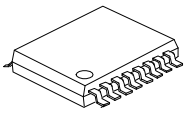
U74AVC4TD245

CMOS IC

4-BIT DUAL SUPPLY TRANSLATING TRANSCEIVER WITH CONFIGURABLE VOLTAGE TRANSLATION; 3-STATE



TSSOP-16

■ DESCRIPTION

U74AVC4TD245 is a 4-bit, dual supply transceiver that enables bidirectional level translation. It features eight 1-bit input-output ports, four direction control inputs, an output enable input and dual supply pins.

The device is 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.

■ FEATURES

* Wide supply voltage range from 0.8V to 3.6V
* Suspend mode
* Inputs accept voltages up to 3.6 V
* I_{OFF} supports live insertion, partial-power-down mode

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AVC4TD245L-P16-R	U74AVC4TD245G-P16-R	TSSOP-16	Tape Reel

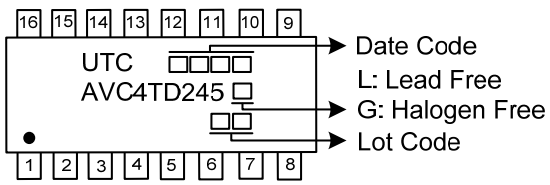
U74AVC4TD245G-P16-R

(1)Packing Type — (1) R: Tape Reel

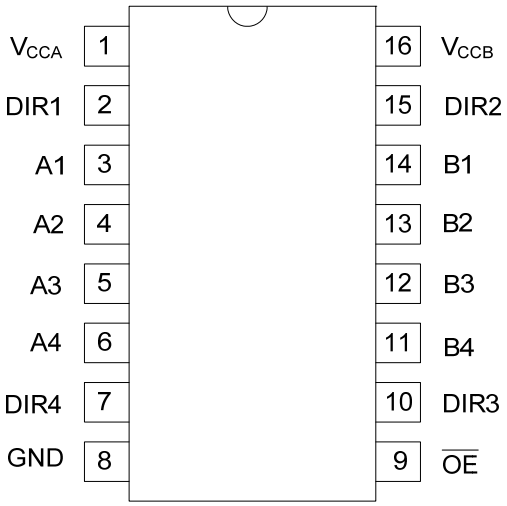
(2)Package Type — (2) P16: TSSOP-16

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

■ MARKING



■ PIN CONFIGURATION

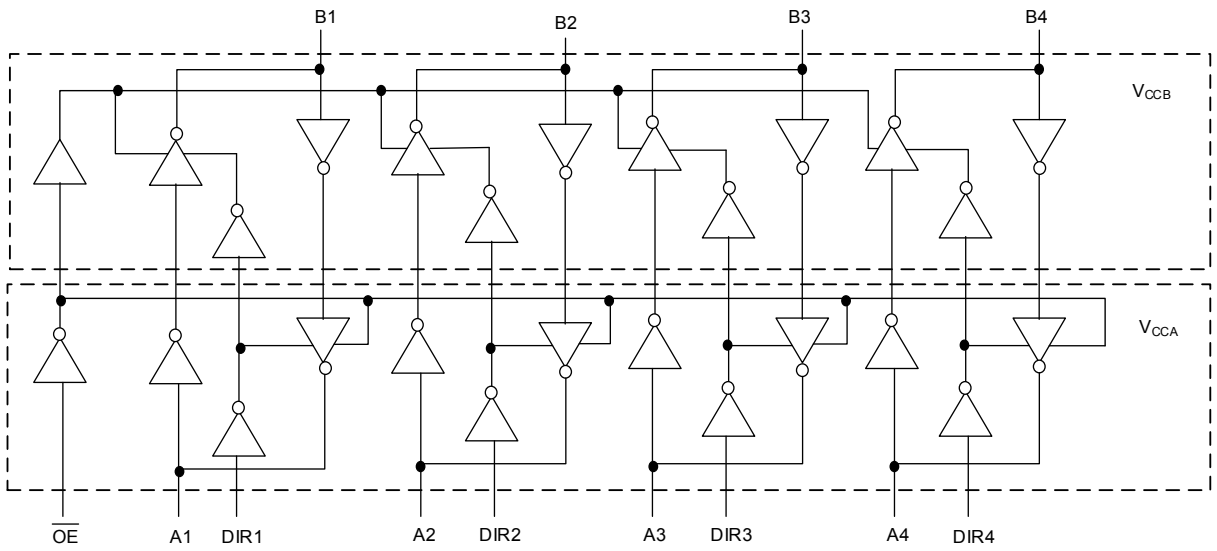


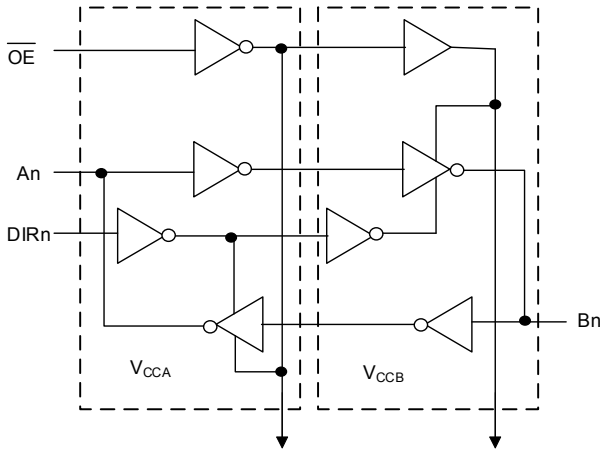
■ FUNCTION TABLE

INPUT					OUTPUT	
$\overline{OE}$	DIR1	DIR2	DIR3	DIR4	An	Bn
L	L	X	X	X	A1=B1	Input B1
L	H	X	X	X	Input A1	B1=A1
L	X	L	X	X	A2=B2	Input B2
L	X	H	X	X	Input A2	B2=A2
L	X	X	L	X	A3=B3	Input B3
L	X	X	H	X	Input A3	B3=A3
L	X	X	X	L	A4=B4	Input B4
L	X	X	X	H	Input A4	B4=A4
H	X	X	X	X	Z	Z
X	X	X	X	X	Z	Z

Note: H: HIGH voltage level, L: LOW voltage level, X = Valid H or L, Z = HIGH-Impedance OFF-State

■ LOGIC DIAGRAM





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

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage A	V_{CCA}		-0.5 ~ +4.6	V
Supply Voltage B	V_{CCB}		-0.5 ~ +4.6	V
Input Voltage	V_{IN}		-0.5 ~ +4.6	V
Output Voltage	V_{OUT}	Active mode	-0.5 ~ V_{CC} +0.5	V
		Suspend or 3-state mode	-0.5 ~ +4.6	V
Input Clamp Current	I_{IK}	V_{IN}<0	-50	mA
Output Clamp Current	I_{OK}	V_{OUT}<0V	-50	mA
Continuous V_{CC} or GND Current	I_{CC}		±100	mA
Continuous Output Current	I_{OUT}	V_{OUT}=0V to V_{CC}	±50	mA
Storage Temperature	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 and output voltage ratings may be exceeded if the input and output current ratings are observed.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	°C/W

■ RECOMMENDED OPERATING COMDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TPY	MAX	UNIT
Supply Voltage A	V_{CCA}		0.8		3.6	V
Supply Voltage B	V_{CCB}		0.8		3.6	V
Input Voltage	V_{IN}		0		3.6	V
Output Voltage	V_{OUT}	Active mode	0		V_{CC}	V
		Suspend or 3-state mode	0		3.6	V
Input-Pulse Rise and Fall Time	t_r / t_f	V_{CC} =0.8 V to 3.6 V			10	ns

