CMOS Digital Integrated Circuits Silicon Monolithic

74AVC1T45NX

1. Functional Description

- 1-Bit Dual-Supply Bus Transceiver with Configurable Power Supply

2. General

The 74AVC1T45FU is a dual-supply, high-speed CMOS 1-bit bus transceiver that can interface between two systems with supply voltages from 0.7 V to 3.6 V.

The two supply voltages can be user-configurable within the operating range and the sequence of supply voltage ON/OFF can be freely set.

When the transmission direction switching input DIR is set to "H", bus A becomes an input and bus B becomes an output, and when set to "L", bus A becomes an output and bus B becomes an input.The input (DIR) has a tolerant function that allows input of up to 3.6 V regardless of the supply voltage. When either power supply is at the GND level, the bus terminals are placed in a high impedance mode and a voltage of up to 3.6 V is allowed to be applied. This feature allows for partial power-down interface applications.

All inputs are equipped with protection circuits to protect the devices from electrostatic discharge damage.

3. Features

(1) Wide operating temperature range: T_{opr} = -40 to 125 ℃

(2) Wide supply voltage value: V_{CCA} = 0.7 to 3.6 V, V_{CCB} = 0.7 to 3.6 V

(3) Bidirectional interface

(4) High-speed operation: t_{pd} = 3.6 ns (max) (V_{CCA} = 3.3 ± 0.3 V, V_{CCB} = 3.3 ± 0.3 V)

(5) Output current: $|I_{OH}|/I_{OL}$ = ± 12 mA (min) (V_{CC} = 3.0 V)
$|I_{OH}|/I_{OL}$ = ± 9 mA (min) (V_{CC} = 2.3 V)
$|I_{OH}|/I_{OL}$ = ± 6 mA (min) (V_{CC} = 1.65 V)
$|I_{OH}|/I_{OL}$ = ± 4 mA (min) (V_{CC} = 1.4 V)
$|I_{OH}|/I_{OL}$ = ± 2 mA (min) (V_{CC} = 1.1 V)
$|I_{OH}|/I_{OL}$ = ± 1 mA (min) (V_{CC} = 0.95 V)
$|I_{OH}|/I_{OL}$ = ± 0.5 mA (min) (V_{CC} = 0.85 V)
$|I_{OH}|/I_{OL}$ = ± 0.2 mA (min) (V_{CC} = 0.76 V)
$|I_{OH}|/I_{OL}$ = ± 0.05 mA (min) (V_{CC} = 0.7 V)

(6) Small package: XSON6

(7) Low power dissipation: Suitable for battery-driven applications such as PDAs and cellular phones.

(8) 3.6 V tolerance and power-down protection are provided to all inputs and outputs.

Start of commercial production
2026-01

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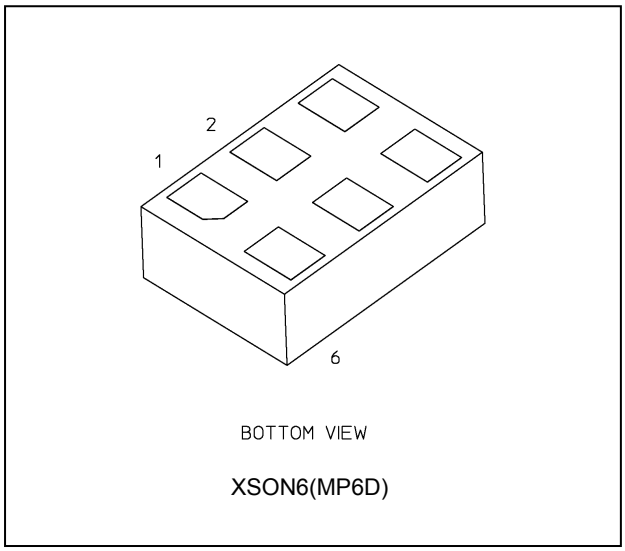
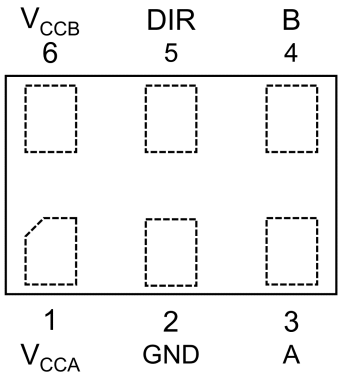
4. Packaging

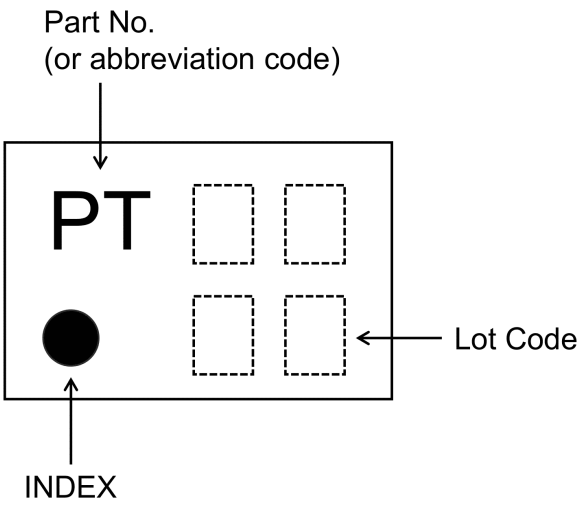


5. Pin Assignment

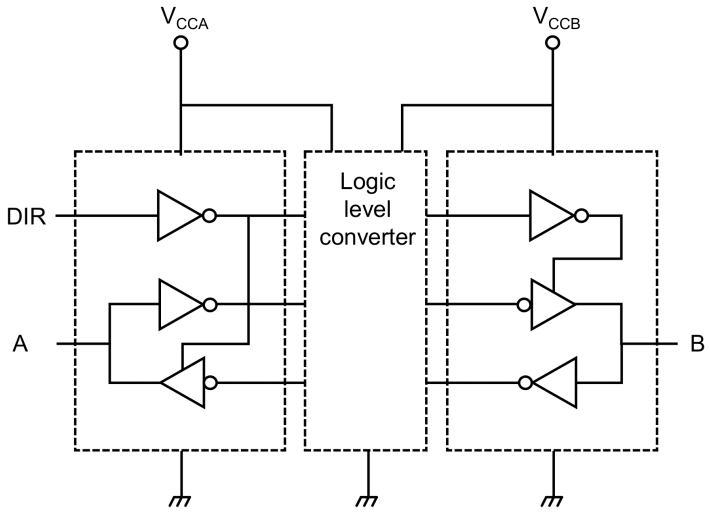


(Top View)

