8-BIT Dual-Supply Bus Transceiver With Configurable Level-Shifting,Voltage Translation,and 3-State Outputs

General Description

The ETQ74LVCH8T245V is an 8-bit non-inverting bus transceiver that uses two separate configurable power supply rails.The device is designed for asynchronous communication between two data buses.

The logic levels of the direction-control (DIR) input and the output-enable (OE) input activate either the B-port outputs,the A-port outputs,or place both output ports into a high-impedance state.The control pins (DIR and OE) are referenced to V_{CCA}.

ETQ74LVCH8T245V offered in a small TSSOP24 package and operates over an ambient temperature range of -40°C to +105°C

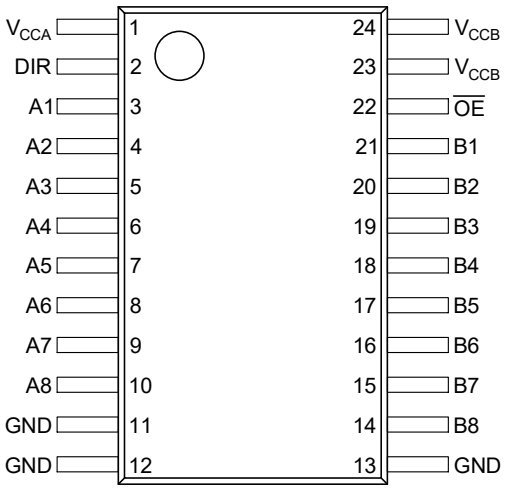
Features

- Control Inputs (DIR and OE) V_{IH} and V_{IL} Levels are Referenced to V_{CCA}
- Bus Hold on Data Inputs Eliminates the Need for External Pull-up and Pull-down Resistors
- VCC Isolation
- Fully Configurable Dual-Rail Design
- Ioff Supports Partial-Power-Down Mode Operation
- Automotive AEC-Q100 Grade 2 Qualified
  - -- Ambient temperature range of -40°C to +105°C
  - -- ESD HBM 6KV
  - -- ESD CDM 1KV
  - -- MSL 3

