



U74AVC8T245

CMOS IC

8 BIT DUAL-SUPPLY BUS TRANSCEIVER WITH CONFIGURABLE VOLTAGE TRANSLATION AND 3-STATE OUTPUTS

■ DESCRIPTION

The UTC **U74AVC8T245** is an 8-bit dual supply transceiver that enables bidirectional level translation. The **U74AVC8T245** is optimized to operate with V_{CCA}/V_{CCB} set at 1.4V to 3.6V. The device is operational with V_{CCA}/V_{CCB} as low as 1.2 V. The A port is designed to track V_{CCA} . V_{CCA} accepts any supply voltage from 1.2V to 3.6V. The B port is designed to track V_{CCB} . V_{CCB} accepts any supply voltage from 1.2 V to 3.6 V. This allows for universal low-voltage bidirectional translation between any of the 1.2V, 1.5V, 1.8V, 2.5V, and 3.3V voltage nodes.

Data can be transmitted by the **U74AVC8T245** from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input, as it is designed for asynchronous communication between data buses. The output-enable (\overline{OE}) input can also be used to disable the outputs, effectively isolating the buses

The **U74AVC8T245** is designed for asynchronous communication between data buses. The device transmits data from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable (\overline{OE}) input can be used to disable the outputs so the buses are effectively isolated.

The **U74AVC8T245** is designed so that the control pins (DIR and \overline{OE}) are supplied by V_{CCA} .

The **U74AVC8T245** solution is compatible with a single-supply system and can be replaced later with a '245 function, with minimal printed circuit board redesign.

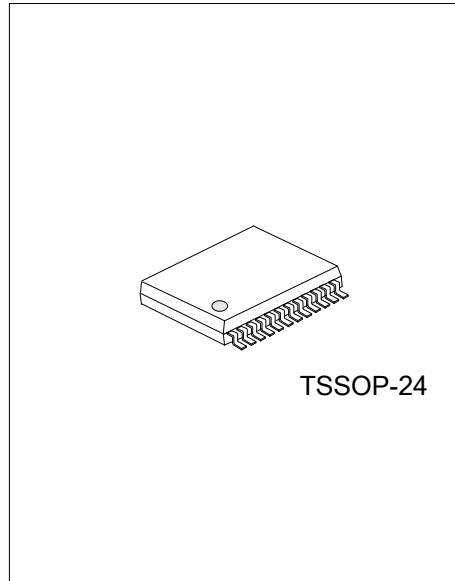
This device is fully specified for partial-power-down applications using I_{OFF} . The I_{OFF} circuitry disables the outputs, thus preventing damaging current backflow through the device when it is powered down.

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

To ensure the high-impedance state during power up or power down, \overline{OE} shall be tied to V_{CC} through a pull-up resistor the minimum value of the resistor is determined by the current-sinking capability of the driver.

■ FEATURES

- * Operation Voltage Range: 1.2 ~ 3.6V
- * Control Inputs V_{IH}/V_{IL} Levels Are Referenced to V_{CCA} Voltage
- * I/Os Are 4.6V Tolerant
- * I_{OFF} Supports Partial Power Down Mode Operation

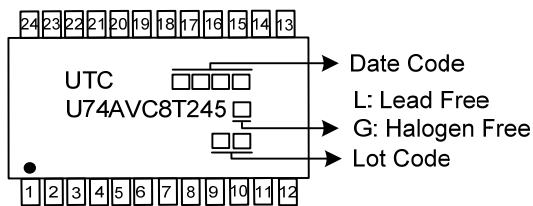


■ ORDERING INFORMATION

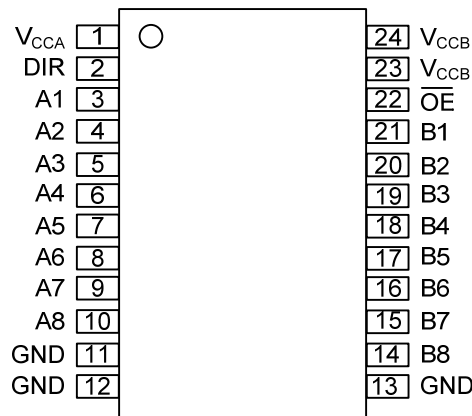
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AVC8T245G-P24-R	U74AVC8T245G-P24-R	TSSOP-24	Tape Reel

<p>U74AVC8T245G-P24-R</p>	<p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) P24: TSSOP-24 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