6. Marking



7. Block Diagram



8. Truth Table

Supply voltage V_{CCA}	Supply voltage V_{CCB}	Input DIR	Input/Output Bus A	Input/Output Bus B	Function
0.7 to 3.6 V	0.7 to 3.6 V	L	Output	Input	A = B
0.7 to 3.6 V	0.7 to 3.6 V	H	Input	Output	B = A
GND	0.7 to 3.6 V	X	Z	Z	Z
0.7 to 3.6 V	GND	X	Z	Z	Z
GND	GND	X	Z	Z	Z

X: Don't care
Z: High impedance

9. Absolute Maximum Ratings (Note) (Unless otherwise specified, T_a = 25 °C)

Characteristics	Symbol	Note	Rating	Unit
Supply voltage	V_{CCA}		-0.5 to 4.6	V
	V_{CCB}		-0.5 to 4.6	
Input voltage (DIR)	V_{IN}		-0.5 to 4.6	V
Bus I/O voltage	$V_{I/OA}$	(Note 1)	-0.5 to 4.6	V
		(Note 2)	-0.5 to V_{CCA} + 0.5	
	$V_{I/OB}$	(Note 1)	-0.5 to 4.6	
		(Note 2)	-0.5 to V_{CCB} + 0.5	
Input diode current	I_{IK}		-50	mA
I/O diode current	$I_{I/OK}$	(Note 3)	-50	mA
Output current	I_{OUTA}		±50	mA
	I_{OUTB}		±50	
V_{CC}/ground current per supply pin	I_{CCA}		100	mA
	I_{CCB}		100	
Power dissipation	P_D		200	mW
Storage temperature	T_{stg}		-65 to 150	°C

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.
Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: Input state or high impedance state.

Note 2: Output state. I_{OUT} absolute maximum rating must be observed.

Note 3: V_{OUT} < GND

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10. Operating Ranges (Note)

Characteristics	Symbol	Note	Test Condition	Rating	Unit
Supply voltage	V_{CCA}		—	0.7 to 3.6	V
	V_{CCB}		—	0.7 to 3.6	
Input voltage (DIR)	V_{IN}		—	0 to 3.6	V
Bus I/O voltage	$V_{I/OA}$	(Note 1)	—	0 to 3.6	V
		(Note 2)	—	0 to V_{CCA}	
	$V_{I/OB}$	(Note 1)	—	0 to 3.6	
		(Note 2)	—	0 to V_{CCB}	
Output current	I_{OUTA}		V_{CCA} = 3.0 to 3.6 V	±12	mA
			V_{CCA} = 2.3 to 2.7 V	±9	
			V_{CCA} = 1.65 to 1.95 V	±6	
			V_{CCA} = 1.4 to 1.6 V	±4	
			V_{CCA} = 1.1 to 1.2 V	±2	
			V_{CCA} = 0.95 to 1.05 V	±1	
			V_{CCA} = 0.85 to 0.95 V	±0.5	
			V_{CCA} = 0.76 to 0.84 V	±0.2	
			V_{CCA} = 0.7 V	±0.05	
	I_{OUTB}		V_{CCB} = 3.0 to 3.6 V	±12	
			V_{CCB} = 2.3 to 2.7 V	±9	
			V_{CCB} = 1.65 to 1.95 V	±6	
			V_{CCB} = 1.4 to 1.6 V	±4	
			V_{CCB} = 1.1 to 1.2 V	±2	
			V_{CCB} = 0.95 to 1.05 V	±1	
			V_{CCB} = 0.85 to 0.95 V	±0.5	
			V_{CCB} = 0.76 to 0.84 V	±0.2	
			V_{CCB} = 0.7 V	±0.05	
Operating temperature	T_{opr}		—	-40 to 125	°C
Input rise and fall times	dt/dv	(Note 3)	V_{CC} = 0.7 V	0 to 20	ns/V
			V_{CC} = 0.8 to 1.2 V	0 to 20	
			V_{CC} = 1.65 to 1.95 V	0 to 20	
			V_{CC} = 2.3 to 2.7 V	0 to 20	
			V_{CC} = 3.0 to 3.6 V	0 to 10	

Note: The operating ranges must be maintained to ensure the normal operation of the device.
Unused inputs and bus inputs must be tied to either V_{CC} or GND.

Note 1: Input state or high impedance state.

Note 2: Output state. I_{OUT} absolute maximum rating must be observed.

