1.General Description

The 74LVC8T245; 74LVCH8T245 is an 8-bit dual supply translating transceivers with 3-state outputs that enable bidirectional level translation. They feature two data input-output ports (pins An and Bn), a direction control input (DIR), 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 1.2 V and 5.5 V making the device suitable for translating between any of the low voltage nodes (1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V and 5.0 V). Pins An, $\overline{OE}$ and DIR are referenced to $V_{CC(A)}$ and pins Bn are referenced to $V_{CC(B)}$. A HIGH on DIR allows transmission from An to Bn and a LOW on DIR 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 devices are 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 A port and B port are in the high-impedance OFF-state.

Active bus hold circuitry in the 74LVCH8T245 holds unused or floating data inputs at a valid logic level.

2.Features and Benefits

■ Wide supply voltage range

- $V_{CC(A)}$: 1.2 V to 5.5 V
- $V_{CC(B)}$: 1.2 V to 5.5 V

■ High noise immunity

■ Complies with JEDEC standards:

- JESD8-7 (1.2 V to 1.95 V)
- JESD8-5 (1.8 V to 2.7 V)
- JESD8C (2.7 V to 3.6 V)
- JESD36 (4.5 V to 5.5 V)

■ Suspend mode

- Latch-up performance exceeds 250 mA
- ±24 mA output drive (V_{CC} = 3.0 V)
- Inputs accept voltages up to 5.5 V
- Low power consumption: 30 µA maximum I_{CC}
- I_{OFF} circuitry provides partial Power-down mode operation
- ESD protection:
  - HBM ANSI/ESDA/JEDEC JS-001 Class 2 exceeds 2500 V
  - CDM ANSI/ESDA/JEDEC JS-002 Class C3 exceeds 2000 V
- Multiple package options

3.Ordering Information

Table 1. Ordering information

Type number	Package		
	Name	Description	Quantity
74LVC8T245PW	TSSOP-24L	plastic thin shrink small outline package; 24 leads; body width 4.4 mm	2500
74LVCH8T245PW			

4.Function Diagram

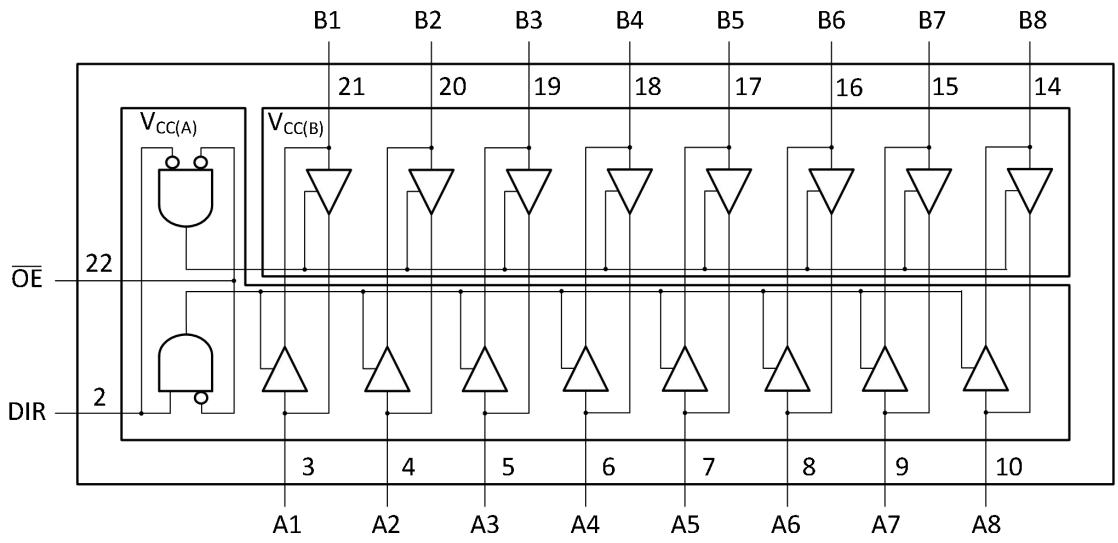


Fig. 1. Logic symbol

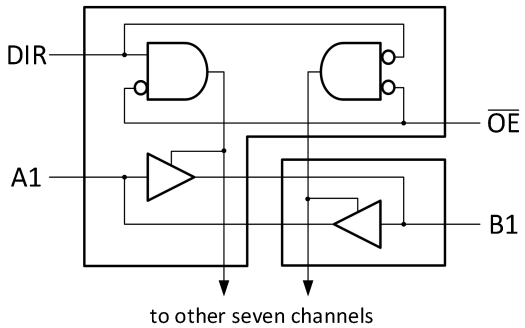


Fig. 2. Logic diagram (one channel)

