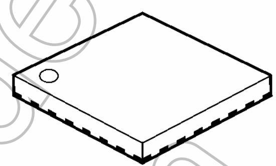
TOSHIBA Digital Integrated Circuit Silicon Monolithic

TC7MPN3245FTG

Low Voltage/Low Power 4-Bit × 2 Dual Supply Bus Transceiver



VQON24-P-0404-0.50

Weight: 0.03 g (typ.)

The TC7MPN3245FTG is an advanced high-speed CMOS 8-bit dual supply voltage interface bus transceiver, fabricated with silicon gate CMOS technology.

It is also designed with over-voltage tolerant inputs and outputs up to 3.6 V.

Designed for use as an interface between a 1.2-V, 1.5-V, 1.8-V, or 2.5-V bus and a 1.8-V, 2.5-V or 3.6-V bus in mixed 1.2-V, 1.5-V, 1.8-V or 2.5-V/1.8-V, 2.5-V or 3.6-V supply systems.

The A-port interfaces with the 1.2-V, 1.5-V, 1.8-V or 2.5-V bus, the B-port with the 1.8-V, 2.5-V, 3.3-V bus.

The direction of data transmission is determined by the level of the DIR input. The enable input ($\overline{OE}$) can be used to disable the device so that the buses are effectively isolated.

All inputs are equipped with protection circuits against static discharge or transient excess voltage.

Features

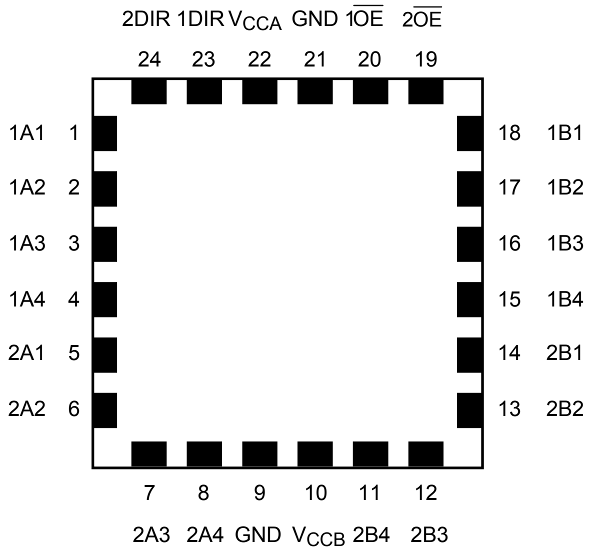
- Bidirectional interface between 1.2-V and 1.8-V, 1.2-V and 2.5-V, 1.2-V and 3.3-V, 1.5-V and 2.5-V, 1.5-V and 3.3-V, 1.8-V and 2.5-V, 1.8-V and 3.3-V or 2.5-V and 3.3-V buses.
- High-speed operation : t_{pd} = 13.7 ns (max) (V_{CCA} = 2.5 ± 0.2 V, V_{CCB} = 3.3 ± 0.3 V)
  t_{pd} = 14.8 ns (max) (V_{CCA} = 1.8 ± 0.15 V, V_{CCB} = 3.3 ± 0.3 V)
  t_{pd} = 16.0 ns (max) (V_{CCA} = 1.5 ± 0.1 V, V_{CCB} = 3.3 ± 0.3 V)
  t_{pd} = 61 ns (max) (V_{CCA} = 1.2 ± 0.1 V, V_{CCB} = 3.3 ± 0.3 V)
  t_{pd} = 18.5 ns (max) (V_{CCA} = 1.8 ± 0.15 V, V_{CCB} = 2.5 ± 0.2 V)
  t_{pd} = 19.7 ns (max) (V_{CCA} = 1.5 ± 0.1 V, V_{CCB} = 2.5 ± 0.2 V)
  t_{pd} = 60 ns (max) (V_{CCA} = 1.2 ± 0.1 V, V_{CCB} = 2.5 ± 0.2 V)
  t_{pd} = 58 ns (max) (V_{CCA} = 1.2 ± 0.1 V, V_{CCB} = 1.5 ± 0.1 V)
- Output current : I_{OHB}/I_{OLB} = ±3 mA (min) (V_{CCB} = 3.0 V)
  I_{OHB}/I_{OLB} = ±2 mA (min) (V_{CCB} = 2.3 V)
  I_{OHB}/I_{OLB} = ±0.5 mA (min) (V_{CCB} = 1.65 V)
  I_{OHA}/I_{OLA} = ±9 mA (min) (V_{CCA} = 2.3 V)
  I_{OHA}/I_{OLA} = ±3 mA (min) (V_{CCA} = 1.65 V)
  I_{OHA}/I_{OLA} = ±1 mA (min) (V_{CCA} = 1.4 V)
- Latch-up performance: ±300 mA
- ESD performance: Machine model ≥ ±200 V
  Human body model ≥ ±2000 V
- Ultra-small package: VQON24
- Low current consumption : Using the new circuit significantly reduces current consumption when $\overline{OE}$ = "H".
  Suitable for battery-driven applications such as PDAs and cellular phones.
- Floating A-bus and B-bus are permitted. (when $\overline{OE}$ = "H")
  3.6-V tolerant function and power-down protection provided on all inputs and outputs.

Note 1: Do not apply a signal to any bus pin when it is in the output mode. Damage may result.

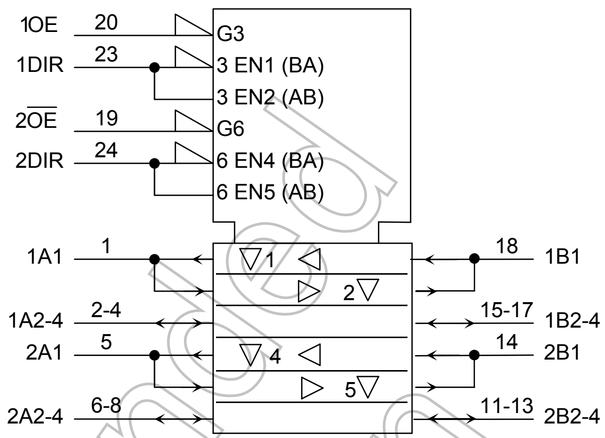
Note 2: RA or RMA flux is recommended when mounting the VQON package.