Note 3: V_{CC} = V_{CCA}, V_{CCB}

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11. Electrical Characteristics

11.1. DC Characteristics (Unless otherwise specified, T_a = -40 to 85 °C)

Characteristics	Symbol	Test Condition		V_{CCA} (V)	V_{CCB} (V)	Min	Max	Unit
High-level input voltage	V_{IHA}	A, DIR		0.7	0.7 to 3.6	V_{CCA} × 0.80	—	V
				0.8 to 1.95	0.7 to 3.6	V_{CCA} × 0.70	—	
				2.3 to 2.7	0.7 to 3.6	1.6	—	
				3.0 to 3.6	0.7 to 3.6	2.0	—	
	V_{IHB}	B		0.7 to 3.6	0.7	V_{CCB} × 0.80	—	
				0.7 to 3.6	0.8 to 1.95	V_{CCB} × 0.70	—	
				0.7 to 3.6	2.3 to 2.7	1.6	—	
				0.7 to 3.6	3.0 to 3.6	2.0	—	
Low-level input voltage	V_{ILA}	A, DIR		0.7	0.7 to 3.6	—	V_{CCA} × 0.20	V
				0.8 to 1.95	0.7 to 3.6	—	V_{CCA} × 0.30	
				2.3 to 2.7	0.7 to 3.6	—	0.7	
				3.0 to 3.6	0.7 to 3.6	—	0.9	
	V_{ILB}	B		0.7 to 3.6	0.7	—	V_{CCB} × 0.20	
				0.7 to 3.6	0.8 to 1.95	—	V_{CCB} × 0.30	
				0.7 to 3.6	2.3 to 2.7	—	0.7	
				0.7 to 3.6	3.0 to 3.6	—	0.9	
High-level output voltage	V_{OH}	A, B Output H	I_{OH} = -0.1 mA	0.7 to 3.6	0.7 to3.6	V_{CCO} -0.1	—	V
			I_{OH} = -0.2 mA	0.76	0.76	0.58	—	
			I_{OH} = -0.5 mA	0.85	0.85	0.65	—	
			I_{OH} = -2 mA	1.1	1.1	0.85	—	
			I_{OH} = -4 mA	1.4	1.4	1.05	—	
			I_{OH} = -6 mA	1.65	1.65	1.2	—	
			I_{OH} = -9 mA	2.3	2.3	1.75	—	
			I_{OH} = -12 mA	3.0	3.0	2.3	—	
Low-level output voltage	V_{OL}	A, B Output L	I_{OL} = 0.1 mA	0.7 to 3.6	0.7 to 3.6	—	0.1	V
			I_{OL} = 0.2 mA	0.76	0.76	—	0.18	
			I_{OL} = 0.5 mA	0.85	0.85	—	0.2	
			I_{OL} = 2 mA	1.1	1.1	—	0.25	
			I_{OL} = 4 mA	1.4	1.4	—	0.35	
			I_{OL} = 6 mA	1.65	1.65	—	0.45	
			I_{OL} = 9 mA	2.3	2.3	—	0.55	
			I_{OL} = 12 mA	3.0	3.0	—	0.7	

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Characteristics	Symbol	Test Condition	V_{CCA} (V)	V_{CCB} (V)	Min	Typ.	Max	Unit
3-state output OFF-state leakage current	I_{OZA}	Function OFF State, V_{OA} = 0 V or 3.6 V	0.7 to 3.6	0.7 to 3.6	—	—	±1	μA
		V_{OA} = 0 V or 3.6 V	0.7 to 3.6	0	—	—	±1	
	I_{OZB}	Function OFF State, V_{OB} = 0 V or 3.6 V	0.7 to 3.6	0.7 to 3.6	—	—	±1	
		V_{OB} = 0 V or 3.6 V	0	0.7 to 3.6	—	—	±1	
Input leakage current	I_{IN}	V_{IN}(DIR) = 0 V to 3.6 V	0.7 to 3.6	0 to 3.6	—	—	±1	μA
Power-OFF leakage current	I_{OFFA}	V_{OA} = 0 V to 3.6 V	0	0.7 to 3.6	—	—	±1	μA
	I_{OFFB}	V_{OB} = 0 V to 3.6 V	0.7 to 3.6	0	—	—	±1	
Quiescent supply current	I_{CCA}	Fix the input to V_{CC} or GND.	0.7 to 3.6	0.7 to 3.6	—	—	1	μA
			3.6	0	—	—	1	
	I_{CCB}	Fix the input to V_{CC} or GND.	0.7 to 3.6	0.7 to 3.6	—	—	1	
			0	3.6	—	—	1	
	I_{CCTA}	V_{IN}(DIR) = V_{CCA}, V_{IOA} = V_{CCA} - 0.6 V	3.0 to 3.6	0.7 to 3.6	—	—	500	
	I_{CCTB}	V_{IN}(DIR) = V_{CCB}, V_{IOB} = V_{CCB} - 0.6 V	0.7 to 3.6	3.0 to 3.6	—	—	500	

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11.2. DC Characteristics (Unless otherwise specified, T_a = -40 to 125 °C)

