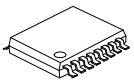
U74AVCH4T245 **Preliminary** ***CMOS IC***

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



TSSOP-16

■ DESCRIPTION

This 4-bit non-inverting bus transceiver uses two separate configurable power-supply rails. The A port and control pins (1DIR, 2DIR, 1OE and 2$\overline{OE}$) are 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 1.2V to 3.6V. The **U74AVCH4T245** is optimized to operate with V_{CCA}/V_{CCB} set at 1.4V to 3.6V. It is operational with V_{CCA}/V_{CCB} as low as 1.2V.

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.

The **U74AVCH4T245** device is designed for asynchronous communication between two data buses. The logic levels of the direction-control (DIR) input and the output-enable ($\overline{OE}$) input activate either the B-port outputs or the A-port outputs or place both output ports into the high-impedance mode. 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 **U74AVCH4T245** 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, then both ports are in the high- impedance state. To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

■ FEATURES

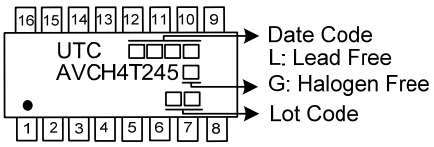
* Operation Voltage Range: 1.2 ~ 3.6V
* Control Inputs V_{IH}/V_{IL} Levels Are Referenced to V_{CCA} Voltage
* I/Os Are 4.6V Tolerant
* I_{OFF} Supports Partial Power Down Mode Operation
* Bus Hold On Data Inputs Eliminates the Need for External pull-up/pull down Resistors

■ ORDERING INFORMATION

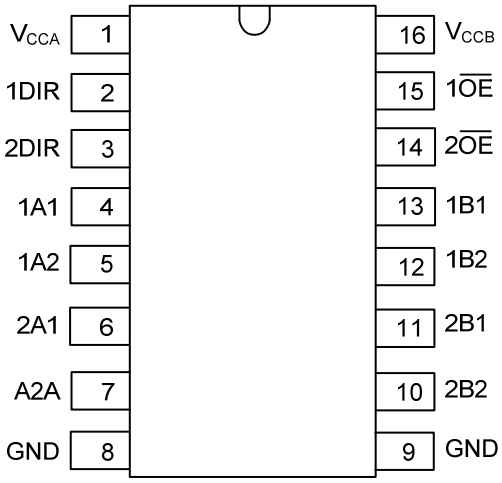
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AVCH4T245L-P16-R	U74AVCH4T245G-P16-R	TSSOP-16	Tape Reel

U74AVCH4T245G-P16-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) P16: TSSOP-16 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ PIN CONFIGURATION



■ PIN DESCRIPTION

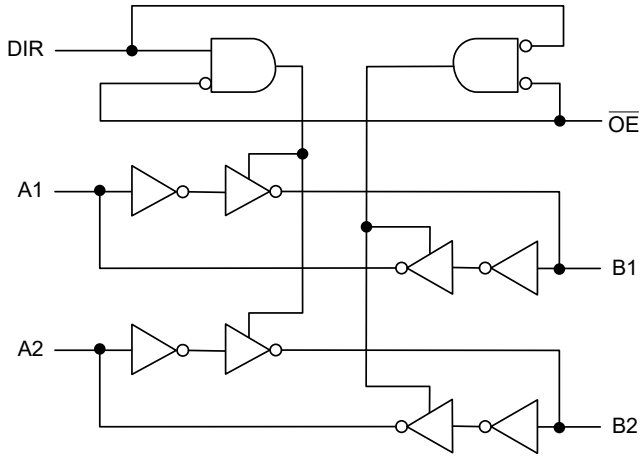
PIN NO.	PIN NAME	TYPE	DESCRIPTION
1	V_{CCA}		A-port power supply voltage. 1.2V ≤ V_{CCA} ≤ 3.6V
2	1DIR	I	Direction-control input for '1' ports
3	2DIR	I	Direction-control input for '2' ports
4	1A1	I/O	Input/output 1A1. Referenced to V_{CCA}
5	1A2	I/O	Input/output 1A2. Referenced to V_{CCA}
6	2A1	I/O	Input/output 2A1. Referenced to V_{CCA}
7	2A2	I/O	Input/output 2A2. Referenced to V_{CCA}
8, 9	GND		Ground
10	2B2	I/O	Input/output 2B2. Referenced to V_{CCB}
11	2B1	I/O	Input/output 2B1. Referenced to V_{CCB}
12	1B2	I/O	Input/output 1B2. Referenced to V_{CCB}
13	1B1	I/O	Input/output 1B1. Referenced to V_{CCB}
14	2OE	I	3-state output-mode enables. Pull OE high to place '2' outputs in 3-state mode. Referenced to V_{CCA}
15	1OE	I	3-state output-mode enables. Pull OE high to place '1' outputs in 3-state mode. Referenced to V_{CCA}
16	V_{CCB}		B-port power supply voltage. 1.2V ≤ V_{CCB} ≤ 3.6V

