Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

PERICOM®

PI74STX4G4245

4-Bit Level Shifting Buffer/Transceiver with Configurable Dual Supply Voltage with Advanced Package Solution
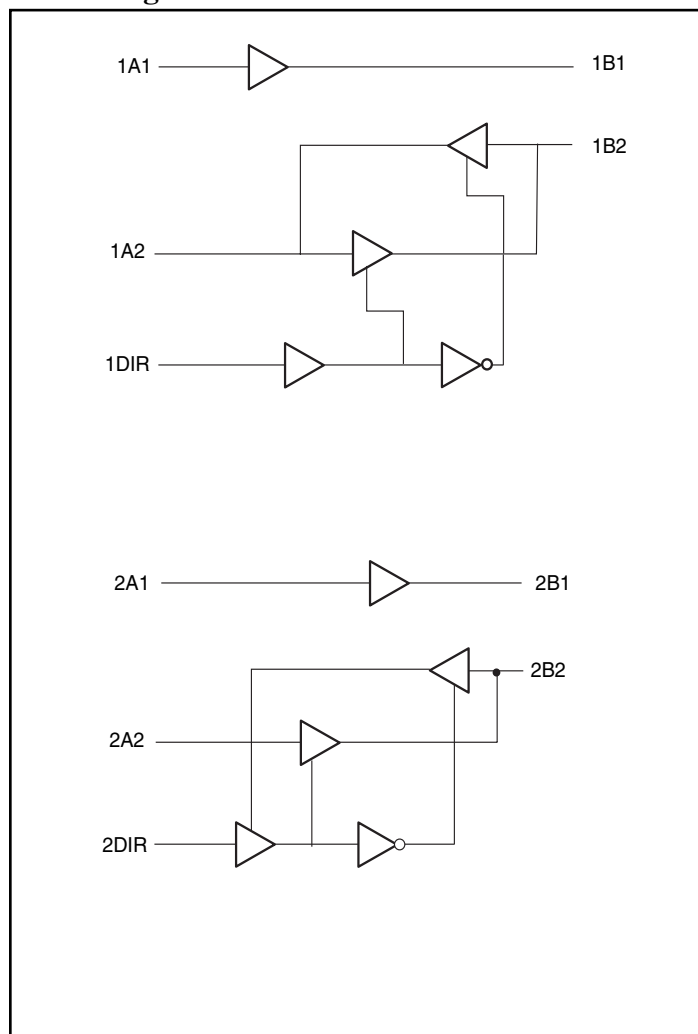
Features

- Operation Voltage: $1.65V \leq V_{CCA} \leq 3.6V$
  $2.3V \leq V_{CCB} \leq 5.5V$
  $V_{CCA} \leq V_{CCB}$

- High Speed: tpd = 5ns typical into 30pF @ 3V V_{CC}

- Power down high-impedance inputs and outputs

- High output drive: ±12mA at 3V V_{CCA}/V_{CCB}
  ±24mA at 5V V_{CCB}

- Industrial operation at –40°C to +85°C

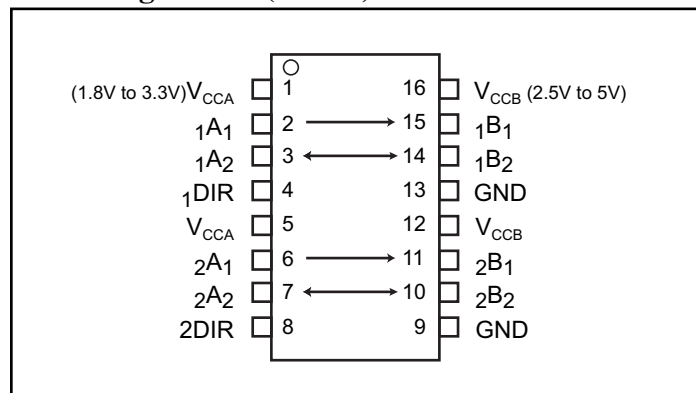- Packaging (Pb-free & Green available):
  – 16-pin TDFN (ZJ)

Description

Pericom Semiconductor's PI74STX4G4245, a 4-bit noninverting buffer/transceiver, contains two separate supply rails: A port (V_{CCA}), set to operate from 1.8V to 3.3V; B port (V_{CCB}), set to operate from 2.5V to 5V. The xA1 to xB1 translation is configured as an unidirectional buffer; the translation between xA2 and xB2 is bidirectional and its direction is controlled by the xDIR pin. The xDIR pin is supplied by V_{CCB}.