Characteristics	Symbol	Test Condition		V_{CCA} (V)	V_{CCB} (V)	Min	Max	Unit
High-level input voltage	V_{IHA}	A, DIR		0.7	0.7 to 3.6	V_{CCA} × 0.80	—	V
				0.8 to 1.95	0.7 to 3.6	V_{CCA} × 0.70	—	
				2.3 to 2.7	0.7 to 3.6	1.6	—	
				3.0 to 3.6	0.7 to 3.6	2.0	—	
	V_{IHB}	B		0.7 to 3.6	0.7	V_{CCB} × 0.80	—	
				0.7 to 3.6	0.8 to 1.95	V_{CCB} × 0.70	—	
				0.7 to 3.6	2.3 to 2.7	1.6	—	
				0.7 to 3.6	3.0 to 3.6	2.0	—	
Low-level input voltage	V_{ILA}	A, DIR		0.7	0.7 to 3.6	—	V_{CCA} × 0.20	V
				0.8 to 1.95	0.7 to 3.6	—	V_{CCA} × 0.30	
				2.3 to 2.7	0.7 to 3.6	—	0.7	
				3.0 to 3.6	0.7 to 3.6	—	0.9	
	V_{ILB}	B		0.7 to 3.6	0.7	—	V_{CCB} × 0.20	
				0.7 to 3.6	0.8 to 1.95	—	V_{CCB} × 0.30	
				0.7 to 3.6	2.3 to 2.7	—	0.7	
				0.7 to 3.6	3.0 to 3.6	—	0.9	
High-level output voltage	V_{OH}	A, B Output H	I_{OH} = -0.1 mA	0.7 to 3.6	0.7 to 3.6	V_{CCO} -0.1	—	V
			I_{OH} = -0.2 mA	0.76	0.76	0.58	—	
			I_{OH} = -0.5 mA	0.85	0.85	0.65	—	
			I_{OH} = -2 mA	1.1	1.1	0.85	—	
			I_{OH} = -4 mA	1.4	1.4	1.05	—	
			I_{OH} = -6 mA	1.65	1.65	1.2	—	
			I_{OH} = -9 mA	2.3	2.3	1.75	—	
			I_{OH} = -12 mA	3.0	3.0	2.3	—	
Low-level output voltage	V_{OL}	A, B Output L	I_{OL} = 0.1 mA	0.7 to 3.6	0.7 to 3.6	—	0.1	V
			I_{OL} = 0.2 mA	0.76	0.76	—	0.18	
			I_{OL} = 0.5 mA	0.85	0.85	—	0.2	
			I_{OL} = 2 mA	1.1	1.1	—	0.25	
			I_{OL} = 4 mA	1.4	1.4	—	0.35	
			I_{OL} = 6 mA	1.65	1.65	—	0.45	
			I_{OL} = 9 mA	2.3	2.3	—	0.55	
			I_{OL} = 12 mA	3.0	3.0	—	0.7	

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Characteristics	Symbol	Test Condition	V_{CCA} (V)	V_{CCB} (V)	Min	Typ.	Max	Unit
3-state output OFF-state leakage current	I_{OZA}	Function OFF State, V_{OA} = 0 V or 3.6 V	0.7 to 3.6	0.7 to 3.6	—	—	±4	μA
		V_{OA} = 0 V or 3.6 V	0.7 to 3.6	0	—	—	±4	
	I_{OZB}	Function OFF State, V_{OB} = 0 V or 3.6 V	0.7 to 3.6	0.7 to 3.6	—	—	±4	
		V_{OB} = 0 V or 3.6 V	0	0.7 to 3.6	—	—	±4	
Input leakage current	I_{IN}	V_{IN}(DIR) = 0 V to 3.6 V	0.7 to 3.6	0 to 3.6	—	—	±2.5	μA
Power-OFF leakage current	I_{OFFA}	V_{IOA} = 0 V to 3.6 V	0	0.7 to 3.6	—	—	±4	μA
	I_{OFFB}	V_{IOB} = 0 V to 3.6 V	0.7 to 3.6	0	—	—	±4	
Quiescent supply current	I_{CCA}	Fix the input to V_{CC} or GND.	0.7 to 3.6	0.7 to 3.6	—	—	4	μA
			3.6	0	—	—	4	
	I_{CCB}	Fix the input to V_{CC} or GND.	0.7 to 3.6	0.7 to 3.6	—	—	4	
			0	3.6	—	—	4	
	I_{CCTA}	V_{IN}(DIR) = V_{CCA}, V_{IOA} = V_{CCA} - 0.6 V	3.0 to 3.6	0.7 to 3.6	—	—	500	
	I_{CCTB}	V_{IN}(DIR) = GND, V_{IOB} = V_{CCB} - 0.6 V	0.7 to 3.6	3.0 to 3.6	—	—	500	

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11.3. AC Characteristics (Note) (V_{CCA} = 0.7 V, T_a = 25 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Typ.	V_{CCB} 0.8 V Typ.	V_{CCB} 0.9 V Typ.	V_{CCB} 1.2 V Typ.	V_{CCB} 1.5 V Typ.	V_{CCB} 1.8 V Typ.	V_{CCB} 2.5 V Typ.	V_{CCB} 3.3 V Typ.	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	15.5	13.9	12.9	12.1	11.3	10.9	10.9	11.5	ns
Propagation delay time (B → A)		15.5	12.7	11.2	9.2	8.5	8.0	7.5	7.2	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	22.8	22.8	22.8	22.8	22.7	22.7	22.6	22.5	
3-state output disable time (DIR → B)		26.1	22.5	20.9	14.1	12.5	12.4	11.9	12.9	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	41.6	35.2	32.1	23.3	21.0	20.5	19.4	20.0	
3-state output enable time (DIR → B)		38.3	36.7	35.7	34.9	34.0	33.6	33.5	34.0	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.4. AC Characteristics (Note) (V_{CCB} = 0.7 V, T_a = 25 °C)

Characteristics	Symbol	V_{CCA} 0.7 V Typ.	V_{CCA} 0.8 V Typ.	V_{CCA} 0.9 V Typ.	V_{CCA} 1.2 V Typ.	V_{CCA} 1.5 V Typ.	V_{CCA} 1.8 V Typ.	V_{CCA} 2.5 V Typ.	V_{CCA} 3.3 V Typ.	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	15.5	12.7	11.2	9.2	8.5	8.0	7.5	7.2	ns
Propagation delay time (B → A)		15.5	13.9	12.9	12.1	11.3	10.9	10.9	11.5	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	23.0	17.1	16.0	7.3	5.5	5.2	3.9	3.7	
3-state output disable time (DIR → B)		26.1	22.9	21.5	19.4	18.4	18.3	18.5	20.6	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	41.6	36.7	34.4	31.5	29.8	29.2	29.4	32.0	
3-state output enable time (DIR → B)		38.6	29.8	27.2	16.5	13.9	13.3	11.4	10.9	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.5. AC Characteristics (Note) (V_{CCB} = 0.7 V, T_a = -40 to 85 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	48.3	40.2	34.8	30.5	29.6	30.0	33.7	40.6	ns
Propagation delay time (B → A)		48.3	39.5	33.4	28.0	25.9	25.1	24.3	23.6	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	54.5	54.5	54.5	54.5	54.5	54.5	54.7	54.9	
3-state output disable time (DIR → B)		63.7	54.5	46.3	35.8	31.9	33.0	38.6	61.5	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	112.0	94.0	79.7	63.8	57.8	58.1	62.9	85.1	
3-state output enable time (DIR → B)		102.8	94.7	89.3	85.0	84.1	84.5	88.4	95.5	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