Start of commercial production
2006-09

Pin Assignment (top view)



IEC Logic Symbol



Truth Table

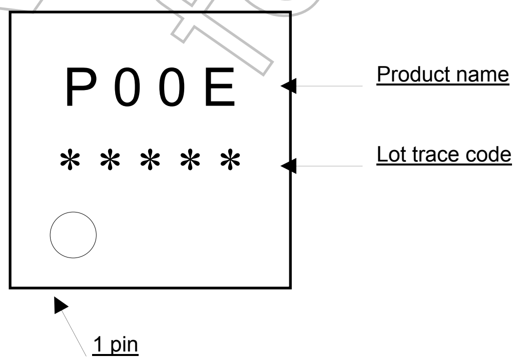
Inputs		Function		Outputs
$\overline{1OE}$	1DIR	Bus 1A1-1A4	Bus 1B1-1B4	
L	L	Output	Input	A = B
L	H	Input	Output	B = A
H	X	Z		Z

Inputs		Function		Outputs
$\overline{2OE}$	2DIR	Bus 2A1-2A4	Bus 2B1-2B4	
L	L	Output	Input	A = B
L	H	Input	Output	B = A
H	X	Z		Z

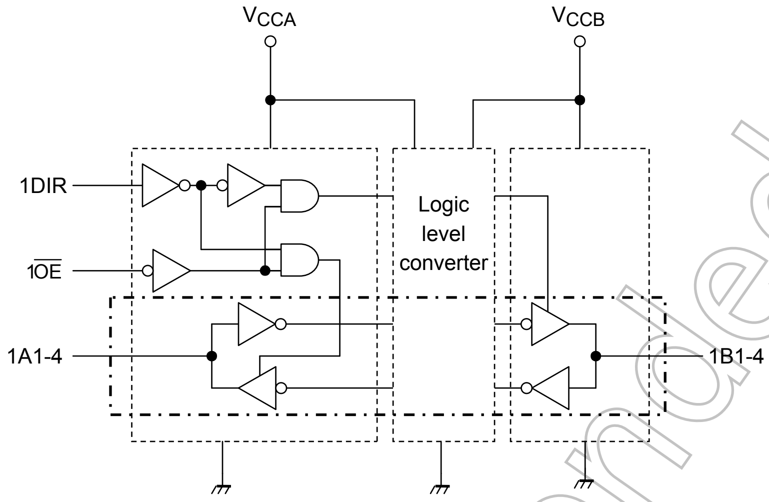
X: Don't care

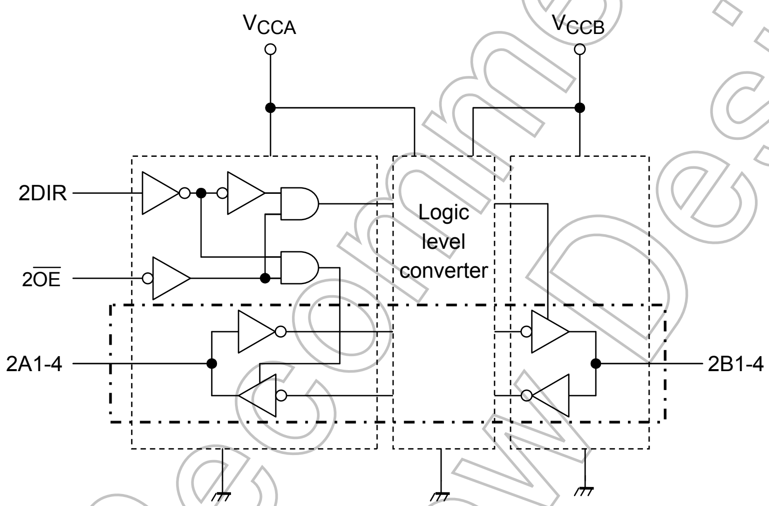
Z: High impedance

Marking



Block Diagram





Absolute Maximum Rating (Note 1)

Characteristics	Symbol	Rating	Unit
Power supply voltage (Note 2)	V_{CCA}	−0.5 to 4.6	V
	V_{CCB}	−0.5 to 4.6	
DC input voltage (DIR, $\overline{OE}$)	V_{IN}	−0.5 to 4.6	V
DC bus I/O voltage	$V_{I/OA}$	−0.5 to 4.6 (Note 3)	V
		−0.5 to V_{CCA} + 0.5 (Note 4)	
	$V_{I/OB}$	−0.5 to 4.6 (Note 3)	
		−0.5 to V_{CCB} + 0.5 (Note 4)	
Input diode current	I_{IK}	−50	mA
Output diode current	$I_{I/OK}$	±50 (Note 5)	mA
DC output current	I_{OUTA}	±25	mA
	I_{OUTB}	±6	
DC V_{CC}/ground current per supply pin	I_{CCA}	±50	mA
	I_{CCB}	±50	
Power dissipation	P_D	180	mW
Storage temperature	T_{stg}	−65 to 150	°C

Note 1: Exceeding any of the absolute maximum ratings, even briefly, may 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 2: Do not supply a voltage to V_{CCB} pin when V_{CCA} is in the OFF state.

Note 3: Output in OFF state

Note 4: High or Low state. I_{OUT} absolute maximum rating must be observed.

Note 5: $V_{OUT} < GND$, $V_{OUT} > V_{CC}$

Operating Ranges (Note1)

Characteristics	Symbol	Rating	Unit
Power supply voltage (Note 2)	V_{CCA}	1.1 to 2.7	V
	V_{CCB}	1.65 to 3.6	
Input voltage (DIR, $\overline{OE}$)	V_{IN}	0 to 3.6	V
Bus I/O voltage	$V_{I/OA}$	0 to 3.6 (Note 3)	V
		0 to V_{CCA} (Note 4)	
	$V_{I/OB}$	0 to 3.6 (Note 3)	
		0 to V_{CCB} (Note 4)	
Output current	I_{OUTA}	±9 (Note 5)	mA
		±3 (Note 6)	
		±1 (Note 7)	
	I_{OUTB}	±3 (Note 8)	
		±2 (Note 9)	
		±0.5 (Note 10)	
Operating temperature	T_{opr}	−40 to 85	°C
Input rise and fall time	dt/dv	0 to 10 (Note 11)	ns/V

Note 1: 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. Please connect both bus inputs and the bus outputs with V_{CC} or GND when the I/O of the bus terminal changes by the function. In this case, please note that the output is not short-circuited.

Note 2: Do not use when $V_{CCA} > V_{CCB}$

Note 3: Output in OFF state

Note 4: High or low state

Note 5: V_{CCB}= 2.3 to 2.7 V

Note 6: V_{CCB} = 1.65 to 1.95 V

Note 7: V_{CCB} = 1.4 to 1.6 V

Note 8: V_{CCA} = 3.0 to 3.6 V

Note 9: V_{CCA} = 2.3 to 2.7 V

Note 10: V_{CCA} = 1.65 to 1.95 V

Note 11: V_{IN} = 0.8 to 2.0 V, V_{CCA} = 2.5 V, V_{CCB} = 3.0 V

Electrical Characteristics

DC Characteristics (2.3 V ≤ V_{CCA} ≤ 2.7 V, 2.7 V < V_{CCB} ≤ 3.6 V)

