UTXB0108 Advance CMOS IC

8-BIT BIDIRECTIONAL LEVEL-SHIFTING AND VOLTAGE TRANSLATOR WITH AUTO-DIRECTION SENSING

DESCRIPTION

This 8-bit noninverting translator uses two separate configurable power-supply rails. The A port is designed to track $V_{\rm CCA}.~V_{\rm CCA}$ accepts any supply voltage from 1.2V to 3.6V. The B port is designed to track $V_{\rm CCB}.~V_{\rm CCB}$ accepts any supply voltage from 1.65V to 5.5V. This allows for universal low-Voltage bidirectional translation between any of the 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, and 5V voltage nodes. $V_{\rm CCA}$ should not exceed $V_{\rm CCB}.$

When the output-enable (OE) input is low, all outputs are placed in the high-impedance state.

The UTXB0108 is designed so that the OE input circuit is supplied by $V_{\text{CCA}}.$

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.

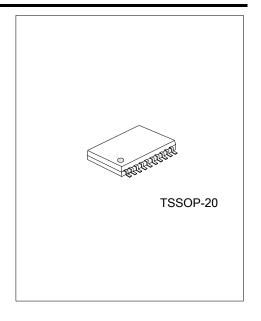
To ensure the high-impedance state during power-up or power-down, OE should be tied to GND through a pull-down resistor; the minimum value of the resistor is determined by the current-sourcing capability of the driver.

■ FEATURES

- * 1.2V to 3.6V on A port and 1.65V to 5.5V on B Port ($V_{CCA} \le V_{CCB}$)
- * V_{CC} Isolation Feature If Either V_{CC} Input Is at GND, All Outputs Are in the High-Impedance State
- * OE Input Circuit Referenced to V_{CCA}
- * Low Power Consumption, 4µA Max. I_{CC}
- * I_{OFF} Supports Partial-Power-Down Mode Operation

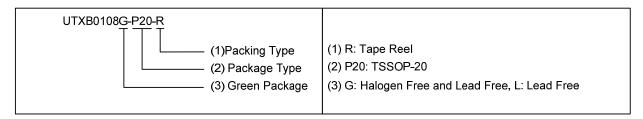
APPLICATION

- * Handset
- * Smartphone
- * Tablet
- * Desktop PC

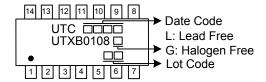


■ ORDERING INFORMATION

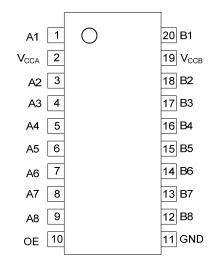
Ordering	Number	Dookses	Dealine
Lead Free	Halogen Free	Package	Packing
UTXB0108L-P20-R	UTXB0108G-P20-R	TSSOP-20	Tape Reel



■ MARKING



■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	I/O	DESCRIPTION
1	A1	I/O	Input/output A1. Referenced to V _{CCA}
2	V _{CCA}		A-Port supply voltage.1.2V ≤ V _{CCA} ≤ 3.6V and V _{CCA} ≤ V _{CCB}
3	A2	I/O	Input/output A2. Referenced to V _{CCA}
4	A3	I/O	Input/output A3. Referenced to V _{CCA}
5	A4	I/O	Input/output A4. Referenced to V _{CCA}
6	A5	I/O	Input/output A5. Referenced to V _{CCA}
7	A6	I/O	Input/output A6. Referenced to V _{CCA}
8	A7	I/O	Input/output A7. Referenced to V _{CCA}
9	A8	I/O	Input/output A8. Referenced to V _{CCA}
10	10 OE I		Output enable. Pull OE low to place all outputs in 3-state mode.
10	OL	'	Referenced to V _{CCA} .
11	GND		Ground
12	B8	I/O	Input/output B8. Referenced to V _{CCB}
13	B7	I/O	Input/output B7. Referenced to V _{CCB}
14	B6	I/O	Input/output B6. Referenced to V _{CCB}
15	B5	I/O	Input/output B5. Referenced to V _{CCB}
16	B4	I/O	Input/output B4. Referenced to V _{CCB}
17	В3	I/O	Input/output B3. Referenced to V _{CCB}
18	B2	I/O	Input/output B2. Referenced to V _{CCB}
19	V_{CCB}		B-Port supply voltage.1.65V ≤ V _{CCB} ≤ 5.5V
20	B1	I/O	Input/output B1. Referenced to V _{CCB}

Note: I=Input, I/O=Input and Output

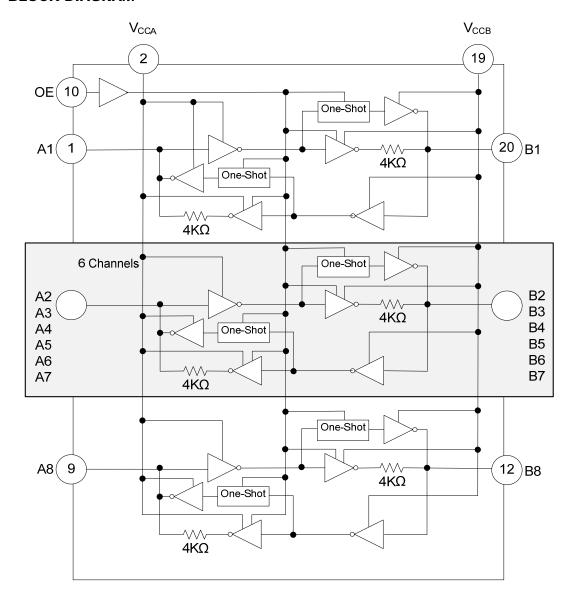
■ FUNCTION TABLE

SUPPLY VOLTAGE		INPUTS	INPUTS/	OUTPUT
V_{CCA}	V_{CCB}	OE	An	Bn
1.2V ~ V _{CCB}	1.65V ~ 5.5V	L	Z	Z
1.2V ~ V _{CCB}	1.65V ~ 5.5V	Н	Input or Output	Output or Input
GND (Note 2)	GND (Note 2)	X	Z	Z

Notes: 1. H = High voltage level; L = Low voltage level; Z : High impedance OFF-state; X = Don't care.