5.Pinning Information

5.1. Pinning

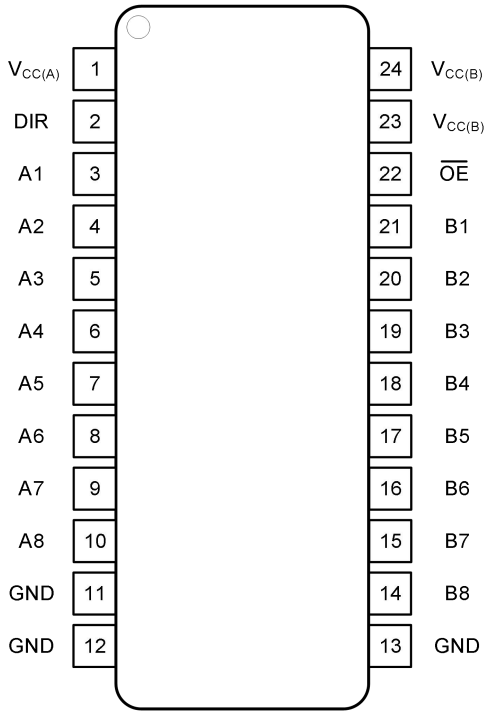


Fig. 3. Top view pin configuration TSSOP

5.2. Pin description

Table 2. Pin description

Symbol	Pin	Description
$V_{CC(A)}$	1	Supply voltage A (An inputs/outputs, $\overline{OE}$ and DIR inputs are referenced to $V_{CC(A)}$)
DIR	2	Direction control
A1, A2, A3, A4, A5, A6, A7, A8	3, 4, 5, 6, 7, 8, 9, 10	Data input or output
GND [1]	11, 12, 13	Ground (0 V)
B1, B2, B3, B4, B5, B6, B7, B8	21, 20, 19, 18, 17, 16, 15, 14	Data input or output
$\overline{OE}$	22	Output enable input (active LOW)
$V_{CC(B)}$	23, 24	Supply voltage B (Bn inputs/outputs are referenced to $V_{CC(B)}$)

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

6. Functional Description

Table 3. Function table

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

Supply voltage	Input		Input/output	
$V_{CC(A)}$, $V_{CC(B)}$	$\overline{OE}$ [2]	DIR [2]	An [2]	Bn [2]
1.2 V to 5.5 V	L	L	A = B	input
1.2 V to 5.5 V	L	H	input	B = A
1.2 V to 5.5 V	H	X	Z	Z
GND [1]	X	X	Z	Z

[1] If at least one of $V_{CC(A)}$ or $V_{CC(B)}$ is at GND level, the device goes into suspend mode.

[2] The An inputs/outputs, DIR and OE input circuit is referenced to $V_{CC(A)}$; The Bn inputs/outputs circuit is referenced to $V_{CC(B)}$.

7. Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Table 4. Absolute Maximum Ratings

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND.

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC(A)}$	supply voltage A		-0.5	6.5	V
$V_{CC(B)}$	supply voltage B		-0.5	6.5	V
I_{IK}	input clamping current	$V_I < 0$ V	-50		mA
V_I	input voltage	[1]	-0.5	6.5	V
I_{OK}	output clamping current	$V_O < 0$ V	-50		mA
V_O	output voltage	Active mode [1][2][3]	-0.5	V_{CCO} + 0.5	V
		Suspend or 3-state mode [1]	-0.5	6.5	V
I_O	output current	V_O = 0 V to V_{CCO} [2]		±50	mA
I_{CC}	supply current	$I_{CC(A)}$ or $I_{CC(B)}$; per V_{CC} pin		100	mA
I_{GND}	ground current	per GND pin	-100		mA
P_{tot}	total power dissipation			500	mW
T_{stg}	storage temperature		-65	150	°C

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

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

[3] V_{CCO} + 0.5 V should not exceed 6.5 V.

8. Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. MDD does not recommend exceeding them or designing to Absolute Maximum Ratings.

Table 5. Recommended Operating Conditions

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC(A)}$	supply voltage A		1.2	5.5	V
$V_{CC(B)}$	supply voltage B		1.2	5.5	V
V_I	input voltage		0	5.5	V
V_O	output voltage	Active mode [1]	0	V_{CCO}	V
		Suspend or 3-state mode	0	5.5	V
T_{amb}	ambient temperature		-40	125	°C
Δt/ΔV	input transition rise and fall rate	V_{CCI} = 1.2 V [2]		20	ns/V
		V_{CCI} = 1.4 V to 1.95 V		20	ns/V
		V_{CCI} = 2.3 V to 2.7 V		20	ns/V
		V_{CCI} = 3 V to 3.6 V		10	ns/V
		V_{CC} = 4.5 V to 5.5 V		5	ns/V

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

9.Static Characteristics

Table 6. Static characteristics

At recommended operating conditions. Voltages are referenced to GND (ground = 0 V). Typical values measured at T_{amb} = 25°C (unless otherwise noted).