Characteristics	Symbol	Test Condition		V_{CCA} (V)	V_{CCB} (V)	Ta = −40 to 85°C		Unit
						Min	Max	
H-level input voltage	V_{IHA}	DIR, $\overline{OE}$, An		2.3 to 2.7	2.7 to 3.6	1.6	—	V
	V_{IHB}	Bn		2.3 to 2.7	2.7 to 3.6	2.0	—	
L-level input voltage	V_{ILA}	DIR, $\overline{OE}$, An		2.3 to 2.7	2.7 to 3.6	—	0.7	V
	V_{ILB}	Bn		2.3 to 2.7	2.7 to 3.6	—	0.8	
H-level output voltage	V_{OHA}	V_{IN} = V_{IH} or V_{IL}	I_{OHA} = −100 μA	2.3 to 2.7	2.7 to 3.6	V_{CCA} − 0.2	—	V
			I_{OHA} = −9 mA	2.3	2.7 to 3.6	1.7	—	
	V_{OHB}		I_{OHB} = −100 μA	2.3 to 2.7	2.7 to 3.6	V_{CCB} − 0.2	—	
			I_{OHB} = −3 mA	2.3 to 2.7	3.0	2.2	—	
L-level output voltage	V_{OLA}	V_{IN} = V_{IH} or V_{IL}	I_{OLA} = 100 μA	2.3 to 2.7	2.7 to 3.6	—	0.2	V
			I_{OLA} = 9 mA	2.3	2.7 to 3.6	—	0.6	
	V_{OLB}		I_{OLB} = 100 μA	2.3 to 2.7	2.7 to 3.6	—	0.2	
			I_{OLB} = 3 mA	2.3 to 2.7	3.0	—	0.55	
3-state output OFF state current	I_{OZA}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		2.3 to 2.7	2.7 to 3.6	—	±5.0	μA
	I_{OZB}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		2.3 to 2.7	2.7 to 3.6	—	±5.0	
Input leakage current	I_{IN}	V_{IN} (DIR, $\overline{OE}$) = 0 to 3.6 V		2.3 to 2.7	2.7 to 3.6	—	±5.0	μA
Power-off leakage current	I_{OFF1}	V_{IN}, V_{OUT} = 0 to 3.6 V		0	0	—	5.0	μA
	I_{OFF2}			2.3 to 2.7	0	—	5.0	
	I_{OFF3}			2.3 to 2.7	Open	—	5.0	
Quiescent supply current	I_{CCA}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		2.3 to 2.7	2.7 to 3.6	—	5.0	μA
	I_{CCB}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		2.3 to 2.7	2.7 to 3.6	—	5.0	
	I_{CCA}	V_{CCA} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		2.3 to 2.7	2.7 to 3.6	—	±5.0	μA
	I_{CCB}	V_{CCB} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		2.3 to 2.7	2.7 to 3.6	—	±5.0	
	I_{CCTB}	V_{INA} = V_{CCB} − 0.6 V per input		2.3 to 2.7	2.7 to 3.6	—	750.0	μA

DC Characteristics (1.65 V ≤ V_{CCA} < 2.3 V, 2.7 V < V_{CCB} ≤ 3.6 V)

Characteristics	Symbol	Test Condition		V_{CCA} (V)	V_{CCB} (V)	Ta = −40 to 85°C		Unit
						Min	Max	
H-level input voltage	V_{IHA}	DIR, $\overline{OE}$, An		1.65 to 2.3	2.7 to 3.6	0.65 × V_{CCA}	—	V
	V_{IHB}	Bn		1.65 to 2.3	2.7 to 3.6	2.0	—	
L-level input voltage	V_{ILA}	DIR, $\overline{OE}$, An		1.65 to 2.3	2.7 to 3.6	—	0.35 × V_{CCA}	V
	V_{ILB}	Bn		1.65 to 2.3	2.7 to 3.6	—	0.8	
H-level output voltage	V_{OHA}	V_{IN} = V_{IH} or V_{IL}	I_{OHA} = −100 μA	1.65 to 2.3	2.7 to 3.6	V_{CCA} − 0.2	—	V
			I_{OHA} = −3 mA	1.65	2.7 to 3.6	1.25	—	
	V_{OHB}		I_{OHB} = −100 μA	1.65 to 2.3	2.7 to 3.6	V_{CCB} − 0.2	—	
			I_{OHB} = −3 mA	1.65 to 2.3	3.0	2.2	—	
L-level output voltage	V_{OLA}	V_{IN} = V_{IH} or V_{IL}	I_{OLA} = 100 μA	1.65 to 2.3	2.7 to 3.6	—	0.2	V
			I_{OLA} = 3 mA	1.65	2.7 to 3.6	—	0.3	
	V_{OLB}		I_{OLB} = 100 μA	1.65 to 2.3	2.7 to 3.6	—	0.2	
			I_{OLB} = 3 mA	1.65 to 2.3	3.0	—	0.55	
3-state output OFF state current	I_{OZA}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.65 to 2.3	2.7 to 3.6	—	±5.0	μA
	I_{OZB}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.65 to 2.3	2.7 to 3.6	—	±5.0	
Input leakage current	I_{IN}	V_{IN} (DIR, $\overline{OE}$) = 0 to 3.6 V		1.65 to 2.3	2.7 to 3.6	—	±2.0	μA
Power-off leakage current	I_{OFF1}	V_{IN}, V_{OUT} = 0 to 3.6 V		0	0	—	5.0	μA
	I_{OFF2}			1.65 to 2.3	0	—	5.0	
	I_{OFF3}			1.65 to 2.3	Open	—	5.0	
Quiescent supply current	I_{CCA}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.65 to 2.3	2.7 to 3.6	—	5.0	μA
	I_{CCB}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.65 to 2.3	2.7 to 3.6	—	5.0	
	I_{CCA}	V_{CCA} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.65 to 2.3	2.7 to 3.6	—	±5.0	μA
	I_{CCB}	V_{CCB} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.65 to 2.3	2.7 to 3.6	—	±5.0	
	I_{CCTB}	V_{INB} = V_{CCB} − 0.6 V per input		1.65 to 2.3	2.7 to 3.6	—	750.0	μA

DC Characteristics (1.4 V ≤ V_{CCA} < 1.65 V, 2.7 V < V_{CCB} ≤ 3.6 V)