Ordering Information

Part No.	Package	Size
ETQ74LVCH8T245V	TSSOP24	4.4mm x7.8mm

Pin Configuration

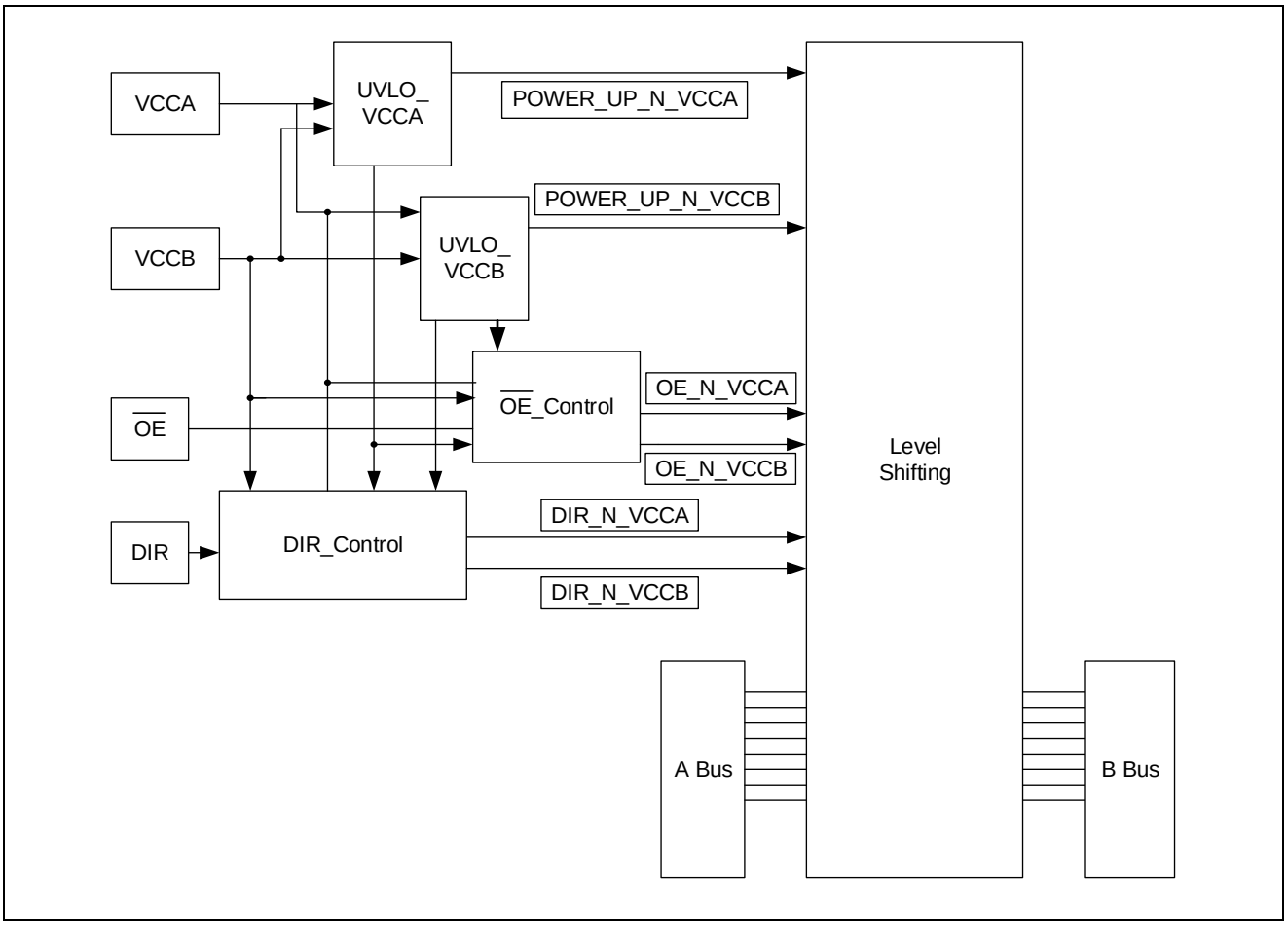


Top View

Pin Assignment

Pin		I/O	Description
Pin Name	TSSOP24		
V_{CCA}	1	–	A port supply voltage.
V_{CCB}	23,24	–	B port supply voltage.
DIR	2	I	Direction-control signal.Referenced to V_{CCA}.
$\overline{OE}$	22	I	3-state output-mode enables.Pull OE high to place all outputs in 3-state mode.Referenced to V_{CCA}.
A1~A8	3~10	I/O	Input/output A1~A8.Referenced to V_{CCA}
B1~B8	14~21	I/O	Input/output B1~B8.Referenced to V_{CCB}
GND	11,12,13	–	Ground pin

Block Diagram



Device Functional Modes

Input circuits of the data I/Os are always active.

Control Inputs		Output Circuits		Operation
$\overline{OE}$	DIR	A Port	B Port	
L	L	Enabled	Hi-Z	B data to A bus
L	H	Hi-Z	Enabled	A data to B bus
H	X	Hi-Z	Hi-Z	Isolation

Description

The ETQ74LVCH8T245V is designed for asynchronous communication between two data buses which allows for universal low-voltage bidirectional translation between any of the 1.8V,2.5V,3.3V,and 5.5V voltage nodes.The A port is designed to track V_{CCA};The B port is designed to track V_{CCB}, All ports accepts supply voltage from 1.65 V to 5.5 V.The input circuitry on both A and B ports are always active.

Active bus-hold circuitry holds unused or undriven inputs at a valid logic state.Use of pull-up or pull-down resistors with the bus-hold circuitry is not recommended.This device is fully specified for partial-power-down

applications using Ioff. The Ioff circuitry disables the outputs,preventing damaging current backflow through the device.

The VCC isolation feature ensures that if either V_{CCA} or V_{CCB} is at GND,then the outputs are in the high impedance state.To ensure the high-impedance state during power up or power down,OE should be tied to V_{CCA} through a pull-up resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

Absolute Maximum Ratings

Symbol	Rating	Value	Unit
V_{CCA} & V_{CCB}	Supply Voltage(1)	-0.5~6.5	V
Input A1~A8 & B1~B8	I/O ports input Voltage	-0.5~6.5	V
Output A1~A8 & B1~B8	I/O ports output Voltage	-0.5~6.5	V
Input clamp current	$V_I < 0$	–50	mA
Output clamp current	$V_O < 0$	–50	mA
Voltage range applied to any output in the high or low state	A port	–0.5 ~ V_{CCA}+0.5	V
	B port	–0.5 ~ V_{CCB}+0.5	
$T_{J(MAX)}$	Maximum Junction Temperature	150	°C
T_{STG}	Storage Temperature	-40~150	°C
ESD_{HBM}	ESD HBM Capability(2)	6000	V
ESD_{CDM}	ESD CDM Capability(2)	1000	V
L_U	Latch up Current Maximum Rating(2)	100	mA

Stresses exceeding those listed in the Maximum Ratings table may damage the device.If any of these limits are exceeded,device functionality should not be assumed,damage may occur and reliability may be affected.

Notes:

1. Refer to ELECTRICAL CHARACTERISTIS and APPLICATION INFORMATION for Safe Operating Area.

2. This device series incorporates ESD protection and is tested by the following methods:
HBM tested per AEC-Q100-002(EIA/JESD22-A114)
CDM tested per AEC-Q100-011(EIA/JESD22-C101)
Latch up Current Maximum Rating tested per AEC-Q100-004(EIA/JESD78E)

Thermal Characteristics

Symbol	Package	Ratings	Value	Unit
$R_{\theta JA}$	TSSOP24	Thermal Characteristics, Thermal Resistance,Junction-to-Air	90	°C/W

Recommended Operating Conditions

For V_{CCA} values not specified in the data sheet,V_{IH}(min) = V_{CCA} × 0.7V,V_{IL}(max) = V_{CCA} × 0.3V.