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	
V_{IH}	HIGH-level input voltage	data input [1]						
		V_{CCI} = 1.2 V	$0.8V_{CCI}$			$0.8V_{CCI}$		V
		V_{CCI} = 1.4 V to 1.95 V	$0.65V_{CCI}$			$0.65V_{CCI}$		V
		V_{CCI} = 2.3 V to 2.7 V	1.7			1.7		V
		V_{CCI} = 3 V to 3.6 V	2.2			2.2		V
		V_{CCI} = 4.5 V to 5.5 V	$0.7V_{CCI}$			$0.7V_{CCI}$		V
		DIR, $\overline{OE}$ input						
		V_{CCI} = 1.2 V	$0.8V_{CC(A)}$			$0.8V_{CC(A)}$		V
		V_{CCI} = 1.4 V to 1.95 V	$0.65V_{CC(A)}$			$0.65V_{CC(A)}$		V
		V_{CCI} = 2.3 V to 2.7 V	1.7			1.7		V
		V_{CCI} = 3 V to 3.6 V	2.0			2.0		V
		V_{CCI} = 4.5 V to 5.5 V	$0.7V_{CC(A)}$			$0.7V_{CC(A)}$		V
V_{IL}	LOW-level input voltage	data input [1]						
		V_{CCI} = 1.2 V			$0.2V_{CCI}$		$0.2V_{CCI}$	V
		V_{CCI} = 1.4 V to 1.95 V			0.35 V_{CCI}		0.35 V_{CCI}	V
		V_{CCI} = 2.3 V to 2.7 V			0.7		0.7	V
		V_{CCI} = 3 V to 3.6 V			0.8		0.8	V
		V_{CCI} = 4.5 V to 5.5 V			$0.3V_{CCI}$		$0.3V_{CCI}$	V
		DIR, $\overline{OE}$ input						
		V_{CCI} = 1.2 V			$0.2V_{CC(A)}$		$0.2V_{CC(A)}$	V
		V_{CCI} = 1.4 V to 1.95 V			0.35 $V_{CC(A)}$		0.35 $V_{CC(A)}$	V
		V_{CCI} = 2.3 V to 2.7 V			0.7		0.7	V
		V_{CCI} = 3 V to 3.6 V			0.8		0.8	V
		V_{CCI} = 4.5 V to 5.5 V			$0.3V_{CC(A)}$		$0.3V_{CC(A)}$	V

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$						
		I_O = -100 µA; V_{CCO} = 1.2 V to 4.5 V	V_{CCO} - 0.1			V_{CCO} - 0.1		V
		I_O = -3 mA; V_{CCO} = 1.4 V	1.0			1.0		V
		I_O = -8 mA; V_{CCO} = 1.65 V	1.2			1.2		V
		I_O = -12 mA; V_{CCO} = 2.3 V	1.9			1.9		V
		I_O = -24 mA; V_{CCO} = 3.0 V	2.4			2.4		V
		I_O = -32 mA; V_{CCO} = 4.5 V	3.8			3.8		V
V_{OL}	LOW-level output voltage	$V_I = V_{IL}$						
		I_O = 100 µA; V_{CCO} = 1.2 V to 4.5 V			0.1		0.1	V
		I_O = 3 mA; V_{CCO} = 1.4 V			0.3		0.3	V
		I_O = 8 mA; V_{CCO} = 1.65 V			0.45		0.45	V
		I_O = 12 mA; V_{CCO} = 2.3 V			0.3		0.3	V
		I_O = 24 mA; V_{CCO} = 3.0 V			0.55		0.55	V
		I_O = 32 mA; V_{CCO} = 4.5 V			0.55		0.55	V
I_I	input leakage current	DIR, $\overline{OE}$ input; V_I = 0V to 5.5V ; V_{CCI} = 1.2V to 5.5V			±2		±10	µA
I_{OZ}	OFF-state output current	A or B port; V_O = 0 V or V_{CCO}; V_{CCO} = 1.2 V to 5.5 V [2]			±2		±10	µA
		suspend mode A port; V_O = 0 V or V_{CCO}; $V_{CC(A)}$ = 5.5 V; $V_{CC(B)}$ = 0 V [2]			±2		±10	µA
		suspend mode B port; V_O = 0 V or V_{CCO}; $V_{CC(A)}$ = 0 V; $V_{CC(B)}$ = 5.5 V [2]			±2		±10	µA
I_{OFF}	power-off leakage current	A port; V_I or V_O = 0 V to 5.5 V; $V_{CC(A)}$ = 0 V; $V_{CC(B)}$ = 1.2 V to 5.5 V			±2		±10	µA
		B port; V_I or V_O = 0 V to 5.5 V;			±2		±10	µA