Block Diagram

Pin Configuration (TDFN)

Function Table

Input		Output
xDIR	DATA	
L	xB2	xA2
H	xA2	xB2
X	xA1	xB1

Pin Description

Pin Name	Description
xDIR	Direction Control
xA1	Data Input
xB1	Data Output
xA2, xB2	Data Input/Output
V_{CCA}, V_{CCB}	Power Supply

Maximum Ratings

(Absolute maximum ratings over operating free-air temperature range from V_{CCB} at 2.5V & V_{CCA} at 1.2V, unless otherwise noted)

Supply voltage range: V_{CCA}.............................–0.5V to +6V	DC Input Diode Current, I_{IK} (V_O <0) ....–50mA
V_{CCB}.............................–0.5V to +6V	DC Output Diode Current, I_{OK} (V_O <0) ....–50mA
Input Voltage Range, V_I:	DC Output Current, (I_{OUT}) ....±50mA
Input xA1[1] ....–0.5V to +6V	DC V_{CC} or GND Current (I_{CC}/I_{GND})........................±100mA
I/O xA2[1,2] ......–0.5V to V_{CCA}+0.5V	Storage temperature range, T_{STG} .... –65°C to 150°C
I/O xB2[1,2] ......–0.5V to V_{CCB}+0.5V	Junction Lead Temperature (I_{OS}) ....260°C
Output Voltage Range, V_O	Power Dissipation: MSOP 200mW
Output B1[1,2] ...–0.5V to V_{CCB} +0.5V	

Notes:

Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

1. The input negative voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. This value is limited to 6V.

Recommended Operating Conditions for A Port (V_{CCA})[1]

Parameter	Description	Test Conditions	Min.	Max.	Units
V_{CCA}	Supply Voltage		1.65	3.6	
V_{IH}	High-level input voltage	V_{CCA} = 1.65V to 1.95V	0.7 x V_{CCA}		
		V_{CCA} = 2.3V to 3.6V	0.7 x V_{CCA}		
V_{IL}	Low-level input voltage	V_{CCA} = 1.65 to 1.95V		0.3 x V_{CCA}	V
		V_{CCA} = 2.3V to 3.6V		0.3 x V_{CCA}	
V_{IA}	Input Voltage		0	V_{CCA}	
V_{OA}	Output Votage		0	V_{CCA}	
I_{OH}	High-level Output Current	V_{CCA} = 1.65 V to 1.95V		-4	
		V_{CCA} = 2.3V to 2.7V		-8	
		V_{CCA} = 3V to 3.6V		-12	mA
I_{OL}	Low-level Output Current	V_{CCA} = 1.65V to 1.95V		4	
		V_{CCA} = 2.3V to 2.7V		8	
		V_{CCA} = 3V to 3.6V		12	
$\Delta t/\Delta V$	Input transition rise or fall rate	V_{CCA} = 1.65V to 1.95V		20	ns/V
		V_{CCA} = 2.3V to 3.6V		10	
T_A	Operation free-air temperature		-40	85	°C

Notes:

1. To ensure proper device operation, all unused inputs must be held at V_{CCA} or GND.

Recommended Operating Conditions for B Port (V_{CCB})[1]