Symbol	Description		Min	Max	Unit
V_{CCA}	Supply Voltage		1.65	5.5	V
V_{CCB}			1.65	5.5	
V_{IH}	High-level input voltage (Data inputs)	V_{CCI}=1.65 to 4.5V	V_{CCI}×0.65		V
		V_{CCI}=2.3 to 2.7V	1.8		
		V_{CCI}=3 to 3.6V	2.2		
		V_{CCI}=4.5 to 5.5V	V_{CCI}×0.7		
V_{IL}	Low-level input voltage (Data inputs)	V_{CCI}=1.65 to 4.5V		V_{CCI}×0.35	V
		V_{CCI}=2.3 to 2.7V		0.6	
		V_{CCI}=3 to 3.6V		0.8	
		V_{CCI}=4.5 to 5.5V		V_{CCI}×0.3	
V_{IH}	High-level input voltage (Control inputs) (referenced to V_{CCA})	V_{CCI}=1.65 to 4.5V	V_{CCI}×0.65		V
		V_{CCI}=2.3 to 2.7V	1.8		
		V_{CCI}=3 to 3.6V	2.2		
		V_{CCI}=4.5 to 5.5V	V_{CCI}×0.7		
V_{IL}	Low-level input voltage (Control inputs) (referenced to V_{CCA})	V_{CCI}=1.65 to 4.5V		V_{CCI}×0.35	V
		V_{CCI}=2.3 to 2.7V		0.6	
		V_{CCI}=3 to 3.6V		0.8	
		V_{CCI}=4.5 to 5.5V		V_{CCI}×0.3	
V_I	Control inputs		0	5.5	V
$V_{I/O}$	Input/output voltage	Active state	0	V_{CCO}	V
		3-State	0	5.5	
I_{OH}	High-level input current	V_{CCO} =1.65 to 4.5V		-4	mA
		V_{CCO} =2.3 to 2.7V		-8	
		V_{CCO} =3 to 3.6V		-24	
		V_{CCO} =4.5 to 5.5V		-32	
I_{OL}	Low-level input current	V_{CCO} =1.65 to 4.5V		4	mA
		V_{CCO} =2.3 to 2.7V		8	
		V_{CCO} =3 to 3.6V		24	
		V_{CCO} =4.5 to 5.5V		32	
△t/△v	Input transition rise or fall rate (Data inputs)	V_{CCI}=1.65 to 4.5V		20	ns/V
		V_{CCI}=2.3 to 2.7V		20	
		V_{CCI}=3 to 3.6V		10	
		V_{CCI}=4.5 to 5.5V		5	
T_A	Operating free-air temperature		-40	105	°C

Electrical Characteristics

All typical limits apply over T_A = 25°C,and all maximum and minimum limits apply over T_A = –40°C to 105°C (unless otherwise noted)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_{OH}	High-level output voltage	I_{OH} = -100μA $V_I = V_{IH}$	V_{CCA} = 1.65V to 4.5V V_{CCB} = 1.65V to 4.5V	V_{CCO} -0.1			V
		I_{OH} = -4mA $V_I = V_{IH}$	V_{CCA} = 1.65V V_{CCB} = 1.65V	1.2			
		I_{OH} = -8mA $V_I = V_{IH}$	V_{CCA} = 2.3V V_{CCB} = 2.3V	1.9			
		I_{OH} = -24mA $V_I = V_{IH}$	V_{CCA} = 3V V_{CCB} = 3V	2.4			
		I_{OH} = -32mA $V_I = V_{IH}$	V_{CCA} = 4.5V V_{CCB} = 4.5V	3.8			
V_{OL}	Low-level output voltage	I_{OL} = 100μA $V_I = V_{IL}$	V_{CCA} = 1.65V to 4.5V V_{CCB} = 1.65V to 4.5V			0.1	V
		I_{OL} = 4mA $V_I = V_{IL}$	V_{CCA} = 1.65V V_{CCB} = 1.65V			0.45	
		I_{OL} = 8mA $V_I = V_{IL}$	V_{CCA} = 2.3V V_{CCB} = 2.3V			0.3	
		I_{OL} = 24mA $V_I = V_{IL}$	V_{CCA} = 3V V_{CCB} = 3V			0.55	
		I_{OL} = 32mA $V_I = V_{IL}$	V_{CCA} = 4.5V V_{CCB} = 4.5V			0.55	
I_I	Control inputs (DIR)	V_I = V_{CCA} or GND	V_{CCA} = 1.65V to 4.5V V_{CCB} = 1.65V to 4.5V		±0.5	±2	μA
I_{BHL}	Bus-hold low Sustaining current	V_I =0.58V	V_{CCA} = 1.65V,V_{CCB} = 1.65V	15			μA
		V_I =0.7V	V_{CCA} =2.3V,V_{CCB} =2.3V	45			
		V_I =0.8V	V_{CCA} = 3V,V_{CCB} = 3V	75			
		V_I =1.35V	V_{CCA} = 4.5V,V_{CCB} = 4.5V	100			
I_{BHH}	Bus-hold high Sustaining current	V_I =0.58V	V_{CCA} = 1.65V,V_{CCB} = 1.65V	-15			μA
		V_I =0.7V	V_{CCA} = 2.3V,V_{CCB} = 2.3V	-45			
		V_I =0.8V	V_{CCA} = 3V,V_{CCB} = 3V	-75			
		V_I =1.35V	V_{CCA} = 4.5V,V_{CCB} = 4.5V	-100			
I_{BHLO}	Bus-hold low sustaining current	V_I = 0 to V_{CC}	V_{CCA} = 1.65V,V_{CCB} = 1.65V	200			μA
			V_{CCA} = 2.3V,V_{CCB} = 2.3V	300			
			V_{CCA} = 3V,V_{CCB} = 3V	500			
			V_{CCA} = 4.5V,V_{CCB} = 4.5V	900			