■ PIN CONFIGURATION



■ PIN DESCRIPTION

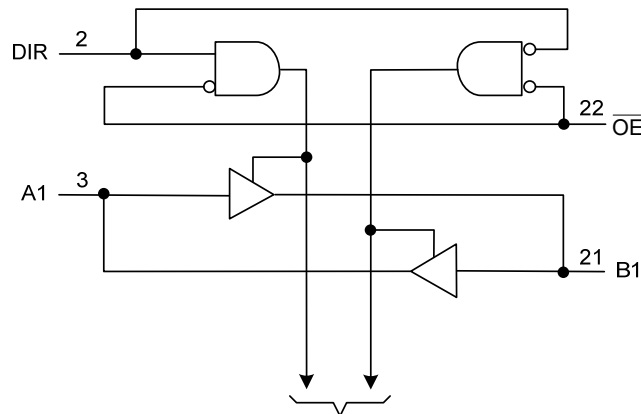
PIN NO.	PIN NAME	TYPE	DESCRIPTION
1	V _{CCA}		A-port power supply voltage. $1.2V \leq V_{CCA} \leq 3.6V$
2	DIR	I	Direction-control signal
3	A1	I/O	Input/output A1. Referenced to V _{CCA}
4	A2	I/O	Input/output A2. Referenced to V _{CCA}
5	A3	I/O	Input/output A3. Referenced to V _{CCA}
6	A4	I/O	Input/output A4. Referenced to V _{CCA}
7	A5	I/O	Input/output A5. Referenced to V _{CCA}
8	A6	I/O	Input/output A6. Referenced to V _{CCA}
9	A7	I/O	Input/output A7. Referenced to V _{CCA}
10	A8	I/O	Input/output A8. Referenced to V _{CCA}
11 ~ 13	GND		Ground
14	B8	I/O	Input/output B8. Referenced to V _{CCB}
15	B7	I/O	Input/output B7. Referenced to V _{CCB}
16	B6	I/O	Input/output B6. Referenced to V _{CCB}
17	B5	I/O	Input/output B5. Referenced to V _{CCB}
18	B4	I/O	Input/output B4. Referenced to V _{CCB}
19	B3	I/O	Input/output B3. Referenced to V _{CCB}
20	B2	I/O	Input/output B2. Referenced to V _{CCB}
21	B1	I/O	Input/output B1. Referenced to V _{CCB}
22	\overline{OE}	I	3-state output-mode enables. Pull OE high to place all outputs in 3-state mode. Referenced to V _{CCA}
23, 24	V _{CCB}		B-port power supply voltage. $1.2V \leq V_{CCB} \leq 3.6V$

■ FUNCTION TABLE

INPUTS		OPERATION
\overline{OE}	DIR	
L	L	B data to A Bus
L	H	A data to B Bus
H	X	All Outputs Hi-Z

Notes: 1. L: low voltage level; H: high voltage level; X: don't care
 2. Input circuits of the data I/Os are always active.

■ LOGIC DIAGRAM



To Seven Other Channels

■ ABSOLUTE MAXIMUM RATING ($T_A=25^{\circ}\text{C}$, unless otherwise specified) (Note 1, 4)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	$V_{\text{CCA}}, V_{\text{CCB}}$		-0.5 ~ 4.6	V
Input Voltage (Note 2)	V_{IN}	I/O ports (A port)	-0.5 ~ 4.6	V
		I/O ports (B port)	-0.5 ~ 4.6	V
		Control inputs	-0.5 ~ 4.6	V
Voltage range applied to any output in the high-impedance or power-off state (Note 2)	V_{OUT}	A port	-0.5 ~ 4.6	V
		B port	-0.5 ~ 4.6	V
Voltage range applied to any output in the high or low state (Note 2, 3)	V_{OUT}	A port	-0.5 ~ $V_{\text{CCA}}+0.5$	V
		B port	-0.5 ~ $V_{\text{CCB}}+0.5$	V
Continuous Output Current	I_{OUT}	$V_{\text{OUT}} = 0 \text{ V to } V_{\text{CC}}$	± 50	mA
Continuous Current Through $V_{\text{CCA}}, V_{\text{CCB}}$ or GND	I_{CC}		± 100	mA
Input Clamp Current	I_{IK}	$V_{\text{IN}} < 0$	-50	mA
Output Clamp Current	I_{OK}	$V_{\text{OUT}} < 0$	-50	mA
Storage Temperature Range	T_{STG}		-65 ~ +150	$^{\circ}\text{C}$

- 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 voltage and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
 3. The output positive-voltage rating may be exceeded up to 4.6V maximum if the output current rating is observed.
 4. It is guarantee by design, not 100% be tested.