■ FUNCTION TABLE

INPUTS		OUTPUT		OPERATION
$\overline{OE}$	DIR	A PORT	B PORT	
L	L	Enabled	Hi-Z	B data to A data
L	H	Hi-Z	Enabled	A data to B data
H	X	Hi-Z	Hi-Z	Isolation

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



■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CCA}, V_{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_{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}<0	-50	mA
Output Clamp Current	I_{OK}	V_{OUT}<0	-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 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.

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

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CCA}, V_{CCB}		1.2		3.6	V
Input Voltage	V_{IN}		0		3.6	V
Output Voltage	V_{OUT}	Active state	0		V_{CC}	V
		3-state	0		3.6	
Input Transition Rise or Fall Rate	Δt/Δv				5	ns/V
Operating Temperature	T_A		-40		+85	°C

■ ELECTRICAL CHARACTERISTICS (T_A=25°C , unless otherwise specified) (Note 1, 2, 3)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	Data inputs (Note 4)	V_{IH}	V_{CCI}=1.2V~1.95V	V_{CCI}× 0.65			V
			V_{CCI}=1.95V~2.7V	1.6			V
			V_{CCI}=2.7V~3.6V	2			V
	DIR (Referenced to V_{CCA}) (Note 5)		V_{CCI}=1.2V~1.95V	V_{CCA}× 0.65			V
			V_{CCI}=1.95V~2.7V	1.6			V
			V_{CCI}=2.7V~3.6V	2			V
Low-Level Input Voltage	Data inputs (Note 4)	V_{IL}	V_{CCI}=1.2V~1.95V			V_{CCI}× 0.35	V
			V_{CCI}=1.95V~2.7V			0.7	V
			V_{CCI}=2.7V~3.6V			0.8	V
	DIR (Referenced to V_{CCA}) (Note 5)		V_{CCI}=1.2V~1.95V			V_{CCA}× 0.35	V
			V_{CCI}=1.95V~2.7V			0.7	V
			V_{CCI}=2.7V~3.6V			0.8	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER		SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
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
			V_{CCA}=V_{CCB}=1.2V I_{OH}=-3mA, V_I=V_{IH}			0.95		V
			V_{CCA}=V_{CCB}=1.4V I_{OH}=-6mA, V_I=V_{IH}				1.05	V
			V_{CCA}=V_{CCB}=1.65V I_{OH}=-8mA, V_I=V_{IH}				1.2	V
			V_{CCA}=V_{CCB}=2.3V I_{OH}=-9mA, V_I=V_{IH}				1.75	V
			V_{CCA}=V_{CCB}=3.0V I_{OH}=-12mA, V_I=V_{IH}				2.3	V
Low-Level Output Voltage		V_{OL}	V_{CCA}=V_{CCB}=1.2V~3.6V I_{OL}=100μA, V_I=V_{IL}				0.2	V
			V_{CCA}=V_{CCB}=1.2V I_{OL}=3mA, V_I=V_{IL}			0.15		V
			V_{CCA}=V_{CCB}=1.4V I_{OL}=6mA, V_I=V_{IL}				0.35	V
			V_{CCA}=V_{CCB}=1.65V I_{OL}=8mA, V_I=V_{IL}				0.45	V
			V_{CCA}=V_{CCB}=2.3V I_{OL}=9mA, V_I=V_{IL}				0.55	V
			V_{CCA}=V_{CCB}=3.0V I_{OL}=12mA, V_I=V_{IL}				0.7	V
Input Leakage Current	Control inputs	$I_{I(LEAK)}$	V_{CCA}=V_{CCB}=1.2~3.6V V_{IN}=V_{CCA} or GND				±1	μA
Bus Hold Low Sustaining Current		I_{BHL}	VI=0.42V; V_{CCA}=V_{CCB}=1.2V			25		μA
			VI=0.49V; V_{CCA}=V_{CCB}=1.4V		15			μA
			VI=0.58V; V_{CCA}=V_{CCB}=1.65V		25			μA
			VI=0.7V; V_{CCA}=V_{CCB}=2.3V		45			μA
			VI=0.8V; V_{CCA}=V_{CCB}=3.3V		100			μA
Bus Hold High Sustaining Current		I_{BHH}	VI=0.78V; V_{CCA}=V_{CCB}=1.2V			-25		μA
			VI=0.91V; V_{CCA}=V_{CCB}=1.4V		-15			μA
			VI=1.07V; V_{CCA}=V_{CCB}=1.65V		-25			μA
			VI=1.6V; V_{CCA}=V_{CCB}=2.3V		-45			μA
			V_I=2V; V_{CCA}=V_{CCB}=3.3V		-100			μA
Bus Hold Low Overdrive Current		I_{BHLO}	V_I=0 to V_{CCI}	V_{CCA}=V_{CCB}=1.2V		40		μA
				V_{CCA}=V_{CCB}=1.6V	125			μA
				V_{CCA}=V_{CCB}=1.95V	200			μA
				V_{CCA}=V_{CCB}=2.7V	300			μA
				V_{CCA}=V_{CCB}=3.6V	500			μA
Bus Hold High Overdrive Current		I_{BHHO}	V_I= V_{CCI} to 0	V_{CCA}=V_{CCB}=1.2V		-40		μA
				V_{CCA}=V_{CCB}=1.6V	-125			μA
				V_{CCA}=V_{CCB}=1.95V	-200			μA
				V_{CCA}=V_{CCB}=2.7V	-300			μA
				V_{CCA}=V_{CCB}=3.6V	-500			μA