2. When either V_{CCA} or V_{CCB} is at GND level, the device goes into Power-down mode.

■ BLOCK DIAGRAM



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

PARAMETER		SYMBOL	RATINGS	UNIT
Supply voltage		V_{CCA}	-0.5 ~ 4.6	V
Supply voltage		V_{CCB}	-0.5 ~ 6.5	V
lanut valta sa	A Port		-0.5 ~ 4.6	V
Input voltage	B port	V _{IN}	-0.5 ~ 6.5	V
Voltage range applied to any output A port		V	-0.5 ~ 4.6	V
in the high-impedance or power-off state	B Port	V _{OUT}	-0.5 ~ 6.5	V
Voltage range applied to any output	A Port	\/	-0.5 ~ V _{CCA} +0.5	V
in the high or low state	B Port	V _{OUT}	-0.5 ~ V _{CCB} +0.5	V
Input clamp current	V _{IN} <0	I _{IK}	-50	mA
Output clamp current	V _{OUT} <0	l _{OK}	-50	mA
Continuous output current		I _{OUT}	±50	mA
Continuous current through V _{CCA} , V ₀	_{CCB} , or GND	I _{CC} / I _{GND}	±100	mA
Storage Temperature	·	T _{STG}	-65 ~ + 150	°C

Note: 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.

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

PARAMETER	२	SYMBOL	TEST C	ONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage		V_{CCA}			1.2		3.6	V
Supply Voltage		V_{CCB}			1.65		5.5	V
Input Voltage		V_{IN}			0		V_{CCI}	V
Output Voltage	A Port Inputs	V	V _{CCA} =1.2V~3.6V,		0		3.6	٧
Output Voltage	B Port Inputs	V _{OUT}	V _{CCB} =1.65V~5	5.5V	0		5.5	٧
High-Level Input Voltage	Data Inputs	V _{IH}	V _{CCA} =1.2V~3.6V, V _{CCB} =1.65V~5.5V		V _{CCI} ×0.65 (Note 3)		V _{CCI}	٧
rligh-Level input voltage	OE				V _{CCA} ×0.65		5.5	V
Low-Level Input Voltage	Data Inputs	V _{IL}	V _{CCA} =1.2V~3.6		0		V _{CCI} ×0.35 (Note 3)	٧
	OE		V _{CCB} =1.65V~5.5V		0		V _{CCA} ×0.35	V
Input Transition Rise or	A Port Inputs	Λ+/Λ	\/ =1 2\/ ₂ 2 6\/	V _{CCB} =1.65V~5.5V			40	ns/V
	B Port	Δt/Δν	V _{CCA} =1.2V~3.6V	V _{CCB} =1.65V~3.6V			40	ns/V
	Inputs			V _{CCB} =4.5V~5.5V			30	ns/V
Operating Temperature		T _A			-40		+85	°C

Notes: 1. The A and B sides of an unused data I/O pair must be held in the same state, i.e., both at V_{CCI} or both at GND.

- 2. V_{CCA} must be less than or equal to V_{CCB} and must not exceed 3.6V.
- 3. V_{CCI} is the supply voltage associated with the input port.

■ **ELECTRICAL CHARACTERISTICS** (T_A=-25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CC	ONDITIONS	MIN	TYP	MAX	UNIT
			V _{CCA} =1.2V, I _{OH} =	:-20µA		1.1		V
Port A Output High Voltage	•	V_{OHA}	V _{CCA} =1.4~3.6V,		V _{CCA} -0.4			V
Dort A Outrout Law Valtage			V _{CCA} =1.2V, I _{OL} =20μA			0.3		V
Port A Output Low Voltage		V_{OLA}	V _{CCA} =1.4V~3.6\	/, I _{OL} =20μA			0.4	V
Port B Output High Voltage	;	V_{OHB}	V _{CCB} =1.65V~5.5	5V, I _{OH} =-20μA	V _{CCB} -0.4			V
Port B Output Low Voltage		V_{OLB}	V _{CCB} =1.65V~5.5	5V, Ι _{ΟL} =20μΑ			0.4	V
Input Leakage Current	OE	I _{I(LEAK)}	V _{CCA} =1.2V~3.6\ V _{CCB} =1.65V~5.5	·			±1	μA
Power OFF Leakage	A Port	_	V _{CCA} =0V, V _{CCB} =				±1	μA
•	B Port	I _{OFF}	V _{CCA} =0V~3.6V,			±1	μA	
High-Impedance State	A or B Port	I _{OZ}	V _{CCA} =1.2V~3.6\ V _{CCB} =1.65V~5.5			±1	μA	
Output Guiterit			V CCB - 1.03 V 33.3	V _{CCA} =1.2V, V _{CCB} =1.65V~5.5V		0.06		μΑ
		I _{CCA}		V _{CCA} =1.4V~3.6V, V _{CCB} =1.65V~5.5V			5	μΑ
			1	V_{CCA} =3.6V, V_{CCB} =0V			2	μA
			_	V _{CCA} =0V, V _{CCB} =5.5V			-2	μA
		Іссв		V _{CCA} =1.2V, V _{CCB} =1.65V~5.5V		3.4		μΑ
				V _{CCA} =1.4V~3.6V, V _{CCB} =1.65V~5.5V			5	μA
				V _{CCA} =3.6V, V _{CCB} =0V			-2	μA
				V _{CCA} =0V, V _{CCB} =5.5V			2	μA
Out and Out all Out and			V _I =V _{CCI} or GND	V _{CCA} =1.2V, V _{CCB} =1.65V~5.5V		3.5		μA
Quiescent Supply Current		I _{CCA} +I _{CCB}	I _O =0A	V _{CCA} =1.4V~3.6V, V _{CCB} =1.65V~5.5V			10	μΑ
				V _{CCA} =1.2V, V _{CCB} =1.65V~5.5V OE=GND		0.05		μA
		Iccza		V _{CCA} =1.2V, V _{CCB} =1.4V~3.6V OE=GND			5	μA
		Іссzв		V _{CCA} =1.2V, V _{CCB} =1.65V~5.5V OE=GND		3.3		μΑ
		ICCZB		V _{CCA} =1.4V~3.6V, V _{CCB} =1.65V~5.5V OE=GND			5	μΑ
Input Capacitance	OE	C _{IN}	V _{CCA} =1.2V~3.6\	,		5		pF
Output Canacitance	A Port	C _{IO}	V _{CCB} =1.65V~5.5	*		5		pF
Catput Capacitarice	B Port	Oio	VCCB=1.03V~3.3V			8		pF

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

^{2.} $\ensuremath{V_{\text{CCO}}}$ is the supply voltage associated with the output port.

