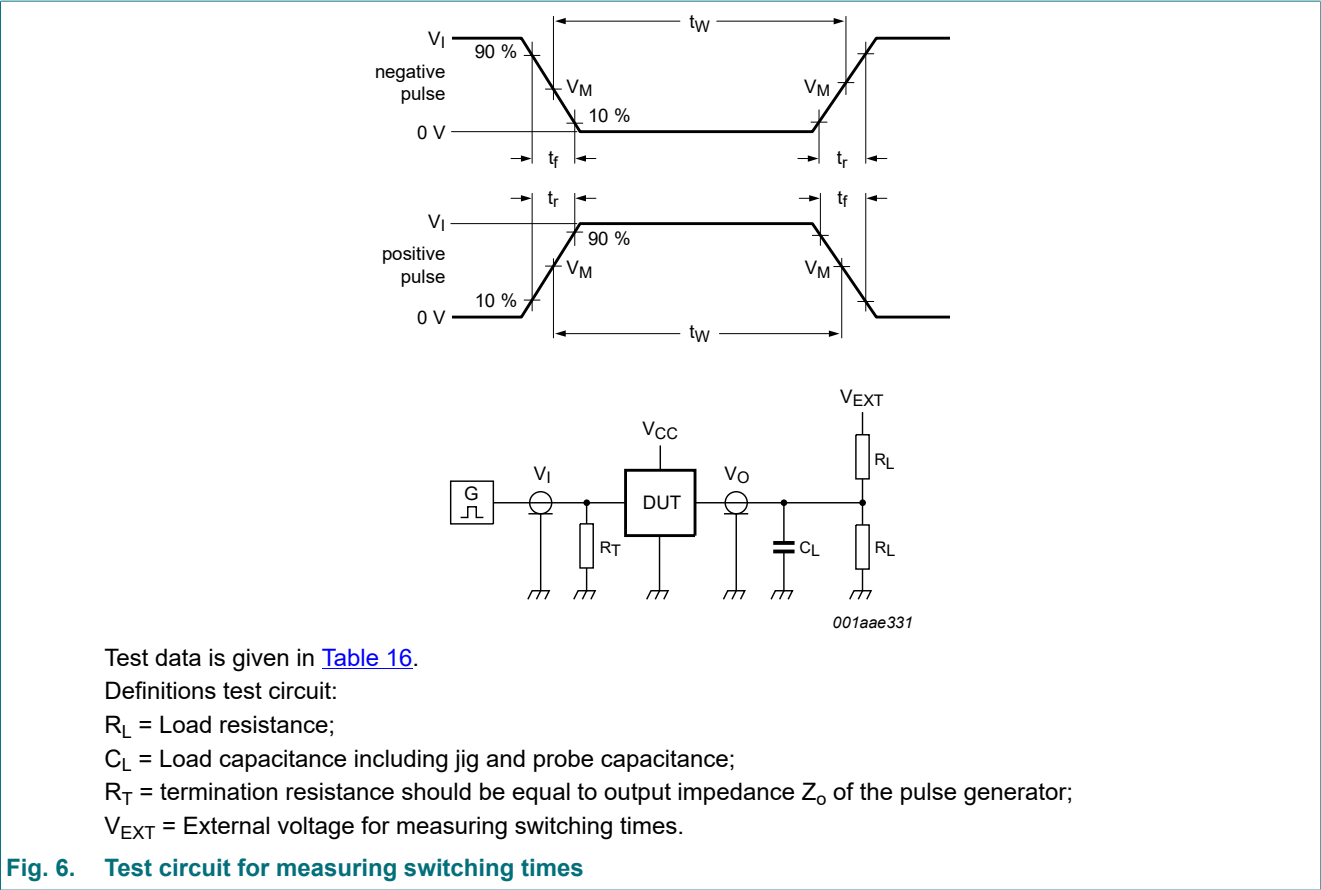


Table 16. Test data

Supply voltage	Input		Load		$V_{EXT}$		
$V_{CC(A)}, V_{CC(B)}$	$V_I$ [1]	$\Delta t/\Delta V$ [2]	$C_L$	$R_L$	$t_{PLH}, t_{PHL}$	$t_{PZH}, t_{PHZ}$	$t_{PZL}, t_{PLZ}$ [3]
0.8 V to 1.6 V	$V_{CCI}$	$\leq 1.0 \text{ ns/V}$	15 pF	2 k $\Omega$	open	GND	$2V_{CCO}$
1.65 V to 2.7 V	$V_{CCI}$	$\leq 1.0 \text{ ns/V}$	15 pF	2 k $\Omega$	open	GND	$2V_{CCO}$
3.0 V to 3.6 V	$V_{CCI}$	$\leq 1.0 \text{ ns/V}$	15 pF	2 k $\Omega$	open	GND	$2V_{CCO}$

[1]  $V_{CCI}$  is the supply voltage associated with the data input port.  
[2]  $dV/dt \geq 1.0 \text{ V/ns}$ .  
[3]  $V_{CCO}$  is the supply voltage associated with the output port.