Paramaters	Description	Test Conditions		Min.	Max.	Units
V_{CCB}	Supply Voltage			2.3	5.5	
V_{IH}	High-level input voltage	Data Inputs	V_{CCB} = 2.3V to 5.5V	0.7 x V_{CCB}		
		DIR pin				
V_{IL}	Low-level input voltage	Data Inputs	V_{CCB} = 2.3V to 5.5V		0.3 x V_{CCB}	V
		DIR pin				
V_{IB}	Input Voltage			0	V_{CCB}	
V_{OB}	Output Votage			0	V_{CCB}	
I_{OH}	High-level Output Current	V_{CCB} = 2.3 V to 2.7V			-8	
		V_{CCB} = 3V to 3.6V			-12	
		V_{CCB} = 4.5V to 5.5V			-24	mA
I_{OL}	Low-level Output Current	V_{CCB} = 2.3V to 2.7V			8	
		V_{CCB} = 3V to 3.6V			12	
		V_{CCB} = 4.5V to 5.5V			24	
$\Delta t/\Delta V$	Input transition rise or fall rate	V_{CCB} = 2.3V to 5.5V			10	m/V
T_A	Operation free-air temperature			-40	85	ºC

Notes:
1.   To ensure proper device operation, all unused inputs must be held at V_{CCB} or GND.

Electrical Characteristics (Over recommended operating free-air temperature range)

Parameters		Test Conditions	$V_{CCA}^{(1)}$	$V_{CCB}^{(1)}$	Min.	Typ.$^{(2)}$	Max.	Units
V_{OHA} (B to A)		I_{OH} = -100uA	1.65V to 3.6V	2.3V ≤ V_{CCB} ≤ 5.5V and V_{CCB} ≥ V_{CCA}	V_{CCB}-0.1			V
		I_{OH} = -4mA	1.65V		1.3			
		I_{OH} = -8mA	2.3V		1.8			
		I_{OH} = -12mA	3.0V		2.4			
V_{OLA} (B to A)		I_{OH} = 100uA	1.65V to 3.6V				0.1	
		I_{OH} = 4mA	1.65V				0.24	
		I_{OH} = 8mA	2.3V				0.3	
		I_{OH} = 12mA	3.0V				0.4	
V_{OHB} (A to B)		I_{OH} = -100uA	1.65V ≤ V_{CCA} ≤ 3.6V and V_{CCB} ≥ V_{CCA}	2.3V to 5.5V	V_{CCB}-0.1			
		I_{OH} = -8mA		2.3V	1.8			
		I_{OH} = -12mA		3.0V	2.4			
		I_{OH} = -24mA		4.5V	3.8			
V_{OLB} (A to B)		I_{OH} = 100uA		2.3V to 5.5V			0.1	
		I_{OH} = 8mA		2.3V			0.3	
		I_{OH} = 12mA		3.0V			0.4	
		I_{OH} = 24mA		4.5V			0.55	
$I_I^{(3)}$		V_I = V_{CCA}/V_{CCB} or GND	1.65V to 3.6V and V_{CCB} ≥ V_{CCA}	2.3V to 5.5V and V_{CCB} ≥ V_{CCA}			±5	μA
I_{OFF}		V_I or V_O = V_{CCB} or GND	0V	0 to 5.5V			±10	
		V_I or V_O = V_{CCA} or GND	0 to 3.6V	0V			±10	
I_{CCA}		V_I = V_{CCA} or GND, I_O = 0	1.65V to 3.6V and V_{CCB} ≥ V_{CCA}	2.3 to 5.5V and V_{CCB} ≥ V_{CCA}			10	
I_{CCB}		V_I = V_{CCB} or GND, I_O = 0					10	
C_I	A1, DIR	VI = V_{CCA} or GND	1.8V	3.3V		4.5		pF
C_O	B1	Vo = V_{CCB} or GND	1.8V	3.3V		4.5		
C_{IO}	A2, B2	V_I or V_O = V_{CCA}/V_{CCB} or GND	1.8V	3.3V		6.0		

Notes:
1. When 1.65 ≤ V_{CCA} ≤ 1.95V, V_{CCB} can not be greater then 3.6V
2. All Typical values are at T_A = 25ºC
3. For I/O ports, the paraneter I_I includes the output leackage current.