Electrical Characteristics(Continued)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
I_{BHHO}	Bus-hold high Sustaining current	V_I =0 to V_{CC}	V_{CCA} = 1.65V,V_{CCB} = 1.65V	-200			μA
			V_{CCA} = 2.3V, V_{CCB} = 2.3V	-300			
			V_{CCA} = 3VmV, V_{CCB} = 3V	-500			
			V_{CCA} = 4.5V,V_{CCB} = 4.5V	-900			
I_{OFF}	Input & output power-off leakage current	V_I or V_O = 0 to 5.5V	B Port V_{CCA} = 0V,V_{CCB} = 0 to 5.5V		±0.5	±2	μA
			A Port V_{CCA} = 0 to 5.5V,V_{CCB} = 0V		±0.5	±2	
I_{OZ}	Off-state output current	V_O = V_{CCO} or GND V_I = V_{CCI} or GND	$\overline{OE}$ =VIH V_{CCA} = 1.65V to 4.5V V_{CCB} = 1.65V to 4.5V			±2	μA
			$\overline{OE}$ =X, B Port V_{CCA} = 0V,V_{CCB} = 5.5V			±2	
			$\overline{OE}$ =X, A Port V_{CCA} = 5.5V,V_{CCB} = 0V			±2	
I_{CCA}	Supply current A port	V_I = V_{CCI} or GND, I_O = 0	V_{CCA} = 1.65V to 4.5V V_{CCB} = 1.65V to 4.5V			20	μA
			V_{CCA} = 5V,V_{CCB} = 0V			20	
			V_{CCA} = 0V,V_{CCB} = 5V			-2	
I_{CCB}	Supply current B port	V_I = V_{CCI} or GND, I_O = 0	V_{CCA} = 1.65V to 4.5V V_{CCB} = 1.65V to 4.5V			20	μA
			V_{CCA} = 5V,V_{CCB} = 0V			-2	
			V_{CCA} = 0V,V_{CCB} = 5V			20	
I_{CCA}+I_{CCB}	Combined supply current	V_I = V_{CCI} or GND, I_O = 0	V_{CCA} = 1.65V to 4.5V V_{CCB} = 1.65V to 4.5V			30	μA
ΔI_{CCA}	Supply-current change DIR	DIR at V_{CCA}-0.6V, B port=open, A port at V_{CCA} or GND	V_{CCA} = 3V to 5.5V V_{CCB} = 3V to 5.5V			50	μA
C_i	Input capacitance (control inputs)	V_I = V_{CCI} or GND	V_{CCA} = 3.3V V_{CCB} = 3.3V		4.5	5.5	pF
C_{io}	Input and output capacitance (A or B port)	V_O = $V_{CCA/B}$ or GND	V_{CCA} = 3.3V V_{CCB} = 3.3V		7.7	10	pF

Switching Characteristics

V_{CCA} = 1.8V ± 0.15V

Parameter	From (Input)	To (Output)	Test Conditions	Min	Max	Unit
t_{PLH},t_{PHL}	A	B	V_{CCB} = 1.8V ± 0.15V	1.7	19.9	ns
			V_{CCB} = 2.5V ± 0.2V	1.3	17.2	
			V_{CCB} = 3.3V ± 0.3V	1	16.4	
			V_{CCB} = 5V ± 0.5V	0.4	16.1	
t_{PLH},t_{PHL}	B	A	V_{CCB} = 1.8V ± 0.15V	0.9	19.8	ns
			V_{CCB} = 2.5V ± 0.2V	0.8	17.6	
			V_{CCB} = 3.3V ± 0.3V	0.7	17.6	
			V_{CCB} = 5V ± 0.5V	0.7	17.4	
t_{PHZ},t_{PLZ}	$\overline{OE}$	A	V_{CCB} = 1.8V ± 0.15V	1.5	32.6	ns
			V_{CCB} = 2.5V ± 0.2V	1.5	32.4	
			V_{CCB} = 3.3V ± 0.3V	1.5	32.3	
			V_{CCB} = 5V ± 0.5V	1.4	32.2	
t_{PHZ},t_{PLZ}	$\overline{OE}$	B	V_{CCB} = 1.8V ± 0.15V	2.4	32.2	ns
			V_{CCB} = 2.5V ± 0.2V	1.9	31.1	
			V_{CCB} = 3.3V ± 0.3V	1.7	51.0	
			V_{CCB} = 5V ± 0.5V	1.3	49.0	
t_{PZH},t_{PZL}	$\overline{OE}$	A	V_{CCB} = 1.8V ± 0.15V	0.4	22.1	ns
			V_{CCB} = 2.5V ± 0.2V	0.4	21.0	
			V_{CCB} = 3.3V ± 0.3V	0.4	19.0	
			V_{CCB} = 5V ± 0.5V	0.4	19.0	
t_{PZH},t_{PZL}	$\overline{OE}$	B	V_{CCB} = 1.8V ± 0.15V	1.8	25.0	ns
			V_{CCB} = 2.5V ± 0.2V	1.5	23.0	
			V_{CCB} = 3.3V ± 0.3V	1.2	19.6	
			V_{CCB} = 5V ± 0.5V	0.9	17.8	

Switching Characteristics(Continued)