12. Typical propagation delay characteristics

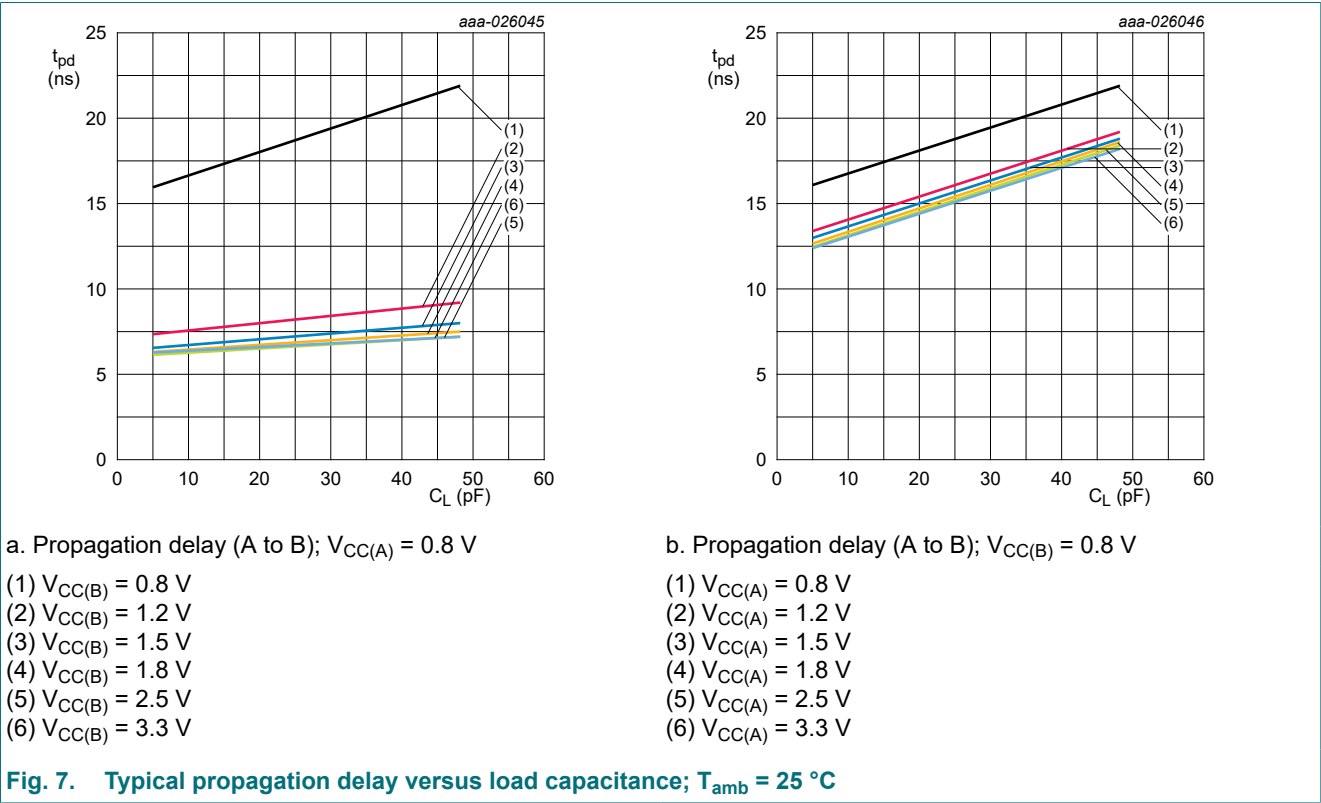
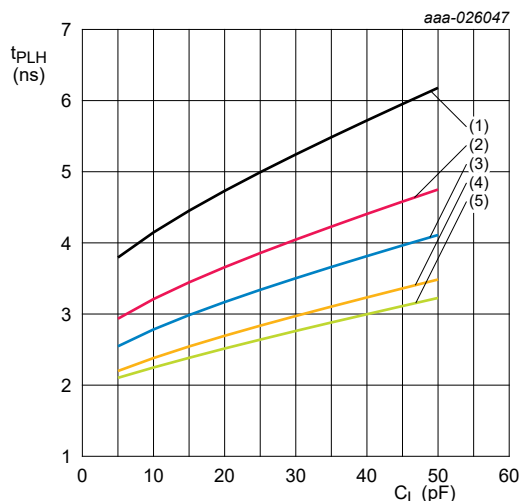