■ 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_{CC}=0.8V	0.7× V_{CCI}			0.7× V_{CCI}			V
			V_{CC}=1.1 ~ 1.95V	0.65× V_{CCI}			0.65× V_{CCI}			V
			V_{CC}=2.3 ~ 2.7V	1.6			1.6			
			V_{CC}=3 ~ 3.6V	2			2			V
	DIR, $\overline{OE}$ input		V_{CC}=0.8V	0.7× V_{CCA}			0.7× V_{CCA}			V
			V_{CC}=1.1 ~ 1.95V	0.65× V_{CCA}			0.65× V_{CCA}			V
			V_{CC}=2.3 ~ 2.7V	1.6			1.6			
			V_{CC}=3 ~ 3.6V	2			2			V
Low-lever output voltage	Data inputs	V_{IL}	V_{CC}=0.8V			0.3× V_{CCI}			0.3× V_{CCI}	V
			V_{CC}=1.1 ~ 1.95V			0.35× V_{CCI}			0.35× V_{CCI}	V
			V_{CC}=2.3 ~ 2.7V			0.7			0.7	
			V_{CC}=3 ~ 3.6V			0.8			0.8	V
	DIR		V_{CC}=0.8V			0.3× V_{CCA}			0.3× V_{CCA}	V
			V_{CC}=1.1 ~ 1.95V			0.35× V_{CCA}			0.35× V_{CCA}	V
			V_{CC}=2.3 ~ 2.7V			0.7			0.7	
			V_{CC}=3 ~ 3.6V			0.8			0.8	V
High-Level Output Voltage		V_{OH}	V_{CCA}= V_{CCB}= 0.8~ 3.6V, V_{IN}=V_{IH} or V_{IL}, I_{OH}=-100μA	V_{CC}-0.1			V_{CC}-0.1			V
			V_{CCA}= V_{CCB}= 1.1V, V_{IN}=V_{IH} or V_{IL}, I_{OH}=-3mA	0.85			0.55			V
			V_{CCA}= V_{CCB}= 1.4V, V_{IN}=V_{IH} or V_{IL}, I_{OH}=-6mA	1.05			0.75			V
			V_{CCA}= V_{CCB}= 1.65V, V_{IN}=V_{IH} or V_{IL}, I_{OH}=-8mA	1.2			0.9			V
			V_{CCA}= V_{CCB}= 2.3V, V_{IN}=V_{IH} or V_{IL}, I_{OH}=-9mA	1.75			1.45			V
			V_{CCA}= V_{CCB}= 2.3V, V_{IN}=V_{IH} or V_{IL}, I_{OH}=-12mA	2.3			2.0			V
Low-Level Output Voltage		V_{OL}	V_{CCA}= V_{CCB}= 0.8~ 3.6V, V_{IN}=V_{IH} or V_{IL}, I_{OL}=100μA			0.1			0.1	V
			V_{CCA}= V_{CCB}= 1.1V, V_{IN}=V_{IH} or V_{IL}, I_{OL}=3mA			0.25			0.5	V
			V_{CCA}= V_{CCB}= 1.4V, V_{IN}=V_{IH} or V_{IL}, I_{OL}=6mA			0.35			0.6	V
			V_{CCA}= V_{CCB}= 1.65V, V_{IN}=V_{IH} or V_{IL}, I_{OL}=8mA			0.45			0.7	V
			V_{CCA}= V_{CCB}= 2.3V, V_{IN}=V_{IH} or V_{IL}, I_{OL}=9mA			0.55			0.8	V
			V_{CCA}= V_{CCB}= 2.3V, V_{IN}=V_{IH} or V_{IL}, I_{OL}=12mA			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	DIR, $\overline{OE}$ input	$I_{I(LEAK)}$	V_{CCA}=V_{CCB}=0.8~3.6V V_{IN}=V_{CCA} or 3.6V			±1			±5	μA
Power OFF Leakage Current	A port	I_{OFF}	V_{CCA}=0V, V_{CCB}=0.8~3.6V V_{IN} or V_{OUT}=0~3.6V			±5			±30	μA
	B port		V_{CCB}=0V, V_{CCA}=0.8~3.6V V_{IN} or V_{OUT}=0~3.6V			±5			±30	μA
Output OFF-state current	A or B port (Note 3)	I_{OZ}	V_{CCA}=V_{CCB}=3.6V V_{OUT}=0V or V_{CCO}			±5			±30	μA
	Suspend Mode A Port (Note 3)		V_{CCA}=3.6V, V_{CCB}=0V V_{OUT}=0V or V_{CCO}			±5			±30	μA
	Suspend Mode B Port (Note 3)		V_{CCA}=0V, V_{CCB}=3.6V V_{OUT}=0V or V_{CCO}			±5			±30	μA
Quiescent Supply Current	A port	I_{CCA}	V_{CCA}=V_{CCB}=0.8~3.6V V_{OUT}=0V or V_{CCI}, I_O=0A			10			55	μA
			V_{CCA}=V_{CCB}=1.1~3.6V V_{OUT}=0V or V_{CCI}, I_O=0A			8			50	μA
