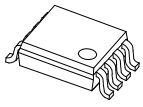
U74LVC2T45B **Preliminary** ***CMOS IC***

DUAL-BIT DUAL-SUPPLY BUS TRANSCEIVER WITH CONFIGURABLE VOLTAGE TRANSLATION



VSSOP-8



X2DFN2010-8

■ DESCRIPTION

Operating with two separate configurable power-supply rails, this dual-bit noninverting bus transceiver allows for universal low-voltage bidirectional translation across 1.8V, 2.5V, 3.3V, and 5V voltage nodes. The A port track V_{CCA}. Which accepts any supply voltage from 1.65V to 5.5V, while the B port tracks V_{CCB}, which similarly accepts any supply voltage from 1.65V to 5.5V.

The **U74LVC2T45B** is designed for asynchronous communication between two data buses. The logic levels of the direction-control (DIR) input activate either the B-port outputs or the A-port outputs. The device transmits data from the A bus to the B bus when the B-port outputs are activated, and from the B bus to the A bus when the A-port outputs are activated. The input circuitry on both A and B ports always is active and must have a logic HIGH or LOW level applied to prevent excess I_{CC} and I_{CCZ}.

The **U74LVC2T45B** is designed so that the DIR input circuit is supplied by V_{CCA}. This device is fully specified for partial-power-down applications using I_{OFF}. The I_{OFF} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

The V_{CC} isolation feature ensures that if either V_{CC} input is at GND, both ports are in the high-impedance state.

■ FEATURES

* Fully Configurable Dual-Rail Design Allows Each Port to Operate Over the Full 1.65V to 5.5V Power-Supply Range
* V_{CC} Isolation Feature: If Either V_{CC} Input Is at GND, Both Ports Are in the High-Impedance State
* ±24mA Output Drive at 3.3V
* I_{OFF} Supports Partial-Power-Down Mode Operation
* Green & Pb Free

■ ORDERING INFORMATION

Ordering Number	Package	Packing
U74LVC2T45BG-V08-R	VSSOP-8	Tape Reel
U74LVC2T45BG-KAY-R	X2DFN2010-8	Tape Reel

U74LVC2T45BG-V08-R

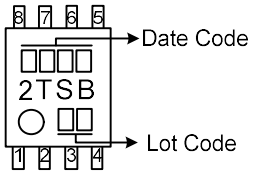
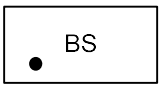
(1)Packing Type — (1) R: Tape Reel

(2)Package Type — (2) V08: VSSOP-8, KAY: X2DFN2010-8

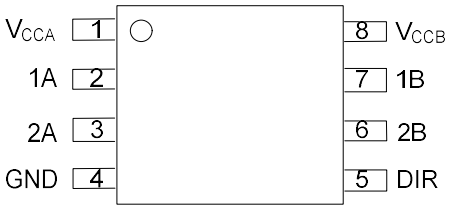
(3)Green Package — (3) G: Halogen Free and Lead Free

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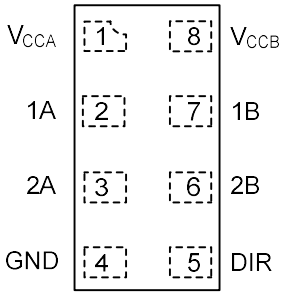
■ MARKING

VSSOP-8	X2DFN2010-8
	

■ PIN CONFIGURATION



VSSOP-8



X2DFN2010-8
(TOP VIEW)