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power OFF Leakage Current	A or B port	I_{OFF}	V_{CCA}=0V, V_{CCB}=0~3.6V V_{IN} or V_{OUT}=0~3.6V			±5	μA
			V_{CCA}=0~3.6V, V_{CCB}=0V V_{IN} or V_{OUT}=0~3.6V			±5	μA
Output OFF-State Current	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}			±5	μA
Quiescent Supply Current		I_{CCA}	V_{CCA}=V_{CCB}=1.2V~3.6V V_{IN}=V_{CCI} or GND, I_O=0			8	μA
			V_{CCA}=0V, V_{CCB}=3.6V V_{IN}=V_{CCI} or GND, I_O=0			-2	μA
			V_{CCA}=3.6V, V_{CCB}=0V V_{IN}=V_{CCI} or GND, I_O=0			8	μA
		I_{CCB}	V_{CCA}=V_{CCB}=1.2V~3.6V V_{IN}=V_{CCI} or GND, I_O=0			8	μA
			V_{CCA}=0V, V_{CCB}=3.6V V_{IN}=V_{CCI} or GND, I_O=0			8	μA
			V_{CCA}=3.6V, V_{CCB}=0V V_{IN}=V_{CCI} or GND, I_O=0			-2	μA
		I_{CCA}+I_{CCB}	V_{CCA}=V_{CCB}=1.2V~3.6V V_{IN}=V_{CCI} or GND, I_O=0			16	μA
Input Capacitance	Control Inputs	C_{IN}	V_{CCA}=V_{CCB}=3.3V V_{IN}=3.3V or GND			4.5	pF
Output Capacitance	A or B port	C_{IO}	V_{CCA}=V_{CCB}=3.3V V_{OUT}=3.3V or GND			7	pF

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. All unused data inputs of the device must be held at V_{CCI} or GND to ensure proper device operation.
4. For V_{CCI} values not specified in the data sheet, V_{IH} min=V_{CCI}×0.7V, V_{IL} max=V_{CCI}×0.3V
5. For V_{CCA} values not specified in the data sheet, V_{IH} min=V_{CCA}×0.7V, V_{IL} max=V_{CCA}×0.3V