		$V_{CC(B)}$ = 0 V; $V_{CC(A)}$ = 1.2 V to 5.5 V						

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	
I_{BHL}	bus hold LOW current	A or B port [1]						
		V_I = 0.58 V; V_{CCI} = 1.65 V	25			20		µA
		V_I = 0.70 V; V_{CCI} = 2.3 V	45			45		µA
		V_I = 0.80 V; V_{CCI} = 3.0 V	100			80		µA
		V_I = 1.35 V; V_{CCI} = 4.5 V	100			100		µA
I_{BHH}	bus hold HIGH current	A or B port [1]						
		V_I = 1.07 V; V_{CCI} = 1.65 V	-1			-1		µA
		V_I = 1.70 V; V_{CCI} = 2.3 V	-7			-7		µA
		V_I = 2.00 V; V_{CCI} = 3.0 V	-35			-35		µA
		V_I = 3.15 V; V_{CCI} = 4.5 V	-95			-95		µA
I_{BHLO}	bus hold LOW overdrive current	A or B port [1][3]						
		V_{CCI} = 1.6 V	125			125		µA
		V_{CCI} = 1.95 V	200			200		µA
		V_{CCI} = 2.7 V	300			300		µA
		V_{CCI} = 3.6 V	500			500		µA
		V_{CCI} = 5.5 V	900			900		µA
I_{BHHO}	bus hold HIGH overdrive current	A or B port [1][3]						
		V_{CCI} = 1.6 V	-125			-125		µA
		V_{CCI} = 1.95 V	-200			-200		µA
		V_{CCI} = 2.7 V	-300			-300		µA
		V_{CCI} = 3.6 V	-500			-500		µA
		V_{CCI} = 5.5 V	-900			-900		µA

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	
I_{CC}	supply current	A port; V_I = 0 V or V_{CCI}; I_O = 0 A [1]						
		$V_{CC(A)}$, $V_{CC(B)}$=1.2V to 5.5V			15		20	µA
		$V_{CC(A)}$ = 5.5V; $V_{CC(B)}$ = 0V			15		20	µA
		$V_{CC(A)}$ = 0V; $V_{CC(B)}$ = 5.5V	-2			-4		µA
		B port; V_I = 0 V or V_{CCI}; I_O = 0 A						
		$V_{CC(A)}$, $V_{CC(B)}$=1.2V to 5.5V			15		20	µA
		$V_{CC(B)}$ = 0V; $V_{CC(A)}$ = 5.5V	-2			-4		µA
		$V_{CC(B)}$ = 5.5V; $V_{CC(A)}$ = 0V			15		20	µA
		A plus B port ($I_{CC(A)}$ + $I_{CC(B)}$); I_O = 0 A; V_I = 0 V or V_{CCI}						
		$V_{CC(A)}$, $V_{CC(B)}$=1.2V to 5.5V			25		30	µA
ΔI_{CC}	additional supply current	per input; $V_{CC(A)}$, $V_{CC(B)}$ = 3.0V to 5.5V						
		DIR and $\overline{OE}$ input; DIR or $\overline{OE}$ input at $V_{CC(A)}$ - 0.6V; A port at $V_{CC(A)}$ or GND; B port = open			50		75	µA
		A port; A port at $V_{CC(A)}$ - 0.6 V; DIR at $V_{CC(A)}$; B port = open [4]			50		75	µA
		B port; B port at $V_{CC(B)}$ - 0.6 V; DIR at $V_{CC(B)}$; A port = open [4]			50		75	µA

[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.
[3] To guarantee the node switches, an external driver must source/sink at least I_{BHLO} / I_{BHHO} when the input is in the range V_{IL} to V_{IH}.
[4] For non bus hold parts only (74LVC8T245).

10. Dynamic Characteristics

Table 7. Dynamic characteristics for temperature range -40 °C to +85 °C

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 6. for waveforms see Fig. 3 and Fig. 4. [1]