■ RECOMMENDED OPERATING CONDITIONS ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{\text{CCA}}, V_{\text{CCB}}$		1.2		3.6	V
Input Voltage	V_{IN}		0		3.6	V
Output Voltage	V_{OUT}	Active state	0		V_{CCO}	V
		3-state	0		3.6	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$				5	ns/V
Operating Temperature	T_A		-40		+125	$^{\circ}\text{C}$

■ ELECTRICAL CHARACTERISTICS (Note 1, 2, 3)

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	V _{IH}	V _{CCI} =1.2V~1.95V	V _{CCI} ^x 0.65			V _{CCI} ^x 0.65			V	
			V _{CCI} =1.95V~2.7V	1.6			1.6			V	
			V _{CCI} =2.7V~3.6V	2			2			V	
	DIR (Referenced to V _{CCA})		V _{CCI} =1.2V~1.95V	V _{CCA} ^x 0.65				V _{CCA} ^x 0.65			V
			V _{CCI} =1.95V~2.7V	1.6			1.6			V	
			V _{CCI} =2.7V~3.6V	2			2			V	
Low-Level Output Voltage	Data Inputs	V _{IL}	V _{CCI} =1.2V~1.95V			V _{CCI} ^x 0.35			V _{CCI} ^x 0.35	V	
			V _{CCI} =1.95V~2.7V			0.7			0.7	V	
			V _{CCI} =2.7V~3.6V			0.8			0.8	V	
	DIR (Referenced to V _{CCA})		V _{CCI} =1.2V~1.95V			V _{CCA} ^x 0.35			V _{CCA} ^x 0.35	V	
			V _{CCI} =1.95V~2.7V			0.7			0.7	V	
			V _{CCI} =2.7V~3.6V			0.8			0.8	V	
High-Level Output Voltage		V _{OH}	V _{CCA} =V _{CCB} =1.2V~3.6V I _{OH} =-100μA, V _I =V _{IH}	V _{CCA} - 0.2			V _{CCA} - 0.2			V	
			V _{CCA} =V _{CCB} =1.2V I _{OH} =-3mA, V _I =V _{IH}		0.95			0.65		V	
			V _{CCA} =V _{CCB} =1.4V I _{OH} =-6mA, V _I =V _{IH}	1.05			0.75			V	
			V _{CCA} =V _{CCB} =1.65V I _{OH} =-8mA, V _I =V _{IH}	1.2			0.9			V	
			V _{CCA} =V _{CCB} =2.3V I _{OH} =-9mA, V _I =V _{IH}	1.75			1.45			V	
			V _{CCA} =V _{CCB} =3.0V I _{OH} =-12mA, V _I =V _{IH}	2.3			2.0			V	
			V _{CCA} =V _{CCB} =1.2V~3.6V I _{OL} =100μA, V _I =V _{IL}			0.2			0.3	V	
Low-Level Output Voltage		V _{OL}	V _{CCA} =V _{CCB} =1.2V I _{OL} =3mA, V _I =V _{IL}		0.15			0.4		V	
			V _{CCA} =V _{CCB} =1.4V I _{OL} =6mA, V _I =V _{IL}			0.35			0.6	V	
			V _{CCA} =V _{CCB} =1.65V I _{OL} =8mA, V _I =V _{IL}			0.45			0.7	V	
			V _{CCA} =V _{CCB} =2.3V I _{OL} =9mA, V _I =V _{IL}			0.55			0.8	V	
			V _{CCA} =V _{CCB} =3.0V I _{OL} =12mA, V _I =V _{IL}			0.7			0.95	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	Control inputs	I _{I(LEAK)}	V _{CCA} =V _{CCB} =1.2V~3.6V V _{IN} =V _{CCA} or GND			±0.25			±5	μA
Power OFF Leakage Current	A or B port	I _{OFF}	V _{CCA} =0V, V _{CCB} =0V~3.6V V _{IN} or V _{OUT} =0V~3.6V			±1			±30	μA
			V _{CCA} =0V~3.6V, V _{CCB} =0V V _{IN} or V _{OUT} =0V~3.6V			±1			±30	μA
Output OFF-state current (Note 3)	A or B port	I _{OZ}	V _{CCA} =V _{CCB} =3.6V V _{OUT} =V _{CCO} or GND V _{IN} =V _{CCI} or GND, \overline{OE} =V _{IH}			±2.5			±30	μA
Quiescent Supply Current		I _{CCA}	V _{CCA} =V _{CCB} =1.2V~3.6V V _{IN} =V _{CCI} or GND, I _O =0			15			50	μA
			V _{CCA} =0V, V _{CCB} =0V~3.6V V _{IN} =V _{CCI} or GND, I _O =0	-2			-12			μA
			V _{CCA} =0V~3.6V, V _{CCB} =0V V _{IN} =V _{CCI} or GND, I _O =0			15			50	μA
Quiescent Supply Current		I _{CCB}	V _{CCA} =V _{CCB} =1.2V~3.6V V _{IN} =V _{CCI} or GND, I _O =0			15			50	μA
			V _{CCA} =0V, V _{CCB} =0V~3.6V V _{IN} =V _{CCI} or GND, I _O =0			15			50	μA
			V _{CCA} =0V~3.6V, V _{CCB} =0V V _{IN} =V _{CCI} or GND, I _O =0	-2			-12			μA
Quiescent Supply Current & Quiescent Supply Current		I _{CCA} +I _{CCB}	V _{CCA} =V _{CCB} =1.2V~3.6V V _{IN} =V _{CCI} or GND, I _O =0			25			65	μA

Notes: 1. V_{CCI} is the V_{CC} associated with the input port.

