

Features

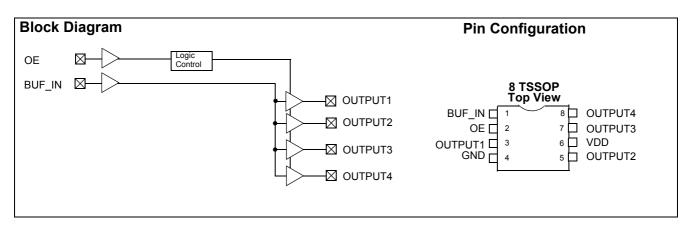
- One input to four output buffer/driver
- General-purpose or PCI-X clock buffer
- Buffers all frequencies from DC to 140 MHz
- Output-to-output skew less than 100 ps
- Space-saving 8-pin TSSOP package
- 3.3V operation
- 60 ps typical output-output skew

Functional Description

The CY2304NZ is a low-cost buffer designed to distribute high-speed clocks for PCI-X and other applications. The device operates at 3.3V and outputs can run up to 140 MHz.

Table 1. Function Table

Inputs	Outputs	
BUF_IN OE		Output [1:4]
L	L	L
Н	L	L
L	Н	L
Н	Н	Н



Pin Description for CY2304NZ

Signal	Pin	Description
V _{DD}	6	3.3V voltage supply
GND	4	Ground
BUF_IN	1	Input clock
OUTPUT [1:4]	3, 5, 7, 8	Outputs
OE	2	Input pin for output enable, active HIGH.

3901 North First Street

San Jose, CA 95134 • 408-943-2600 Revised January 04, 2005



CY2304NZ

Maximum Ratings

Supply Voltage to Ground Potential–0.5V to V_{DD} +0.5V
DC Input Voltage (Except REF)–0.5V to $\rm V_{DD}$ +0.5V
DC Input Voltage REF–0.5V to $\mathrm{V_{DD}}$ +0.5V

Storage Temperature65°C to +150	Э°С
Max. Soldering Temperature (10 sec.) 260	Э°С
Junction Temperature 150	Э°С
Static Discharge Voltage (per MIL-STD-883, Method 3015)> 2,00)0V

Operating Conditions

Parameter Description		Min.	Max.	Unit
V _{DD}	Supply Voltage	3.0	3.6	V
T _A	Operating Temperature (Ambient Temperature)	-40	85	°C
CL	Load Capacitance	-	25	pF
C _{IN}	Input Capacitance	-	7	pF
BUF_IN, OUTPUT [1:4]	Operating Frequency	DC	140	MHz
t _{PU}	Power-up time for all VDD's to reach minimum specified voltage (power ramps must be monotonic)	0.05	50	ms

Electrical Characteristics

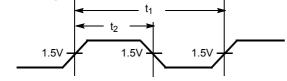
Parameter	Description	Test Conditions	Min.	Max.	Unit
V _{IL}	Input LOW Voltage ^[1]		-	0.8	V
V _{IH}	Input HIGH Voltage ^[1]		2.0	-	V
IIL	Input LOW Current	V _{IN} = 0V	-5	5	μΑ
IIH	Input HIGH Current	V _{IN} = V _{DD}	-5	5	μΑ
V _{OL}	Output LOW Voltage ^[2]	I _{OL} = 24 mA	-	0.8	V
		I _{OL} = 12 mA	-	0.55	V
V _{OH}	Output HIGH Voltage ^[2]	I _{OH} = –24 mA	2.0	-	V
		I _{OH} = -12 mA	2.4	-	V
I _{DD}	Supply Current	Unloaded outputs at 66.66 MHz	-	25	mA