Symbol	Parameter	Conditions	$V_{CC(B)}$										Unit
			1.5V±0.1V		1.8V±0.15V		2.5V±0.2V		3.3V±0.3V		5.0V±0.5V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$V_{CC(A)}$ = 1.5 V ± 0.1 V													
t_{pd}	propagation time	An to Bn	0.9	43.2	0.9	39.2	0.8	36.3	0.7	35.1	0.7	35.1	ns
		Bn to An	0.9	43.2	0.9	39.2	0.8	36.3	0.7	35.1	0.7	35.1	ns
t_{dis}	disable time	$\overline{OE}$ to An	1.5	72.5	1.5	72.5	1.5	72.5	1.5	72.5	1.4	72.5	ns
		$\overline{OE}$ to Bn	1.5	72.5	1.5	72.5	1.5	72.5	1.5	72.5	1.4	72.5	ns
t_{en}	enable time	$\overline{OE}$ to An	0.4	92.2	0.4	92.2	0.4	92.2	0.4	92.2	0.4	92.2	ns
		$\overline{OE}$ to Bn	0.4	92.2	0.4	92.2	0.4	92.2	0.4	92.2	0.4	92.2	ns
$V_{CC(A)}$ = 1.8 V ± 0.15 V													
t_{pd}	propagation time	An to Bn	0.9	38.6	0.9	30.5	0.8	26.9	0.7	26.3	0.7	25.8	ns
		Bn to An	0.9	38.6	0.9	30.5	0.8	26.9	0.7	26.3	0.7	25.8	ns
t_{dis}	disable time	$\overline{OE}$ to An	1.5	46.3	1.5	46.3	1.5	46.3	1.5	46.3	1.4	46.3	ns
		$\overline{OE}$ to Bn	1.5	46.3	1.5	46.3	1.5	46.3	1.5	46.3	1.4	46.3	ns
t_{en}	enable time	$\overline{OE}$ to An	0.4	63.2	0.4	58.1	0.4	54.6	0.4	54.1	0.4	53.1	ns
		$\overline{OE}$ to Bn	0.4	63.2	0.4	58.1	0.4	54.6	0.4	54.1	0.4	53.1	ns
$V_{CC(A)}$ = 2.5 V ± 0.2 V													
t_{pd}	propagation time	An to Bn	1.2	33.0	1.2	24.7	1.0	19.7	1.0	18.3	0.9	17.1	ns
		Bn to An	1.2	33.0	1.2	24.7	1.0	19.7	1.0	18.3	0.9	17.1	ns
t_{dis}	disable time	$\overline{OE}$ to An	1.4	25.1	1.4	25.1	1.4	25.1	1.4	25.1	1.4	25.1	ns
		$\overline{OE}$ to Bn	1.4	25.1	1.4	25.1	1.4	25.1	1.4	25.1	1.4	25.1	ns
t_{en}	enable time	$\overline{OE}$ to An	1.0	38.3	1.0	33.1	1.0	29.5	1.0	28.0	1.0	27.0	ns
		$\overline{OE}$ to Bn	1.0	38.3	1.0	33.1	1.0	29.5	1.0	28.0	1.0	27.0	ns
$V_{CC(A)}$ = 3.3 V ± 0.3 V													
t_{pd}	propagation time	An to Bn	0.8	31.2	0.8	22.6	0.8	16.2	0.7	14.5	0.6	13.6	ns
		Bn to An	0.8	31.2	0.8	22.6	0.8	16.2	0.7	14.5	0.6	13.6	ns
t_{dis}	disable time	$\overline{OE}$ to An	1.6	20.2	1.6	20.2	1.6	20.2	1.6	20.2	1.6	20.2	ns
		$\overline{OE}$ to Bn	1.6	20.2	1.6	20.2	1.6	20.2	1.6	20.2	1.6	20.2	ns
t_{en}	enable time	$\overline{OE}$ to An	0.8	31.5	0.8	25.8	0.8	22.4	0.8	21.1	0.8	20.8	ns
		$\overline{OE}$ to Bn	1.8	31.5	0.8	25.8	0.8	22.4	0.8	21.1	0.8	20.8	ns
$V_{CC(A)}$ = 5.0 V ± 0.5 V													
t_{pd}	propagation time	An to Bn	0.7	29.8	0.7	21.3	0.4	14.8	0.3	12.6	0.3	11.2	ns
		Bn to An	0.7	29.8	0.7	21.3	0.4	14.8	0.3	12.6	0.3	11.2	ns
t_{dis}	disable time	$\overline{OE}$ to An	0.3	15.6	0.3	15.6	0.3	15.6	0.3	15.6	0.3	15.6	ns
		$\overline{OE}$ to Bn	0.3	15.6	0.3	15.6	0.3	15.6	0.3	15.6	0.3	15.6	ns
t_{en}	enable time	$\overline{OE}$ to An	0.7	29.1	0.7	21.2	0.7	18.5	0.7	16.8	0.7	15.9	ns
		$\overline{OE}$ to Bn	0.7	29.1	0.7	21.2	0.7	18.5	0.7	16.8	0.7	15.9	ns

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

Table 8. Dynamic characteristics for temperature range -40 °C to +125 °C

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 6. for waveforms see Fig. 3 and Fig. 4. [1]