V_{CCA} = 2.5V ± 0.2V

Parameter	From (Input)	To (Output)	Test Conditions	Min	Max	Unit
t_{PLH},t_{PHL}	A	B	V_{CCB} = 1.8V ± 0.15V	1.5	18.6	ns
			V_{CCB} = 2.5V ± 0.2V	1.2	15.5	
			V_{CCB} = 3.3V ± 0.3V	0.8	15.1	
			V_{CCB} = 5V ± 0.5V	0.8	14.8	
t_{PLH},t_{PHL}	B	A	V_{CCB} = 1.8V ± 0.15V	1.2	17.1	ns
			V_{CCB} = 2.5V ± 0.2V	1	15.7	
			V_{CCB} = 3.3V ± 0.3V	1	15.2	
			V_{CCB} = 5V ± 0.5V	0.9	15.0	
t_{PHZ},t_{PLZ}	$\overline{OE}$	A	V_{CCB} = 1.8V ± 0.15V	1.5	35.0	ns
			V_{CCB} = 2.5V ± 0.2V	1.4	34.0	
			V_{CCB} = 3.3V ± 0.3V	1.4	34.0	
			V_{CCB} = 5V ± 0.5V	1.4	34.0	
t_{PHZ},t_{PLZ}	$\overline{OE}$	B	V_{CCB} = 1.8V ± 0.15V	2.3	32.0	ns
			V_{CCB} = 2.5V ± 0.2V	1.8	30.0	
			V_{CCB} = 3.3V ± 0.3V	1.7	50.0	
			V_{CCB} = 5V ± 0.5V	1.7	50.0	
t_{PZH},t_{PZL}	$\overline{OE}$	A	V_{CCB} = 1.8V ± 0.15V	1	16.0	ns
			V_{CCB} = 2.5V ± 0.2V	1	16.0	
			V_{CCB} = 3.3V ± 0.3V	1	16.0	
			V_{CCB} = 5V ± 0.5V	1	16.0	
t_{PZH},t_{PZL}	$\overline{OE}$	B	V_{CCB} = 1.8V ± 0.15V	1.7	22.0	ns
			V_{CCB} = 2.5V ± 0.2V	1.5	20.0	
			V_{CCB} = 3.3V ± 0.3V	1.5	20.0	
			V_{CCB} = 5V ± 0.5V	1.2	18.0	

Switching Characteristics(Continued)

V_{CCA} = 3.3V ± 0.3V

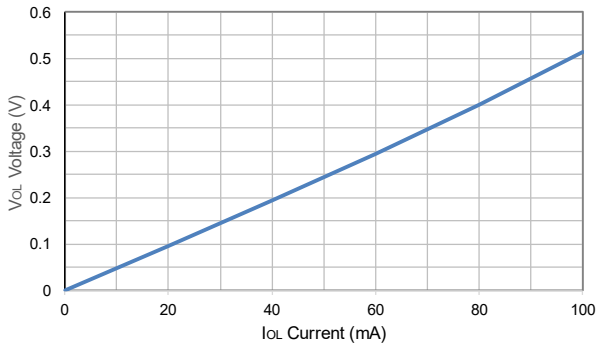
Parameter	From (Input)	To (Output)	Test Conditions	Min	Max	Unit
t_{PLH},t_{PHL}	A	B	V_{CCB} = 1.8V ± 0.15V	1.5	17.5	ns
			V_{CCB} = 2.5V ± 0.2V	1.1	15.0	
			V_{CCB} = 3.3V ± 0.3V	0.8	14.5	
			V_{CCB} = 5V ± 0.5V	0.5	14.3	
t_{PLH},t_{PHL}	B	A	V_{CCB} = 1.8V ± 0.15V	0.8	16.9	ns
			V_{CCB} = 2.5V ± 0.2V	0.8	15.2	
			V_{CCB} = 3.3V ± 0.3V	0.7	14.5	
			V_{CCB} = 5V ± 0.5V	0.6	14.1	
t_{PHZ},t_{PLZ}	$\overline{OE}$	A	V_{CCB} = 1.8V ± 0.15V	1.6	52.0	ns
			V_{CCB} = 2.5V ± 0.2V	1.6	50.0	
			V_{CCB} = 3.3V ± 0.3V	1.6	50.0	
			V_{CCB} = 5V ± 0.5V	1.6	50.0	
t_{PHZ},t_{PLZ}	$\overline{OE}$	B	V_{CCB} = 1.8V ± 0.15V	2.1	30.0	ns
			V_{CCB} = 2.5V ± 0.2V	1.7	28.0	
			V_{CCB} = 3.3V ± 0.3V	1.5	48.0	
			V_{CCB} = 5V ± 0.5V	1.5	48.0	
t_{PZH},t_{PZL}	$\overline{OE}$	A	V_{CCB} = 1.8V ± 0.15V	0.8	16.0	ns
			V_{CCB} = 2.5V ± 0.2V	0.8	16.0	
			V_{CCB} = 3.3V ± 0.3V	0.8	16.0	
			V_{CCB} = 5V ± 0.5V	0.8	16.0	
t_{PZH},t_{PZL}	$\overline{OE}$	B	V_{CCB} = 1.8V ± 0.15V	1.7	22.0	ns
			V_{CCB} = 2.5V ± 0.2V	1.5	20.0	
			V_{CCB} = 3.3V ± 0.3V	1.5	20.0	
			V_{CCB} = 5V ± 0.5V	1.2	18.0	

Switching Characteristics(Continued)