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

DADAMETED	· `	1	NOTIONO	N 411 1	T\/C	B # A \$ /	115.22
PARAMETER	SYMBOL	I IESI CC	ONDITIONS	MIN	TYP	MAX	UNIT
			V _{CCB} =1.8V		9.5		ns
		V _{CCA} =1.2V	V _{CCB} =2.5V		7.9		ns
			V _{CCB} =3.3V		7.6		ns
			V _{CCB} =5V		8.5	10.0	ns
			V _{CCB} =1.8V±0.15V	1.4		12.9	ns
		V _{CCA} =1.5V±0.1V	V _{CCB} =2.5V±0.2V	1.2		10.1	ns
			V _{CCB} =3.3V±0.3V	1.1		10	ns
Propagation Delay			V _{CCB} =5V±0.5V	0.8		9.9	ns
From Input (A) to Output (B)			V _{CCB} =1.8V±0.15V	1.6		11	ns
		V _{CCA} =1.8V±0.15V	V _{CCB} =2.5V±0.2V	1.4		7.7	ns
			V _{CCB} =3.3V±0.3V	1.3		6.8	ns
			V _{CCB} =5V±0.5V	1.2		6.5	ns
			V _{CCB} =2.5V±0.2V	1.1		6.4	ns
		V_{CCA} =2.5V±0.2V	V _{CCB} =3.3V±0.3V	1.0		5.3	ns
			V _{CCB} =5V±0.5V	0.9		4.7	ns
		V _{CCA} =3.3V±0.3V	V _{CCB} =3.3V±0.3V	0.9		4.9	ns
	t _{PD}	33.1	V _{CCB} =5V±0.5V	8.0		4.0	ns
	. –	I F	V _{CCB} =1.8V		9.2		ns
		V _{CCA} =1.2V	V _{CCB} =2.5V		8.8		ns
		,	V _{CCB} =3.3V		8.4		ns
			V _{CCB} =5V		8.0		ns
		V _{CCA} =1.5V±0.1V	V _{CCB} =1.8V±0.15V	0.9		14.2	ns
			V _{CCB} =2.5V±0.2V	0.7		12	ns
		TOOK THE TEST	V _{CCB} =3.3V±0.3V	0.4		11.7	ns
Propagation Delay			V _{CCB} =5V±0.5V	0.3		13.7	ns
From Input (B) to Output (A)			V _{CCB} =1.8V±0.15V	1.5		12	ns
		V _{CCA} =1.8V±0.15V	V _{CCB} =2.5V±0.2V	1.2		8.4	ns
		TOOK THE TEST	V _{CCB} =3.3V±0.3V	8.0		7.6	ns
			V _{CCB} =5V±0.5V	0.5		7.1	ns
		V _{CCA} =2.5V±0.2V	V _{CCB} =2.5V±0.2V	1.0		7.0	ns
				0.6		5.6	ns
			V _{CCB} =5V±0.5V	0.3		4.4	ns
		V _{CCA} =3.3V±0.3V	V _{CCB} =3.3V±0.3V	0.5		5.4	ns
		TOOK TITTEET	V _{CCB} =5V±0.5V	0.2		4.0	ns
			V _{CCB} =1.8V		1		μs
		V _{CCA} =1.2V	V _{CCB} =2.5V		1		μs
		1 00A 11=1	V _{CCB} =3.3V		1		μs
			V _{CCB} =5V		1		μs
			V _{CCB} =1.8V±0.15V			1	μs
		V _{CCA} =1.5V±0.1V	V _{CCB} =2.5V±0.2V			1	μs
		TOOK THE TEST	V _{CCB} =3.3V±0.3V			1	μs
Enable Time			V _{CCB} =5V±0.5V			1	μs
From Input (OE) to Output (A or B)	t _{en}		V _{CCB} =1.8V±0.15V			1	μs
		V _{CCA} =1.8V±0.15V	V _{CCB} =2.5V±0.2V			1	μs
		COA	V _{CCB} =3.3V±0.3V			1	μs
			V _{CCB} =5V±0.5V			1	μs
			V _{CCB} =2.5V±0.2V			1	μs
		V _{CCA} =2.5V±0.2V	V _{CCB} =3.3V±0.3V			1	μs
		Vo	V _{CCB} =5V±0.5V			1	μs
			V _{CCB} =3.3V±0.3V			1	μs
		VCCA-0.5V±0.5V	V _{CCB} =5V±0.5V			1	μs

■ SWITCHING CHARACTERISTICS (Cont.)