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11.6. AC Characteristics (Note) (V_{CCA} = 0.8 ± 0.04 V, T_a = -40 to 85 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.045 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	39.5	31.3	25.5	21.9	20.1	19.9	21.0	23.3	ns
Propagation delay time (B → A)		40.2	31.3	24.8	19.4	17.0	16.3	15.6	15.3	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	37.8	37.8	37.8	38.0	38.4	38.7	40.8	44.3	
3-state output disable time (DIR → B)		53.4	44.1	37.1	25.9	23.0	22.8	24.0	27.2	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	93.6	75.4	61.9	45.3	40.0	39.1	39.6	42.5	
3-state output enable time (DIR → B)		77.3	69.1	63.3	59.9	58.5	58.6	61.8	67.6	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.7. AC Characteristics (Note) (V_{CCA} = 0.9 ± 0.045 V, T_a = -40 to 85 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	33.4	24.8	18.8	15.7	14.0	13.4	13.3	13.7	ns
Propagation delay time (B → A)		34.8	25.5	18.8	13.7	11.5	10.6	9.9	9.4	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	25.7	25.7	25.7	25.7	25.7	25.8	26.6	27.6	
3-state output disable time (DIR → B)		44.1	36.4	28.0	19.6	16.4	16.0	15.9	16.0	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	78.9	61.9	46.8	33.3	27.9	26.6	25.8	25.4	
3-state output enable time (DIR → B)		59.1	50.5	44.5	41.4	39.7	39.2	39.9	41.3	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.8. AC Characteristics (Note) (V_{CCA} = 1.2 ± 0.1 V, T_a = -40 to 85 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	28.0	19.4	13.7	10.9	9.6	9.1	8.5	8.2	ns
Propagation delay time (B → A)		30.5	21.9	15.7	10.9	9.3	8.2	7.5	7.2	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.0	
3-state output disable time (DIR → B)		35.9	27.0	22.7	14.9	12.6	11.3	10.1	9.4	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	66.4	48.9	38.4	25.8	21.9	19.5	17.6	16.6	
3-state output enable time (DIR → B)		41.1	32.5	26.8	24.0	22.7	22.2	21.6	21.2	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

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11.9. AC Characteristics (Note) (V_{CCA} = 1.5 ± 0.1 V, T_a = -40 to 85 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	25.9	17.0	11.5	9.3	7.4	6.9	6.6	6.5	ns
Propagation delay time (B → A)		29.6	20.1	14.0	9.6	7.4	6.4	5.5	5.2	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	9.2	9.2	9.2	9.1	9.1	9.0	8.9	8.9	
3-state output disable time (DIR → B)		33.4	24.7	22.0	11.5	10.1	9.3	8.1	7.8	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	63.0	44.8	36.0	21.1	17.5	15.7	13.6	13.0	
3-state output enable time (DIR → B)		35.1	26.2	20.7	18.4	16.5	15.9	15.5	15.4	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.10. AC Characteristics (Note) (V_{CCA} = 1.8 ± 0.15 V, T_a = -40 to 85 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	25.1	16.3	10.6	8.2	6.4	6.0	5.7	5.7	ns
Propagation delay time (B → A)		30.0	19.9	13.4	9.1	6.9	6.0	5.0	4.6	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	8.3	8.3	8.3	8.3	8.2	8.2	8.1	8.1	
3-state output disable time (DIR → B)		32.7	24.0	21.5	10.6	9.1	8.2	7.1	7.0	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	62.7	43.9	34.9	19.7	16.0	14.2	12.1	11.6	
3-state output enable time (DIR → B)		33.4	24.6	18.9	16.5	14.6	14.2	13.8	13.8	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.11. AC Characteristics (Note) (V_{CCA} = 2.5 ± 0.2 V, T_a = -40 to 85 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB}0 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	24.3	15.6	9.9	7.5	5.5	5.0	4.5	4.5	ns
Propagation delay time (B → A)		33.7	21.0	13.3	8.5	6.6	5.7	4.5	4.0	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	6.1	6.1	6.1	6.1	6.1	6.0	6.0	5.9	
3-state output disable time (DIR → B)		32.1	25.7	23.9	10.2	7.4	6.5	5.9	5.8	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	65.8	46.7	37.2	18.7	14.0	12.2	10.4	9.8	
3-state output enable time (DIR → B)		30.4	21.7	16.0	13.6	11.6	11.0	10.5	10.4	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