			V_{CCA}=3.6V, V_{CCB}=0V V_{OUT}=0V or V_{CCI}, I_O=0A			8			50	μA
			V_{CCA}=0V, V_{CCB}=3.6V V_{OUT}=0V or V_{CCI}, I_O=0A	-2			-12			μA
Quiescent Supply Current	B port	I_{CCB}	V_{CCA}=V_{CCB}=0.8~3.6V V_{OUT}=0V or V_{CCI}, I_O=0A			10			55	μA
			V_{CCA}=V_{CCB}=1.1~3.6V V_{OUT}=0V or V_{CCI}, I_O=0A			8			50	μA
			V_{CCA}=3.6V, V_{CCB}=0V V_{OUT}=0V or V_{CCI}, I_O=0A	-2			-12			μA
			V_{CCA}=0V, V_{CCB}=3.6V V_{OUT}=0V or V_{CCI}, I_O=0A			8			50	μA
Quiescent Supply Current & Quiescent Supply Current		I_{CCA}+I_{CCB}	V_{CCA}=V_{CCB}=0.8~3.6V V_{OUT}=0V or V_{CCI}, I_O=0A			16			65	μA
			V_{CCA}=V_{CCB}=1.1~3.6V V_{OUT}=0V or V_{CCI}, I_O=0A			500			650	μA
Additional Quiescent Supply Current Per Input Pin		ΔI_{CC}	V_{CCA}= V_{CCB} =3.6V, V_{IN}=3V			500			650	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 IOZ includes the input leakage current.

■ SWITCHING CHARACTERISTICS

(Over recommended operating free-air temperature range, V_{CCA}=0.8V, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A) to output (B)	t_{PLH} t_{PHL}	V_{CCB}=0.8V		14.5			16.5		ns
		V_{CCB}=1.2V		7.3			9.3		ns
		V_{CCB}=1.5V±0.1V		6.5			8.5		ns
		V_{CCB}=1.8V±0.15V		6.2			8.2		ns
		V_{CCB}=2.5V±0.2V		5.9			6.9		ns
		V_{CCB}=3.3V±0.3V		6.0			8.0		ns
Propagation delay from input (B) to output (A)	t_{PLH} t_{PHL}	V_{CCB}=0.8V		14.5			16.5		ns
		V_{CCB}=1.2V		12.7			14.7		ns
		V_{CCB}=1.5V±0.1V		12.4			14.4		ns
		V_{CCB}=1.8V±0.15V		12.3			14.3		ns
		V_{CCB}=2.5V±0.2V		12.1			14.1		ns
		V_{CCB}=3.3V±0.3V		12.0			14.0		ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=0.8V		14.3			16.3		ns
		V_{CCB}=1.2V		14.3			16.3		ns
		V_{CCB}=1.5V±0.1V		14.3			16.3		ns
		V_{CCB}=1.8V±0.15V		14.3			16.3		ns
		V_{CCB}=2.5V±0.2V		14.3			16.3		ns
		V_{CCB}=3.3V±0.3V		14.3			16.3		ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=0.8V		17.0			19		ns
		V_{CCB}=1.2V		9.9			11.9		ns
		V_{CCB}=1.5V±0.1V		9.0			11.0		ns
		V_{CCB}=1.8V±0.15V		9.4			11.4		ns
		V_{CCB}=2.5V±0.2V		9.0			11.0		ns
		V_{CCB}=3.3V±0.3V		9.7			11.7		ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PZH} t_{PZL}	V_{CCB}=0.8V		18.2			20.2		ns
		V_{CCB}=1.2V		18.2			20.2		ns
		V_{CCB}=1.5V±0.1V		18.2			20.2		ns
		V_{CCB}=1.8V±0.15V		18.2			20.2		ns
		V_{CCB}=2.5V±0.2V		18.2			20.2		ns
		V_{CCB}=3.3V±0.3V		18.2			20.2		ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PZH} t_{PZL}	V_{CCB}=0.8V		19.2			21.2		ns
		V_{CCB}=1.2V		10.7			12.7		ns
		V_{CCB}=1.5V±0.1V		9.8			11.8		ns
		V_{CCB}=1.8V±0.15V		9.6			11.6		ns
		V_{CCB}=2.5V±0.2V		9.7			11.7		ns
		V_{CCB}=3.3V±0.3V		10.2			12.2		ns