Variable Time Company to the property of t	PARAMETE	P	SYMBOL	 	NOITIONS	MIN	TYP	MAX	UNIT
Voca=1.2V	TAIVAIVILIE	_1\	STWIBOL	1231 00		IVIIIN		IVIAA	
Voca									
Note				V _{CCA} =1.2V					
Disable Time From Input (OE) to Output (A) Voca=1.8V±0.15V									
Name						6.6	10	33	
Disable Time From Input (QE) to Output (A) Variable Time									
Disable Time From Input (OE) to Output (A) Voca=1.8V±0.15V 5.9 2.67 ns Voca=1.8V±0.15V 5.9 2.67 ns Voca=1.8V±0.15V 5.9 2.67 ns Voca=1.8V±0.15V 5.9 2.67 ns Voca=0.8V±0.2V 5.6 2.16 ns Voca=0.8V±0.3V 5.4 18.9 ns Voca=0.8V±0.3V 5.4 18.9 ns Voca=0.8V±0.5V 4.8 18.7 ns Voca=0.8V±0.5V 5.0 16.9 ns Voca=0.8V±0.5V 5.0 16.9 ns Voca=0.8V±0.5V 5.0 16.9 ns Voca=0.8V±0.5V 4.1 12.4 ns Voca=0.8V±0.5V 5.6 2.6 ns Voca=0.8V±0.5V 5.0 2.6 ns Voca=0.8V±0.5V 5.0 2.6 ns Voca=0.8V±0.5V 5.0 2.6				V _{CCA} =1.5V±0.1V					
Disable lime From Input (OE) to Output (A) Voca=1.8V±0.15V Voca=2.5V±0.2V 5.6 21.6 ns Voca=2.5V±0.2V 5.6 21.6 ns Voca=3.5V±0.3V 4.8 18.7 ns Voca=3.5V±0.5V 4.8 18.7 ns Voca=5.5V±0.5V 4.8 18.7 ns Voca=5.5V±0.5V 4.5 13.8 ns Voca=3.5V±0.5V 4.5 13.8 ns Voca=3.5V±0.5V 4.5 13.8 ns Voca=1.8V±0.15V Voca=3.3V±0.3V 4.5 13.8 ns Voca=1.8V±0.15V Voca=3.3V±0.3V 4.5 13.8 ns Voca=1.8V±0.5V 4.1 12.4 ns Voca=1.8V±0.15V Voca=3.3V±0.3V 4.5 13.8 ns Voca=1.8V±0.15V Voca=3.5V±0.5V 5.6 20.6 ns Voca=3.5V±0.5V 5.6 20.6 ns Voca=3.3V±0.3V 5.5 22.1 ns Voca=3.3V±0.3V 5.6 20.6 ns Voca=3.3V±0.3V 5.6 20.6 ns Voca=3.3V±0.3V 4.5 17.9 ns Voca=3.3V±0.3V 4.5 17.9 ns Voca=3.3V±0.3V 4.5 17.9 ns Voca=3.3V±0.3V 4.5 17.9 ns Voca=3.3V±0.3V 4.1 17.3 ns									
Voca	Disable Time								
Voca=1.8V±0.15V	From Input (OE) to Outp	ut (A)							
Voca=2.5V±0.5V				V _{CCA} =1.8V±0.15V					
V _{CCA} =2.5V±0.2V V _{CCB} =3.3V±0.3V 4.9 15 15 15 15 15 15 15 1									
V _{CCA} =2.5V±0.2V V _{CCB} =3.3V±0.3V 4.9 15 ns V _{CCB} =5V±0.5V 4.5 13.8 ns V _{CCB} =3.3V±0.3V 4.5 13.9 ns V _{CCB} =1.8V V _{CCB} =3.3V±0.5V 4.1 12.4 ns V _{CCB} =1.8V V _{CCB} =3.3V±0.3V 4.5 13.9 ns V _{CCB} =1.8V V _{CCB} =3.3V±0.3V 4.5 12.4 ns V _{CCB} =3.3V±0.3V V _{CCB} =3.3V±0.3V 15 ns V _{CCB} =5.5V 16 ns V _{CCB} =5.5V V _{CCB} =3.3V±0.5V 15 ns V _{CCB} =5.5V V _{CCB} =3.3V±0.3V V _{CC}									
V _{CCA} =3.3V±0.3V				0.51/.001/					
tids Variable Time Variable Time A Port Rise Rise and Fall Time And Fall Times Variable Time A Port Rise A P									
Total Program Total Progr									
Note				$1 \vee_{CCA} = 3.3 \vee_{T} + 0.3 \vee_{T}$					
V _{CCA} =1.2V V _{CCA} =1.2V V _{CCA} =2.5V V _{CCB} =3.3V V _{CCB} =3.3V V _{CCCB} =3.3V V _{CCCB} =1.8V±0.15V V _{CCCB} =1.8V±0.15V V _{CCCB} =5.5V±0.5V V _{CCCB}			t _{dis}			4.1		12.4	
Note				I F					
Vcca=3.3V 15				V _{CCA} =1.2V					ns
Disable Time From Input (OE) to Output (B) V _{CCA} =1.5V±0.1V V _{CCA} =1.5V±0.2V 5.8 25.6 ns V _{CCB} =2.5V±0.2V 5.8 25.6 ns V _{CCB} =3.3V±0.3V 5.5 22.1 ns V _{CCB} =5.5V±0.5V 5.6 20.6 ns V _{CCB} =1.8V±0.15V 6.1 33.9 ns V _{CCB} =1.8V±0.15V 6.1 33.9 ns V _{CCB} =2.5V±0.2V 5.2 23.7 ns V _{CCB} =2.5V±0.2V 5.2 23.7 ns V _{CCB} =2.5V±0.2V 5.0 19.9 ns V _{CCB} =2.5V±0.2V 4.8 21.8 ns V _{CCB} =2.5V±0.5V 4.4 15.2 ns V _{CCB} =5.5V±0.5V 4.4 15.2 ns V _{CCB} =3.3V±0.3V 4.1 17.3 ns V _{CCB} =5.5V±0.5V 4.0 14.4 ns V _{CCB} =5.5V±0.5V 4.0 14.4 ns V _{CCB} =5.5V±0.5V 4.1 ns V _{CCB} =5.5V±0.5V 4.1 ns V _{CCB} =3.3V±0.3V 0.8 6.3 ns v _{CCB} =5.5V±0.5V 0.7 5.0 ns v _{CCB} =5.5V±0.5V 0.7 5.0 ns v _{CCB} =5.5V±0.5V 0.7 5.0 ns v _{CCB} =5.5V±0.5V 0.8 0.3 ns v _{CCB} =5.5V±0.5V 0.8 0.3 ns v _{CCB} =5.5V±0.5V 0.5 3.5 ns v _{CCB} =5.5V±0.5V 0.5 3.5 ns v _{CCB} =3.3V±0.3V 0.5 3.0 ns v _{CCB} =3.3V									ns
Disable Time							15		ns
Disable Time From Input (OE) to Output (B) V _{CCA} =1.8V±0.15V V _{CCA} =1.8V±0.15V V _{CCA} =3.3V±0.3V V _{CCB} =5V±0.5V 5.6 20.6 ns V _{CCB} =1.8V±0.15V V _{CCB} =3.3V±0.3V 5.5 22.1 ns V _{CCB} =1.8V±0.15V V _{CCB} =2.5V±0.2V 5.2 23.7 ns V _{CCB} =3.3V±0.3V 5.0 17.6 ns V _{CCB} =2.5V±0.2V 4.8 21.8 ns V _{CCB} =2.5V±0.2V 4.8 21.8 ns V _{CCB} =3.3V±0.3V V _{CCB} =3.3V±0.3V 4.1 17.3 ns V _{CCB} =5V±0.5V 4.4 15.2 ns V _{CCB} =5V±0.5V 4.4 17.3 ns V _{CCB} =5V±0.5V 4.4 18.2 N _{CCB} =3.3V±0.3V N _{CCB} =3.3V±0.3V N _{CCB} =3.3V±0.3V N _{CCB} =3.3V±0.3V N _{CCB} =3.3V±0.5V N _{CCB} =3.3V N _{CCB} =3.3V±0.3V N _{CCB} =3.3V±0.3V N _{CCB} =3.3V±0.5V N _{CCB} =3.3V±0.3V N _{CCB} =5.5V±0.2V N _{CCB} =5.5V±0.2V N _{CCB} =5.5V±0.2V N _{CCB} =5.5V±0.5V N _{CCB} =5.5V±0									ns
Disable Time From Input (OE) to Output (B) Vcca=1.8V±0.15V Vcca=1.8V±0.15V Vcca=3.3V±0.3V Vcca=2.5V±0.2V Vcca=3.3V±0.3V Vcca=3.3V±0.3V Vcca=2.5V±0.2V Vcca=3.3V±0.3V Vcca=3.3V±0.5V Vcca=3.3V±0.3V Vcca=				Vcca=1.5V+0.1V					ns
Disable I Ime From Input (OE) to Output (B) V _{CCA} =1.8V±0.15V			VCCA 1.0VIII.					ns	
From Input (OE) to Output (B) V _{CCA} =1.8V±0.15V V _{CCA} =2.5V±0.2V V _{CCB} =5.V±0.5V V _{CCB} =5.V±0.5V V _{CCB} =5.V±0.2V V _{CCB} =3.3V±0.3V V _{CCB} =3.3V±0.3V V _{CCB} =3.3V±0.3V V _{CCB} =3.3V±0.3V V _{CCB} =3.3V±0.5V V _{CCB} =3.3V±0.15V V _{CCB} =3.3V±0.5V V _{CCB} =3.3V±0.15V V _{CCB} =3.3V±0.15V V _{CCB} =3.3V±0.15V V _{CCB} =3.3V±0.3V V _{CCB} =3.3V±0.3V V _{CCB} =3.3V±0.3V V _{CCB} =3.3V±0.5V V _{CCB} =3.3V±0.3V V _{CCB} =3.3V±0.3	Disable Time	Disable Time				5.6			ns
V		ut (B)							ns
Vcca	Trom input (OL) to Outp	at (D)		\/ ₀₀ ,=1 8\/+0 15\/	V _{CCB} =2.5V±0.2V	5.2		23.7	ns
$V_{CCA}=2.5 \forall \pm 0.2 \forall \begin{array}{c} V_{CCB}=2.5 \forall \pm 0.2 \forall \\ V_{CCB}=3.3 \forall \pm 0.3 \forall \\ V_{CCB}=3.3 \forall \pm 0.5 \forall \\ V_{CCB}=3.3 \forall V_{CCB}=3$				V CCA-1.0 V ±0.13 V	V _{CCB} =3.3V±0.3V	5.0		19.9	ns
V					V _{CCB} =5V±0.5V	5.0		17.6	ns