2. V_{CCO} is the V_{CC} associated with the output port.

3. For I/O ports, the parameter I_{OZ} includes the input leakage current.

■ SWITCHING CHARACTERISTICS

(Over recommended operating free-air temperature range, $V_{CCA}=1.2V$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	$T_A=25^{\circ}C$			$T_A=-40\sim+125^{\circ}C$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (An) to Output (Bn)	t_{PLH} t_{PHL}	$V_{CCB}=1.2V$		11.5			12.5		ns
		$V_{CCB}=1.5V\pm 0.1V$		10			11		ns
		$V_{CCB}=1.8V\pm 0.15V$		8.5			9.5		ns
		$V_{CCB}=2.5V\pm 0.2V$		8			9		ns
		$V_{CCB}=3.3V\pm 0.3V$		6.5			7.5		ns
Propagation Delay From Input (Bn) to Output (An)	t_{PLH} t_{PHL}	$V_{CCB}=1.2V$		12.5			13.5		ns
		$V_{CCB}=1.5V\pm 0.1V$		12			13		ns
		$V_{CCB}=1.8V\pm 0.15V$		11			12		ns
		$V_{CCB}=2.5V\pm 0.2V$		10.5			11.5		ns
		$V_{CCB}=3.3V\pm 0.3V$		9.5			10.5		ns
Propagation Delay From Input (\overline{OE}) to Output (An)	t_{PZH} t_{PZL}	$V_{CCB}=1.2V$		25.5			30		ns
		$V_{CCB}=1.5V\pm 0.1V$		25.5			30		ns
		$V_{CCB}=1.8V\pm 0.15V$		25.5			30		ns
		$V_{CCB}=2.5V\pm 0.2V$		25.5			30		ns
		$V_{CCB}=3.3V\pm 0.3V$		25.5			30		ns
Propagation Delay From Input (\overline{OE}) to Output (Bn)	t_{PZH} t_{PZL}	$V_{CCB}=1.2V$		20			22		ns
		$V_{CCB}=1.5V\pm 0.1V$		17			19		ns
		$V_{CCB}=1.8V\pm 0.15V$		14			16		ns
		$V_{CCB}=2.5V\pm 0.2V$		11			13		ns
		$V_{CCB}=3.3V\pm 0.3V$		9.5			10		ns
Propagation Delay From Input (\overline{OE}) to Output (An)	t_{PHZ} t_{PLZ}	$V_{CCB}=1.2V$		18			20		ns
		$V_{CCB}=1.5V\pm 0.1V$		18			20		ns
		$V_{CCB}=1.8V\pm 0.15V$		18			20		ns
		$V_{CCB}=2.5V\pm 0.2V$		18			20		ns
		$V_{CCB}=3.3V\pm 0.3V$		18			20		ns
Propagation Delay From Input (\overline{OE}) to Output (Bn)	t_{PHZ} t_{PLZ}	$V_{CCB}=1.2V$		15.5			17		ns
		$V_{CCB}=1.5V\pm 0.1V$		14.5			15.5		ns
		$V_{CCB}=1.8V\pm 0.15V$		13.5			14.5		ns
		$V_{CCB}=2.5V\pm 0.2V$		12			13		ns
		$V_{CCB}=3.3V\pm 0.3V$		11			12		ns

■ SWITCHING CHARACTERISTICS (Cont.)