■ SWITCHING CHARACTERISTICS

(Over recommended operating free-air temperature range, V_{CCB}=0.8V, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A) to output (B)	t_{PLH} t_{PHL}	V_{CCB}=0.8V		14.5			16.5		ns
		V_{CCB}=1.2V		12.7			14.7		ns
		V_{CCB}=1.5V±0.1V		12.4			14.4		ns
		V_{CCB}=1.8V±0.15V		12.3			14.3		ns
		V_{CCB}=2.5V±0.2V		12.1			14.1		ns
		V_{CCB}=3.3V±0.3V		12.0			14.0		ns
Propagation delay from input (B) to output (A)	t_{PLH} t_{PHL}	V_{CCB}=0.8V		14.5			16.5		ns
		V_{CCB}=1.2V		7.3			9.3		ns
		V_{CCB}=1.5V±0.1V		6.5			8.5		ns
		V_{CCB}=1.8V±0.15V		6.2			8.2		ns
		V_{CCB}=2.5V±0.2V		5.9			7.9		ns
		V_{CCB}=3.3V±0.3V		6.0			8.0		ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=0.8V		14.3			16.3		ns
		V_{CCB}=1.2V		5.5			7.5		ns
		V_{CCB}=1.5V±0.1V		4.1			6.1		ns
		V_{CCB}=1.8V±0.15V		4.0			6.0		ns
		V_{CCB}=2.5V±0.2V		3.0			5.0		ns
		V_{CCB}=3.3V±0.3V		3.5			5.5		ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=0.8V		17.0			19.0		ns
		V_{CCB}=1.2V		13.8			15.8		ns
		V_{CCB}=1.5V±0.1V		13.4			15.4		ns
		V_{CCB}=1.8V±0.15V		13.1			15.1		ns
		V_{CCB}=2.5V±0.2V		12.9			14.9		ns
		V_{CCB}=3.3V±0.3V		12.7			14.7		ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PZH} t_{PZL}	V_{CCB}=0.8V		18.2			20.2		ns
		V_{CCB}=1.2V		5.6			7.6		ns
		V_{CCB}=1.5V±0.1V		4.0			6.0		ns
		V_{CCB}=1.8V±0.15V		3.2			5.2		ns
		V_{CCB}=2.5V±0.2V		2.4			4.4		ns
		V_{CCB}=3.3V±0.3V		2.2			4.2		ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PZH} t_{PZL}	V_{CCB}=0.8V		19.2			21.2		ns
		V_{CCB}=1.2V		14.6			16.6		ns
		V_{CCB}=1.5V±0.1V		14.1			16.1		ns
		V_{CCB}=1.8V±0.15V		13.9			15.9		ns
		V_{CCB}=2.5V±0.2V		13.7			15.7		ns
		V_{CCB}=3.3V±0.3V		13.6			15.6		ns