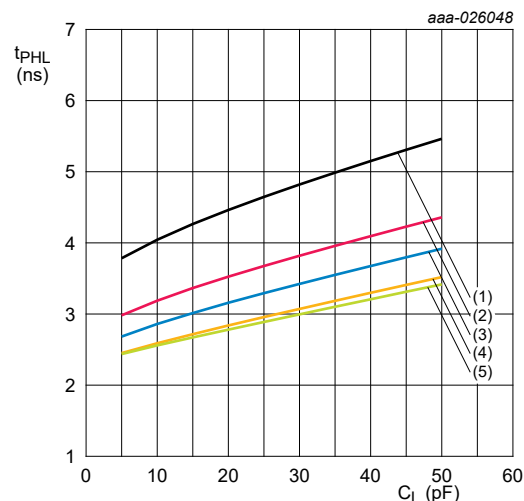
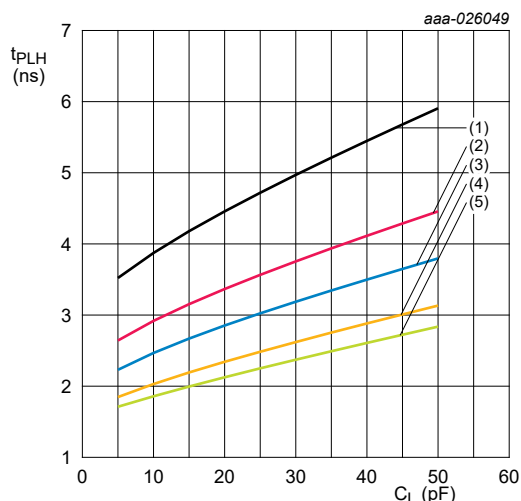
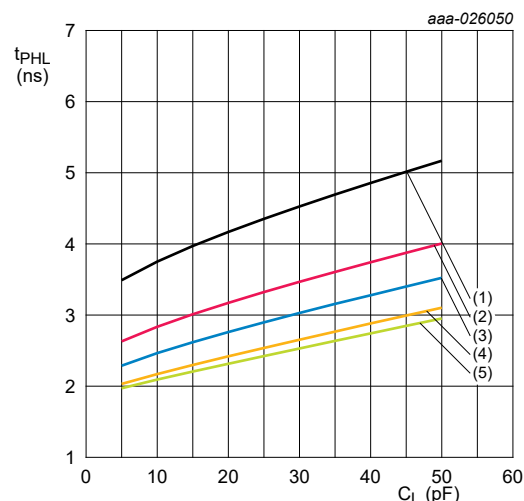
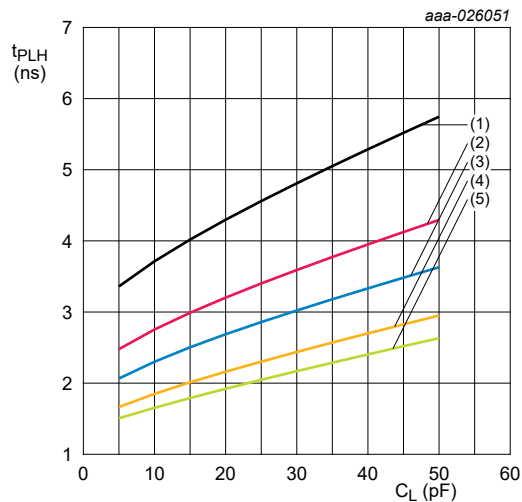