$V_{CCA} = 3.3V \pm 0.3V \qquad V_{CCB} = 5V \pm 0.5V \qquad 4.4 \qquad 15.2 ns \\ V_{CCA} = 3.3V \pm 0.3V \qquad V_{CCB} = 3.3V \pm 0.3V \qquad 4.1 \qquad 17.3 ns \\ V_{CCB} = 5V \pm 0.5V \qquad 4.0 \qquad 14.4 ns \\ V_{CCB} = 1.8V \qquad 4.1 \qquad ns \\ V_{CCB} = 3.3V \qquad 4.1 \qquad ns \\ V_{CCB} = 3.3V \qquad 4.1 \qquad ns \\ V_{CCB} = 5V \qquad 3.9 \qquad ns \\ V_{CCB} = 5V \qquad 0.8 \qquad 6.5 ns \\ V_{CCB} = 1.8V \pm 0.15V \qquad 0.8 \qquad 6.3 ns \\ V_{CCB} = 3.3V \pm 0.3V \qquad 0.8 \qquad 6.3 ns \\ V_{CCB} = 3.3V \pm 0.3V \qquad 0.8 \qquad 6.3 ns \\ V_{CCB} = 3.3V \pm 0.3V \qquad 0.8 \qquad 6.3 ns \\ V_{CCB} = 3.3V \pm 0.3V \qquad 0.8 \qquad 6.3 ns \\ V_{CCB} = 3.3V \pm 0.3V \qquad 0.8 \qquad 6.3 ns \\ V_{CCB} = 3.3V \pm 0.3V \qquad 0.8 \qquad 6.3 ns \\ V_{CCB} = 3.3V \pm 0.3V \qquad 0.7 \qquad 5.0 ns \\ V_{CCB} = 3.3V \pm 0.3V \qquad 0.7 \qquad 5.0 ns \\ V_{CCB} = 5V \pm 0.5V \qquad 0.7 \qquad 5.0 ns \\ V_{CCB} = 5V \pm 0.5V \qquad 0.7 \qquad 5.0 ns \\ V_{CCB} = 5V \pm 0.5V \qquad 0.8 \qquad 3.6 ns \\ V_{CCB} = 5V \pm 0.5V \qquad 0.8 \qquad 3.6 ns \\ V_{CCB} = 5V \pm 0.5V \qquad 0.5 \qquad 3.5 ns \\ V_{CCB} = 5V \pm 0.5V \qquad 0.5 \qquad 3.5 ns \\ V_{CCB} = 5V \pm 0.5V \qquad 0.5 \qquad 3.5 ns \\ V_{CCB} = 5V \pm 0.5V \qquad 0.5 \qquad 3.5 ns \\ V_{CCB} = 5V \pm 0.5V \qquad 0.5 \qquad 3.5 ns \\ V_{CCB} = 3.3V \pm 0.3V \qquad 0.5 \qquad 3.0 ns \\ V_{CCB} = 3.3V \pm 0.3V \qquad 0.5 \qquad 3.0 ns \\ V_{CCB} = 5V \pm 0.5V \qquad 0.5 \qquad 3.0 $				V _{CCA} =2.5V±0.2V	V _{CCB} =2.5V±0.2V	4.8		21.8	ns
$V_{CCA}=3.3V\pm0.3V \\ V_{CCB}=3.3V\pm0.3V \\ V_{CCB}=5V\pm0.5V \\ V_{CCB}=1.8V \\ V_{CCB}=2.5V \\ V_{CCB}=3.3V \\ V_{CCB}=3.3V\pm0.15V \\ V_{CCB}=3.3V\pm0.15V \\ V_{CCB}=3.3V\pm0.15V \\ V_{CCB}=3.3V\pm0.15V \\ V_{CCB}=3.3V\pm0.15V \\ V_{CCB}=3.3V\pm0.15V \\ V_{CCB}=3.3V\pm0.2V \\ V_{CCB}=3.3V\pm0.3V \\ V_{CC$					V _{CCB} =3.3V±0.3V	4.5		17.9	ns
$V_{CCA}=3.3 V \pm 0.3 V \\ V_{CCB}=5 V \pm 0.5 V \\ V_{CCB}=1.8 V \\ V_{CCB}=2.5 V \\ V_{CCB}=3.3 V \\ V_{CCB}=3.3 V \\ V_{CCB}=5 V \\ V_{CCB}=1.8 V \pm 0.15 V \\ V_{CCB}=3.3 V \\ V_{CCB}=3.3 V \pm 0.3 V \\$					V _{CCB} =5V±0.5V	4.4		15.2	ns
V _{CCA} =1.2V					V _{CCB} =3.3V±0.3V	4.1		17.3	ns
$V_{CCA}=1.2V \begin{array}{c ccccccccccccccccccccccccccccccccccc$				V _{CCA} -3.3V±0.3V	V _{CCB} =5V±0.5V	4.0		14.4	ns
$ \text{Rise and Fall Time} \\ \text{Rise and Fall Time And Fall Time} \\ \text{Rise and Fall Time} \\ \text{Rise and Fall Time} \\ Rise and Fall Time $					V _{CCB} =1.8V		4.1		ns
$V_{CCB}=3.3V $				\/=1 2\/	V _{CCB} =2.5V		4.4		ns
$ \text{Rise and Fall Time} \\ \text{Rise and Fall Time} \\ \text{A Port Rise} \\ \text{And Fall} \\ \text{Times} \\ \text{V}_{\text{CCA}} = 1.5 \text{V} \pm 0.1 \text{V} \\ \text{V}_{\text{CCB}} = 1.8 \text{V} \pm 0.15 \text{V} \\ \text{V}_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ \text{V}_{\text{CCB}} = 3.3 \text{V} \pm 0.3 \text{V} \\ \text{V}_{\text{CCB}} = 5.5 \text{V} \pm 0.2 \text{V} \\ \text{V}_{\text{CCB}} = 3.3 \text{V} \pm 0.3 \text{V} \\ \text{V}_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ \text{V}_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ \text{V}_{\text{CCB}} = 3.3 \text{V} \pm 0.3 \text{V} \\ \text{V}_{\text{CCB}} $				V CCA-1.2V	V _{CCB} =3.3V		4.1		ns
$ \text{Rise and Fall Time} \\ \text{Rise and Fall Time} \\ \text{Rise and Fall Time} \\ \text{A Port Rise} \\ \text{And Fall} \\ \text{Times} \\ \text{V}_{\text{CCA}} = 1.5 \text{V} \pm 0.1 \text{V} \\ \text{V}_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ \text{V}_{\text{CCB}} = 3.3 \text{V} \pm 0.3 \text{V} \\ \text{V}_{\text{CCB}} = 5.5 \text{V} \pm 0.2 \text{V} \\ \text{V}_{\text{CCB}} = 1.8 \text{V} \pm 0.15 \text{V} \\ \text{V}_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ \text{V}_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ \text{V}_{\text{CCB}} = 1.8 \text{V} \pm 0.15 \text{V} \\ \text{V}_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ \text{V}_{\text{CCB}} = 2.5 \text{V} \pm $					V _{CCB} =5V		3.9		ns
Rise and Fall Time $ \begin{array}{c} \text{A Port Rise} \\ \text{And Fall} \\ \text{Times} \end{array} \begin{array}{c} t_{\text{rA, t}_{fA}} \\ v_{\text{CCA}} = 1.5 \text{V} \pm 0.1 \text{V} \\ v_{\text{CCB}} = 3.3 \text{V} \pm 0.3 \text{V} \\ v_{\text{CCB}} = 5 \text{V} \pm 0.5 \text{V} \\ v_{\text{CCB}} = 1.8 \text{V} \pm 0.15 \text{V} \\ v_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ v_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ v_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ v_{\text{CCB}} = 3.3 \text{V} \pm 0.3 \text{V} \\ v_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ v_{\text{CCB}} = 3.3 \text{V} \pm 0.3 $					V _{CCB} =1.8V±0.15V	8.0		6.5	ns
Rise and Fall Time $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$)/ =1 5)/10 1)/	V _{CCB} =2.5V±0.2V	8.0		6.3	ns
Rise and Fall Time $ V_{CCA} = 1.8V \pm 0.15V $				V _{CCA} =1.5V±0.1V	V _{CCB} =3.3V±0.3V	8.0		6.3	ns
Times $ V_{\text{CCA}} = 1.8 \text{V} \pm 0.15 \text{V} \\ V_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ V_{\text{CCB}} = 3.3 \text{V} \pm 0.3 \text{V} \\ V_{\text{CCB}} = 5.5 \text{V} \pm 0.2 \text{V} \\ V_{\text{CCB}} = 5.5 \text{V} \pm 0.2 \text{V} \\ V_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ V_{\text{CCB}} = 3.3 \text{V} \pm 0.3 \text{V} \\ V_{C$		A Port Rise			V _{CCB} =5V±0.5V	8.0		6.3	ns
Times $ V_{\text{CCA}} = 1.8 \text{V} \pm 0.15 \text{V} \\ V_{\text{CCB}} = 2.5 \text{V} \pm 0.2 \text{V} \\ 0.7 \\ V_{\text{CCB}} = 3.3 \text{V} \pm 0.3 \text{V} \\ 1.0 \\ V_{\text{CCB}} = 5.5 \text{V} \pm 0.5 \text{V} \\ 0.7 \\ 0.7 \\ 0.8 \\ 0.6 \\ 0.8 \\ 0.6 \\ 0.8 \\ 0.6 \\ 0.8 \\ 0.6 \\ 0.8 \\ 0.6 \\ 0.8 \\ $	Rise and Fall Time	And Fall	t_{rA} , t_{fA}		V _{CCB} =1.8V±0.15V	0.7		5.1	ns
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		Times		\/ =4.0\/\\\0.45\/		0.7		5.0	ns
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				V _{CCA} =1.8V±0.15V	V _{CCB} =3.3V±0.3V	1.0		5.0	ns
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$									ns
V _{CCA} =2.5V±0.2V V _{CCB} =3.3V±0.3V 0.6 3.6 ns V _{CCB} =5V±0.5V 0.5 3.5 ns V _{CCB} =3.3V±0.3V V _{CCB} =3.3V±0.3V 0.5 3.0 ns									ns
$V_{CCB}=5V\pm0.5V$ 0.5 3.5 ns $V_{CCB}=3.3V\pm0.3V$ 0.5 3.0 ns									
V _{CCB} =3.3V±0.3V									
				.,					
				V _{CCA} =3.3V±0.3V	V _{CCB} =5V±0.5V	0.5		3.0	ns

