

Four Output PCI-X and General Purpose Buffer

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
- Available in 8-pin TSSOP and SOIC Packages
- 3.3V operation

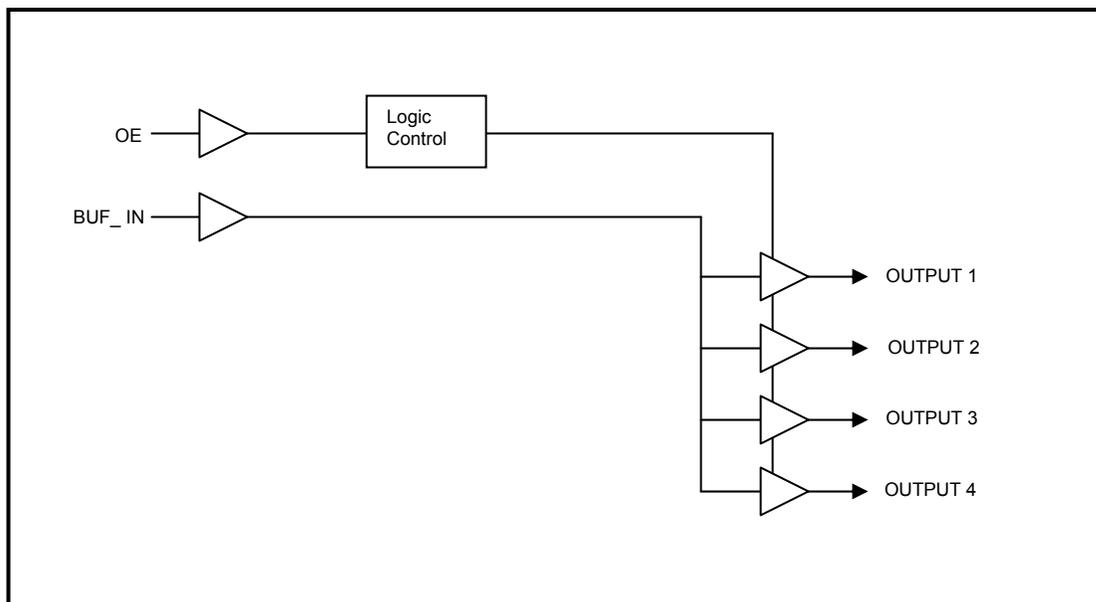
Functional Description

The ASM2P2304NZ 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
H	L	L
L	H	L
H	H	H

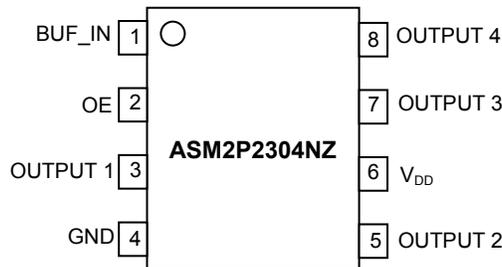
Block Diagram



January 2007

rev 1.1

Pin Configuration



Pin Description

Pin #	Pin Name	Type	Description
1	BUF_IN ¹	I	Input clock. 5V Tolerant Input
2	OE	I	Input pin for Output Enable, active HIGH. Connect to V _{DD}
3	Output 1 ²	O	Output 1
4	GND	P	Ground
5	Output 2 ²	O	Output 2
6	V _{DD}	P	3.3V Voltage Supply
7	Output 3 ²	O	Output 3
8	Output 4 ²	O	Output 4

Notes :

1. Weak pull down on input
2. Weak pull down on all outputs

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Absolute Maximum Ratings

Parameter	Description	Min	Max
Supply Voltage to Ground Potential	-0.5	7	V
DC Input Voltage (Except BUF_IN)	-0.5	V _{DD} + 0.5	V
DC Input Voltage (BUF_IN)	-0.5	7	V
Storage Temperature	-65	+150	°C
Max. Soldering Temperature (10 sec)		260	°C
Junction Temperature		150	°C
Static Discharge Voltage (As per JEDEC STD22- A114-B)		2000	V
Note: These are stress ratings only and functional usage is not implied. Exposure to absolute maximum ratings for prolonged periods can affect device reliability.			

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
C _L	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 V _{DD} '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
I _{IL}	Input LOW Current	V _{IN} = 0V	-5	5	μA
I _{IH}	Input HIGH Current	V _{IN} = V _{DD}	-5	12	μA
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 for Commercial and Industrial Temperature Devices³

Parameter	Name	Description	Min	Typ	Max	Unit	
t _D	Duty Cycle ² = t ₂ ÷ 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 2.0V and 0.8V	-	-	1.50	nS	
t ₅	Output to Output Skew ²	All outputs equally loaded	For Commercial parts	-	-	100	pS
			For Industrial parts	-	-	150	
t ₆	Propagation Delay, BUF_IN Rising Edge to OUTPUT Rising Edge ²	Measured at V _{DD} /2	2.5	3.5	5	nS	

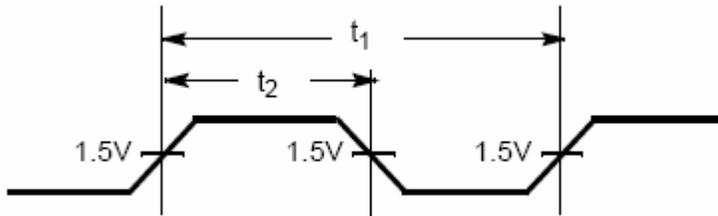
Note:

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.