■ SWITCHING CHARACTERISTICS

(Over recommended operating free-air temperature range, V_{CCA}=1.2V±0.1V, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A) to output (B)	t_{PLH} t_{PHL}	V_{CCB}=1.2V±0.1V	1.0		12.1	1.0		14.1	ns
		V_{CCB}=1.5V±0.1V	1.0		9.0	1.0		11.0	ns
		V_{CCB}=1.8V±0.15V	1.0		8.0	1.0		10.0	ns
		V_{CCB}=2.5V±0.2V	1.0		6.8	1.0		8.8	ns
		V_{CCB}=3.3V±0.3V	1.0		6.6	1.0		8.6	ns
Propagation delay from input (B) to output (A)	t_{PLH} t_{PHL}	V_{CCB}=1.2V	1.0		12.1	1.0		14.1	ns
		V_{CCB}=1.5V±0.1V	1.0		11.4	1.0		13.4	ns
		V_{CCB}=1.8V±0.15V	1.0		11.2	1.0		13.2	ns
		V_{CCB}=2.5V±0.2V	1.0		10.9	1.0		12.9	ns
		V_{CCB}=3.3V±0.3V	1.0		10.7	1.0		12.7	ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V	1.0		11.5	1.0		13.5	ns
		V_{CCB}=1.5V±0.1V	1.0		11.5	1.0		13.5	ns
		V_{CCB}=1.8V±0.15V	1.0		11.5	1.0		13.5	ns
		V_{CCB}=2.5V±0.2V	1.0		11.5	1.0		13.5	ns
		V_{CCB}=3.3V±0.3V	1.0		11.5	1.0		13.5	ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V	1.0		12.8	1.0		14.8	ns
		V_{CCB}=1.5V±0.1V	1.0		9.9	1.0		11.9	ns
		V_{CCB}=1.8V±0.15V	1.0		9.2	1.0		11.2	ns
		V_{CCB}=2.5V±0.2V	1.0		8.1	1.0		10.1	ns
		V_{CCB}=3.3V±0.3V	1.0		9.2	1.0		11.2	ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PZH} t_{PZL}	V_{CCB}=1.2V	1.0		15.6	1.0		17.6	ns
		V_{CCB}=1.5V±0.1V	1.0		15.6	1.0		17.6	ns
		V_{CCB}=1.8V±0.15V	1.0		15.6	1.0		17.6	ns
		V_{CCB}=2.5V±0.2V	1.0		15.6	1.0		17.6	ns
		V_{CCB}=3.3V±0.3V	1.0		15.6	1.0		17.6	ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PZH} t_{PZL}	V_{CCB}=1.2V	1.0		17.3	1.0		19.3	ns
		V_{CCB}=1.5V±0.1V	1.0		12.7	1.0		14.7	ns
		V_{CCB}=1.8V±0.15V	1.0		10.9	1.0		12.9	ns
		V_{CCB}=2.5V±0.2V	1.0		9.0	1.0		11.0	ns
		V_{CCB}=3.3V±0.3V	1.0		8.6	1.0		10.6	ns

■ SWITCHING CHARACTERISTICS (Cont.)

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

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A) to output (B)	t_{PLH} t_{PHL}	V_{CCB}=1.2V±0.1V	1.0		11.4	1.0		13.4	ns
		V_{CCB}=1.5V±0.1V	1.0		8.2	1.0		10.2	ns
		V_{CCB}=1.8V±0.15V	1.0		6.9	1.0		8.9	ns
		V_{CCB}=2.5V±0.2V	1.0		5.6	1.0		7.6	ns
		V_{CCB}=3.3V±0.3V	1.0		5.0	1.0		7.0	ns
Propagation delay from input (B) to output (A)	t_{PLH} t_{PHL}	V_{CCB}=1.2V	1.0		9.0	1.0		11.0	ns
		V_{CCB}=1.5V±0.1V	1.0		8.2	1.0		10.2	ns
		V_{CCB}=1.8V±0.15V	1.0		8.0	1.0		10.0	ns
		V_{CCB}=2.5V±0.2V	1.0		7.6	1.0		9.6	ns
		V_{CCB}=3.3V±0.3V	1.0		7.5	1.0		9.5	ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V	1.0		6.9	1.0		8.9	ns
		V_{CCB}=1.5V±0.1V	1.0		6.9	1.0		8.9	ns
		V_{CCB}=1.8V±0.15V	1.0		6.9	1.0		8.9	ns
		V_{CCB}=2.5V±0.2V	1.0		6.9	1.0		8.9	ns
		V_{CCB}=3.3V±0.3V	1.0		6.9	1.0		8.9	ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V	1.0		11.8	1.0		13.8	ns
		V_{CCB}=1.5V±0.1V	1.0		8.7	1.0		10.7	ns
		V_{CCB}=1.8V±0.15V	1.0		8.3	1.0		10.3	ns
		V_{CCB}=2.5V±0.2V	1.0		7.2	1.0		9.2	ns
		V_{CCB}=3.3V±0.3V	1.0		7.1	1.0		9.1	ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PZH} t_{PZL}	V_{CCB}=1.2V	1.0		8.7	1.0		10.7	ns
		V_{CCB}=1.5V±0.1V	1.0		8.7	1.0		10.7	ns
		V_{CCB}=1.8V±0.15V	1.0		8.7	1.0		10.7	ns
		V_{CCB}=2.5V±0.2V	1.0		8.7	1.0		10.7	ns
		V_{CCB}=3.3V±0.3V	1.0		8.7	1.0		10.7	ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PZH} t_{PZL}	V_{CCB}=1.2V	1.0		16.6	1.0		18.6	ns
		V_{CCB}=1.5V±0.1V	1.0		9.1	1.0		11.1	ns
		V_{CCB}=1.8V±0.15V	1.0		8.9	1.0		10.9	ns
		V_{CCB}=2.5V±0.2V	1.0		7.4	1.0		9.4	ns
		V_{CCB}=3.3V±0.3V	1.0		6.5	1.0		8.5	ns

■ SWITCHING CHARACTERISTICS (Cont.)