■ SWITCHING CHARACTERISTICS (Cont.)

PARAMET	ER	SYMBOL	TEST CC	ONDITIONS	MIN	TYP	MAX	UNIT
				V _{CCB} =1.8V		5.0		ns
			1 0 1	V _{CCB} =2.5V		5.0		ns
			V _{CCA} =1.2V	V _{CCB} =3.3V		5.1		ns
				V _{CCB} =5V		5.1		ns
				V _{CCB} =1.8V±0.15V	1.0		7.3	ns
			\/ -1 5\/\\0.1\/	V _{CCB} =2.5V±0.2V	0.7		4.9	ns
			V _{CCA} =1.5V±0.1V	V _{CCB} =3.3V±0.3V	0.7		4.6	ns
	B Port Rise			V _{CCB} =5V±0.5V	0.6		4.6	ns
Rise and Fall Time	And Fall	t_{rB} , t_{fB}		V _{CCB} =1.8V±0.15V	1.0		7.3	ns
	Times		V _{CCA} =1.8V±0.15V	V _{CCB} =2.5V±0.2V	0.7		5.0	ns
			V _{CCA} =1.6V±0.15V	V _{CCB} =3.3V±0.3V	0.7		3.9	ns
				V _{CCB} =5V±0.5V	0.6		3.8	ns
				V _{CCB} =2.5V±0.2V	0.6		4.9	ns
			V _{CCA} =2.5V±0.2V	V _{CCB} =3.3V±0.3V	0.7		3.9	ns
				V _{CCB} =5V±0.5V	0.6		3.2	ns
			V _{CCA} =3.3V±0.3V	V _{CCB} =3.3V±0.3V	0.7		3.9	ns
			V _{CCA} -3.3V±0.3V	V _{CCB} =5V±0.5V	0.6		3.2	ns
			V _{CCA} =1.2V, V _{CCI}	V _{CCA} =1.2V, V _{CCB} =1.8V~5V		20		Mbps
			V _{CCA} =1.5V±0.1V,				50	Mbps
			V _{CCB} =1.65V~5.5	SV .			30	Minha
Data Rate		f _{data}	V _{CCA} =1.8V±0.15V	V _{CCB} =1.8V±0.15V			52	Mbps
Data Nate		Idata		V _{CCB} =2.3V~5.5V			60	Mbps
			V _{CCA} =2.5V±0.2V	V _{CCB} =2.5V±0.2V			70	Mbps
			V CCA-2.3 V ±0.2 V	V _{CCB} =3V~5.5V			100	Mbps
	.		V _{CCA} =3.3V±0.3V	V _{CCB} =3V~5.5V			100	Mbps
			V _{CCA} =1.2V, V _{CCI}	_B =1.8V~5V		50		ns
			V _{CCA} =1.5V±0.1\	•	20			ns
			V _{CCB} =1.65V~5.5					
Pulse Duration	Data Inputs	t _W	V _{CCA} =1.8V±0.15V	V _{CCB} =1.8V±0.15V	19			ns
		-νν	1.004 1.00 100	$V_{CCB} = 2.3V \sim 5.5V$	17			ns
		<u> </u>	11/22/=17 51/+11 71/ =	V _{CCB} =2.5V±0.2V	14			ns
				V _{CCB} =3V~5.5V	10			ns
			V _{CCA} =3.3V±0.3V	V _{CCB} =3V~5.5V	10			ns