Characteristics	Symbol	Test Condition		V_{CCA} (V)	V_{CCB} (V)	Ta = −40 to 85°C		Unit
						Min	Max	
H-level input voltage	V_{IHA}	DIR, $\overline{OE}$, An		1.4 to 1.65	2.7 to 3.6	0.65 × V_{CCA}	—	V
	V_{IHB}	Bn		1.4 to 1.65	2.7 to 3.6	2.0	—	
L-level input voltage	V_{ILA}	DIR, $\overline{OE}$, An		1.4 to 1.65	2.7 to 3.6	—	0.30 × V_{CCA}	V
	V_{ILB}	Bn		1.4 to 1.65	2.7 to 3.6	—	0.8	
H-level output voltage	V_{OHA}	V_{IN} = V_{IH} or V_{IL}	I_{OHA} = −100 μA	1.4 to 1.65	2.7 to 3.6	V_{CCA} − 0.2	—	V
			I_{OHA} = −1 mA	1.4	2.7 to 3.6	1.05	—	
	V_{OHB}		I_{OHB} = −100 μA	1.4 to 1.65	2.7 to 3.6	V_{CCB} − 0.2	—	
			I_{OHB} = −3 mA	1.4 to 1.65	3.0	2.2	—	
L-level output voltage	V_{OLA}	V_{IN} = V_{IH} or V_{IL}	I_{OLA} = 100 μA	1.4 to 1.65	2.7 to 3.6	—	0.2	V
			I_{OLA} = 1 mA	1.4	2.7 to 3.6	—	0.35	
	V_{OLB}		I_{OLB} = 100 μA	1.4 to 1.65	2.7 to 3.6	—	0.2	
			I_{OLB} = 3 mA	1.4 to 1.65	3.0	—	0.55	
3-state output OFF state current	I_{OZA}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.4 to 1.65	2.7 to 3.6	—	±5.0	μA
	I_{OZB}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.4 to 1.65	2.7 to 3.6	—	±5.0	
Input leakage current	I_{IN}	V_{IN} (DIR, $\overline{OE}$) = 0 to 3.6 V		1.4 to 1.65	2.7 to 3.6	—	±2.0	μA
Power-off leakage current	I_{OFF1}	V_{IN}, V_{OUT} = 0 to 3.6 V		0	0	—	5.0	μA
	I_{OFF2}			1.4 to 1.65	0	—	5.0	
	I_{OFF3}			1.4 to 1.65	Open	—	5.0	
Quiescent supply current	I_{CCA}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.4 to 1.65	2.7 to 3.6	—	5.0	μA
	I_{CCB}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.4 to 1.65	2.7 to 3.6	—	5.0	
	I_{CCA}	V_{CCA} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.4 to 1.65	2.7 to 3.6	—	±5.0	μA
	I_{CCB}	V_{CCB} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.4 to 1.65	2.7 to 3.6	—	±5.0	
	I_{CCTB}	V_{INB} = V_{CCB} − 0.6 V per input		1.4 to 1.65	2.7 to 3.6	—	750.0	μA

DC Characteristics (1.1 V ≤ V_{CCA} < 1.4 V, 2.7 V < V_{CCB} ≤ 3.6 V)

Characteristics	Symbol	Test Condition		V_{CCA} (V)	V_{CCB} (V)	Ta = −40 to 85°C Min	Ta = −40 to 85°C Max	Unit
H-level input voltage	V_{IHA}	DIR, $\overline{OE}$, An		1.1 to 1.4	2.7 to 3.6	0.65 × V_{CCA}	—	V
	V_{IHB}	Bn		1.1 to 1.4	2.7 to 3.6	2.0	—	
L-level input voltage	V_{ILA}	DIR, $\overline{OE}$, An		1.1 to 1.4	2.7 to 3.6	—	0.30 × V_{CCA}	V
	V_{ILB}	Bn		1.1 to 1.4	2.7 to 3.6	—	0.8	
H-level output voltage	V_{OHA}	V_{IN} = V_{IH} or V_{IL}	I_{OHA} = −100 μA	1.1 to 1.4	2.7 to 3.6	V_{CCA} − 0.2	—	V
	V_{OHB}		I_{OHB} = −100 μA	1.1 to 1.4	2.7 to 3.6	V_{CCB} − 0.2	—	
			I_{OHB} = −3 mA	1.1 to 1.4	3.0	2.2	—	
L-level output voltage	V_{OLA}	V_{IN} = V_{IH} or V_{IL}	I_{OLA} = 100 μA	1.1 to 1.4	2.7 to 3.6	—	0.2	V
	V_{OLB}		I_{OLB} = 100 μA	1.1 to 1.4	2.7 to 3.6	—	0.2	
			I_{OLB} = 3 mA	1.1 to 1.4	3.0	—	0.55	
3-state output OFF state current	I_{OZA}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.1 to 1.4	2.7 to 3.6	—	±5.0	μA
	I_{OZB}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.1 to 1.4	2.7 to 3.6	—	±5.0	
Input leakage current	I_{IN}	V_{IN} (DIR, $\overline{OE}$) = 0 to 3.6 V		1.1 to 1.4	2.7 to 3.6	—	±2.0	μA
Power-off leakage current	I_{OFF1}	V_{IN}, V_{OUT} = 0 to 3.6 V		0	0	—	5.0	μA
	I_{OFF2}			1.1 to 1.4	0	—	5.0	
	I_{OFF3}			1.1 to 1.4	Open	—	5.0	
Quiescent supply current	I_{CCA}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.1 to 1.4	2.7 to 3.6	—	5.0	μA
	I_{CCB}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.1 to 1.4	2.7 to 3.6	—	5.0	
	I_{CCA}	V_{CCA} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.1 to 1.4	2.7 to 3.6	—	±5.0	μA
	I_{CCB}	V_{CCB} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.1 to 1.4	2.7 to 3.6	—	±5.0	
	I_{CCTB}	V_{INB} = V_{CCA} − 0.6 V per input		1.1 to 1.4	2.7 to 3.6	—	750.0	

DC Characteristics (1.65 V ≤ V_{CCA} < 2.3 V, 2.3 V ≤ V_{CCB} ≤ 2.7 V)

Characteristics	Symbol	Test Condition		V_{CCA} (V)	V_{CCB} (V)	Ta = −40 to 85°C		Unit
						Min	Max	
H-level input voltage	V_{IHA}	DIR, $\overline{OE}$, An		1.65 to 2.3	2.3 to 2.7	0.65 × V_{CCA}	—	V
	V_{IHB}	Bn		1.65 to 2.3	2.3 to 2.7	1.6	—	
L-level input voltage	V_{ILA}	DIR, $\overline{OE}$, An		1.65 to 2.3	2.3 to 2.7	—	0.35 × V_{CCA}	V
	V_{ILB}	Bn		1.65 to 2.3	2.3 to 2.7	—	0.7	
H-level output voltage	V_{OHA}	V_{IN} = V_{IH} or V_{IL}	I_{OHA} = −100 μA	1.65 to 2.3	2.3 to 2.7	V_{CCA} − 0.2	—	V
			I_{OHA} = −3 mA	1.65	2.3 to 2.7	1.25	—	
	V_{OHB}		I_{OHB} = −100 μA	1.65 to 2.3	2.3 to 2.7	V_{CCB} − 0.2	—	
			I_{OHB} = −2 mA	1.65 to 2.3	2.3	1.7	—	
L-level output voltage	V_{OLA}	V_{IN} = V_{IH} or V_{IL}	I_{OLA} = 100 μA	1.65 to 2.3	2.3 to 2.7	—	0.2	V
			I_{OLA} = 3 mA	1.65	2.3 to 2.7	—	0.3	
	V_{OLB}		I_{OLB} = 100 μA	1.65 to 2.3	2.3 to 2.7	—	0.2	
			I_{OLB} = 2 mA	1.65 to 2.3	2.3	—	0.6	
3-state output OFF state current	I_{OZA}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.65 to 2.3	2.3 to 2.7	—	±5.0	μA
	I_{OZB}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.65 to 2.3	2.3 to 2.7	—	±5.0	
Input leakage current	I_{IN}	V_{IN} (DIR, $\overline{OE}$) = 0 to 3.6 V		1.65 to 2.3	2.3 to 2.7	—	±2.0	μA
Power-off leakage current	I_{OFF1}	V_{IN}, V_{OUT} = 0 to 3.6 V		0	0	—	5.0	μA
	I_{OFF2}			1.65 to 2.3	0	—	5.0	
	I_{OFF3}			1.65 to 2.3	Open	—	5.0	
Quiescent supply current	I_{CCA}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.65 to 2.3	2.3 to 2.7	—	5.0	μA
	I_{CCB}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.65 to 2.3	2.3 to 2.7	—	5.0	
	I_{CCA}	V_{CCA} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.65 to 2.3	2.3 to 2.7	—	±5.0	μA
	I_{CCB}	V_{CCB} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.65 to 2.3	2.3 to 2.7	—	±5.0	