■ SWITCHING CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A) to Output (B)	t_{PLH} t_{PHL}	V_{CCB}=1.2V		11.4		ns
		V_{CCB}=1.5V±0.1V		8.9		ns
		V_{CCB}=1.8V±0.15V		8.7		ns
		V_{CCB}=2.5V±0.2V		8.6		ns
		V_{CCB}=3.3V±0.3V		8.8		ns
Propagation Delay From Input (B) to Output (A)	t_{PLH} t_{PHL}	V_{CCB}=1.2V		12.1		ns
		V_{CCB}=1.5V±0.1V		11.6		ns
		V_{CCB}=1.8V±0.15V		11.3		ns
		V_{CCB}=2.5V±0.2V		11.1		ns
		V_{CCB}=3.3V±0.3V		11.1		ns
Propagation Delay From Input ($\overline{OE}$) to Output (A)	t_{PZH} t_{PZL}	V_{CCB}=1.2V		15.2		ns
		V_{CCB}=1.5V±0.1V		14.2		ns
		V_{CCB}=1.8V±0.15V		14.2		ns
		V_{CCB}=2.5V±0.2V		12.3		ns
		V_{CCB}=3.3V±0.3V		12.8		ns
Propagation Delay From Input ($\overline{OE}$) to Output (B)	t_{PZH} t_{PZL}	V_{CCB}=1.2V		14.9		ns
		V_{CCB}=1.5V±0.1V		14.1		ns
		V_{CCB}=1.8V±0.15V		14		ns
		V_{CCB}=2.5V±0.2V		12.7		ns
		V_{CCB}=3.3V±0.3V		13.5		ns
Propagation Delay From Input ($\overline{OE}$) to Output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V		14.6		ns
		V_{CCB}=1.5V±0.1V		13.7		ns
		V_{CCB}=1.8V±0.15V		13.3		ns
		V_{CCB}=2.5V±0.2V		12.9		ns
		V_{CCB}=3.3V±0.3V		12.7		ns
Propagation Delay From Input ($\overline{OE}$) to Output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V		14		ns
		V_{CCB}=1.5V±0.1V		13.3		ns
		V_{CCB}=1.8V±0.15V		12.9		ns
		V_{CCB}=2.5V±0.2V		12.6		ns
		V_{CCB}=3.3V±0.3V		12.6		ns

■ SWITCHING CHARACTERISTICS (Cont.)

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A) to Output (B)	t_{PLH} t_{PHL}	V_{CCB}=1.2V		10.7		ns
		V_{CCB}=1.5V±0.1V	0.1		10.3	ns
		V_{CCB}=1.8V±0.15V	0.1		9.2	ns
		V_{CCB}=2.5V±0.2V	0.1		8.2	ns
		V_{CCB}=3.3V±0.3V	0.1		8.2	ns
Propagation Delay From Input (B) to Output (A)	t_{PLH} t_{PHL}	V_{CCB}=1.2V		10.8		ns
		V_{CCB}=1.5V±0.1V	0.1		10.3	ns
		V_{CCB}=1.8V±0.15V	0.1		10	ns
		V_{CCB}=2.5V±0.2V	0.1		9.7	ns
		V_{CCB}=3.3V±0.3V	0.1		9.6	ns
Propagation Delay From Input ($\overline{OE}$) to Output (A)	t_{PZH} t_{PZL}	V_{CCB}=1.2V		13.6		ns
		V_{CCB}=1.5V±0.1V	0.1		12.2	ns
		V_{CCB}=1.8V±0.15V	0.1		12.2	ns
		V_{CCB}=2.5V±0.2V	0.1		12.2	ns
		V_{CCB}=3.3V±0.3V	0.1		12.2	ns
Propagation Delay From Input ($\overline{OE}$) to Output (B)	t_{PZH} t_{PZL}	V_{CCB}=1.2V		13.2		ns
		V_{CCB}=1.5V±0.1V	0.1		12.3	ns
		V_{CCB}=1.8V±0.15V	0.1		11.1	ns
		V_{CCB}=2.5V±0.2V	0.1		9.4	ns
		V_{CCB}=3.3V±0.3V	0.1		9.6	ns
Propagation Delay From Input ($\overline{OE}$) to Output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V		12.9		ns
		V_{CCB}=1.5V±0.1V	0.1		12.6	ns
		V_{CCB}=1.8V±0.15V	0.1		12.5	ns
		V_{CCB}=2.5V±0.2V	0.1		12.4	ns
		V_{CCB}=3.3V±0.3V	0.1		12.4	ns
Propagation Delay From Input ($\overline{OE}$) to Output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V		12.5		ns
		V_{CCB}=1.5V±0.1V	0.1		12.6	ns
		V_{CCB}=1.8V±0.15V	0.1		10.7	ns
		V_{CCB}=2.5V±0.2V	0.1		8.8	ns
		V_{CCB}=3.3V±0.3V	0.1		8.6	ns