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11.12. AC Characteristics (Note) (V_{CCA} = 3.3 ± 0.3 V, T_a = -40 to 85 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	23.6	15.3	9.4	7.2	5.2	4.6	4.0	3.7	ns
Propagation delay time (B → A)		40.6	23.3	13.7	8.2	6.5	5.7	4.5	3.7	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	
3-state output disable time (DIR → B)		31.3	27.5	22.4	9.9	6.5	5.9	5.2	5.0	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	71.9	50.8	36.1	18.1	13.0	11.6	9.7	8.7	
3-state output enable time (DIR → B)		29.3	21.0	15.1	12.9	10.9	10.3	9.7	9.4	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.13. AC Characteristics (Note) (V_{CCA} = 0.7 V, T_a = -40 to 125 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	48.3	40.2	34.8	30.5	29.6	30.0	33.7	40.6	ns
Propagation delay time (B → A)		48.3	39.5	33.4	28.0	25.9	25.1	24.3	23.6	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	54.5	54.5	54.5	54.5	54.5	54.5	54.7	54.9	
3-state output disable time (DIR → B)		63.7	54.5	46.3	35.8	31.9	33.0	38.6	61.5	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	112.0	94.0	79.7	63.8	57.8	58.1	62.9	85.1	
3-state output enable time (DIR → B)		102.8	94.7	89.3	85.0	84.1	84.5	88.4	95.5	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.14. AC Characteristics (Note) (V_{CCA} = 0.8 ± 0.04 V, T_a = -40 to 125 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	39.5	31.3	25.5	21.9	20.1	19.9	21.0	23.3	ns
Propagation delay time (B → A)		40.2	31.3	24.8	19.4	17.0	16.3	15.6	15.3	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	37.8	37.8	37.8	38.0	38.4	38.7	40.8	44.3	
3-state output disable time (DIR → B)		53.4	44.1	37.1	25.9	23.0	22.8	24.0	27.2	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	93.6	75.4	61.9	45.3	40.0	39.1	39.6	42.5	
3-state output enable time (DIR → B)		77.3	69.1	63.3	59.9	58.5	58.6	61.8	67.6	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

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11.15. AC Characteristics (Note) (V_{CCA} = 0.9 ± 0.045 V, T_a = -40 to 125 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	33.4	24.8	18.8	15.8	14.2	13.4	13.3	13.7	ns
Propagation delay time (B → A)		34.8	25.5	18.8	13.7	11.7	10.6	9.9	9.4	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	25.7	25.7	25.7	25.7	25.7	25.8	26.6	27.6	
3-state output disable time (DIR → B)		44.1	36.4	28.0	19.6	16.7	16.1	15.9	16.0	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	78.9	61.9	46.8	33.3	28.4	26.7	25.8	25.4	
3-state output enable time (DIR → B)		59.1	50.5	44.5	41.5	39.9	39.2	39.9	41.3	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.16. AC Characteristics (Note) (V_{CCA} = 1.2 ± 0.1 V, T_a = -40 to 125 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	28.0	19.4	13.7	11.3	10.0	9.5	8.9	8.7	ns
Propagation delay time (B → A)		30.5	21.9	15.8	11.3	9.7	8.6	7.9	7.6	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	13.5	13.6	13.6	13.6	13.6	13.6	13.6	13.5	
3-state output disable time (DIR → B)		35.9	27.0	23.1	15.9	13.1	11.6	10.5	9.8	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	66.4	48.9	38.9	27.2	22.8	20.2	18.4	17.4	
3-state output enable time (DIR → B)		41.5	33.0	27.3	24.9	23.6	23.1	22.5	22.2	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.17. AC Characteristics (Note) (V_{CCA} = 1.5 ± 0.1 V, T_a = -40 to 125 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	25.9	17.0	11.7	9.7	7.9	7.4	7.0	6.9	ns
Propagation delay time (B → A)		29.6	20.1	14.2	10.0	7.9	6.8	6.0	5.5	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	9.8	9.8	9.8	9.7	9.7	9.6	9.5	9.4	
3-state output disable time (DIR → B)		33.4	24.7	22.3	11.9	10.5	9.7	8.5	8.1	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	63.0	44.8	36.5	21.9	18.4	16.5	14.5	13.6	
3-state output enable time (DIR → B)		35.7	26.8	21.5	19.4	17.6	17.0	16.5	16.3	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

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11.18. AC Characteristics (Note) (V_{CCA} = 1.8 ± 0.15 V, T_a = -40 to 125 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	25.1	16.3	10.6	8.6	6.8	6.3	6.0	5.9	ns
Propagation delay time (B → A)		30.0	19.9	13.4	9.5	7.4	6.3	5.6	4.9	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	8.7	8.7	8.7	8.7	8.6	8.6	8.5	8.5	
3-state output disable time (DIR → B)		32.7	24.0	21.5	11.0	9.6	8.7	7.6	7.4	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	62.7	43.9	34.9	20.5	17.0	15.0	13.2	12.3	
3-state output enable time (DIR → B)		33.8	25.0	19.3	17.3	15.4	14.9	14.5	14.4	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.19. AC Characteristics (Note) (V_{CCA} = 2.5 ± 0.2 V, T_a = -40 to 125 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	24.3	15.6	9.9	7.9	6.0	5.6	4.7	4.7	ns
Propagation delay time (B → A)		33.7	21.0	13.3	8.9	7.0	6.0	4.7	4.3	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	6.5	6.5	6.5	6.5	6.5	6.4	6.4	6.3	
3-state output disable time (DIR → B)		32.1	25.7	23.9	10.5	7.8	6.9	6.3	6.2	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	65.8	46.7	37.2	19.4	14.8	12.9	11.0	10.5	
3-state output enable time (DIR → B)		30.8	22.1	16.4	14.4	12.5	12.0	11.1	11.0	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

11.20. AC Characteristics (Note) (V_{CCA} = 3.3 ± 0.3 V, T_a = -40 to 125 °C)

Characteristics	Symbol	V_{CCB} 0.7 V Max	V_{CCB} 0.8 ± 0.04 V Max	V_{CCB} 0.9 ± 0.045 V Max	V_{CCB} 1.2 ± 0.1 V Max	V_{CCB} 1.5 ± 0.1 V Max	V_{CCB} 1.8 ± 0.15 V Max	V_{CCB} 2.5 ± 0.2 V Max	V_{CCB} 3.3 ± 0.3 V Max	Unit
Propagation delay time (A → B)	t_{PLH}/t_{PHL}	23.6	15.3	9.4	7.6	5.5	4.9	4.3	3.9	ns
Propagation delay time (B → A)		40.6	23.3	13.7	8.7	6.9	5.9	4.7	3.9	
3-state output disable time (DIR → A)	t_{PLZ}/t_{PHZ}	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.9	
3-state output disable time (DIR → B)		31.3	26.8	22.4	10.2	7.0	6.4	5.5	5.4	
3-state output enable time (DIR → A)	t_{PZL}/t_{PZH} (Note 1)	71.9	50.1	36.1	18.9	13.9	12.3	10.2	9.3	
3-state output enable time (DIR → B)		29.6	21.3	15.4	13.6	11.5	10.9	10.3	9.8	

Note: See Figure 12.1, 13.1, 13.2, table 12.1.1, 12.1.2, 13.1.1 for the measurement circuit.