■ PIN DESCRIPTION

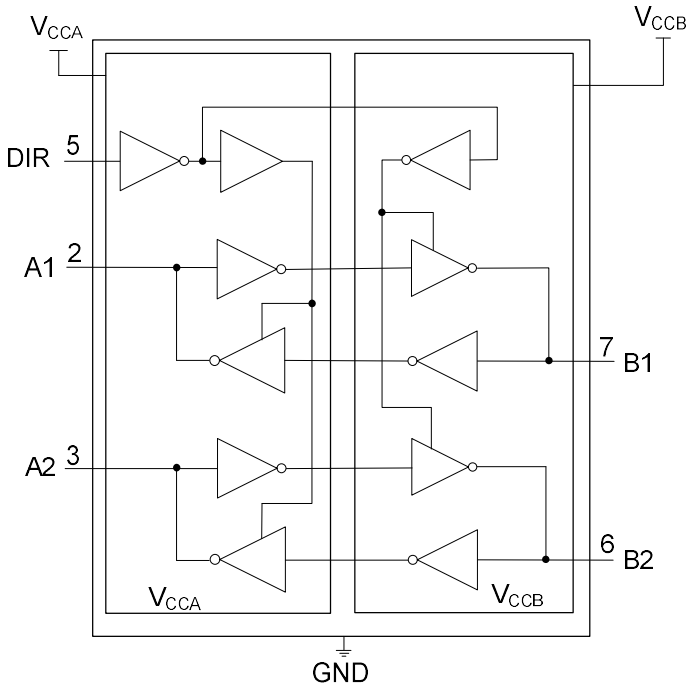
PIN NO.	PIN NAME	I/O	DESCRIPTION
1	V_{CCA}	P	A-portsupplyvoltage.1.65V ≤ V_{CCA} ≤ 5.5V
2	A1	I/O	Input/output A1.Referencedto V_{CCA}
3	A2	I/O	Input/output A2.Referencedto V_{CCA}
4	GND	G	Ground
5	DIR	I	Direction control signal
6	B2	I/O	Input/output B2.Referencedto V_{CCB}
7	B1	I/O	Input/output B1.Referencedto V_{CCB}
8	V_{CCB}	P	B-portsupplyvoltage.1.65V ≤ V_{CCB} ≤ 5.5V

Note: P=Power, G=Ground, I/O=Input and output, I=Input

■ FUNCTION TABLE

INPUTS DIR	OPERATION
L	B data to A bus
H	A data to B bus

■ LOGIC DIAGRAM (POSITIVE LOGIC)



■ ABSOLUTE MAXIMUM RATING (NOTE 1, 4)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CCA}		-0.5 ~ 6.5	V
Supply Voltage	V_{CCB}		-0.5 ~ 6.5	V
Input Voltage (Note 2)	V_{IN}	A Port	-0.5 ~ 6.5	V
		B Port	-0.5 ~ 6.5	V
		Control Input	-0.5 ~ 6.5	V
Voltage applied to any output in the high-impedance or power off state (Note 2)	V_{OUT}	A Port	-0.5 ~ 6.5	V
		B Port	-0.5 ~ 6.5	V
Voltage applied to any output in the high or low state (Note 2, 3)	V_{OUT}	A Port	-0.5 ~ V_{CCA}+0.5	V
		B Port	-0.5 ~ V_{CCB}+0.5	V
Continuous Output Current	I_{OUT}		±50	mA
Continuous current through V_{CCA}, V_{CCB} or GND			±100	mA
Input Clamp Current	I_{IK}	V_{IN}<0V	-50	mA
Output Clamp Current	I_{OK}	V_{OUT}<0V	-50	mA
Storage Temperature Range	T_{STG}		-65 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. The input negative-voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.
3. The value of V_{CC} is provided in the recommended operating conditions table.
4. It's guarantee by design, the parameter is not production tested.

■ RECOMMENDED OPERATING CONDITIONS (NOTE)

PARAMETER		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage		V_{CCA}		1.65		5.5	V
Supply Voltage		V_{CCB}		1.65		5.5	V
Input Voltage		V_{IN}		0		5.5	V
Output Voltage		V_{OUT}		0		V_{CCO}	V
Input Transition Rise or Fall Rate	Data Inputs	Δt/Δv	V_{CCI}=1.65V~1.95V			20	ns/V
			V_{CCI}=2.3V~2.7V			20	ns/V
			V_{CCI}=3V~3.6V			10	ns/V
			V_{CCI}=4.5V~5.5V			5	ns/V
	Control Input		V_{CCI}=1.65V~1.95V			5	ns/V
Operating Temperature		T_A		-40		+125	°C

Notes: It's guarantee by design, the parameter is not production tested.