DC Characteristics (1.4 V ≤ V_{CCA} < 1.65 V, 2.3 V ≤ V_{CCB} ≤ 2.7 V)

Characteristics	Symbol	Test Condition		V_{CCA} (V)	V_{CCB} (V)	Ta = −40 to 85°C		Unit
						Min	Max	
H-level input voltage	V_{IHA}	DIR, $\overline{OE}$, An		1.4 to 1.65	2.3 to 2.7	0.65 × V_{CCA}	—	V
	V_{IHB}	Bn		1.4 to 1.65	2.3 to 2.7	1.6	—	
L-level input voltage	V_{ILA}	DIR, $\overline{OE}$, An		1.4 to 1.65	2.3 to 2.7	—	0.30 × V_{CCA}	V
	V_{ILB}	Bn		1.4 to 1.65	2.3 to 2.7	—	0.7	
H-level output voltage	V_{OHA}	$V_{IN} = V_{IH}$ or V_{IL}	I_{OHA} = −100 μA	1.4 to 1.65	2.3 to 2.7	V_{CCA} − 0.2	—	V
			I_{OHA} = −1 mA	1.4	2.3 to 2.7	1.05	—	
	V_{OHB}		I_{OHB} = −100 μA	1.4 to 1.65	2.3 to 2.7	V_{CCB} − 0.2	—	
			I_{OHB} = −2 mA	1.4 to 1.65	2.3	1.7	—	
L-level output voltage	V_{OLA}	$V_{IN} = V_{IH}$ or V_{IL}	I_{OLA} = 100 μA	1.4 to 1.65	2.3 to 2.7	—	0.2	V
			I_{OLA} = 1 mA	1.4	2.3 to 2.7	—	0.35	
	V_{OLB}		I_{OLB} = 100 μA	1.4 to 1.65	2.3 to 2.7	—	0.2	
			I_{OLB} = 2 mA	1.4 to 1.65	2.3	—	0.6	
3-state output OFF state current	I_{OZA}	$V_{IN} = V_{IH}$ or V_{IL} V_{OUT} = 0 to 3.6 V		1.4 to 1.65	2.3 to 2.7	—	±5.0	μA
	I_{OZB}	$V_{IN} = V_{IH}$ or V_{IL} V_{OUT} = 0 to 3.6 V		1.4 to 1.65	2.3 to 2.7	—	±5.0	
Input leakage current	I_{IN}	V_{IN} (DIR, $\overline{OE}$) = 0 to 3.6 V		1.4 to 1.65	2.3 to 2.7	—	±2.0	μA
Power-off leakage current	I_{OFF1}	V_{IN}, V_{OUT} = 0 to 3.6 V		0	0	—	5.0	μA
	I_{OFF2}			1.4 to 1.65	0	—	5.0	
	I_{OFF3}			1.4 to 1.65	Open	—	5.0	
Quiescent supply current	I_{CCA}	$V_{INA} = V_{CCA}$ or GND $V_{INB} = V_{CCB}$ or GND		1.4 to 1.65	2.3 to 2.7	—	5.0	μA
	I_{CCB}	$V_{INA} = V_{CCA}$ or GND $V_{INB} = V_{CCB}$ or GND		1.4 to 1.65	2.3 to 2.7	—	5.0	
	I_{CCA}	$V_{CCA} \le (V_{IN}, V_{OUT}) \le 3.6$ V		1.4 to 1.65	2.3 to 2.7	—	±5.0	μA
	I_{CCB}	$V_{CCB} \le (V_{IN}, V_{OUT}) \le 3.6$ V		1.4 to 1.65	2.3 to 2.7	—	±5.0	

DC Characteristics (1.1 V ≤ V_{CCA} < 1.4 V, 2.3 V ≤ V_{CCB} ≤ 2.7 V)

Characteristics	Symbol	Test Condition		V_{CCA} (V)	V_{CCB} (V)	Ta = −40 to 85°C		Unit
						Min	Max	
H-level input voltage	V_{IHA}	DIR, $\overline{OE}$, An		1.1 to 1.4	2.3 to 2.7	0.65 × V_{CCA}	—	V
	V_{IHB}	Bn		1.1 to 1.4	2.3 to 2.7	1.6	—	
L-level input voltage	V_{ILA}	DIR, $\overline{OE}$, An		1.1 to 1.4	2.3 to 2.7	—	0.30 × V_{CCA}	V
	V_{ILB}	Bn		1.1 to 1.4	2.3 to 2.7	—	0.7	
H-level output voltage	V_{OHA}	V_{IN} = V_{IH} or V_{IL}	I_{OHA} = −100 μA	1.1 to 1.4	2.3 to 2.7	V_{CCA} − 0.2	—	V
	V_{OHB}		I_{OHB} = −100 μA	1.1 to 1.4	2.3 to 2.7	V_{CCB} − 0.2	—	
			I_{OHB} = −2 mA	1.1 to 1.4	2.3	1.7	—	
L-level output voltage	V_{OLA}	V_{IN} = V_{IH} or V_{IL}	I_{OLA} = 100 μA	1.1 to 1.4	2.3 to 2.7	—	0.2	V
	V_{OLB}		I_{OLB} = 100 μA	1.1 to 1.4	2.3 to 2.7	—	0.2	
			I_{OLB} = 2 mA	1.1 to 1.4	2.3	—	0.6	
3-state output OFF state current	I_{OZA}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.1 to 1.4	2.3 to 2.7	—	±5.0	μA
	I_{OZB}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.1 to 1.4	2.3 to 2.7	—	±5.0	
Input leakage current	I_{IN}	V_{IN} (DIR, $\overline{OE}$) = 0 to 3.6 V		1.1 to 1.4	2.3 to 2.7	—	±2.0	μA
Power-off leakage current	I_{OFF1}	V_{IN}, V_{OUT} = 0 to 3.6 V		0	0	—	5.0	μA
	I_{OFF2}			1.1 to 1.4	0	—	5.0	
	I_{OFF3}			1.1 to 1.4	Open	—	5.0	
Quiescent supply current	I_{CCA}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.1 to 1.4	2.3 to 2.7	—	5.0	μA
	I_{CCB}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.1 to 1.4	2.3 to 2.7	—	5.0	
	I_{CCA}	V_{CCA} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.1 to 1.4	2.3 to 2.7	—	±5.0	μA
	I_{CCB}	V_{CCB} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.1 to 1.4	2.3 to 2.7	—	±5.0	