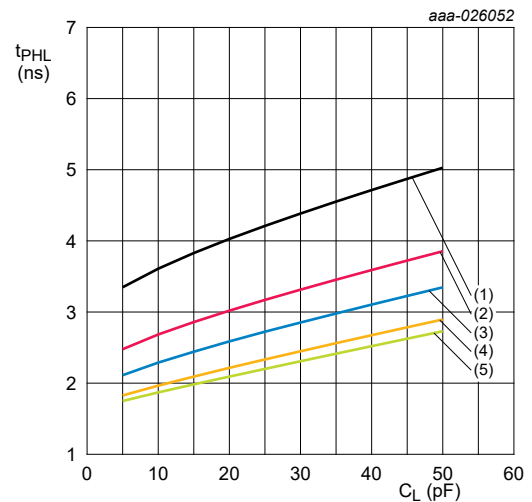
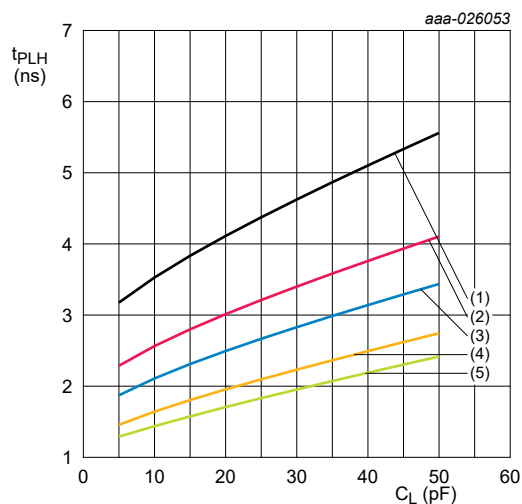
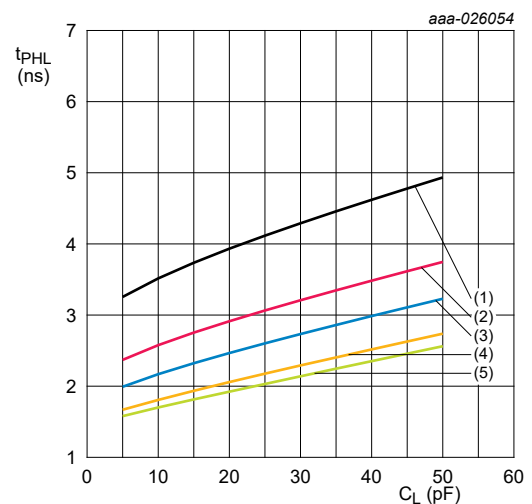