■ ELECTRICAL CHARACTERISTICS (NOTE 5)

PARAMETER		SYMBOL	TEST CONDITIONS		T_A=25°C			T_A=-40~+125°C			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	Data Inputs (Note 1)	V_{IH}	V_{CCI}=1.65V~1.95V		V_{CCI} ×0.65			V_{CCI} ×0.65			V
			V_{CCI}=2.3V~2.7V		1.7			1.7			V
			V_{CCI}=3V~3.6V		2			2			V
			V_{CCI}=4.5V~5.5V		V_{CCI} ×0.7			V_{CCI} ×0.7			V
	DIR (Referenced to V_{CCA}) (Note 2)		V_{CCI}=1.65V~1.95V		V_{CCA} ×0.65			V_{CCA} ×0.65			V
			V_{CCI}=2.3V~2.7V		1.7			1.7			V
			V_{CCI}=3V~3.6V		2			2			V
			V_{CCI}=4.5V~5.5V		V_{CCA} ×0.7			V_{CCA} ×0.7			V
Low-Level Input Voltage	Data Inputs (Note 1)	V_{IL}	V_{CCI}=1.65V~1.95V				V_{CCI} ×0.35			V_{CCI} ×0.35	V
			V_{CCI}=2.3V~2.7V				0.7			0.7	V
			V_{CCI}=3V~3.6V				0.8			0.8	V
			V_{CCI}=4.5V~5.5V				V_{CCI} ×0.3			V_{CCI} ×0.3	V
	DIR (Referenced to V_{CCA}) (Note 2)		V_{CCI}=1.65V~1.95V				V_{CCA} ×0.35			V_{CCA} ×0.35	V
			V_{CCI}=2.3V~2.7V				0.7			0.7	V
			V_{CCI}=3V~3.6V				0.8			0.8	V
			V_{CCI}=4.5V~5.5V				V_{CCA} ×0.3			V_{CCA} ×0.3	V
Output High Voltage		V_{OH}	V_I=V_{IH}	V_{CCA}=1.65V~4.5V, V_{CCB}=1.65V~4.5V, I_{OH}=-100μA	V_{CCO}-0.1			V_{CCO} -0.1			V
				V_{CCA}=1.65V, V_{CCB}=1.65V, I_{OH}=-4mA	1.2			0.95			V
				V_{CCA}=2.3V, V_{CCB}=2.3V, I_{OH}=-8mA	1.9			1.7			V
				V_{CCA}=3V, V_{CCB}=3V, I_{OH}=-24mA	2.4			2.0			V
				V_{CCA}=4.5V, V_{CCB}=4.5V, I_{OH}=-32mA	3.8			3.4			V
Output Low Voltage		V_{OL}	V_I=V_{IL}	V_{CCA}=1.65V~4.5V, V_{CCB}=1.65V~4.5V, I_{OL}=100μA			0.1			0.1	V
				V_{CCA}=1.65V, V_{CCB}=1.65V, I_{OL}=4mA			0.45			0.7	V
				V_{CCA}=2.3V, V_{CCB}=2.3V, I_{OL}=8mA			0.3			0.45	V
				V_{CCA}=3V, V_{CCB}=3V, I_{OL}=24mA			0.55			0.8	V
				V_{CCA}=4.5V, V_{CCB}=4.5V, I_{OL}=32mA			0.55			0.8	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER		SYMBOL	TEST CONDITIONS		T_A=25°C			T_A=-40~+125°C			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
Input Leakage Current	DIR	$I_{I(LEAK)}$	V_{IN}=V_{CCA} or GND, V_{CCA}=1.65V~5.5V, V_{CCB}=1.65V~5.5V				±1			±10	μA
Power OFF Leakage Current	A Port	I_{OFF}	V_{IN} or V_{OUT}=0~5.5V, V_{CCA}=0V, V_{CCB}=0V~5.5V				±1			±10	μA
	B Port		V_{IN} or V_{OUT}=0~5.5V, V_{CCA}=0V~5.5V, V_{CCB}=0V				±1			±10	μA
Output OFF-State Current	A or B Port	I_{OZ}	V_{OUT}=V_{CCO} or GND, V_{IN}=V_{CCI} or GND, V_{CCA}=5.5V, V_{CCB}=0V				±1			±10	μA
Supply A Current		I_{CCA}	V_{IN}=V_{CCI} or GND, I_{OUT}=0A	V_{CCA}=1.65V~5.5V, V_{CCA}=1.65V~5.5V			3			3	μA
				V_{CCA}=5V, V_{CCB}=0V			2			2	μA
				V_{CCA}=0V, V_{CCB}=5V			-2			-2	μA
Supply B Current		I_{CCB}		V_{CCA}=1.65V~5.5V, V_{CCA}=1.65V~5.5V			3			3	μA
				V_{CCA}=5V, V_{CCB}=0V			-2			-2	μA
				V_{CCA}=0V, V_{CCB}=5V			2			2	μA
Supply A Current & Supply B Current		I_{CCA}+I_{CCB}		V_{CCA}=1.65V~5.5V, V_{CCB}=1.65V~5.5V			4			4	μA
Supply A Current	A Port	ΔI_{CCA}	One A Port at V_{CCA}-0.6V, DIR at V_{CCA}, B Port=OPEN	V_{CCA}=3V~5.5V, V_{CCB}=3V~5.5V				50		75	μA
Supply A Current	DIR		DIR at V_{CCA}-0.6V, B Port=OPEN, A Port at V_{CCA} or GND					50		75	μA
Supply B Current	B Port	ΔI_{CCB}	One B Port at V_{CCB}-0.6V DIR at GND, A Port=OPEN					50		75	μA