Symbol	Parameter	Conditions	$V_{CC(B)}$										Unit
			1.5V±0.1V		1.8V±0.15V		2.5V±0.2V		3.3V±0.3V		5.0V±0.5V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$V_{CC(A)}$ = 1.5 V ± 0.1 V													
t_{pd}	propagation time	An to Bn	0.9	43.3	0.9	38.9	0.8	36.3	0.7	35.1	0.7	35.1	ns
		Bn to An	0.9	43.3	0.9	38.9	0.8	36.3	0.7	35.1	0.7	35.1	ns
t_{dis}	disable time	$\overline{OE}$ to An	1.5	74.5	1.5	74.5	1.5	74.5	1.5	74.5	1.4	74.5	ns
		$\overline{OE}$ to Bn	1.5	74.5	1.5	74.5	1.5	74.5	1.5	74.5	1.4	74.5	ns
t_{en}	enable time	$\overline{OE}$ to An	0.4	94.2	0.4	94.2	0.4	94.2	0.4	94.2	0.4	94.2	ns
		$\overline{OE}$ to Bn	0.4	94.2	0.4	94.2	0.4	94.2	0.4	94.2	0.4	94.2	ns
$V_{CC(A)}$ = 1.8 V ± 0.15 V													
t_{pd}	propagation time	An to Bn	0.9	38.4	0.9	30.8	0.8	27.8	0.7	26.4	0.7	25.3	ns
		Bn to An	0.9	38.4	0.9	30.8	0.8	27.8	0.7	26.4	0.7	25.3	ns
t_{dis}	disable time	$\overline{OE}$ to An	1.5	50.3	1.5	50	1.5	50.2	1.5	50.4	1.4	50.3	ns
		$\overline{OE}$ to Bn	1.5	50.3	1.5	50	1.5	50.2	1.5	50.4	1.4	50.3	ns
t_{en}	enable time	$\overline{OE}$ to An	0.4	67.2	0.4	61.8	0.4	58.5	0.4	58.2	0.4	57.1	ns
		$\overline{OE}$ to Bn	0.4	67.2	0.4	61.8	0.4	58.5	0.4	58.2	0.4	57.1	ns
$V_{CC(A)}$ = 2.5 V ± 0.2 V													
t_{pd}	propagation time	An to Bn	1.2	33.4	1.2	25.4	1.0	19.7	1.0	18.5	0.9	17.3	ns
		Bn to An	1.2	33.4	1.2	25.4	1.0	19.7	1.0	18.5	0.9	17.3	ns
t_{dis}	disable time	$\overline{OE}$ to An	1.4	29.1	1.4	28.8	1.4	29	1.4	29.2	1.4	29.1	ns
		$\overline{OE}$ to Bn	1.4	29.1	1.4	28.8	1.4	29	1.4	29.2	1.4	29.1	ns
t_{en}	enable time	$\overline{OE}$ to An	1.0	42.3	1.0	36.8	1.0	33.4	1.0	32.1	1.0	31.0	ns
		$\overline{OE}$ to Bn	1.0	42.3	1.0	36.8	1.0	33.4	1.0	32.1	1.0	31.0	ns
$V_{CC(A)}$ = 3.3 V ± 0.3 V													
t_{pd}	propagation time	An to Bn	0.8	32.2	0.8	23.2	0.8	16.8	0.7	15.5	0.6	14.6	ns
		Bn to An	0.8	32.2	0.8	23.2	0.8	16.8	0.7	15.5	0.6	14.6	ns
t_{dis}	disable time	$\overline{OE}$ to An	1.6	24.2	1.6	23.9	1.6	24.1	1.6	24.3	1.6	24.2	ns
		$\overline{OE}$ to Bn	1.6	24.2	1.6	23.9	1.6	24.1	1.6	24.3	1.6	24.2	ns
t_{en}	enable time	$\overline{OE}$ to An	0.8	35.5	0.8	29.5	0.8	26.3	0.8	25.2	0.8	24.8	ns
		$\overline{OE}$ to Bn	0.8	35.5	0.8	29.5	0.8	26.3	0.8	25.2	0.8	24.8	ns
$V_{CC(A)}$ = 5.0 V ± 0.5 V													
t_{pd}	propagation time	An to Bn	0.7	30.4	0.7	22.1	0.4	15.5	0.3	13.4	0.3	11.9	ns
		Bn to An	0.7	30.4	0.7	22.1	0.4	15.5	0.3	13.4	0.3	11.9	ns
t_{dis}	disable time	$\overline{OE}$ to An	0.3	19.6	0.3	19.3	0.3	19.5	0.3	19.7	0.3	19.6	ns
		$\overline{OE}$ to Bn	0.3	19.6	0.3	19.3	0.3	19.5	0.3	19.7	0.3	19.6	ns
t_{en}	enable time	$\overline{OE}$ to An	0.7	33.1	0.7	24.9	0.7	22.4	0.7	20.9	0.7	19.9	ns
		$\overline{OE}$ to Bn	0.7	33.1	0.7	24.9	0.7	22.4	0.7	20.9	0.7	19.9	ns

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

Table 9. Typical power dissipation capacitance at $V_{CC(A)}$ = $V_{CC(B)}$ and T_{amb} = 25 °C

Voltages are referenced to GND (ground = 0 V). [1][2]

Symbol	Parameter	Conditions	$V_{CC(A)}$ and $V_{CC(B)}$				Unit
			1.8 V	2.5 V	3.3 V	5.0 V	
C_{PD}	power dissipation capacitance	A port: (direction A to B); B port: (direction B to A)	1	1	1	1	pF
		A port: (direction B to A); B port: (direction A to B)	16	16	17	18	pF

[1] C_{PD} is used to determine the dynamic power dissipation (P_D in µW).