DC Characteristics (1.1 V ≤ V_{CCA} < 1.4 V, 1.65 V ≤ V_{CCB} < 2.3 V)

Characteristics	Symbol	Test Condition		V_{CCA} (V)	V_{CCB} (V)	Ta = −40 to 85°C		Unit
						Min	Max	
H-level input voltage	V_{IHA}	DIR, $\overline{OE}$, An		1.1 to 1.4	1.65 to 2.3	0.65 × V_{CCA}	—	V
H-level input voltage	V_{IHB}	Bn		1.1 to 1.4	1.65 to 2.3	0.65 × V_{CCB}	—	V
L-level input voltage	V_{ILA}	DIR, $\overline{OE}$, An		1.1 to 1.4	1.65 to 2.3	—	0.30 × V_{CCA}	V
L-level input voltage	V_{ILB}	Bn		1.1 to 1.4	1.65 to 2.3	—	0.35 × V_{CCB}	V
H-level output voltage	V_{OHA}	V_{IN} = V_{IH} or V_{IL}	I_{OHA} = −100 μA	1.1 to 1.4	1.65 to 2.3	V_{CCA} − 0.2	—	V
H-level output voltage	V_{OHB}	V_{IN} = V_{IH} or V_{IL}	I_{OHB} = −100 μA	1.1 to 1.4	1.65 to 2.3	V_{CCB} − 0.2	—	V
H-level output voltage	V_{OHB}	V_{IN} = V_{IH} or V_{IL}	I_{OHB} = −0.5 mA	1.1 to 1.4	1.65	1.25	—	V
L-level output voltage	V_{OLA}	V_{IN} = V_{IH} or V_{IL}	I_{OLA} = 100 μA	1.1 to 1.4	1.65 to 2.3	—	0.2	V
L-level output voltage	V_{OLB}	V_{IN} = V_{IH} or V_{IL}	I_{OLB} = 100 μA	1.1 to 1.4	1.65 to 2.3	—	0.2	V
L-level output voltage	V_{OLB}	V_{IN} = V_{IH} or V_{IL}	I_{OLB} = 0.5 mA	1.1 to 1.4	1.65	—	0.3	V
3-state output OFF state current	I_{OZA}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.1 to 1.4	1.65 to 2.3	—	±5.0	μA
3-state output OFF state current	I_{OZB}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = 0 to 3.6 V		1.1 to 1.4	1.65 to 2.3	—	±5.0	μA
Input leakage current	I_{IN}	V_{IN} (DIR, $\overline{OE}$) = 0 to 3.6 V		1.1 to 1.4	1.65 to 2.3	—	±2.0	μA
Power-off leakage current	I_{OFF1}	V_{IN}, V_{OUT} = 0 to 3.6 V		0	0	—	5.0	μA
Power-off leakage current	I_{OFF2}	V_{IN}, V_{OUT} = 0 to 3.6 V		1.1 to 1.4	0	—	5.0	μA
Power-off leakage current	I_{OFF3}	V_{IN}, V_{OUT} = 0 to 3.6 V		1.1 to 1.4	Open	—	5.0	μA
Quiescent supply current	I_{CCA}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.1 to 1.4	1.65 to 2.3	—	5.0	μA
Quiescent supply current	I_{CCB}	V_{INA} = V_{CCA} or GND V_{INB} = V_{CCB} or GND		1.1 to 1.4	1.65 to 2.3	—	5.0	μA
Quiescent supply current	I_{CCA}	V_{CCA} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.1 to 1.4	1.65 to 2.3	—	±5.0	μA
Quiescent supply current	I_{CCB}	V_{CCB} ≤ (V_{IN}, V_{OUT}) ≤ 3.6 V		1.1 to 1.4	1.65 to 2.3	—	±5.0	μA

AC Characteristics (Ta = –40 to 85°C, Input: $t_r = t_f = 2.0$ ns)

$V_{CCA} = 2.5 \pm 0.2$ V, $V_{CCB} = 3.3 \pm 0.3$ V

Characteristics	Symbol	Test Condition	Min	Max	Unit
Propagation delay time (Bn → An)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	5.4	
3-state output enable time ($\overline{OE}$ → An)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	8.4	ns
3-state output disable time ($\overline{OE}$ → An)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	6.7	
Propagation delay time (An → Bn)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	13.7	
3-state output enable time ($\overline{OE}$ → Bn)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	16.6	ns
3-state output disable time ($\overline{OE}$ → Bn)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	7.2	
Output-to-output skew	t_{osLH} t_{osHL}	(Note)	—	0.5	ns

Note: Parameter guaranteed by design.
($t_{osLH} = |t_{pLHm} - t_{pLHn}|$, $t_{osHL} = |t_{pHLm} - t_{pHLn}|$)

$V_{CCA} = 1.8 \pm 0.15$ V, $V_{CCB} = 3.3 \pm 0.3$ V

Characteristics	Symbol	Test Condition	Min	Max	Unit
Propagation delay time (Bn → An)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	8.9	
3-state output enable time ($\overline{OE}$ → An)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	13.4	ns
3-state output disable time ($\overline{OE}$ → An)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	10.9	
Propagation delay time (An → Bn)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	14.8	
3-state output enable time ($\overline{OE}$ → Bn)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	18.9	ns
3-state output disable time ($\overline{OE}$ → Bn)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	8.7	
Output-to-output skew	t_{osLH} t_{osHL}	(Note)	—	0.5	ns

Note: Parameter guaranteed by design.
($t_{osLH} = |t_{pLHm} - t_{pLHn}|$, $t_{osHL} = |t_{pHLm} - t_{pHLn}|$)

V_{CCA} = 1.5 ± 0.1 V, V_{CCB} = 3.3 ± 0.3 V

Characteristics	Symbol	Test Condition	Min	Max	Unit
Propagation delay time (Bn → An)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	10.3	
3-state output enable time ($\overline{OE}$ → An)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	18.5	ns
3-state output disable time ($\overline{OE}$ → An)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	13.0	
Propagation delay time (An → Bn)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	16.0	
3-state output enable time ($\overline{OE}$ → Bn)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	22.8	ns
3-state output disable time ($\overline{OE}$ → Bn)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	10.2	
Output-to-output skew	t_{osLH} t_{osHL}	(Note)	—	1.5	ns

Note: Parameter guaranteed by design.
($t_{osLH} = |t_{pLHm} - t_{pLHn}|$, $t_{osHL} = |t_{pHLm} - t_{pHLn}|$)