(Over recommended operating free-air temperature range, $V_{CCA}=1.5V\pm 0.1V$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	$T_A=25^{\circ}C$			$T_A=-40\sim+125^{\circ}C$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (An) to Output (Bn)	t_{PLH} t_{PHL}	$V_{CCB}=1.2V$		11.3			12.5		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		10.4			14.7	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		9.8			13.3	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		9.3			13.9	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		8.8			17.2	ns
Propagation Delay From Input (Bn) to Output (An)	t_{PLH} t_{PHL}	$V_{CCB}=1.2V$		11.4			12.6		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		10.4			14.7	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		9.5			14.2	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		8.6			13.5	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		7.5			13.2	ns
Propagation Delay From Input (\overline{OE}) to Output (An)	t_{PZH} t_{PZL}	$V_{CCB}=1.2V$		16.9			18.1		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		15.7			20.5	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		15.6			20.5	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		15.6			20.5	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		15.7			20.5	ns
Propagation Delay From Input (\overline{OE}) to Output (Bn)	t_{PZH} t_{PZL}	$V_{CCB}=1.2V$		16.2			17.4		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		15.6			18.6	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		13.7			17.7	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		11.4			15.1	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		9.2			14.4	ns
Propagation Delay From Input (\overline{OE}) to Output (An)	t_{PHZ} t_{PLZ}	$V_{CCB}=1.2V$		15			16.2		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		12.6			20.3	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		12.5			20.3	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		12.5			20.3	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		12.6			20.3	ns
Propagation Delay From Input (\overline{OE}) to Output (Bn)	t_{PHZ} t_{PLZ}	$V_{CCB}=1.2V$		16.5			17.7		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		14.4			20	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		13.7			18.6	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		13			17.9	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		12.8			18.9	ns

■ SWITCHING CHARACTERISTICS (Cont.)

(Over recommended operating free-air temperature range, $V_{CCA}=1.8V\pm 0.15V$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	$T_A=25^\circ\text{C}$			$T_A=-40\sim+125^\circ\text{C}$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (An) to Output (Bn)	t_{PLH} t_{PHL}	$V_{CCB}=1.2V$		10			11.5		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		8.1			14.2	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		7.5			13	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		7			12.3	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		6.5			12.1	ns
Propagation Delay From Input (Bn) to Output (An)	t_{PLH} t_{PHL}	$V_{CCB}=1.2V$		10.1			11.6		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		7.4			13.3	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		6.5			13	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		5.6			12.1	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		4.5			11.8	ns
Propagation Delay From Input (\overline{OE}) to Output (An)	t_{PZH} t_{PZL}	$V_{CCB}=1.2V$		15.4			16.9		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		13.5			17.2	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		13.4			17.2	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		13.4			17.2	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		13.5			17.2	ns
Propagation Delay From Input (\overline{OE}) to Output (Bn)	t_{PZH} t_{PZL}	$V_{CCB}=1.2V$		14.8			16.3		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		15.2			19.6	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		13.4			17	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		10.9			14.2	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		8.2			13.2	ns
Propagation Delay From Input (\overline{OE}) to Output (An)	t_{PHZ} t_{PLZ}	$V_{CCB}=1.2V$		13.8			15.3		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		12			17.7	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		12			17.7	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		12			17.7	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		12			17.7	ns
Propagation Delay From Input (\overline{OE}) to Output (Bn)	t_{PHZ} t_{PLZ}	$V_{CCB}=1.2V$		15.3			16.8		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		15			18.9	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		14.3			17.3	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		13.5			15.8	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		13.1			15.4	ns

■ SWITCHING CHARACTERISTICS (Cont.)

(Over recommended operating free-air temperature range, $V_{CCA}=2.5V\pm 0.2V$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	$T_A=25^\circ\text{C}$			$T_A=-40\sim+125^\circ\text{C}$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (An) to Output (Bn)	t_{PLH} t_{PHL}	$V_{CCB}=1.2V$		7.9			9.4		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		7.8			13.5	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		7.2			12.1	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		6.6			10.7	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		6.2			10.2	ns
Propagation Delay From Input (Bn) to Output (An)	t_{PLH} t_{PHL}	$V_{CCB}=1.2V$		8			9.5		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		6.3			13.9	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		5.5			12.3	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		5			10.7	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		4.5			10.4	ns
Propagation Delay From Input (\overline{OE}) to Output (An)	t_{PZH} t_{PZL}	$V_{CCB}=1.2V$		13			14.5		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		12.6			13.7	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		11.4			13.7	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		10.9			13.7	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		11.1			13.7	ns
Propagation Delay From Input (\overline{OE}) to Output (Bn)	t_{PZH} t_{PZL}	$V_{CCB}=1.2V$		12.5			14		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		14.8			19.1	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		13			16.5	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		10.4			13.3	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		7.6			12.3	ns
Propagation Delay From Input (\overline{OE}) to Output (An)	t_{PHZ} t_{PLZ}	$V_{CCB}=1.2V$		11.1			12.6		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		11.7			14.2	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		11.8			14.2	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		9.5			14.2	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		9.9			14.2	ns
Propagation Delay From Input (\overline{OE}) to Output (Bn)	t_{PHZ} t_{PLZ}	$V_{CCB}=1.2V$		12.8			14.3		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		14.5			17.7	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		13.8			16.3	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		12.8			14.2	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		11.4			12.1	ns

■ SWITCHING CHARACTERISTICS (Cont.)