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

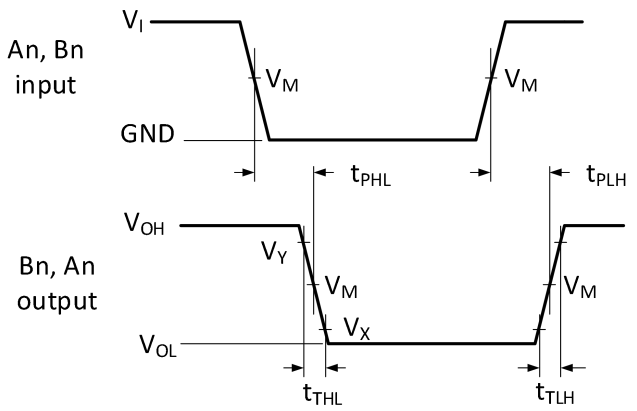
V_{CC} = supply voltage in V;

N = number of inputs switching;

$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

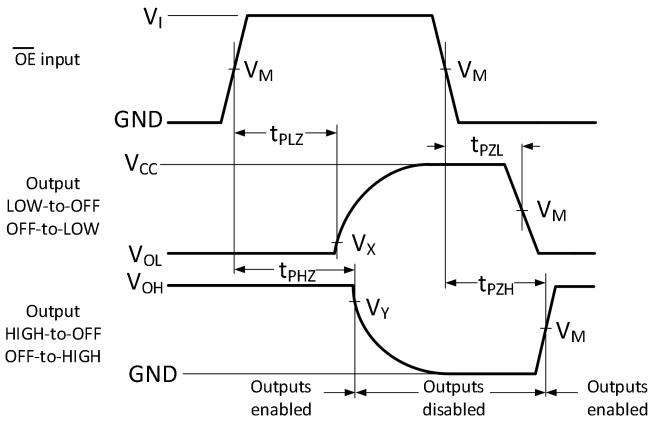
[2] f_i = 10 MHz; V_I = GND to V_{CC}; $t_r = t_f$ = 1 ns; C_L = 0 pF; $R_L = \infty\ \Omega$.

10.1. Waveforms and test circuit



Measurement points are given in Table 10.
V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Fig. 4. The input An, Bn to output Bn, An propagation delays



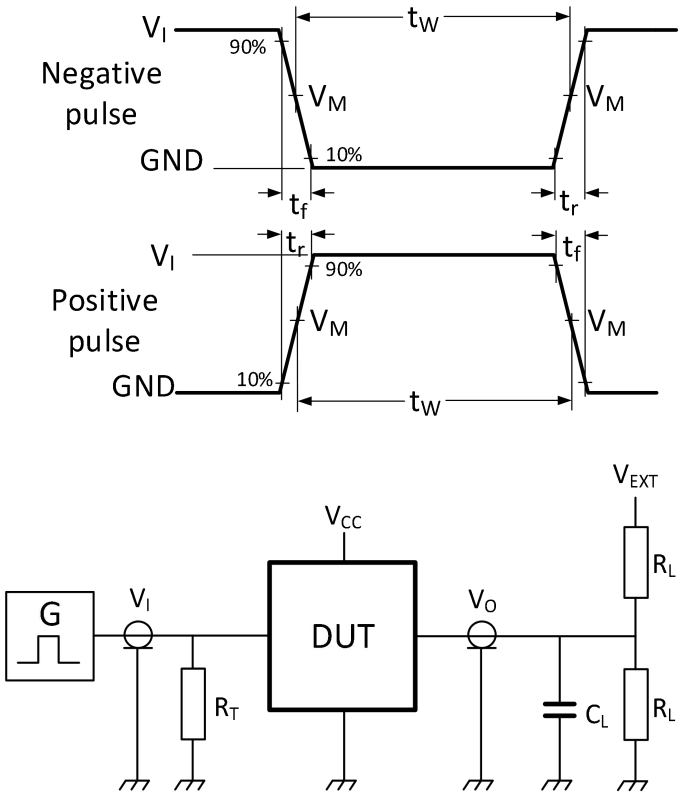
Measurement points are given in Table 10.
V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Fig. 5. 3-state enable and disable times

Table 10. Measurement points

Supply voltage	Input [1]	Output [2]		
$V_{CC(A)}$, $V_{CC(B)}$	V_M	V_M	V_X	V_Y
1.2 V to 1.6 V	$0.5V_{CCI}$	$0.5V_{CCO}$	V_{OL} + 0.1 V	V_{OH} - 0.1 V
1.65 V to 2.7 V	$0.5V_{CCI}$	$0.5V_{CCO}$	V_{OL} + 0.15 V	V_{OH} - 0.15 V
3.0 V to 5.5 V	$0.5V_{CCI}$	$0.5V_{CCO}$	V_{OL} + 0.3 V	V_{OH} - 0.3 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.