Notes: 1. For V_{CCI} values not specified in the data sheet, V_{IH} min=V_{CCI}×0.7V,V_{IL} max=V_{CCI}×0.3V.
2. For V_{CCI} values not specified in the data sheet, V_{IH} min=V_{CCA}×0.7V,V_{IL} max=V_{CCA}×0.3V.
3. V_{CCI} is the voltage associated with the input port supply V_{CCA} or V_{CCB}.
4. V_{CCO} is the voltage associated with the output port supply V_{CCA} or V_{CCB}.
5. It's guarantee by design, the parameter is not production tested.

SWITCHING CHARACTERISTICS ~~(T_A=25°C, unless otherwise specified)~~ (Note)

PARAMETER	SYMBOL	TEST CONDITIONS		T_A=25°C			T_A=-40~+125°C			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (nA) to Output (nB)	t_{PLH}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			19.7			23.5	ns
			V_{CCB}=2.5V±0.2V			12.3			14.3	ns
			V_{CCB}=3.3V±0.3V			10.3			12	ns
			V_{CCB}=5V±0.5V			9.2			11.5	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			18			21.6	ns
			V_{CCB}=2.5V±0.2V			10.5			13.4	ns
			V_{CCB}=3.3V±0.3V			8.4			10.9	ns
			V_{CCB}=5V±0.5V			7.1			9.3	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			17.5			21.1	ns
			V_{CCB}=2.5V±0.2V			10			12.8	ns
			V_{CCB}=3.3V±0.3V			7.6			10.2	ns
			V_{CCB}=5V±0.5V			6.4			8.9	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			17.1			20.7	ns
			V_{CCB}=2.5V±0.2V			9.5			12.3	ns
			V_{CCB}=3.3V±0.3V			7.4			10	ns
			V_{CCB}=5V±0.5V			5.9			8.3	ns
Propagation Delay From Input (nB) to Output (nA)	t_{PLH}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			19.7			23.5	ns
			V_{CCB}=2.5V±0.2V			18			21.6	ns
			V_{CCB}=3.3V±0.3V			17.5			21.1	ns
			V_{CCB}=5V±0.5V			17.1			20.7	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			12.3			14.3	ns
			V_{CCB}=2.5V±0.2V			10.5			13.4	ns
			V_{CCB}=3.3V±0.3V			10			12.8	ns
			V_{CCB}=5V±0.5V			9.5			12.3	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			10.3			12	ns
			V_{CCB}=2.5V±0.2V			8.4			10.9	ns
			V_{CCB}=3.3V±0.3V			7.8			10.2	ns
			V_{CCB}=5V±0.5V			7.4			10	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			9.2			11.5	ns
			V_{CCB}=2.5V±0.2V			7.1			9.3	ns
			V_{CCB}=3.3V±0.3V			6.4			8.9	ns
			V_{CCB}=5V±0.5V			5.9			8.3	ns
Propagation Delay From Input (nA) to Output (nB)	t_{PHL}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			16.3			19.8	ns
			V_{CCB}=2.5V±0.2V			10.5			13.4	ns
			V_{CCB}=3.3V±0.3V			9.1			11.9	ns
			V_{CCB}=5V±0.5V			9			11.7	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			14.9			18.2	ns
			V_{CCB}=2.5V±0.2V			9.5			12.3	ns
			V_{CCB}=3.3V±0.3V			7.4			10	ns
			V_{CCB}=5V±0.5V			6.6			9.1	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			14.6			17.9	ns
			V_{CCB}=2.5V±0.2V			9			11.9	ns
			V_{CCB}=3.3V±0.3V			7			9.5	ns
			V_{CCB}=5V±0.5V			6			8.4	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			14.2			17.5	ns
			V_{CCB}=2.5V±0.2V			8.2			10.9	ns
			V_{CCB}=3.3V±0.3V			6.5			9	ns
			V_{CCB}=5V±0.5V			5.5			7.9	ns