(Over recommended operating free-air temperature range, $V_{CCA}=3.3V\pm 0.3V$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	$T_A=25^\circ C$			$T_A=-40\sim+125^\circ C$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (An) to Output (Bn)	t_{PLH} t_{PHL}	$V_{CCB}=1.2V$		9.5			10.7		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		7.6			13.2	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		7.1			11.1	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		5.9			10.4	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		4.5			9.7	ns
Propagation Delay From Input (Bn) to Output (An)	t_{PLH} t_{PHL}	$V_{CCB}=1.2V$		7.5			8.7		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		6			17.2	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		5.1			12.1	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		4.7			10.2	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		4			9.7	ns
Propagation Delay From Input (\overline{OE}) to Output (An)	t_{PZH} t_{PZL}	$V_{CCB}=1.2V$		3.5			4.7		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		7			12.3	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		6.4			12.3	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		5			12.3	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		5			12.3	ns
Propagation Delay From Input (\overline{OE}) to Output (Bn)	t_{PZH} t_{PZL}	$V_{CCB}=1.2V$		13			14.2		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		8.8			18.9	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		7.9			16.1	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		6.8			13.2	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		5.9			12.3	ns
Propagation Delay From Input (\overline{OE}) to Output (An)	t_{PHZ} t_{PLZ}	$V_{CCB}=1.2V$		5			6.2		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		9.7			12.3	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		8.7			12.3	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		6			12.3	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		7			12.3	ns
Propagation Delay From Input (\overline{OE}) to Output (Bn)	t_{PHZ} t_{PLZ}	$V_{CCB}=1.2V$		13			14.2		ns
		$V_{CCB}=1.5V\pm 0.1V$	0.5		11.3			17.4	ns
		$V_{CCB}=1.8V\pm 0.15V$	0.5		10.1			15.8	ns
		$V_{CCB}=2.5V\pm 0.2V$	0.5		8.4			13.7	ns
		$V_{CCB}=3.3V\pm 0.3V$	0.5		8.2			12.6	ns

■ OPERATING CHARACTERISTIC (C_L=0, f=10MHz, t_r=t_f=1ns, T_A=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance (An to Bn)	Outputs enabled	C _{PDA}	V _{CCA} =V _{CCB} =1.2V		1		pF
			V _{CCA} =V _{CCB} =1.5V		1		pF
			V _{CCA} =V _{CCB} =1.8V		1		pF
			V _{CCA} =V _{CCB} =2.5V		1		pF
			V _{CCA} =V _{CCB} =3.3V		1		pF
	Outputs disabled		V _{CCA} =V _{CCB} =1.2V		1		pF
			V _{CCA} =V _{CCB} =1.5V		1		pF
			V _{CCA} =V _{CCB} =1.8V		1		pF
			V _{CCA} =V _{CCB} =2.5V		1		pF
			V _{CCA} =V _{CCB} =3.3V		1		pF
Power Dissipation Capacitance (Bn to An)	Outputs enabled	V _{CCA} =V _{CCB} =1.2V		12		pF	
		V _{CCA} =V _{CCB} =1.5V		12		pF	
		V _{CCA} =V _{CCB} =1.8V		12		pF	
		V _{CCA} =V _{CCB} =2.5V		13		pF	
		V _{CCA} =V _{CCB} =3.3V		14		pF	
	Outputs disabled	V _{CCA} =V _{CCB} =1.2V		1		pF	
		V _{CCA} =V _{CCB} =1.5V		1		pF	
		V _{CCA} =V _{CCB} =1.8V		1		pF	
		V _{CCA} =V _{CCB} =2.5V		1		pF	
		V _{CCA} =V _{CCB} =3.3V		1		pF	
Power Dissipation Capacitance (An to Bn)	Outputs enabled	C _{PDB}	V _{CCA} =V _{CCB} =1.2V		12		pF
			V _{CCA} =V _{CCB} =1.5V		12		pF
			V _{CCA} =V _{CCB} =1.8V		12		pF
			V _{CCA} =V _{CCB} =2.5V		13		pF
			V _{CCA} =V _{CCB} =3.3V		14		pF
	Outputs disabled		V _{CCA} =V _{CCB} =1.2V		1		pF
			V _{CCA} =V _{CCB} =1.5V		1		pF
			V _{CCA} =V _{CCB} =1.8V		1		pF
			V _{CCA} =V _{CCB} =2.5V		1		pF
			V _{CCA} =V _{CCB} =3.3V		1		pF
Power Dissipation Capacitance (Bn to An)	Outputs enabled	V _{CCA} =V _{CCB} =1.2V		1		pF	
		V _{CCA} =V _{CCB} =1.5V		1		pF	
		V _{CCA} =V _{CCB} =1.8V		1		pF	
		V _{CCA} =V _{CCB} =2.5V		1		pF	
		V _{CCA} =V _{CCB} =3.3V		1		pF	
	Outputs disabled	V _{CCA} =V _{CCB} =1.2V		1		pF	
		V _{CCA} =V _{CCB} =1.5V		1		pF	
		V _{CCA} =V _{CCB} =1.8V		1		pF	
		V _{CCA} =V _{CCB} =2.5V		1		pF	
		V _{CCA} =V _{CCB} =3.3V		1		pF	

Note: Power dissipation capacitance per transceiver.