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

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A) to output (B)	t_{PLH} t_{PHL}	V_{CCB}=1.2V±0.1V	1.0		11.2	1.0		13.2	ns
		V_{CCB}=1.5V±0.1V	1.0		8.0	1.0		10.0	ns
		V_{CCB}=1.8V±0.15V	1.0		6.6	1.0		8.6	ns
		V_{CCB}=2.5V±0.2V	1.0		5.2	1.0		7.2	ns
		V_{CCB}=3.3V±0.3V	1.0		4.6	1.0		6.6	ns
Propagation delay from input (B) to output (A)	t_{PLH} t_{PHL}	V_{CCB}=1.2V	1.0		8.0	1.0		10.0	ns
		V_{CCB}=1.5V±0.1V	1.0		6.9	1.0		8.9	ns
		V_{CCB}=1.8V±0.15V	1.0		6.6	1.0		8.6	ns
		V_{CCB}=2.5V±0.2V	1.0		6.4	1.0		8.4	ns
		V_{CCB}=3.3V±0.3V	1.0		6.1	1.0		8.1	ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V	1.0		6.6	1.0		8.6	ns
		V_{CCB}=1.5V±0.1V	1.0		6.6	1.0		8.6	ns
		V_{CCB}=1.8V±0.15V	1.0		6.6	1.0		8.6	ns
		V_{CCB}=2.5V±0.2V	1.0		6.6	1.0		8.6	ns
		V_{CCB}=3.3V±0.3V	1.0		6.6	1.0		8.6	ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V	1.0		11.4	1.0		13.4	ns
		V_{CCB}=1.5V±0.1V	1.0		8.1	1.0		10.1	ns
		V_{CCB}=1.8V±0.15V	1.0		8.0	1.0		10.0	ns
		V_{CCB}=2.5V±0.2V	1.0		6.7	1.0		8.7	ns
		V_{CCB}=3.3V±0.3V	1.0		6.8	1.0		8.8	ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PZH} t_{PZL}	V_{CCB}=1.2V	1.0		7.8	1.0		9.8	ns
		V_{CCB}=1.5V±0.1V	1.0		7.8	1.0		9.8	ns
		V_{CCB}=1.8V±0.15V	1.0		7.8	1.0		9.8	ns
		V_{CCB}=2.5V±0.2V	1.0		7.8	1.0		9.8	ns
		V_{CCB}=3.3V±0.3V	1.0		7.8	1.0		9.8	ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PZH} t_{PZL}	V_{CCB}=1.2V	1.0		16.0	1.0		18.0	ns
		V_{CCB}=1.5V±0.1V	1.0		8.3	1.0		10.3	ns
		V_{CCB}=1.8V±0.15V	1.0		8.0	1.0		10.0	ns
		V_{CCB}=2.5V±0.2V	1.0		6.3	1.0		8.3	ns
		V_{CCB}=3.3V±0.3V	1.0		5.8	1.0		7.8	ns

■ SWITCHING CHARACTERISTICS (Cont.)

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

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A) to output (B)	t_{PLH} t_{PHL}	V_{CCB}=1.2V±0.1V	1.0		10.9	1.0		12.9	ns
		V_{CCB}=1.5V±0.1V	1.0		7.6	1.0		9.6	ns
		V_{CCB}=1.8V±0.15V	1.0		6.4	1.0		8.4	ns
		V_{CCB}=2.5V±0.2V	1.0		4.9	1.0		6.9	ns
		V_{CCB}=3.3V±0.3V	1.0		4.3	1.0		6.3	ns
Propagation delay from input (B) to output (A)	t_{PLH} t_{PHL}	V_{CCB}=1.2V	1.0		6.8	1.0		8.8	ns
		V_{CCB}=1.5V±0.1V	1.0		5.6	1.0		7.6	ns
		V_{CCB}=1.8V±0.15V	1.0		5.2	1.0		7.2	ns
		V_{CCB}=2.5V±0.2V	1.0		4.9	1.0		6.9	ns
		V_{CCB}=3.3V±0.3V	1.0		4.5	1.0		6.5	ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V	1.0		4.6	1.0		6.6	ns
		V_{CCB}=1.5V±0.1V	1.0		4.6	1.0		6.6	ns
		V_{CCB}=1.8V±0.15V	1.0		4.6	1.0		6.6	ns
		V_{CCB}=2.5V±0.2V	1.0		4.6	1.0		6.6	ns
		V_{CCB}=3.3V±0.3V	1.0		4.6	1.0		6.6	ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V	1.0		10.7	1.0		12.7	ns
		V_{CCB}=1.5V±0.1V	1.0		7.8	1.0		9.8	ns
		V_{CCB}=1.8V±0.15V	1.0		7.3	1.0		9.3	ns
		V_{CCB}=2.5V±0.2V	1.0		5.8	1.0		7.8	ns
		V_{CCB}=3.3V±0.3V	1.0		6.6	1.0		8.6	ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PZH} t_{PZL}	V_{CCB}=1.2V	1.0		5.2	1.0		7.2	ns
		V_{CCB}=1.5V±0.1V	1.0		5.2	1.0		7.2	ns
		V_{CCB}=1.8V±0.15V	1.0		5.2	1.0		7.2	ns
		V_{CCB}=2.5V±0.2V	1.0		5.2	1.0		7.2	ns
		V_{CCB}=3.3V±0.3V	1.0		5.2	1.0		7.2	ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PZH} t_{PZL}	V_{CCB}=1.2V	1.0		15.7	1.0		17.7	ns
		V_{CCB}=1.5V±0.1V	1.0		7.9	1.0		9.9	ns
		V_{CCB}=1.8V±0.15V	1.0		6.9	1.0		8.9	ns
		V_{CCB}=2.5V±0.2V	1.0		5.3	1.0		7.3	ns
		V_{CCB}=3.3V±0.3V	1.0		4.9	1.0		6.9	ns

■ SWITCHING CHARACTERISTICS (Cont.)