Test data is given in Table 11.
Definitions for test circuit:
R_L = Load resistance.
C_L = Load capacitance including jig and probe capacitance.
R_T = Termination resistance should be equal to the output impedance Z_o of the pulse generator.
V_{EXT} = External voltage for measuring switching times.

Fig. 6. Test circuit for measuring switching times

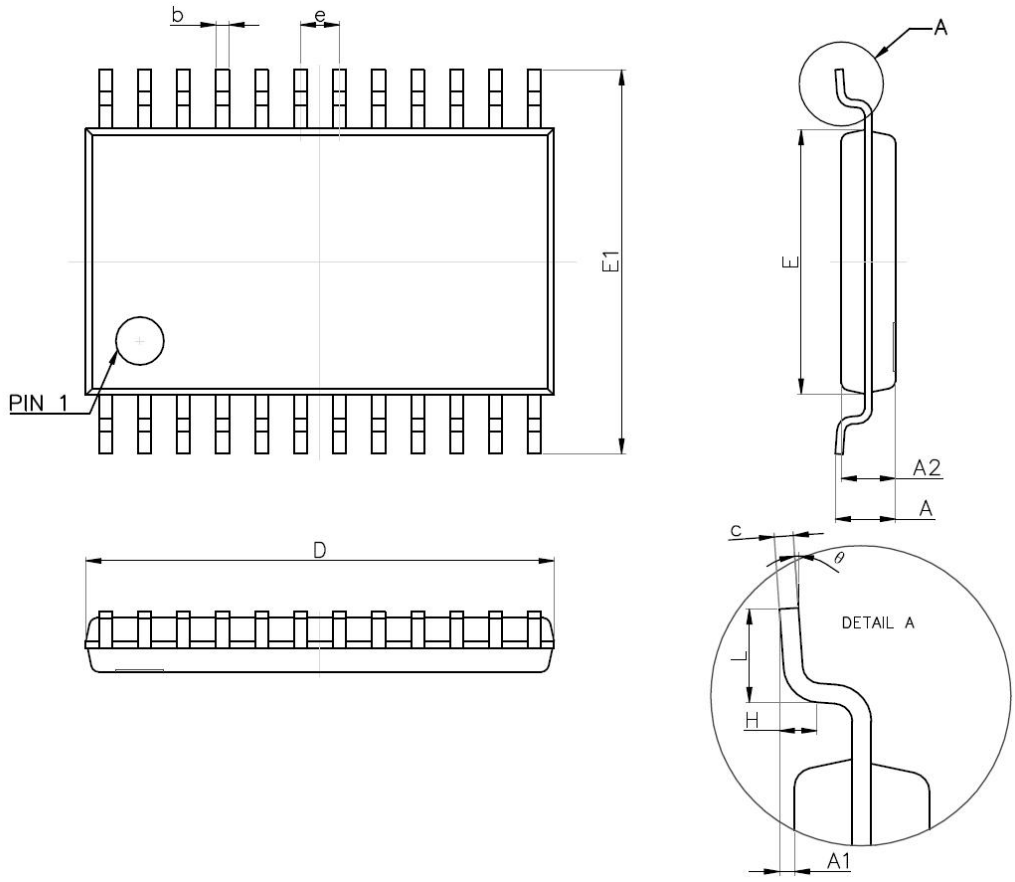
Table 11. Test data

Supply voltage	Input		Load		V_{EXT}		
$V_{CC(A)}$, $V_{CC(B)}$	V_I [1]	$t_r = t_f$	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ} [2]
1.2 V to 5.5 V	V_{CCI}	≤ 2.5 ns	15 pF	2kΩ	open	GND	$2V_{CCO}$

[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.

11. Package Outline

TSSOP-24L



Symbol	Dimensions In Millimeters		Dimensions In Millimeters	
	Min.	Max.	Min.	Max.
A	-	1.20	6.20	6.60
A1	0.05	0.15	0.65BSC	
A2	0.80	1.05	0.45	0.75
A3	0.39	0.49	1.00REF	
b	0.20	0.28	0°	8°
b1	0.19	0.25		
c	0.13	0.17		
c1	0.12	0.14		
D	6.40	6.60		
E1	4.30	4.50		

12. Abbreviations

Table 12. Abbreviations

Acronym	Description
CMOS	Complementary Metal-Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
CDM	Charged Device Model

13. Revision History

Table 13. Revision history

Document ID	Release Date	Data sheet status	Change notice	Supersedes
74LVC_LVCH8T245 Rev. 1.0	Feb 10, 2025	Product datasheet		