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

PARAMETE	R	SYMBOL	TEST CC	ONDITIONS	MIN	TYP	MAX	UNIT
				V _{CCA} =1.2V V _{CCB} =5V		9.0		pF
				V _{CCA} =1.2V V _{CCB} =1.8V		8.0		pF
				V _{CCA} =1.5V V _{CCB} =1.8V		7.0		pF
	A Port Input B Port Output			V _{CCA} =1.8V V _{CCB} =1.8V		7.0		pF
				V _{CCA} =2.5V V _{CCB} =2.5V		7.0		pF
				V _{CCA} =2.5V V _{CCB} =5V		7.0		pF
Power Dissipation			$C_L=0$, $f=10MH_Z$ $t_r=t_f=1nS$	V _{CCB} =3.3~5V		8.0		pF
Capacitance			OE=V _{CCA} (Output Enabled)			12		pF
	B Port Input A Port Output			V _{CCA} =1.2V V _{CCB} =1.8V		11		pF
		C _{PDA}		V _{CCA} =1.5V V _{CCB} =1.8V		11		pF
				V _{CCB} =1.8V V _{CCB} =1.8V		11		pF
				V _{CCA} =2.5V V _{CCB} =2.5V		11		pF
				V _{CCA} =2.5V V _{CCB} =5V		11		pF
				V _{CCB} =3.3V V _{CCB} =3.3~5V		11		pF
				V _{CCB} =1.2V V _{CCB} =5V		0.01		pF
				V _{CCA} =1.2V V _{CCB} =1.8V		0.01		pF
			C _L =0, f=10MH _Z			0.01		pF
Power Dissipation Capacitance	A Port Input B Port Output		OE=GND	V _{CCA} =1.8V V _{CCB} =1.8V		0.01		pF
			(Output Disabled)	V _{CCB} =2.5V		0.01		pF
				V _{CCA} =2.5V V _{CCB} =5V		0.01		pF
				V _{CCA} =3.3V V _{CCB} =3.3~5V		0.01		pF

■ OPERATING CHARACTERISTICS (Cont.)

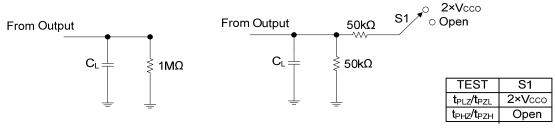
PARAMETE	R	SYMBOL	TEST CC	NDITIONS	MIN	TYP	MAX	UNIT
				V _{CCA} =1.2V V _{CCB} =5V		0.01		pF
				V _{CCA} =1.2V V _{CCB} =1.8V		0.01		pF
				V _{CCA} =1.5V V _{CCB} =1.8V		0.01		pF
	B Port Input A Port Output	C_PDA	t _r =t _f =1nS OE=GND	V _{CCA} =1.8V V _{CCB} =1.8V		0.01		pF
			(Output Disabled)	V _{CCA} =2.5V V _{CCB} =2.5V		0.01		pF
				V _{CCA} =2.5V V _{CCB} =5V		0.01		pF
				V _{CCA} =3.3V V _{CCB} =3.3~5V		0.01		pF
				V _{CCA} =1.2V V _{CCB} =5V		35		pF
				V _{CCA} =1.2V V _{CCB} =1.8V		26		pF
				V _{CCA} =1.5V V _{CCB} =1.8V		27		pF
Power Dissipation Capacitance	A Port Input B Port Output			V _{CCA} =1.8V V _{CCB} =1.8V		27		pF
				V _{CCA} =2.5V V _{CCB} =2.5V		27		pF
				V _{CCA} =2.5V V _{CCB} =5V		27		pF
		C_PDB	t _r =t _f =1nS	V _{CCB} =3.3~5V		28		pF
			OE=V _{CCA} (Output Enabled)			26		pF
				V _{CCA} =1.2V V _{CCB} =1.8V		19		pF
	D. D. Albard			V _{CCA} =1.5V V _{CCB} =1.8V		18		pF
	B Port Input A Port Output			V _{CCA} =1.8V V _{CCB} =1.8V		18		pF
				V _{CCA} =2.5V V _{CCB} =2.5V		18		pF
				V _{CCA} =2.5V V _{CCB} =5V		20		pF
				V _{CCA} =3.3V V _{CCB} =3.3~5V		21		pF

■ OPERATING CHARACTERISTICS (Cont.)

PARAMETE	ER .	SYMBOL	TEST CC	ONDITIONS	MIN	TYP	MAX	UNIT
				V _{CCA} =1.2V V _{CCB} =5V		0.01		pF
				V _{CCA} =1.2V V _{CCB} =1.8V		0.01		pF
				V _{CCA} =1.5V V _{CCB} =1.8V		0.01		pF
	A Port Input B Port Output			V _{CCA} =1.8V V _{CCB} =1.8V		0.01		pF
				V _{CCA} =2.5V V _{CCB} =2.5V		0.01		pF
			C_L =0, f=10MH _Z t_r = t_f =1nS OE=GND (Output Disabled)	V _{CCA} =2.5V V _{CCB} =5V		0.01		pF
Power Dissipation				V _{CCA} =3.3V V _{CCB} =3.3~5V		0.03		pF
Capacitance				V _{CCA} =1.2V V _{CCB} =5V		0.01		pF
				V _{CCA} =1.2V V _{CCB} =1.8V		0.01		pF
				V _{CCA} =1.5V V _{CCB} =1.8V		0.01		pF
	B Port Input A Port Output			V _{CCA} =1.8V V _{CCB} =1.8V		0.01		pF
				V _{CCA} =2.5V V _{CCB} =2.5V		0.01		pF
				V _{CCA} =2.5V V _{CCB} =5V		0.01		pF
				V _{CCA} =3.3V V _{CCB} =3.3~5V		0.03		pF