■ SWITCHING CHARACTERISTICS (Cont.)

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A) to Output (B)	t_{PLH} t_{PHL}	V_{CCB}=1.2V		10.4		ns
		V_{CCB}=1.5V±0.1V	0.1		10	ns
		V_{CCB}=1.8V±0.15V	0.1		8.9	ns
		V_{CCB}=2.5V±0.2V	0.1		7.9	ns
		V_{CCB}=3.3V±0.3V	0.1		7.9	ns
Propagation Delay From Input (B) to Output (A)	t_{PLH} t_{PHL}	V_{CCB}=1.2V		10.5		ns
		V_{CCB}=1.5V±0.1V	0.1		9.3	ns
		V_{CCB}=1.8V±0.15V	0.1		8.9	ns
		V_{CCB}=2.5V±0.2V	0.1		8.6	ns
		V_{CCB}=3.3V±0.3V	0.1		8.5	ns
Propagation Delay From Input ($\overline{OE}$) to Output (A)	t_{PZH} t_{PZL}	V_{CCB}=1.2V		11.4		ns
		V_{CCB}=1.5V±0.1V	0.1		10.6	ns
		V_{CCB}=1.8V±0.15V	0.1		10.7	ns
		V_{CCB}=2.5V±0.2V	0.1		10.7	ns
		V_{CCB}=3.3V±0.3V	0.1		10.7	ns
Propagation Delay From Input ($\overline{OE}$) to Output (B)	t_{PZH} t_{PZL}	V_{CCB}=1.2V		13		ns
		V_{CCB}=1.5V±0.1V	0.1		11.9	ns
		V_{CCB}=1.8V±0.15V	0.1		10.7	ns
		V_{CCB}=2.5V±0.2V	0.1		8.9	ns
		V_{CCB}=3.3V±0.3V	0.1		8.9	ns
Propagation Delay From Input ($\overline{OE}$) to Output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V		12.4		ns
		V_{CCB}=1.5V±0.1V	0.1		10.4	ns
		V_{CCB}=1.8V±0.15V	0.1		10.3	ns
		V_{CCB}=2.5V±0.2V	0.1		10.3	ns
		V_{CCB}=3.3V±0.3V	0.1		10.2	ns
Propagation Delay From Input ($\overline{OE}$) to Output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V		12.1		ns
		V_{CCB}=1.5V±0.1V	0.1		12.2	ns
		V_{CCB}=1.8V±0.15V	0.1		10.4	ns
		V_{CCB}=2.5V±0.2V	0.1		8.3	ns
		V_{CCB}=3.3V±0.3V	0.1		7.6	ns

■ SWITCHING CHARACTERISTICS (Cont.)