■ SWITCHING CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS		T_A=25°C			T_A=-40~+125°C			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (nB) to Output (nA)	t_{PHL}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			16.3			19.8	ns
			V_{CCB}=2.5V±0.2V			14.9			18.2	ns
			V_{CCB}=3.3V±0.3V			14.6			17.9	ns
			V_{CCB}=5V±0.5V			14.2			17.5	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			10.5			13.4	ns
			V_{CCB}=2.5V±0.2V			9.5			12.3	ns
			V_{CCB}=3.3V±0.3V			9			11.7	ns
			V_{CCB}=5V±0.5V			8.2			10.9	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			9.1			11.9	ns
			V_{CCB}=2.5V±0.2V			7.4			10	ns
			V_{CCB}=3.3V±0.3V			7			9.5	ns
			V_{CCB}=5V±0.5V			6.5			9	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			9			11.7	ns
			V_{CCB}=2.5V±0.2V			6.6			9.1	ns
			V_{CCB}=3.3V±0.3V			6			8.4	ns
			V_{CCB}=5V±0.5V			5.5			7.9	ns
Propagation Delay From Input (DIR) to Output (nA)	t_{PHZ}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			32.9			34.9	ns
			V_{CCB}=2.5V±0.2V			32.5			34.5	ns
			V_{CCB}=3.3V±0.3V			32.5			34.5	ns
			V_{CCB}=5V±0.5V			31.3			33.3	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			19.1			21.1	ns
			V_{CCB}=2.5V±0.2V			18.8			20.8	ns
			V_{CCB}=3.3V±0.3V			18.8			20.8	ns
			V_{CCB}=5V±0.5V			18.5			20.5	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			12.9			14.9	ns
			V_{CCB}=2.5V±0.2V			12.8			14.8	ns
			V_{CCB}=3.3V±0.3V			12.8			14.8	ns
			V_{CCB}=5V±0.5V			12.4			14.4	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			10.2			12.2	ns
			V_{CCB}=2.5V±0.2V			9.9			11.9	ns
			V_{CCB}=3.3V±0.3V			9.9			11.9	ns
			V_{CCB}=5V±0.5V			9.8			11.8	ns
Propagation Delay From Input (DIR) to Output (nB)	t_{PHZ}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			29.9			31.9	ns
			V_{CCB}=2.5V±0.2V			16.9			18.9	ns
			V_{CCB}=3.3V±0.3V			12.3			14.3	ns
			V_{CCB}=5V±0.5V			10.6			12.6	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			29.9			31.9	ns
			V_{CCB}=2.5V±0.2V			15.9			17.9	ns
			V_{CCB}=3.3V±0.3V			12.5			14.5	ns
			V_{CCB}=5V±0.5V			9.6			11.6	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			29.3			31.3	ns
			V_{CCB}=2.5V±0.2V			15.7			17.7	ns
			V_{CCB}=3.3V±0.3V			12.4			14.4	ns
			V_{CCB}=5V±0.5V			9.4			11.4	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			28.1			30.1	ns
			V_{CCB}=2.5V±0.2V			15.9			17.9	ns
			V_{CCB}=3.3V±0.3V			12.1			14.1	ns
			V_{CCB}=5V±0.5V			9.3			11.3	ns