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

PARAMETER	SYMBOL	TEST CONDITIONS	T_A=25°C			T_A=-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A) to output (B)	t_{PLH} t_{PHL}	V_{CCB}=1.2V±0.1V	1.0		10.7	1.0		12.7	ns
		V_{CCB}=1.5V±0.1V	1.0		7.5	1.0		9.5	ns
		V_{CCB}=1.8V±0.15V	1.0		6.1	1.0		8.1	ns
		V_{CCB}=2.5V±0.2V	1.0		4.5	1.0		6.5	ns
		V_{CCB}=3.3V±0.3V	1.0		4.1	1.0		6.1	ns
Propagation delay from input (B) to output (A)	t_{PLH} t_{PHL}	V_{CCB}=1.2V	1.0		6.6	1.0		8.6	ns
		V_{CCB}=1.5V±0.1V	1.0		5.0	1.0		7.0	ns
		V_{CCB}=1.8V±0.15V	1.0		4.6	1.0		6.6	ns
		V_{CCB}=2.5V±0.2V	1.0		4.3	1.0		6.3	ns
		V_{CCB}=3.3V±0.3V	1.0		4.1	1.0		6.1	ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V	1.0		5.2	1.0		7.2	ns
		V_{CCB}=1.5V±0.1V	1.0		5.2	1.0		7.2	ns
		V_{CCB}=1.8V±0.15V	1.0		5.2	1.0		7.2	ns
		V_{CCB}=2.5V±0.2V	1.0		5.2	1.0		7.2	ns
		V_{CCB}=3.3V±0.3V	1.0		5.2	1.0		7.2	ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PHZ} t_{PLZ}	V_{CCB}=1.2V	1.0		10.4	1.0		12.4	ns
		V_{CCB}=1.5V±0.1V	1.0		7.4	1.0		9.4	ns
		V_{CCB}=1.8V±0.15V	1.0		7.1	1.0		9.1	ns
		V_{CCB}=2.5V±0.2V	1.0		5.6	1.0		7.6	ns
		V_{CCB}=3.3V±0.3V	1.0		6.5	1.0		8.5	ns
Propagation delay from input ($\overline{OE}$) to output (A)	t_{PZH} t_{PZL}	V_{CCB}=1.2V	1.0		4.6	1.0		6.6	ns
		V_{CCB}=1.5V±0.1V	1.0		4.6	1.0		6.6	ns
		V_{CCB}=1.8V±0.15V	1.0		4.6	1.0		6.6	ns
		V_{CCB}=2.5V±0.2V	1.0		4.6	1.0		6.6	ns
		V_{CCB}=3.3V±0.3V	1.0		4.6	1.0		6.6	ns
Propagation delay from input ($\overline{OE}$) to output (B)	t_{PZH} t_{PZL}	V_{CCB}=1.2V	1.0		15.5	1.0		17.5	ns
		V_{CCB}=1.5V±0.1V	1.0		7.8	1.0		9.8	ns
		V_{CCB}=1.8V±0.15V	1.0		6.8	1.0		8.8	ns
		V_{CCB}=2.5V±0.2V	1.0		5.1	1.0		7.1	ns
		V_{CCB}=3.3V±0.3V	1.0		4.6	1.0		6.6	ns