Fig. 7. Typical propagation delay versus load capacitance;  $T_{amb} = 25\text{ }^{\circ}\text{C}$

a. LOW to HIGH propagation delay (A to B);  $V_{CC(A)} = 1.2$  Vb. HIGH to LOW propagation delay (A to B);  $V_{CC(A)} = 1.2$  Vc. LOW to HIGH propagation delay (A to B);  $V_{CC(A)} = 1.5$  Vd. HIGH to LOW propagation delay (A to B);  $V_{CC(A)} = 1.5$  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

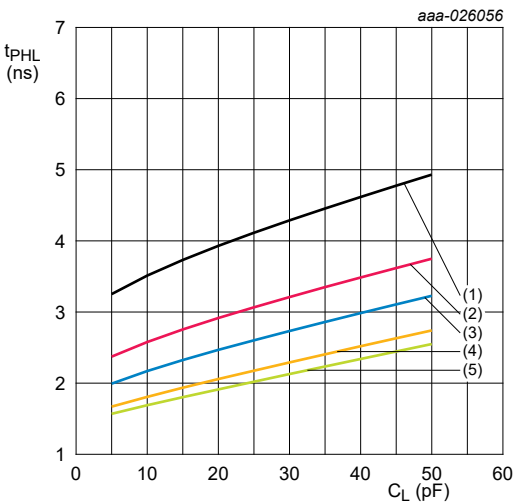
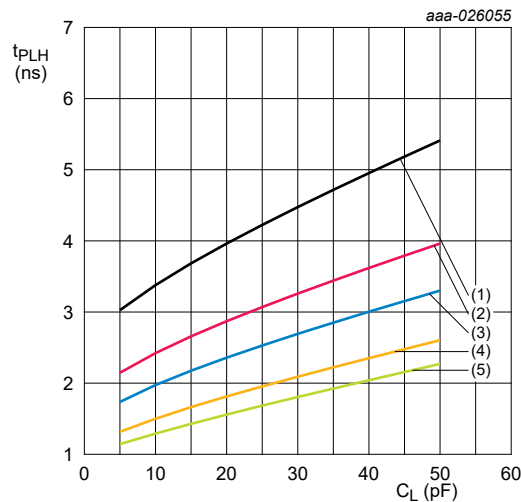
Fig. 8. Typical propagation delay versus load capacitance;  $T_{amb} = 25$  °C

a. LOW to HIGH propagation delay (A to B);  $V_{CC(A)} = 1.8$  Vb. HIGH to LOW propagation delay (A to B);  $V_{CC(A)} = 1.8$  Vc. LOW to HIGH propagation delay (A to B);  $V_{CC(A)} = 2.5$  Vd. HIGH to LOW propagation delay (A to B);  $V_{CC(A)} = 2.5$  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

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





a. LOW to HIGH propagation delay (A to B);  $V_{CC(A)} = 3.3\text{ V}$       b. HIGH to LOW propagation delay (A to B);  $V_{CC(A)} = 3.3\text{ V}$   
(1)  $V_{CC(B)} = 1.2\text{ V}$   
(2)  $V_{CC(B)} = 1.5\text{ V}$   
(3)  $V_{CC(B)} = 1.8\text{ V}$   
(4)  $V_{CC(B)} = 2.5\text{ V}$   
(5)  $V_{CC(B)} = 3.3\text{ V}$

Fig. 10. Typical propagation delay versus load capacitance;  $T_{amb} = 25\text{ °C}$