■ SWITCHING CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS		T_A=25°C			T_A=-40~+125°C			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (DIR) to Output (nA)	t_{PLZ}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			21.7			23.7	ns
			V_{CCB}=2.5V±0.2V			21.6			23.6	ns
			V_{CCB}=3.3V±0.3V			21.5			23.5	ns
			V_{CCB}=5V±0.5V			21.4			23.4	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			14.6			16.6	ns
			V_{CCB}=2.5V±0.2V			14.5			16.5	ns
			V_{CCB}=3.3V±0.3V			14.3			16.3	ns
			V_{CCB}=5V±0.5V			14.3			16.3	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			10.4			12.4	ns
			V_{CCB}=2.5V±0.2V			10.4			12.4	ns
			V_{CCB}=3.3V±0.3V			10.1			12.1	ns
			V_{CCB}=5V±0.5V			9.8			11.8	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			8.9			10.9	ns
			V_{CCB}=2.5V±0.2V			8.7			10.7	ns
			V_{CCB}=3.3V±0.3V			8.7			10.7	ns
			V_{CCB}=5V±0.5V			8.6			10.6	ns
Propagation Delay From Input (DIR) to Output (nB)	t_{PLZ}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			21.5			23.5	ns
			V_{CCB}=2.5V±0.2V			14.6			16.6	ns
			V_{CCB}=3.3V±0.3V			11.7			13.7	ns
			V_{CCB}=5V±0.5V			9.1			11.1	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			20.9			22.9	ns
			V_{CCB}=2.5V±0.2V			13.2			15.2	ns
			V_{CCB}=3.3V±0.3V			10.9			12.9	ns
			V_{CCB}=5V±0.5V			8.2			10.2	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			19.7			21.7	ns
			V_{CCB}=2.5V±0.2V			13.3			15.3	ns
			V_{CCB}=3.3V±0.3V			10.3			12.3	ns
			V_{CCB}=5V±0.5V			7.6			9.6	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			18.9			20.9	ns
			V_{CCB}=2.5V±0.2V			13			15	ns
			V_{CCB}=3.3V±0.3V			9.7			11.7	ns
			V_{CCB}=5V±0.5V			7.6			9.6	ns
Propagation Delay From Input (DIR) to Output (nA)	t_{PZH}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			39.2			41.2	ns
			V_{CCB}=2.5V±0.2V			30.6			32.6	ns
			V_{CCB}=3.3V±0.3V			27.2			29.2	ns
			V_{CCB}=5V±0.5V			24.2			26.2	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			31.2			33.2	ns
			V_{CCB}=2.5V±0.2V			21.7			23.7	ns
			V_{CCB}=3.3V±0.3V			18.9			20.9	ns
			V_{CCB}=5V±0.5V			15.7			17.7	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			28			30	ns
			V_{CCB}=2.5V±0.2V			19.7			21.7	ns
			V_{CCB}=3.3V±0.3V			16.1			18.1	ns
			V_{CCB}=5V±0.5V			13			15	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			26.1			28.1	ns
			V_{CCB}=2.5V±0.2V			18.1			20.1	ns
			V_{CCB}=3.3V±0.3V			14.1			16.1	ns
			V_{CCB}=5V±0.5V			11.5			13.5	ns

■ SWITCHING CHARACTERISTICS (Cont.)