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A) to Output (B)	t_{PLH} t_{PHL}	V_{CCB}=1.2V		7.8		ns
		V_{CCB}=1.5V±0.1V	0.1		8.7	ns
		V_{CCB}=1.8V±0.15V	0.1		7.6	ns
		V_{CCB}=2.5V±0.2V	0.1		6.5	ns
		V_{CCB}=3.3V±0.3V	0.1		6.6	ns
Propagation Delay From Input (B) to Output (A)	t_{PLH} t_{PHL}	V_{CCB}=1.2V		7.7		ns
		V_{CCB}=1.5V±0.1V	0.1		7.2	ns
		V_{CCB}=1.8V±0.15V	0.1		6.9	ns
		V_{CCB}=2.5V±0.2V	0.1		6.4	ns
		V_{CCB}=3.3V±0.3V	0.1		6.3	ns
Propagation Delay From Input ($\overline{OE}$) to Output (A)	t_{PZH} t_{PZL}	V_{CCB}=1.2V		8.7		ns
		V_{CCB}=1.5V±0.1V	0.1		9.4	ns
		V_{CCB}=1.8V±0.15V	0.1		9.4	ns
		V_{CCB}=2.5V±0.2V	0.1		7.2	ns
		V_{CCB}=3.3V±0.3V	0.1		7.6	ns
Propagation Delay From Input ($\overline{OE}$) to Output (B)	t_{PZH} t_{PZL}	V_{CCB}=1.2V		8.5		ns
		V_{CCB}=1.5V±0.1V	0.1		10.4	ns
		V_{CCB}=1.8V±0.15V	0.1		9.2	ns
		V_{CCB}=2.5V±0.2V	0.1		7.2	ns
		V_{CCB}=3.3V±0.3V	0.1		6.2	ns
Propagation Delay From Input ($\overline{OE}$) to Output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V		10		ns
		V_{CCB}=1.5V±0.1V	0.1		8.5	ns
		V_{CCB}=1.8V±0.15V	0.1		7.2	ns
		V_{CCB}=2.5V±0.2V	0.1		6.8	ns
		V_{CCB}=3.3V±0.3V	0.1		6.8	ns
Propagation Delay From Input ($\overline{OE}$) to Output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V		9.8		ns
		V_{CCB}=1.5V±0.1V	0.1		10.8	ns
		V_{CCB}=1.8V±0.15V	0.1		9	ns
		V_{CCB}=2.5V±0.2V	0.1		6.8	ns
		V_{CCB}=3.3V±0.3V	0.1		6	ns

■ SWITCHING CHARACTERISTICS (Cont.)