13. Package outline

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

SOT1160-1

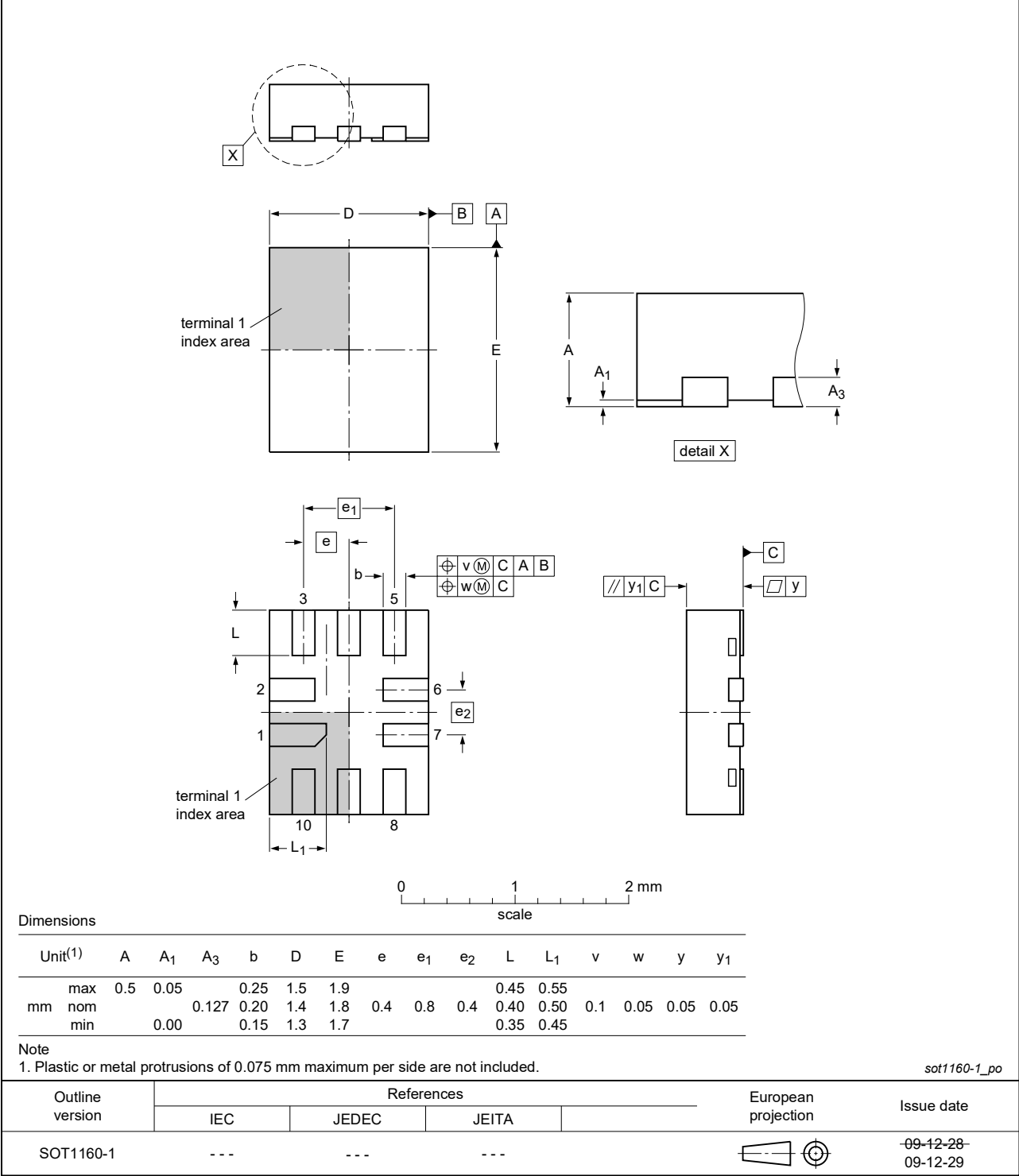


Fig. 11. Package outline SOT1160-1 (XQFN10)

14. Abbreviations

Table 17. Abbreviations

Acronym	Description
ANSI	American National Standards Institute
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
ESDA	ElectroStatic Discharge Association
HBM	Human Body Model
JEDEC	Joint Electron Device Engineering Council

15. Revision history

Table 18. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AVC2T245_Q100 v.2	20240702	Product data sheet	-	74AVC2T245_Q100 v.1
Modifications:	<ul style="list-style-type: none"><li><a href="#">Section 2</a>: ESD specification updated according to the latest JEDEC standard.</li><li><a href="#">Section 8</a>: Derating values for P<sub>tot</sub> total power dissipation updated.</li></ul>			
74AVC2T245_Q100 v.1	20190614	Product data sheet	-	-

## 16. 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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