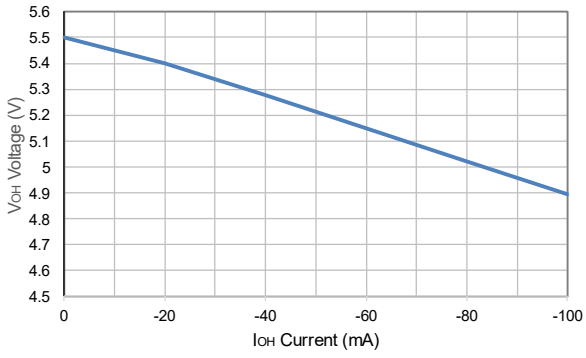
V_{CCA} = 5V ± 0.5V

Parameter	From (Input)	To (Output)	Test Conditions	Min	Max	Unit
t_{PLH},t_{PHL}	A	B	V_{CCB} = 1.8V ± 0.15V	1.5	17.3	ns
			V_{CCB} = 2.5V ± 0.2V	1	14.8	
			V_{CCB} = 3.3V ± 0.3V	0.7	14.4	
			V_{CCB} = 5V ± 0.5V	0.4	14.2	
t_{PLH},t_{PHL}	B	A	V_{CCB} = 1.8V ± 0.15V	0.7	16.8	ns
			V_{CCB} = 2.5V ± 0.2V	0.4	15.0	
			V_{CCB} = 3.3V ± 0.3V	0.3	14.3	
			V_{CCB} = 5V ± 0.5V	0.3	14.1	
t_{PHZ},t_{PLZ}	$\overline{OE}$	A	V_{CCB} = 1.8V ± 0.15V	0.3	50.0	ns
			V_{CCB} = 2.5V ± 0.2V	0.3	50.0	
			V_{CCB} = 3.3V ± 0.3V	0.3	50.0	
			V_{CCB} = 5V ± 0.5V	0.3	50.0	
t_{PHZ},t_{PLZ}	$\overline{OE}$	B	V_{CCB} = 1.8V ± 0.15V	2	36.0	ns
			V_{CCB} = 2.5V ± 0.2V	1.6	36.0	
			V_{CCB} = 3.3V ± 0.3V	1.4	50.0	
			V_{CCB} = 5V ± 0.5V	0.7	50.0	
t_{PZH},t_{PZL}	$\overline{OE}$	A	V_{CCB} = 1.8V ± 0.15V	0.7	16.0	ns
			V_{CCB} = 2.5V ± 0.2V	0.7	16.0	
			V_{CCB} = 3.3V ± 0.3V	0.7	16.0	
			V_{CCB} = 5V ± 0.5V	0.7	16.0	
t_{PZH},t_{PZL}	$\overline{OE}$	B	V_{CCB} = 1.8V ± 0.15V	1.7	22.0	ns
			V_{CCB} = 2.5V ± 0.2V	1.5	20.0	
			V_{CCB} = 3.3V ± 0.3V	1.5	20.0	
			V_{CCB} = 5V ± 0.5V	1.2	18.0	

Typical Characteristics



V_{OL} vs I_{OL}



V_{OH} vs I_{OH}

Operating Characteristics

Parameter		Test Conditions		Typ	Unit
CpdA	A-port input, B-port output	CL = 0, f = 10MHz, $t_r = t_f$ = 1ns	$V_{CCA} = V_{CCB}$ = 1.8V	3	pF
			$V_{CCA} = V_{CCB}$ = 2.5V	3.5	
			$V_{CCA} = V_{CCB}$ = 3.3V	4	
			$V_{CCA} = V_{CCB}$ = 5V	7	
	B-port input, A-port output	CL = 0, f = 10MHz, $t_r = t_f$ = 1ns	$V_{CCA} = V_{CCB}$ = 1.8V	14	
			$V_{CCA} = V_{CCB}$ = 2.5V	14.5	
			$V_{CCA} = V_{CCB}$ = 3.3V	15	
			$V_{CCA} = V_{CCB}$ = 5V	20	
CpdB	A-port input, B-port output	CL = 0, f = 10MHz, $t_r = t_f$ = 1ns	$V_{CCA} = V_{CCB}$ = 1.8V	14.5	
			$V_{CCA} = V_{CCB}$ = 2.5V	15	
			$V_{CCA} = V_{CCB}$ = 3.3V	16	
			$V_{CCA} = V_{CCB}$ = 5V	22	
	B-port input, A-port output	CL = 0, f = 10MHz, $t_r = t_f$ = 1ns	$V_{CCA} = V_{CCB}$ = 1.8V	3	
			$V_{CCA} = V_{CCB}$ = 2.5V	3.5	
			$V_{CCA} = V_{CCB}$ = 3.3V	4	
			$V_{CCA} = V_{CCB}$ = 5V	7	

Feature Description

Fully Configurable Dual-Rail Design

Both V_{CCA} and V_{CCB} can be supplied at any voltage from 1.65V to 5.5V,making the device suitable for translating between any of the voltage nodes:1.8V,2.5V,3.3V and 5V.

Partial-Power-Down Mode Operation

Ioff circuitry disables the outputs,preventing damaging current backflow through the device when it is powered down.This can occur in applications where subsections of a system are powered down (partial power down) to reduce power consumption.

Active Bus Hold Circuitry

Active bus-hold circuitry holds unused or undriven inputs at a valid logic state,which helps with board space savings and reduced component costs.Use of pullup or pulldown resistors with the bus-hold circuitry is not recommended.