Note 1: Output enable time is obtained from the following formula.

Output enable time (DIR → A) = Output disable time (DIR → B) + Propagation delay time (B → A)

Output enable time (DIR → B) = Output disable time (DIR → A) + Propagation delay time (A → B)

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11.21. Capacitive Characteristics (Unless otherwise specified, T_a = 25 °C)

Characteristics	Symbol	Note	Test Condition	V_{CCA}, V_{CCB} 0.7 V Typ.	V_{CCA}, V_{CCB} 0.8 V Typ.	V_{CCA}, V_{CCB} 0.9 V Typ.	V_{CCA}, V_{CCB} 1.2 V Typ.	V_{CCA}, V_{CCB} 1.5 V Typ.	V_{CCA}, V_{CCB} 1.8 V Typ.	V_{CCA}, V_{CCB} 2.5 V Typ.	V_{CCA}, V_{CCB} 3.3 V Typ.	Unit
Input capacitance	C_{IN}		V_{IN} = 0 V or 3.3 V	—	—	—	—	—	—	—	4	pF
Bus I/O capacitance	$C_{I/OA}$		A = OFF, V_{IOA} = 0 V or 3.3 V	—	—	—	—	—	—	—	5	pF
	$C_{I/OB}$		B = OFF, V_{IOB} = 0 V or 3.3 V	—	—	—	—	—	—	—	5	
Power dissipation capacitance	C_{PDA}	(Note 1)	A → B	1.5	1.5	1.5	1.5	2	2	2	2.5	pF
			B → A	13	13	13	13.5	13.5	14	14.5	15	
	C_{PDB}	(Note 1)	A → B	13	13	13	13.5	13.5	14	14.5	15	
			B → A	1.5	1.5	1.5	1.5	2	2	2	2.5	

Note 1: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation.

$I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}$

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12. AC Test Circuit

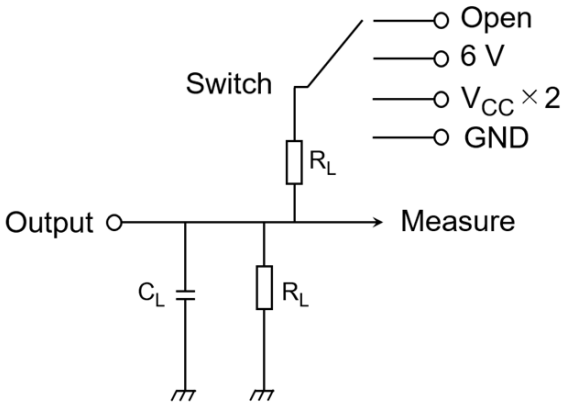

Fig. 12.1 AC Test Circuit

Table 12.1.1 Parameter for AC Test Circuit

Parameter	Switch
t_{PLH}, t_{PHL}	Open
t_{PLZ}, t_{PZL}	$V_{CC} \times 2$
t_{PHZ}, t_{PZH}	GND

Table 12.1.2 Parameter for AC Test Circui

Symbol	V_{CC} = 0.8 V	V_{CC} = 0.9 ± 0.045 V V_{CC} = 1.0 ± 0.05 V	V_{CC} = 1.2 ± 0.1 V V_{CC} = 1.5 ± 0.1 V	V_{CC} = 1.8 ± 0.15 V V_{CC} = 2.5 ± 0.2 V	V_{CC} = 3.3 ± 0.3 V
R_L	10 kΩ	10 kΩ	2 kΩ	2 kΩ	2 kΩ
C_L	5 pF	5 pF	15 pF	15 pF	15 pF