V_{CCA} = 1.2 ± 0.1 V, V_{CCB} = 3.3 ± 0.3 V

Characteristics	Symbol	Test Condition	Min	Max	Unit
Propagation delay time (Bn → An)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	61	
3-state output enable time ($\overline{OE}$ → An)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	95	ns
3-state output disable time ($\overline{OE}$ → An)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	44	
Propagation delay time (An → Bn)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	29	
3-state output enable time ($\overline{OE}$ → Bn)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	63	ns
3-state output disable time ($\overline{OE}$ → Bn)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	23	
Output-to-output skew	t_{osLH} t_{osHL}	(Note)	—	1.5	ns

Note: Parameter guaranteed by design.
($t_{osLH} = |t_{pLHm} - t_{pLHn}|$, $t_{osHL} = |t_{pHLm} - t_{pHLn}|$)

V_{CCA} = 1.8 ± 0.15 V, V_{CCB} = 2.5 ± 0.2 V

Characteristics	Symbol	Test Condition	Min	Max	Unit
Propagation delay time (Bn → An)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	9.1	
3-state output enable time ($\overline{OE}$ → An)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	13.5	ns
3-state output disable time ($\overline{OE}$ → An)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	11.8	
Propagation delay time (An → Bn)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	18.5	
3-state output enable time ($\overline{OE}$ → Bn)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	23.6	ns
3-state output disable time ($\overline{OE}$ → Bn)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	6.9	
Output-to-output skew	t_{osLH} t_{osHL}	(Note)	—	0.5	ns

Note: Parameter guaranteed by design.
$(t_{osLH} = |t_{pLHm} - t_{pLHn}|,\ t_{osHL} = |t_{pHLm} - t_{pHLn}|)$

V_{CCA} = 1.5 ± 0.1 V, V_{CCB} = 2.5 ± 0.2 V

Characteristics	Symbol	Test Condition	Min	Max	Unit
Propagation delay time (Bn → An)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	10.8	
3-state output enable time ($\overline{OE}$ → An)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	18.3	ns
3-state output disable time ($\overline{OE}$ → An)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	14.2	
Propagation delay time (An → Bn)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	19.7	
3-state output enable time ($\overline{OE}$ → Bn)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	26.6	ns
3-state output disable time ($\overline{OE}$ → Bn)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	8.3	
Output-to-output skew	t_{osLH} t_{osHL}	(Note)	—	1.5	ns

Note: Parameter guaranteed by design.
$(t_{osLH} = |t_{pLHm} - t_{pLHn}|,\ t_{osHL} = |t_{pHLm} - t_{pHLn}|)$

V_{CCA} = 1.2 ± 0.1 V, V_{CCB} = 2.5 ± 0.2 V

Characteristics	Symbol	Test Condition	Min	Max	Unit
Propagation delay time (Bn → An)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	60	
3-state output enable time ($\overline{OE}$ → An)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	95	ns
3-state output disable time ($\overline{OE}$ → An)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	45	
Propagation delay time (An → Bn)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	33	
3-state output enable time ($\overline{OE}$ → Bn)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	66	ns
3-state output disable time ($\overline{OE}$ → Bn)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	20	
Output-to-output skew	t_{osLH} t_{osHL}	(Note)	—	1.5	ns

Note: Parameter guaranteed by design.
($t_{osLH} = |t_{pLHm} - t_{pLHn}|$, $t_{osHL} = |t_{pHLm} - t_{pHLn}|$)

V_{CCA} = 1.2 ± 0.1 V, V_{CCB} = 1.8 ± 0.15 V

Characteristics	Symbol	Test Condition	Min	Max	Unit
Propagation delay time (Bn → An)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	58	
3-state output enable time ($\overline{OE}$ → An)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	92	ns
3-state output disable time ($\overline{OE}$ → An)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	47	
Propagation delay time (An → Bn)	t_{pLH} t_{pHL}	Figure 1, Figure 2	1.0	43	
3-state output enable time ($\overline{OE}$ → Bn)	t_{pZL} t_{pZH}	Figure 1, Figure 3	1.0	78	ns
3-state output disable time ($\overline{OE}$ → Bn)	t_{pLZ} t_{pHZ}	Figure 1, Figure 3	1.0	20	
Output-to-output skew	t_{osLH} t_{osHL}	(Note)	—	1.5	ns

Note: Parameter guaranteed by design.
($t_{osLH} = |t_{pLHm} - t_{pLHn}|$, $t_{osHL} = |t_{pHLm} - t_{pHLn}|$)

Dynamic Switching Characteristics (Ta = 25°C, Input: $t_r = t_f = 2.0$ ns, $C_L = 30$ pF)

Characteristics		Symbol	Test Condition	V_{CCA} (V)	V_{CCB} (V)	Typ.	Unit
Quiet output maximum dynamic V_{OL}	A → B	V_{OLP}	$V_{IH} = V_{CC}$, $V_{IL} = 0$ V (Note)	2.5	3.3	0.35	V
				1.8	3.3	0.35	
				1.8	2.5	0.25	
	B → A			2.5	3.3	0.6	
				1.8	3.3	0.25	
				1.8	2.5	0.25	
Quiet output minimum dynamic V_{OL}	A → B	V_{OLV}	$V_{IH} = V_{CC}$, $V_{IL} = 0$ V (Note)	2.5	3.3	−0.35	V
				1.8	3.3	−0.35	
				1.8	2.5	−0.25	
	B → A			2.5	3.3	−0.6	
				1.8	3.3	−0.25	
				1.8	2.5	−0.25	
Quiet output maximum dynamic V_{OH}	A → B	V_{OHP}	$V_{IH} = V_{CC}$, $V_{IL} = 0$ V (Note)	2.5	3.3	2.65	V
				1.8	3.3	2.65	
				1.8	2.5	2.05	
	B → A			2.5	3.3	1.7	
				1.8	3.3	1.3	
				1.8	2.5	1.3	
Quiet output minimum dynamic V_{OH}	A → B	V_{OHV}	$V_{IH} = V_{CC}$, $V_{IL} = 0$ V (Note)	2.5	3.3	3.95	V
				1.8	3.3	3.95	
				1.8	2.5	2.95	
	B → A			2.5	3.3	3.3	
				1.8	3.3	2.3	
				1.8	2.5	2.3	

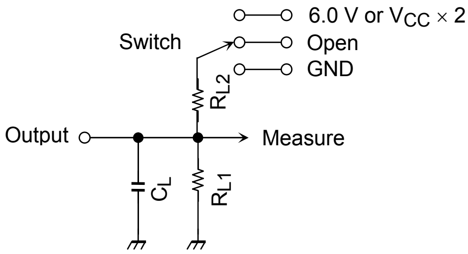
Note: Parameter guaranteed by design.