Switching Characteristics^[3] for Commercial and Industrial Temperature Devices

Parameter	Name	Description	Min.	Тур.	Max.	Unit	
	Duty Cycle ^[2] = $t_2 \div t_1$	Measured at 1.5V	40.0	50.0	60.0	%	
t ₃	Rise Time ^[2]	Measured between 0.8V and 2.0V	-	-	1.50	ns	
t ₄	Fall Time ^[2]	Measured between 0.8V and 2.0V	-	-	1.50	ns	
t ₅	Output to Output Skew ^[2]	All outputs equally loaded	-	60	100	ps	
t ₆	Propagation Delay, BUF_IN Rising Edge to OUTPUT Rising Edge ^[2]	Measured at V _{DD} /2	2.5	3.5	5	ns	

Switching Waveforms

Duty Cycle Timing



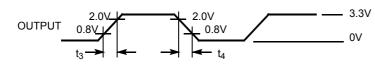
Notes:
1. BUF_IN input has a threshold voltage of V_{DD}/2.
2. Parameter is guaranteed by design and characterization. It is not 100% tested in production.
3. All parameters specified with loaded outputs.



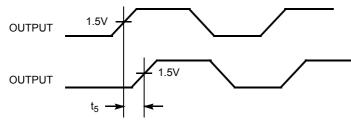
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Switching Waveforms (continued)

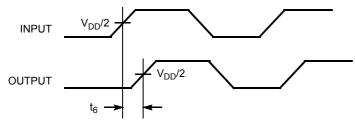
All Outputs Rise/Fall Time



Output-Output Skew



Input-Output Propagation Delay



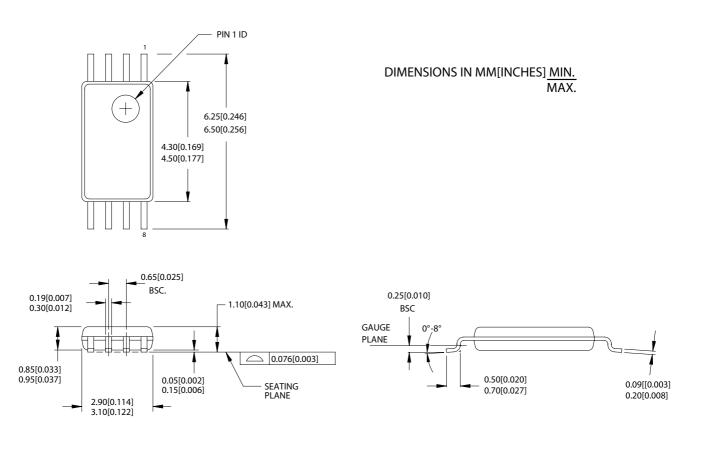
Ordering Information

Ordering Code	Package Type	Operating Range
Standard		
CY2304NZZC-1	8-pin TSSOP	Commercial, 0°C to 70°C
CY2304NZZC-1T	8-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY2304NZZI-1	8-pin TSSOP	Industrial, –40°C to 85°C
CY2304NZZI-1T	8-pin TSSOP – Tape and Reel	Industrial, –40°C to 85°C
Lead-free		
CY2304NZZXC-1	8-pin TSSOP	Commercial, 0°C to 70°C
CY2304NZZXC-1T	8-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY2304NZZXI-1	8-pin TSSOP	Industrial, –40°C to 85°C
CY2304NZZXI-1T	8-pin TSSOP – Tape and Reel	Industrial, –40°C to 85°C



Package Diagram

8-Lead Thin Shrunk Small Outline Package (4.40 MM Body) Z8



51-85093-*A

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Document History Page

Document Title: CY2304NZ Four Output PCI-X and General Purpose Buffer Document Number: 38-07099					
REV.	ECN NO.	Issue Date	Orig. of Change	Description of Change	
**	111420	02/12/02	IKA	New data sheet	
*A	118610	09/25/02	HWT	Added Industrial Temperature Range in the Ordering Information	
*B	121820	12/14/02	RBI	Power-up requirements added to Operating Conditions Information	
*C	291098	See ECN	RGL	Added Lead-free Devices Specified typical value for output-output skew	