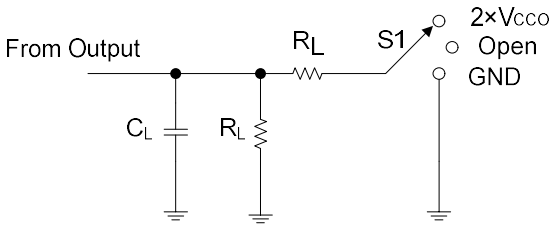
PARAMETER	SYMBOL	TEST CONDITIONS		T_A=25°C			T_A=-40~+125°C			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (DIR) to Output (nB)	t_{PZH}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			39.4			41.4	ns
			V_{CCB}=2.5V±0.2V			31.9			33.9	ns
			V_{CCB}=3.3V±0.3V			29.8			31.8	ns
			V_{CCB}=5V±0.5V			28.6			30.6	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			30.6			32.6	ns
			V_{CCB}=2.5V±0.2V			23			25	ns
			V_{CCB}=3.3V±0.3V			20.7			22.7	ns
			V_{CCB}=5V±0.5V			19.4			21.4	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			25.9			27.9	ns
			V_{CCB}=2.5V±0.2V			18.4			20.4	ns
			V_{CCB}=3.3V±0.3V			15.9			17.9	ns
			V_{CCB}=5V±0.5V			14.2			16.2	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			24			26	ns
			V_{CCB}=2.5V±0.2V			16.2			18.2	ns
			V_{CCB}=3.3V±0.3V			14.1			16.1	ns
			V_{CCB}=5V±0.5V			12.5			14.5	ns
Propagation Delay From Input (DIR) to Output (nA)	t_{PZL}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			44.2			46.2	ns
			V_{CCB}=2.5V±0.2V			29.8			31.8	ns
			V_{CCB}=3.3V±0.3V			25.9			27.9	ns
			V_{CCB}=5V±0.5V			22.8			24.8	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			38.4			40.4	ns
			V_{CCB}=2.5V±0.2V			23.4			25.4	ns
			V_{CCB}=3.3V±0.3V			19.5			21.5	ns
			V_{CCB}=5V±0.5V			15.8			17.8	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			36.4			38.4	ns
			V_{CCB}=2.5V±0.2V			21.1			23.1	ns
			V_{CCB}=3.3V±0.3V			17.4			19.4	ns
			V_{CCB}=5V±0.5V			13.9			15.9	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			35.1			37.1	ns
			V_{CCB}=2.5V±0.2V			20.5			22.5	ns
			V_{CCB}=3.3V±0.3V			16.1			18.1	ns
			V_{CCB}=5V±0.5V			12.8			14.8	ns
Propagation Delay From Input (DIR) to Output (nB)	t_{PZL}	V_{CCA}=1.8V±0.15V	V_{CCB}=1.8V±0.15V			47.2			49.2	ns
			V_{CCB}=2.5V±0.2V			41			43	ns
			V_{CCB}=3.3V±0.3V			39.6			41.6	ns
			V_{CCB}=5V±0.5V			38.3			40.3	ns
		V_{CCA}=2.5V±0.2V	V_{CCB}=1.8V±0.15V			32			34	ns
			V_{CCB}=2.5V±0.2V			26.3			28.3	ns
			V_{CCB}=3.3V±0.3V			24.2			26.2	ns
			V_{CCB}=5V±0.5V			23.1			25.1	ns
		V_{CCA}=3.3V±0.3V	V_{CCB}=1.8V±0.15V			25.5			27.5	ns
			V_{CCB}=2.5V±0.2V			19.8			21.8	ns
			V_{CCB}=3.3V±0.3V			17.8			19.8	ns
			V_{CCB}=5V±0.5V			16.4			18.4	ns
		V_{CCA}=5V±0.5V	V_{CCB}=1.8V±0.15V			22.4			24.4	ns
			V_{CCB}=2.5V±0.2V			16.1			18.1	ns
			V_{CCB}=3.3V±0.3V			14.4			16.4	ns
			V_{CCB}=5V±0.5V			13.3			15.3	ns

Note: It's guarantee by design, the parameter is not production tested.

■ OPERATING CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Input Capacitance	Control Inputs	C_{IN}	V_I=V_{CCA} or GND	V_{CCA}=3.3V, V_{CCB}=3.3V		2.5		pF
Output Capacitance	A or B Port	C_{IO}	V_O=$V_{CCA/B}$ or GND			6		pF
Power Dissipation Capacitance	A Port Input B Port Output	C_{PDA}	C_L=0, f=10MHz t_r=t_f=1nS	V_{CCB}=1.8V		3		pF
				V_{CCB}=2.5V		4		pF
				V_{CCB}=3.3V		4		pF
				V_{CCB}=5V		4		pF
	B Port Input A Port Output			V_{CCB}=1.8V		18		pF
				V_{CCB}=2.5V		19		pF
				V_{CCB}=3.3V		20		pF
				V_{CCB}=5V		21		pF
	A Port Input B Port Output	C_{PDB}		V_{CCB}=1.8V		18		pF
				V_{CCB}=2.5V		19		pF
				V_{CCB}=3.3V		20		pF
				V_{CCB}=5V		21		pF
	B Port Input A Port Output			V_{CCB}=1.8V		3		pF
				V_{CCB}=2.5V		4		pF
				V_{CCB}=3.3V		4		pF
				V_{CCB}=5V		4		pF

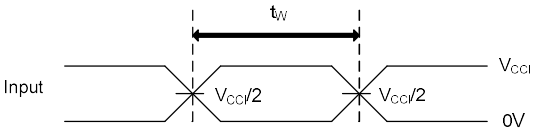
■ TEST CIRCUIT AND WAVEFORMS



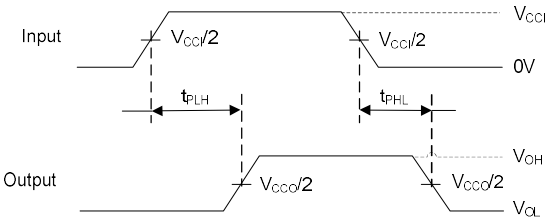
TEST	S1
t_{PD}	Open
t_{PLZ}/t_{PZL}	2×VCCO
t_{PHZ}/t_{PZH}	GND