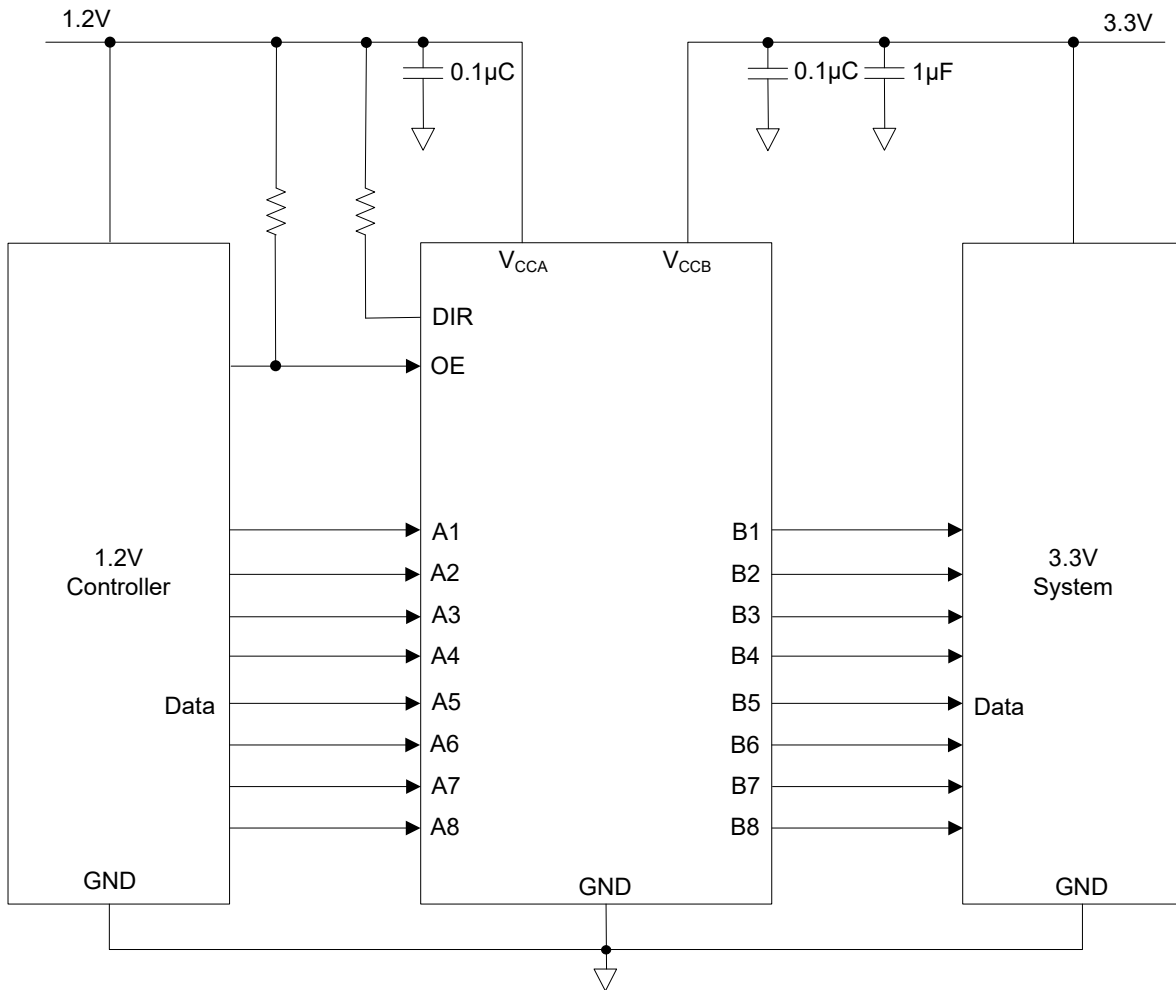
■ OPERATING CHARACTERISTIC (f=10MHz, T_A=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	Control inputs	C _{IN}	V _{CCA} =V _{CCB} =3.3V V _{IN} =3.3V or GND		3.5		pF
Output Capacitance	A or B port	C _{IO}	V _{CCA} =V _{CCB} =3.3V V _{OUT} =3.3V or GND		6		pF

APPLICATION INFORMATION

The **U74AVC8T245** device can be used in level-translation applications for interfacing devices or systems operating at different interface voltages with one another. The **U74AVC8T245** device is ideal for data transmission which direction is different with each channel. The maximum data rate can be up to 320 Mbps when device voltage power supply is more than 1.8V.