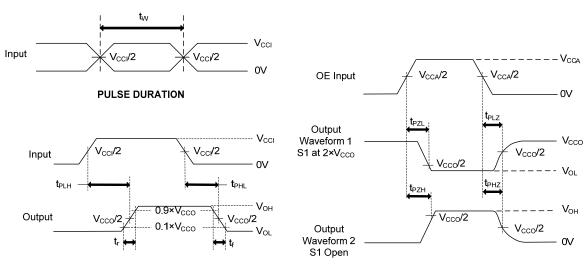
■ TEST CIRCUIT AND WAVEFORMS

Load Circuit



MAX DATA RATE, PULSE DURATION PROPAGATION DELAY OUTPUT RISE AND FALL TIME MEASUREMENT

ENABLE/DISABLE TIME MEASUREMENT



PROPAGATION DELAY TIMES

ENABLE AND DISABLE TIMES

- Notes: 1. C_L includes probe and jig capacitance.
 - 2. The outputs are measured one at a time, with one transition per measurement.
 - 3. t_{PLH} and t_{PHL} are the same as t_{PD} .
 - 4. V_{CCI} is the V_{CC} associated with the input port.
 - 5. V_{CCO} is the V_{CC} associated with the output port.
 - 6. All parameters and waveforms are not applicable to all devices.

■ DETAILED DESCRIPTION

Overview

The **UTXB0108** device is a 8-bit, directionless voltage-level translator specifically designed for translating logic voltage levels. The A port is able to accept I/O voltages ranging from 1.2V to 3.6V, while the B port can accept I/O voltages from 1.65V to 5.5V. The device is a buffered architecture with edge-rate accelerators (one-shots)

to improve the overall data rate. This device can only translate push-pull CMOS logic outputs. If for open-drain signal translation, please refer to UTC's UTXS010X products.

Architecture

The **UTXB0108** architecture (see Figure 1) does not require a direction-control signal to control the direction of data flow from A to B or from B to A. In a dc state, the output drivers of the **UTXB0108** can maintain a high or low, but are designed to be weak, so that they can be overdriven by an external driver when data on the bus starts flowing the opposite direction.

The output one-shots detect rising or falling edges on the A or B ports. During a rising edge, the one-shot turns on the PMOS transistors (T1, T3) for a short duration, which speeds up the low-to-high transition. Similarly, during a falling edge, the one-shot turns on the NMOS transistors (T2, T4) for a short duration, which speeds up the high-to-low transition. The typical output impedance during output transition is 70Ω at $V_{CCO} = 1.2V$ to 1.8V, 50Ω at $V_{CCO} = 1.8V$ to 3.3V, and 40Ω at $V_{CCO} = 3.3V$ to 5V.

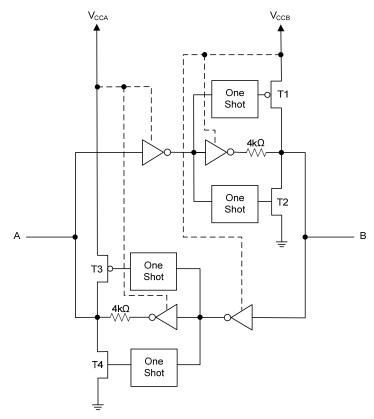


Figure 1. Architecture of UTXB0108 I/O Cell

■ DETAILED DESCRIPTION (Cont.)

Power-Up

During operation, ensure that $V_{CCA} \le V_{CCB}$ at all times. During power-up sequencing, $V_{CCA} \ge V_{CCB}$ does not damage the device, so any power supply can be ramped up first. The **UTXB0108** has circuitry that disables all output ports when either V_{CC} is switched off ($V_{CCA/B}$ =0V).

Output Load Considerations

Recommends careful PCB layout practices with short PCB trace lengths to avoid excessive capacitive loading and to ensure that proper O.S. triggering takes place. PCB signal trace-lengths should be kept short enough such that the round trip delay of any reflection is less than the one-shot duration. This improves signal integrity by ensuring that any reflection sees a low impedance at the driver. The O.S. circuits have been designed to stay on for approximately 10ns. The maximum capacitance of the lumped load that can be driven also depends directly on the one-shot duration. With very heavy capacitive loads, the one-shot can time-out before the signal is driven fully to the positive rail. The O.S. duration has been set to best optimize trade-offs between dynamic ICC, load driving capability, and maximum bit-rate considerations. Both PCB trace length and connectors add to the capacitance that the UTXB0108 output sees, so it is recommended that this lumped-load capacitance be considered to avoid O.S. retriggering, bus contention, output signal oscillations, or other adverse system-level affects.

Enable and Disable

The **UTXB0108** has an OE input that is used to disable the device by setting OE = LOW, which places all I/Os in the high-impedance (Hi-Z) state. The disable time (t_{dis}) indicates the delay between when OE goes low and when the outputs actually get disabled (Hi-Z). The enable time (t_{en}) indicates the amount of time the user must allow for the one-shot circuitry to become operational after OE is taken high.

Pull-up or Pull-down Resistors on I/O Lines

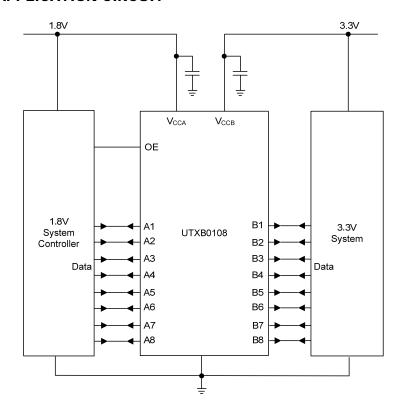
The **UTXB0108** is designed to drive capacitive loads of up to 70pF. The output drivers of the **UTXB0108** have low dc drive strength. If pull-up or pull-down resistors are connected externally to the data I/Os, their values must be kept higher than $50k\Omega$ to ensure that they do not contend with the output drivers of the **UTXB0108**.

For the same reason, the **UTXB0108** should not be used in applications such as I²C or 1-Wire where an open-drain driver is connected on the bidirectional data I/O. For these applications, use a device from the UTC UTXS01xx series of level translators.

Device Functional Modes

The **UTXB0108** device has two functional modes, enabled and disabled. To disable the device, set the OE input to low, which places all I/Os in a high impedance state. Setting the OE input to high will enable the device.

■ TYPICAL APPLICATION CIRCUIT



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