Switching Characteristics for V_{CCA} = 1.8V ± 0.15V
(Over recommended operating free-air temperature range, see figure 1)

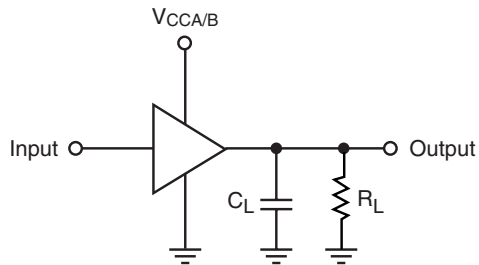| Parameter	From (Input)	To (Output)	V_{CCB} = 2.5V ±0.2V		V_{CCB} = 3.3V ±0.3V		Units
			Min.	Max.	Min.	Max.	
t_{PHL}	A	B	1.0	8	1.0	8	
t_{PLH}			1.0	8	1.0	8	
t_{PHL}	B	A	1.0	7	1.0	7	ns
t_{PLH}			1.0	7	1.0	7	
$t_{SK(O)}$				1.5		1	

Switching Characteristics for V_{CCA} = 2.5V ± 0.2V
(Over recommended operating free-air temperature range, see figure 1)

Parameter	From (Input)	To (Output)	V_{CCB} = 2.5V ±0.2V		V_{CCB} = 3.3V ±0.3V		V_{CCB} = 5V ±0.5V		Units
			Min.	Max.	Min.	Max.	Min.	Max.	
t_{PHL}	A	B	1.0	7	1.0	6.5	1.0	6	
t_{PLH}			1.0	7	1.0	6.5	1.0	6	
t_{PHL}	B	A	1.0	6	1.0	6	1.0	5	ns
t_{PLH}			1.0	6	1.0	6	1.0	5	
$t_{SK(O)}$				1.5		1		1	

Switching Characteristics for V_{CCA} = 3.3V ± 0.3V
(Over recommended operating free-air temperature range, see figure 1)

Parameter	From (Input)	To (Output)	V_{CCB} = 3.3V ±0.3V		V_{CCB} = 5V ±0.5V		Units
			Min.	Max.	Min.	Max.	
t_{PHL}	A	B	1.0	5	1.0	5	
t_{PLH}			1.0	5	1.0	5	
t_{PHL}	B	A	1.0	5	1.0	5	ns
t_{PLH}			1.0	5	1.0	5	
$t_{SK(O)}$				1		1	