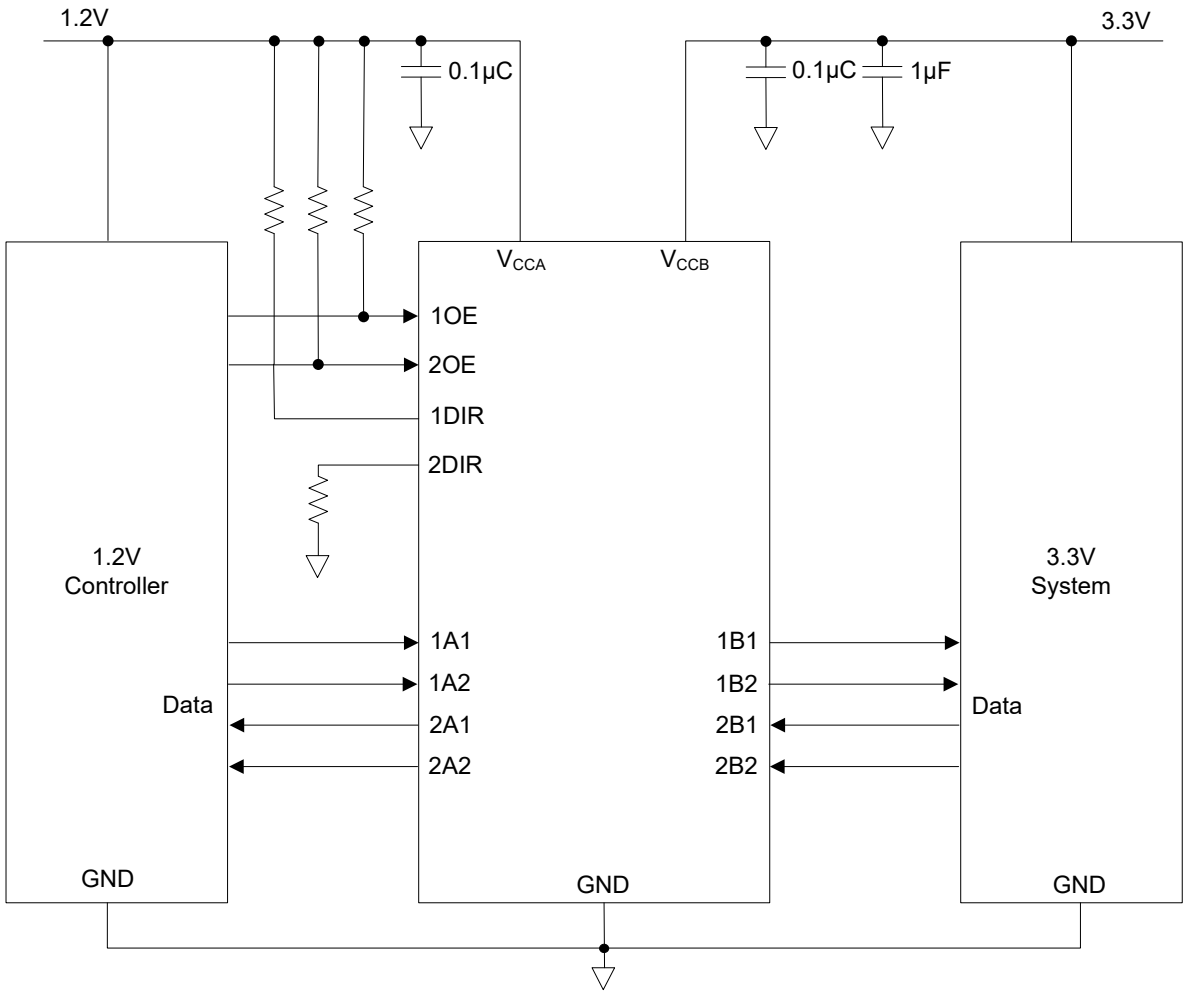
(Over recommended operating free-air temperature range, V_{CCA}=3.3V±0.3V, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A) to Output (B)	t_{PLH} t_{PHL}	V_{CCB}=1.2V		7.9		ns
		V_{CCB}=1.5V±0.1V	0.1		8.6	ns
		V_{CCB}=1.8V±0.15V	0.1		7.5	ns
		V_{CCB}=2.5V±0.2V	0.1		6.3	ns
		V_{CCB}=3.3V±0.3V	0.1		5.9	ns
Propagation Delay From Input (B) to Output (A)	t_{PLH} t_{PHL}	V_{CCB}=1.2V		7.6		ns
		V_{CCB}=1.5V±0.1V	0.1		7.2	ns
		V_{CCB}=1.8V±0.15V	0.1		6.4	ns
		V_{CCB}=2.5V±0.2V	0.1		6	ns
		V_{CCB}=3.3V±0.3V	0.1		5.8	ns
Propagation Delay From Input ($\overline{OE}$) to Output (A)	t_{PZH} t_{PZL}	V_{CCB}=1.2V		8.8		ns
		V_{CCB}=1.5V±0.1V	0.1		10.3	ns
		V_{CCB}=1.8V±0.15V	0.1		9.3	ns
		V_{CCB}=2.5V±0.2V	0.1		6.6	ns
		V_{CCB}=3.3V±0.3V	0.1		7.6	ns
Propagation Delay From Input ($\overline{OE}$) to Output (B)	t_{PZH} t_{PZL}	V_{CCB}=1.2V		9.3		ns
		V_{CCB}=1.5V±0.1V	0.1		10.3	ns
		V_{CCB}=1.8V±0.15V	0.1		9.1	ns
		V_{CCB}=2.5V±0.2V	0.1		7.4	ns
		V_{CCB}=3.3V±0.3V	0.1		7.2	ns
Propagation Delay From Input ($\overline{OE}$) to Output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V		9.8		ns
		V_{CCB}=1.5V±0.1V	0.1		10.7	ns
		V_{CCB}=1.8V±0.15V	0.1		7.2	ns
		V_{CCB}=2.5V±0.2V	0.1		5.8	ns
		V_{CCB}=3.3V±0.3V	0.1		5.8	ns
Propagation Delay From Input ($\overline{OE}$) to Output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V		9.7		ns
		V_{CCB}=1.5V±0.1V	0.1		10.7	ns
		V_{CCB}=1.8V±0.15V	0.1		8.8	ns
		V_{CCB}=2.5V±0.2V	0.1		6.7	ns
		V_{CCB}=3.3V±0.3V	0.1		5.8	ns

■ APPLICATION INFORMATION

The **U74AVCH4T245** device can be used in level-translation applications for interfacing devices or systems operating at different interface voltages with one another. The **U74AVCH4T245** device is ideal for use in applications where a push-pull driver is connected to the data I/Os.