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

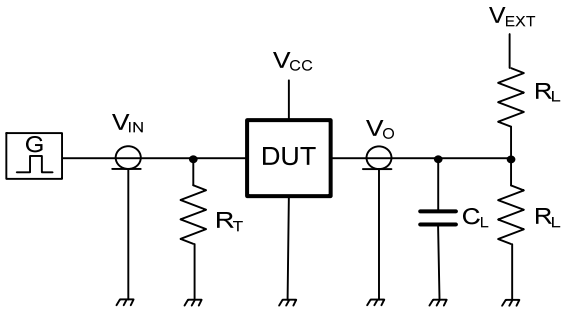
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance (A to B)	Outputs enabled	C_{PDA}	V_{CCA}=V_{CCB}=0.8V		0.2		pF
			V_{CCA}=V_{CCB}=1.2V		0.2		pF
			V_{CCA}=V_{CCB}=1.5V		0.2		pF
			V_{CCA}=V_{CCB}=1.8V		0.2		pF
			V_{CCA}=V_{CCB}=2.5V		0.3		pF
			V_{CCA}=V_{CCB}=3.3V		0.4		pF
	Outputs disabled		V_{CCA}=V_{CCB}=0.8V		0.2		pF
			V_{CCA}=V_{CCB}=1.2V		0.2		pF
			V_{CCA}=V_{CCB}=1.5V		0.2		pF
			V_{CCA}=V_{CCB}=1.8V		0.2		pF
			V_{CCA}=V_{CCB}=2.5V		0.3		pF
			V_{CCA}=V_{CCB}=3.3V		0.4		pF
Power Dissipation Capacitance (B to A)	Outputs enabled		V_{CCA}=V_{CCB}=0.8V		9.5		pF
			V_{CCA}=V_{CCB}=1.2V		9.7		pF
			V_{CCA}=V_{CCB}=1.5V		9.8		pF
			V_{CCA}=V_{CCB}=1.8V		9.9		pF
			V_{CCA}=V_{CCB}=2.5V		10.7		pF
			V_{CCA}=V_{CCB}=3.3V		11.9		pF
	Outputs disabled		V_{CCA}=V_{CCB}=0.8V		0.6		pF
			V_{CCA}=V_{CCB}=1.2V		0.6		pF
			V_{CCA}=V_{CCB}=1.5V		0.6		pF
			V_{CCA}=V_{CCB}=1.8V		0.6		pF
			V_{CCA}=V_{CCB}=2.5V		0.7		pF
			V_{CCA}=V_{CCB}=3.3V		0.7		pF
Power Dissipation Capacitance (A to B)	Outputs enabled	C_{PDB}	V_{CCA}=V_{CCB}=0.8V		9.5		pF
			V_{CCA}=V_{CCB}=1.2V		9.7		pF
			V_{CCA}=V_{CCB}=1.5V		9.8		pF
			V_{CCA}=V_{CCB}=1.8V		9.9		pF
			V_{CCA}=V_{CCB}=2.5V		10.7		pF
			V_{CCA}=V_{CCB}=3.3V		11.9		pF
	Outputs disabled		V_{CCA}=V_{CCB}=0.8V		0.6		pF
			V_{CCA}=V_{CCB}=1.2V		0.6		pF
			V_{CCA}=V_{CCB}=1.5V		0.6		pF
			V_{CCA}=V_{CCB}=1.8V		0.6		pF
			V_{CCA}=V_{CCB}=2.5V		0.7		pF
			V_{CCA}=V_{CCB}=3.3V		0.7		pF
Power Dissipation Capacitance (B to A)	Outputs enabled		V_{CCA}=V_{CCB}=0.8V		0.2		pF
			V_{CCA}=V_{CCB}=1.2V		0.2		pF
			V_{CCA}=V_{CCB}=1.5V		0.2		pF
			V_{CCA}=V_{CCB}=1.8V		0.2		pF
			V_{CCA}=V_{CCB}=2.5V		0.3		pF
			V_{CCA}=V_{CCB}=3.3V		0.4		pF
	Outputs disabled		V_{CCA}=V_{CCB}=0.8V		0.2		pF
			V_{CCA}=V_{CCB}=1.2V		0.2		pF
			V_{CCA}=V_{CCB}=1.5V		0.2		pF
			V_{CCA}=V_{CCB}=1.8V		0.2		pF
			V_{CCA}=V_{CCB}=2.5V		0.3		pF
			V_{CCA}=V_{CCB}=3.3V		0.4		pF

Note: Power dissipation capacitance per transceiver.

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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	DIR, $\overline{OE}$ input	C_{IN}	V_{CCA}=V_{CCB}=3.3V, V_{IN}=0V or 3.3V		2.0		pF
Output Capacitance	A or B port	C_{IO}	V_{CCA}=V_{CCB}=3.3V, V_{OUT}=3.3V or 0V		4.0		pF

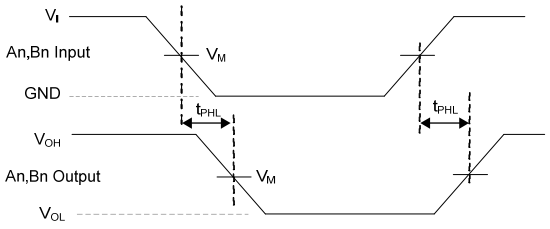
■ TEST CIRCUIT AND WAVEFORMS



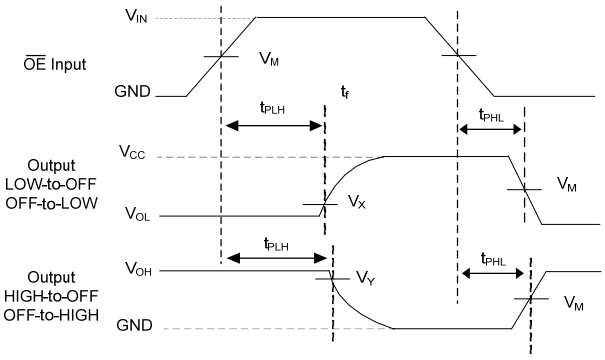
TEST	S1
t_{PLH}/t_{PHL}	GND

TEST CIRCUIT

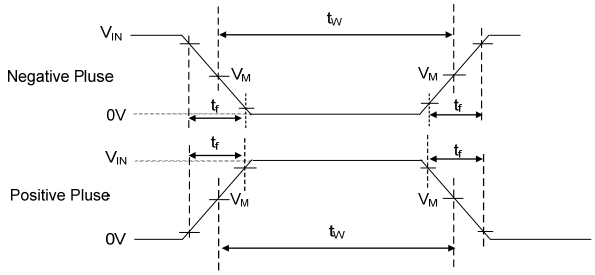
Inputs		V_M	V_{LOAD}	C_L	R_L
V_{IN}	t_r, t_f				
V_{CC}	20 ns	$V_{CC}/2$	V_{CC}	50 pF	200 KΩ



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES



MEASURING SWITCHING TIMES

Notes: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR ≤1MHz, Z_O = 50Ω.