Capacitive Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Circuit		V_{CCA} (V)	V_{CCB} (V)	Typ.	Unit
Input capacitance	C_{IN}	DIR, $\overline{OE}$		2.5	3.3	7	pF
Bus I/O capacitance	$C_{I/O}$	An, Bn		2.5	3.3	8	pF
Power dissipation capacitance (Note)	C_{PDA}	$\overline{OE}$ = "L"	A → B (DIR = "H")	2.5	3.3	3	pF
			B → A (DIR = "L")	2.5	3.3	16	
		$\overline{OE}$ = "H"	A → B (DIR = "H")	2.5	3.3	0	
			B → A (DIR = "L")	2.5	3.3	0	
	C_{PDB}	$\overline{OE}$ = "L"	A → B (DIR = "H")	2.5	3.3	16	
			B → A (DIR = "L")	2.5	3.3	5	
		$\overline{OE}$ = "H"	A → B (DIR = "H")	2.5	3.3	0	
			B → A (DIR = "L")	2.5	3.3	0	

Note: 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:
$I_{CC\ (opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/4$ (per bit)

AC Test Circuit



Parameter	Switch	
t_{pLH}, t_{pHL}	Open	
t_{pLZ}, t_{pZL}	6.0 V	@ V_{CC} = 3.3 ± 0.3 V
	V_{CC} × 2	@ V_{CC} = 2.5 ± 0.2 V
		@ V_{CC} = 1.8 ± 0.15 V
		@ V_{CC} = 1.5 ± 0.1 V
		@ V_{CC} = 1.2 ± 0.1 V
t_{pHZ}, t_{pZH}	GND	

Symbol	V_{CC} (output)			
	3.3 ± 0.3 V 2.5 ± 0.2 V	1.8 ± 0.15 V	1.5 ± 0.1 V	1.2 ± 0.1 V
$R_{L1/2A}$	500 Ω	1 kΩ	2 kΩ	10 kΩ
C_{LA}	30 pF	30 pF	15 pF	15 pF
R_{L1B}	—	—	—	—
R_{L2B}	1 kΩ	1 kΩ	1 kΩ	1 kΩ
C_{LB}	30 pF	30 pF	30 pF	30 pF

Figure 1

AC Waveform

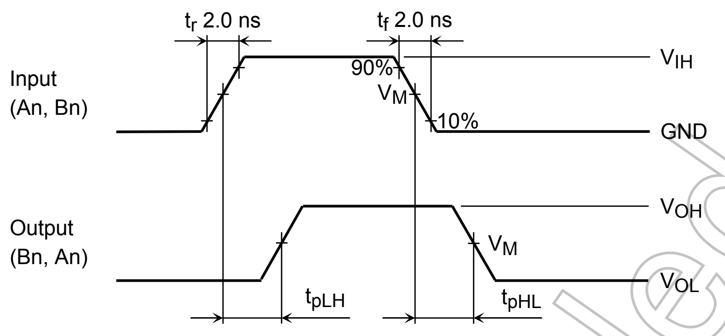


Figure 2 t_{pLH}, t_{pHL}

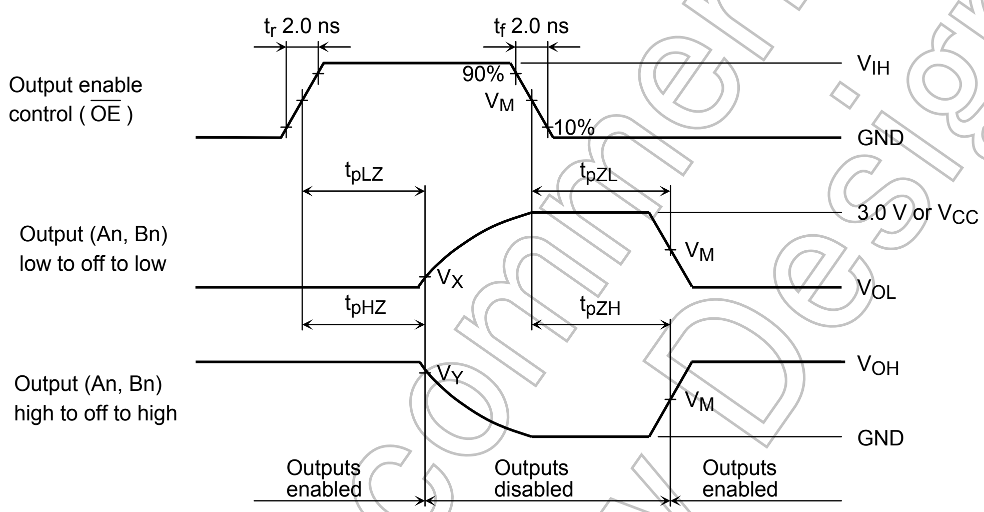


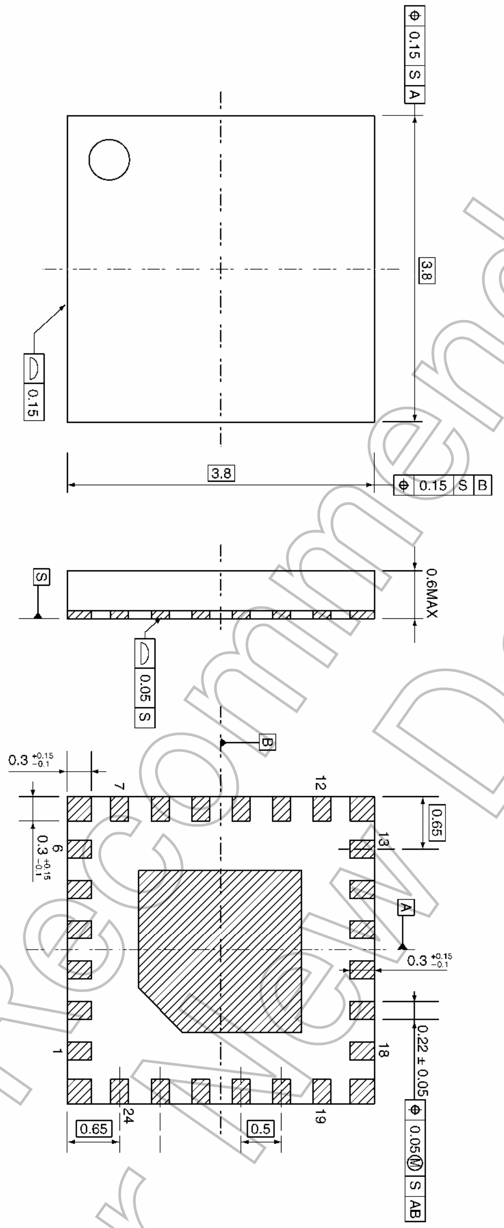
Figure 3 t_{pLZ}, t_{pHZ}, t_{pZL}, t_{pZH}

Symbol	V_{CC}		
	3.3 ± 0.3 V	2.5 ± 0.2 V 1.8 ± 0.15 V	1.5 ± 0.1 V 1.2 ± 0.1 V
V_{IH}	2.7 V	V_{CC}	V_{CC}
V_M	1.5 V	$V_{CC}/2$	$V_{CC}/2$
V_X	V_{OL} + 0.3 V	V_{OL} + 0.15 V	V_{OL} + 0.1 V
V_Y	V_{OH} − 0.3 V	V_{OH} − 0.15 V	V_{OH} − 0.1 V

Package Dimensions

VQON24-P-0404-0.50 Unit: mm

VQON24-P-0404-0.50 Unit: mm



Weight: 0.03 g (typ.)

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