■ TYPICAL APPLICATION CIRCUIT



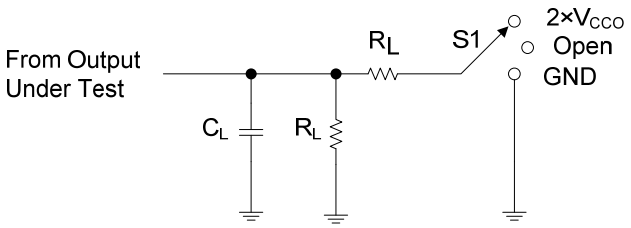
■ POWER SUPPLY RECOMMENDATIONS

The **U74AVCH4T245** 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.

■ BUS-HOLD CIRCUITRY

This device has active bus-hold circuitry that holds unused or un-driven inputs at a valid logic state. Use of pull-up or pull-down resistors with the bus-hold circuitry is not recommended. (Refer to the Bus-Hold Circuit Application Report. Pull up and pull down resistors are not recommended on the inputs of devices with bus-hold. Unused inputs can be left floating.

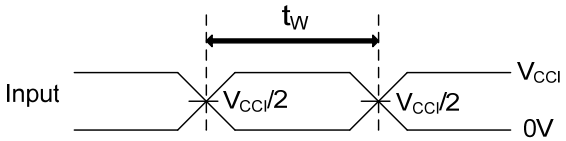
■ TEST CIRCUIT AND WAVEFORMS



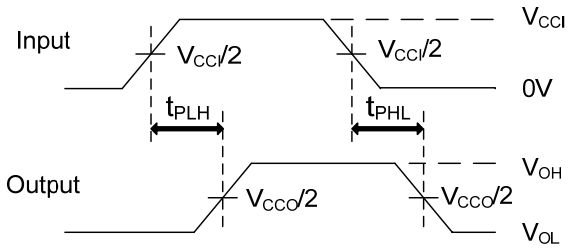
TEST	S1
t_{PD}	Open
t_{PLZ}/t_{PZL}	$2\times V_{CCO}$
t_{PHZ}/t_{PZH}	GND

LOAD CIRCUIT

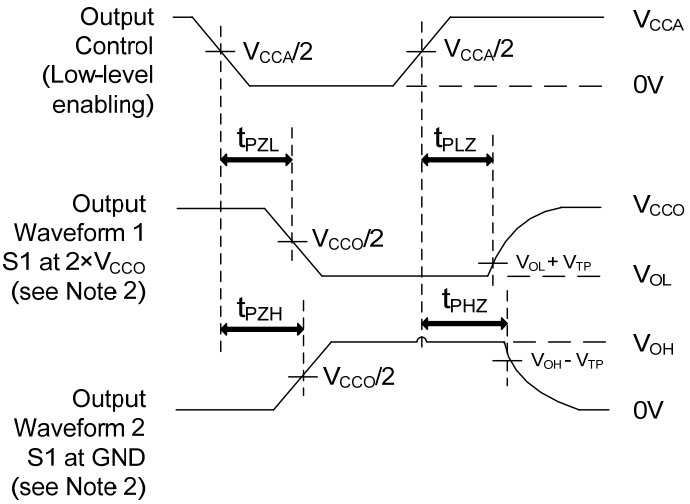
V_{CCO}	C_L	R_L	V_{TP}
1.2V	15pF	2kΩ	0.1V
1.5V±0.1V	15pF	2kΩ	0.1V
1.8V±0.15V	15pF	2kΩ	0.15V
2.5V±0.2V	15pF	2kΩ	0.15V
3.3V±0.3V	15pF	2kΩ	0.3V



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: $P_{RR} \le 1MHz$, $Z_O = 50\Omega$, $t_r \le 3ns$, $t_f \le 3ns$.
3. t_{PLH} and t_{PHL} are the same as t_{PD}.