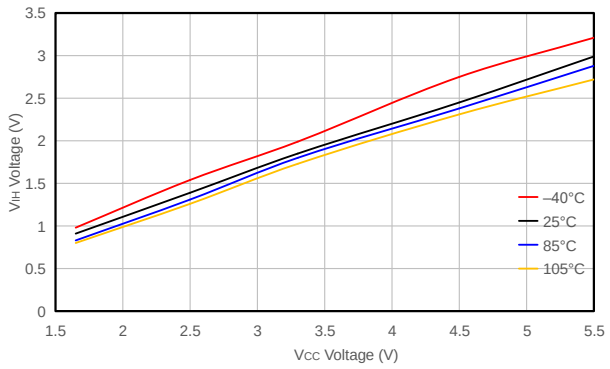
Supports High-Speed Translation

The device can support high data rate applications,which can be calculated from the maximum propagation delay.This is also dependant on the output load.For example,for a 3.3V to 5V conversion,the maximum frequency is 200MHz.

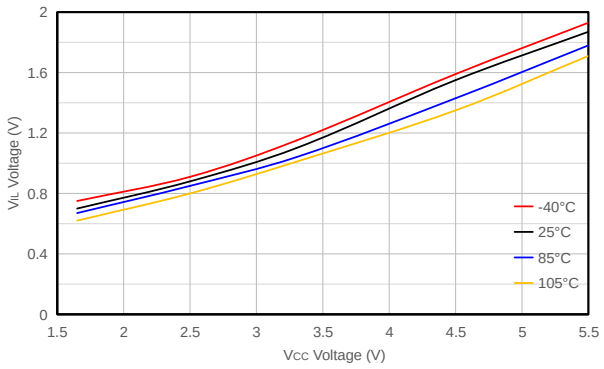
VCC Isolation

The VCC isolation feature ensures that if either VCCA or VCCB are at GND (or < 0.4V),both ports will be in a high impedance state (IOZ shown in Electrical Characteristics).This prevents false logic levels from being presented to either bus.