AC Loading and Waveforms

V$_{CCA/B}$	C$_L$	R$_L$
1.8 ± 0.15V	15pF	1KΩ
2.5V ± 0.2V	15pF	500Ω
3.0V to 3.6V	30pF	500Ω
5V ± 0.5V	50pF	500Ω

C$_L$ includes load and stray capacitance
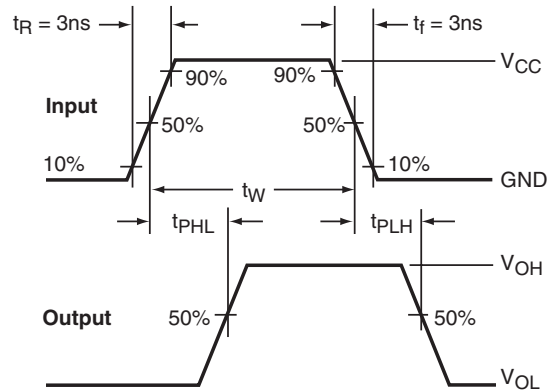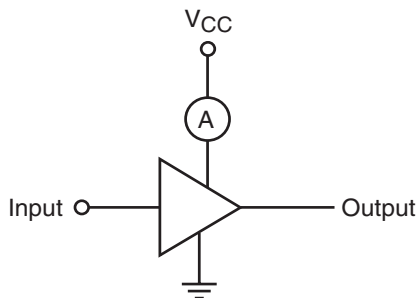Input PRR = 1.0 MHz; t$_W$ = 500ns
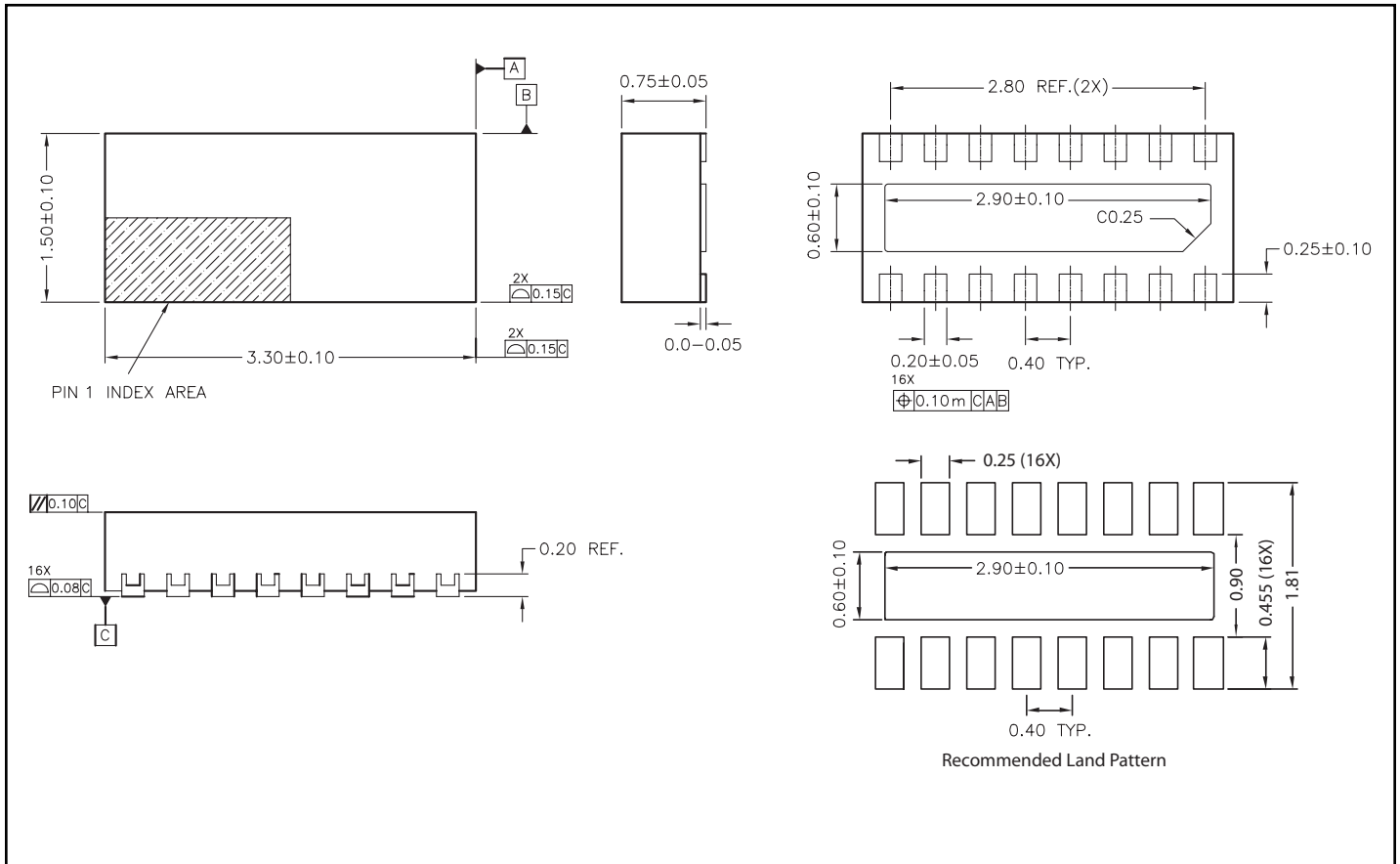
Figure 1. AC Test Circuit

Input = AC Waveform; t$_r$ = t$_f$ = 1.8ns;
PRR = 10 MHz; Duty Cycle = 50%

Figure 2. I$_{CCD}$ Test Circuit

Figure 3. AC Waveforms

Packaging Mechanical: 16-pin TDFN

Ordering Information

Ordering Code	Package Code	Package Type	Top Mark
PI74STX4G4245ZJE	ZJ	Pb-free & Green, 16-pin TDFN	4G

Notes:
• Thermal Characteristics can be found on the web at www.pericom.com/packaging/
• E = Pb-free and Green
• Adding an X suffix= Tape/Reel