TYPICAL APPLICATION CIRCUIT

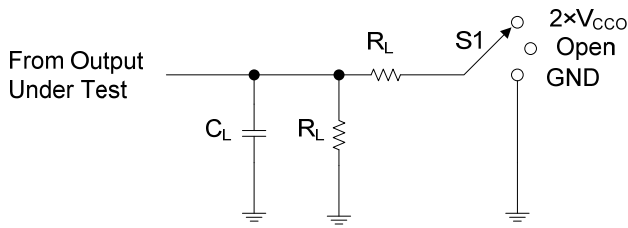


POWER SUPPLY RECOMMENDATIONS

The **U74AVC8T245** device uses two separate configurable power-supply rails, V_{CCA} and V_{CCB} . V_{CCA} accepts any supply voltage from 1.2V to 3.6V and V_{CCB} accepts any supply voltage from 1.2V to 3.6V. The A port and B port are designed to track V_{CCA} and V_{CCB} respectively allowing for low-voltage bidirectional translation between any of the 1.2V, 1.5V, 1.8V, 2.5V and 3.3V voltage nodes.

The output-enable \overline{OE} input circuit is designed so that it is supplied by V_{CCA} and when the \overline{OE} input is high, all outputs are placed in the high-impedance state. To ensure the high-impedance state of the outputs during power up or power down, the \overline{OE} input pin must be tied to V_{CCA} through a pullup resistor and must not be enabled until V_{CCA} and V_{CCB} are fully ramped and stable. The minimum value of the pullup resistor to V_{CCA} is determined by the current-sinking capability of the driver.

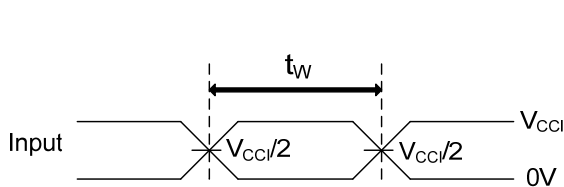
TEST CIRCUIT AND WAVEFORMS



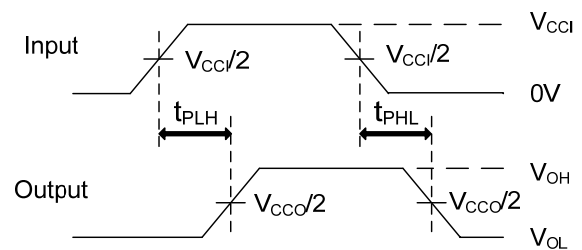
TEST	S1
t_{PD}	Open
t_{PLZ}/t_{PZL}	$2 \times V_{CCO}$
t_{PHZ}/t_{PZH}	GND

LOAD CIRCUIT

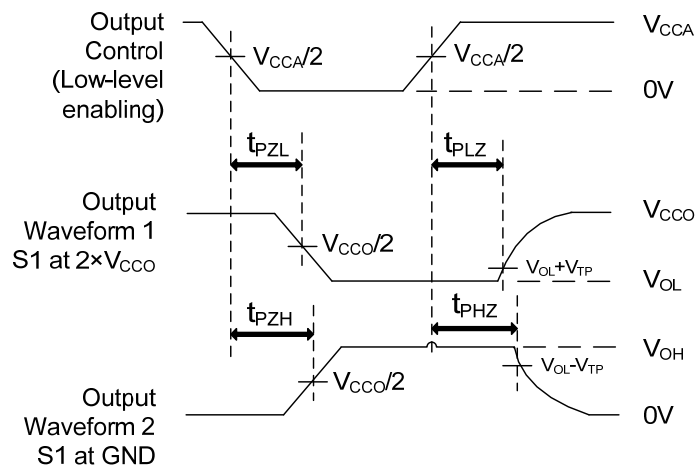
V_{CCO}	C_L	R_L	V_{TP}
1.2V	15pF	2k Ω	0.1V
1.5V \pm 0.1V	15pF	2k Ω	0.1V
1.8V \pm 0.15V	15pF	2k Ω	0.15V
2.5V \pm 0.2V	15pF	2k Ω	0.15V
3.3V \pm 0.3V	15pF	2k Ω	0.3V



PULSE DURATION



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Note: C_L includes probe and jig capacitance.

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