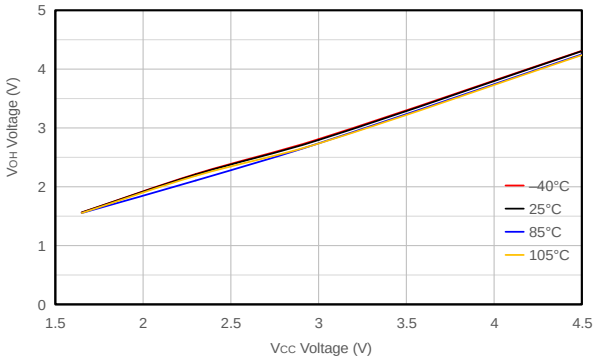
Temperature Characteristics



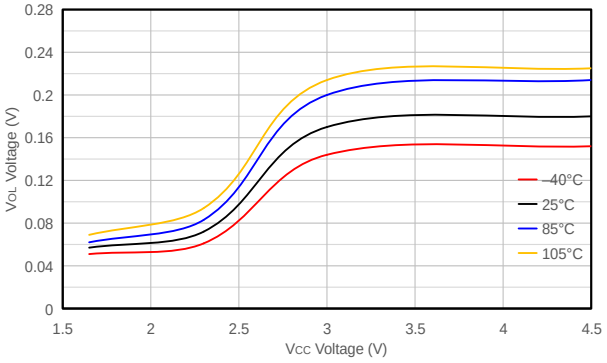
V_{IH} vs V_{CC}



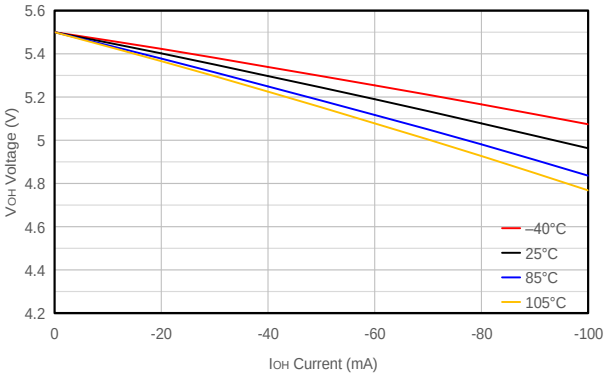
V_{IL} vs V_{CC}



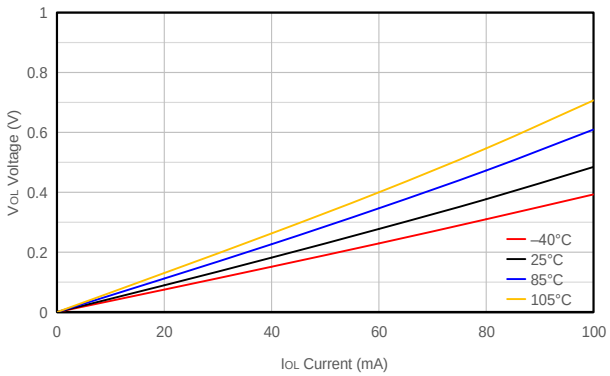
V_{OH} vs V_{CC}



V_{OL} vs V_{CC}

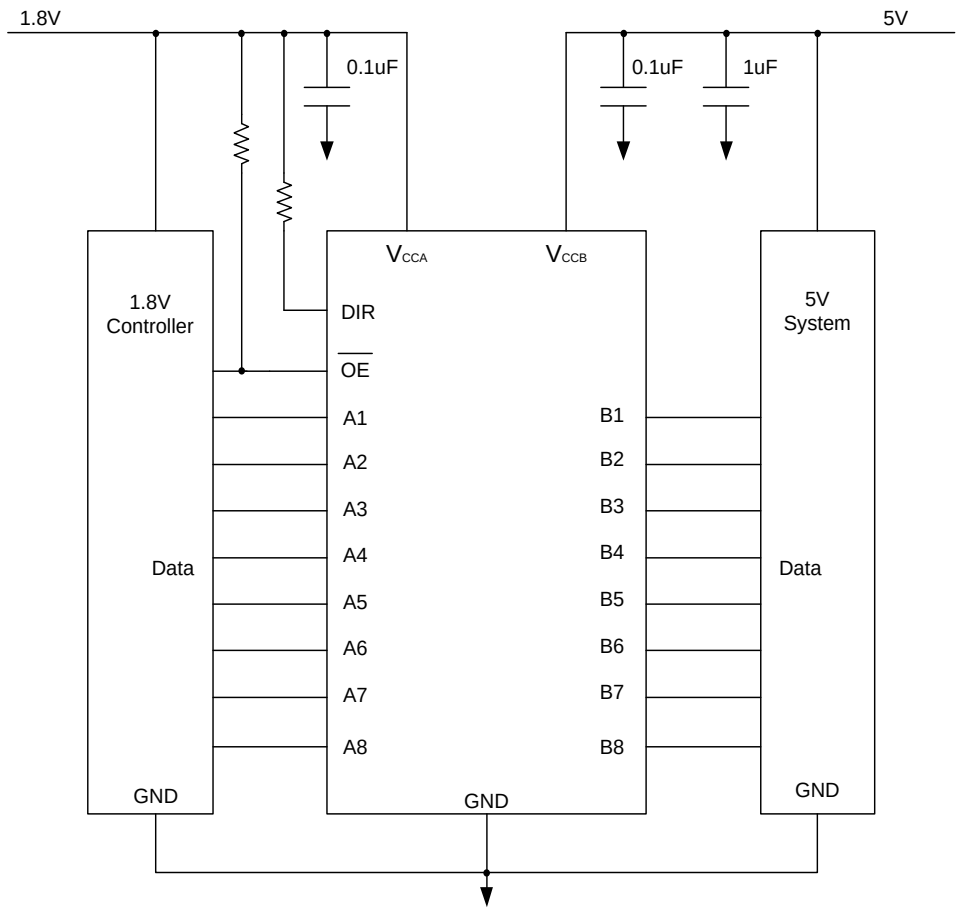


V_{OH} vs I_{OH}



V_{OL} vs I_{OL}

Application Circuits

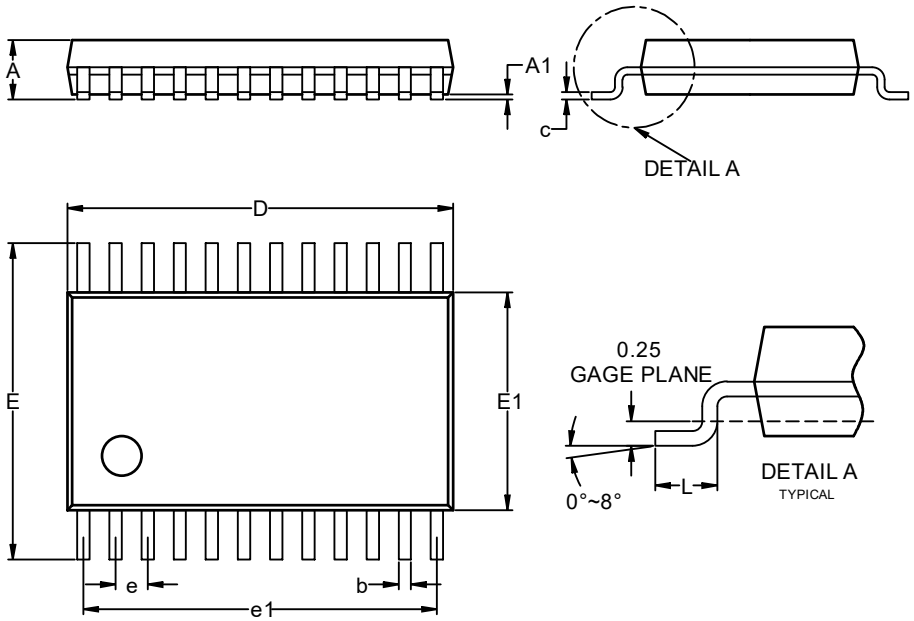


Applications Information

The ETQ74LVCH8T245V device can be used in level-translation applications for interfacing devices or systems operating at different interface voltages with one another.The maximum output current can be up to 32mA when device is powered by 5V.

Package Dimension

TSSOP24



COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

Symbol	Min	Nom	Max
A	–	–	1.20
A1	0.05	–	0.15
b	0.19	0.24	0.30
c		0.15TYP	
D	7.70	7.80	7.90
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
e		0.65BSC	
e1		7.15BSC	
L	0.50	–	0.75

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
0.0	2022-04-15	Preliminary Version	Yuangr	Yuangr	Zhujl
1.0	2022-09-20	Initial Version	Tianqh	Yuangr	Zhujl
1.1	2025-04-21	Update temperature characteristic curve	Tianqh	Yuangr	Zhujl