LOAD CIRCUIT

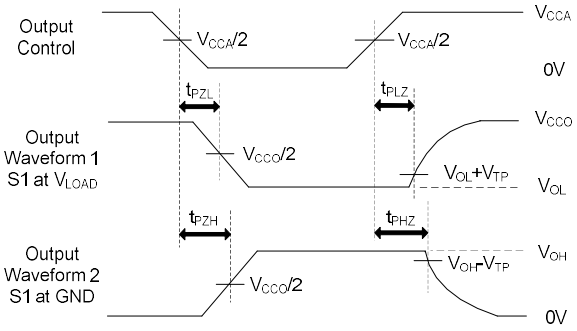
V_{CC}	C_L	R_L	V_{TP}
1.8V±0.15V	15pF	2kΩ	0.15V
2.5V±0.2V	15pF	2kΩ	0.15V
3.3V±0.3V	15pF	2kΩ	0.3V
5V±0.5V	15pF	2kΩ	0.3V



PULSE DURATION



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Notes: 1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: $P_{RR} \leq 10MHz$, $Z_O = 50\Omega$, $dv/dt \geq 1V/ns$.

■ DETAILED DESCRIPTION

Overview

The **U74LVC2T45B** is dual-bit, dual-supply noninverting voltage level translation. Pin Ax and direction control pin are support by V_{CCA} and pin Bx are support by V_{CCB}. The A port is able to accept I/O voltages ranging from 1.65V to 5.5V, while the B port can accept I/O voltages from 1.65V to 5.5V. The high on DIR allows data transmission from A to B and a low on DIR allows data transmission from B to A.

■ FEATURES DESCRIPTION

Feature Description

Fully Configurable Dual-Rail Design Allows Each Port to Operate Over the Full 1.65V to 5.5V

Power-Supply Range

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

Support High-Speed Translation

U74LVC2T45B can support high data rate application. The translated signal data rate can be up to 420 Mbps when signal is translated from 3.3V to 5V.

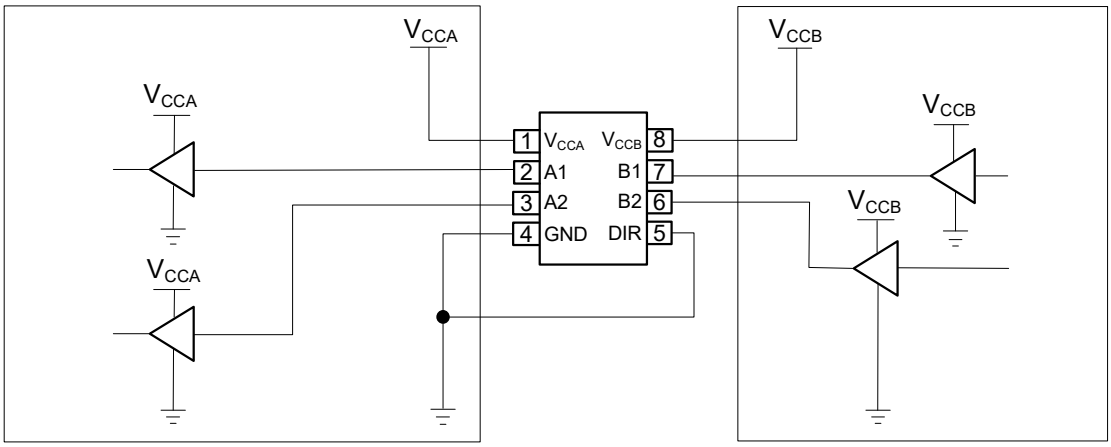
I_{OFF} Supports Partial-Power-Down Mode Operation

I_{OFF} will prevent backflow current by disabling I/O output circuits when device is in partial-power-down mode.

Application Information

The **U74LVC2T45B** device can be used in level-translation applications for interfacing devices or systems operating at different interface voltages with one another. The maximum data rate can be up to 420 Mbps when device translate signal from 3.3V to 5V.

■ TYPICAL APPLICATION CIRCUIT



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