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13. AC Waveform

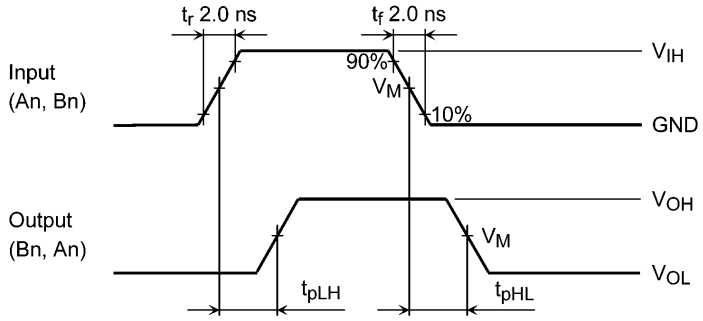

Fig. 13.1 t_{PLH}, t_{PHL}

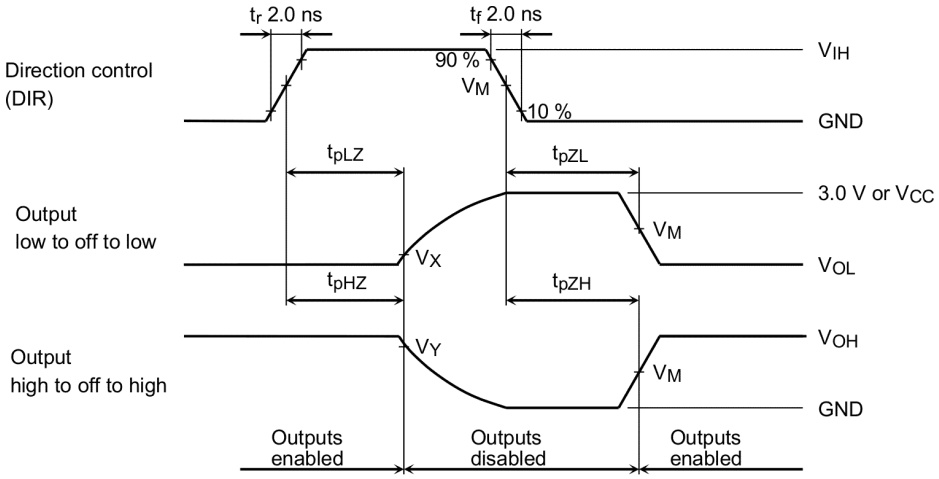

Fig. 13.2 t_{PLZ}, t_{PHZ}, t_{PZL}, t_{PZH}

Table 13.1.1 AC Waveform Symbols

Symbol	V_{CC} = 0.8 V	V_{CC} = 1.0 ± 0.05 V V_{CC} = 0.9 ± 0.045 V	V_{CC} = 1.5 ± 0.1 V V_{CC} = 1.2 ± 0.1 V	V_{CC} = 2.5 ± 0.2 V V_{CC} = 1.8 ± 0.15 V	V_{CC} = 3.3 ± 0.3 V
V_{IH}	V_{CC}	V_{CC}	V_{CC}	V_{CC}	V_{CC}
V_M	V_{CC} / 2	V_{CC} / 2	V_{CC} / 2	V_{CC} / 2	V_{CC} / 2
V_X	V_{OL} + 0.1 V	V_{OL} + 0.1 V	V_{OL} + 0.1 V	V_{OL} + 0.15 V	V_{OL} + 0.3 V
V_Y	V_{OH} - 0.1 V	V_{OH} - 0.1 V	V_{OH} - 0.1 V	V_{OH} - 0.15 V	V_{OH} - 0.3 V

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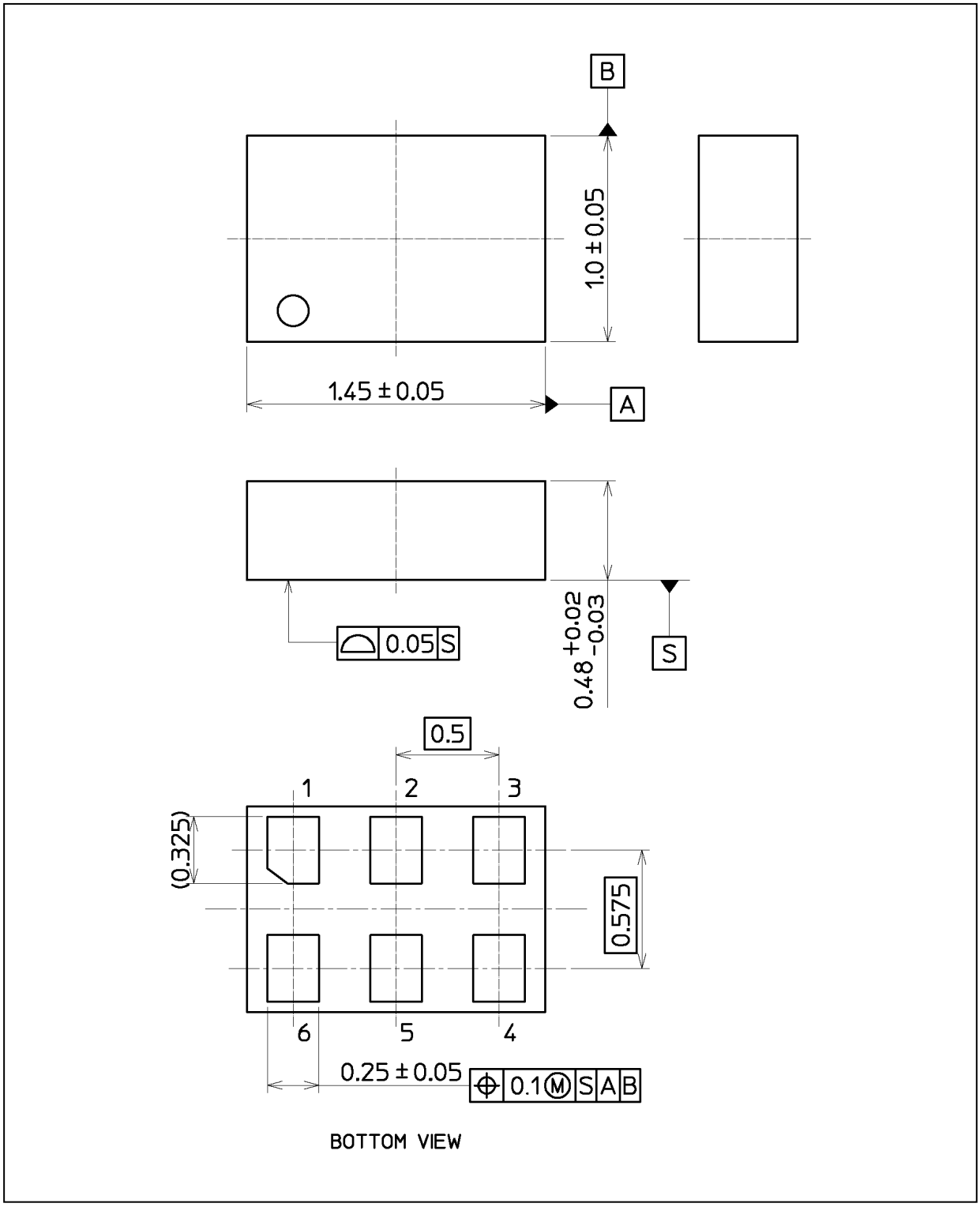
Package Dimensions

Unit: mm



Weight: 0.002 g (typ.)

Package Name(s)
Nickname: XSON6(MP6D)

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