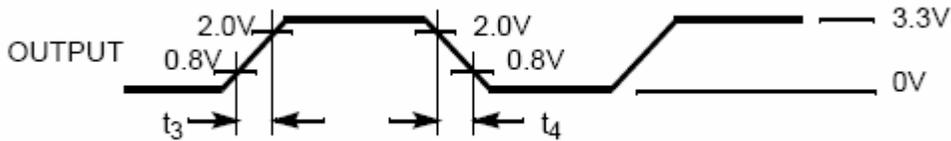
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Switching Waveforms

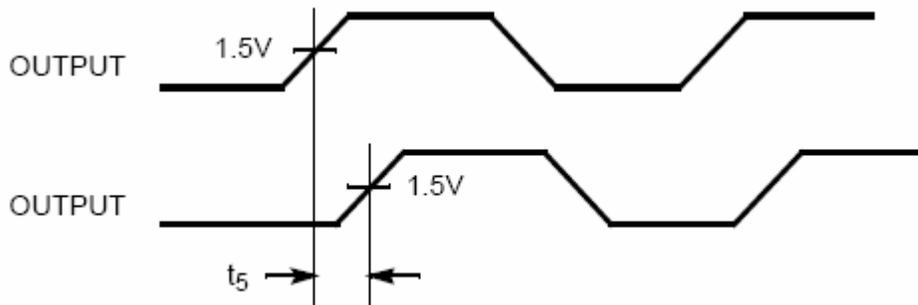
Duty Cycle Timing



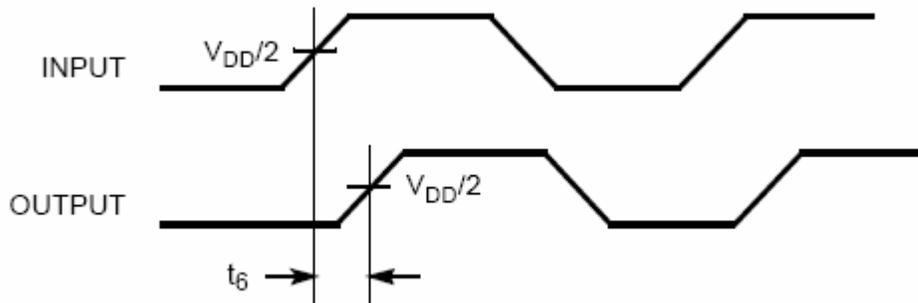
All Outputs Rise/Fall Time



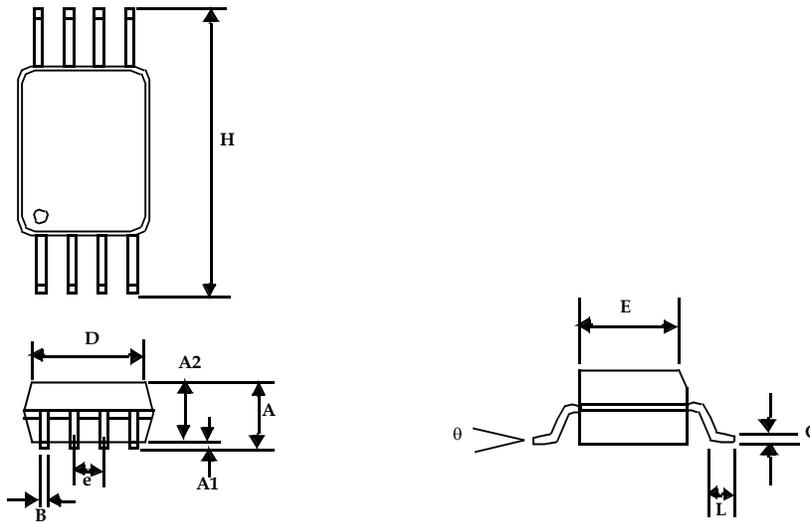
Output-Output Skew



Input-Output Propagation Delay



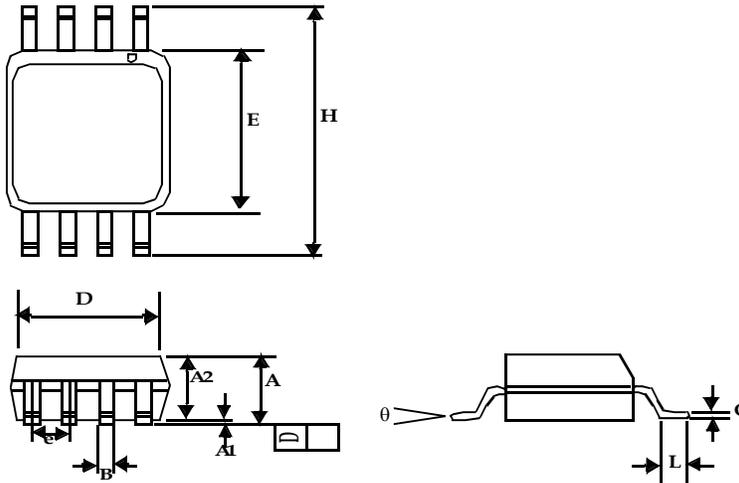
8-lead Thin Shrunk Small Outline Package (4.40-MM Body)



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A		0.043		1.10
A1	0.002	0.006	0.05	0.15
A2	0.033	0.037	0.85	0.95
B	0.008	0.012	0.19	0.30
c	0.004	0.008	0.09	0.20
D	0.114	0.122	2.90	3.10
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
H	0.252 BSC		6.40 BSC	
L	0.020	0.028	0.50	0.70
θ	0°	8°	0°	8°

Package Information

8-lead (150-mil) SOIC Package

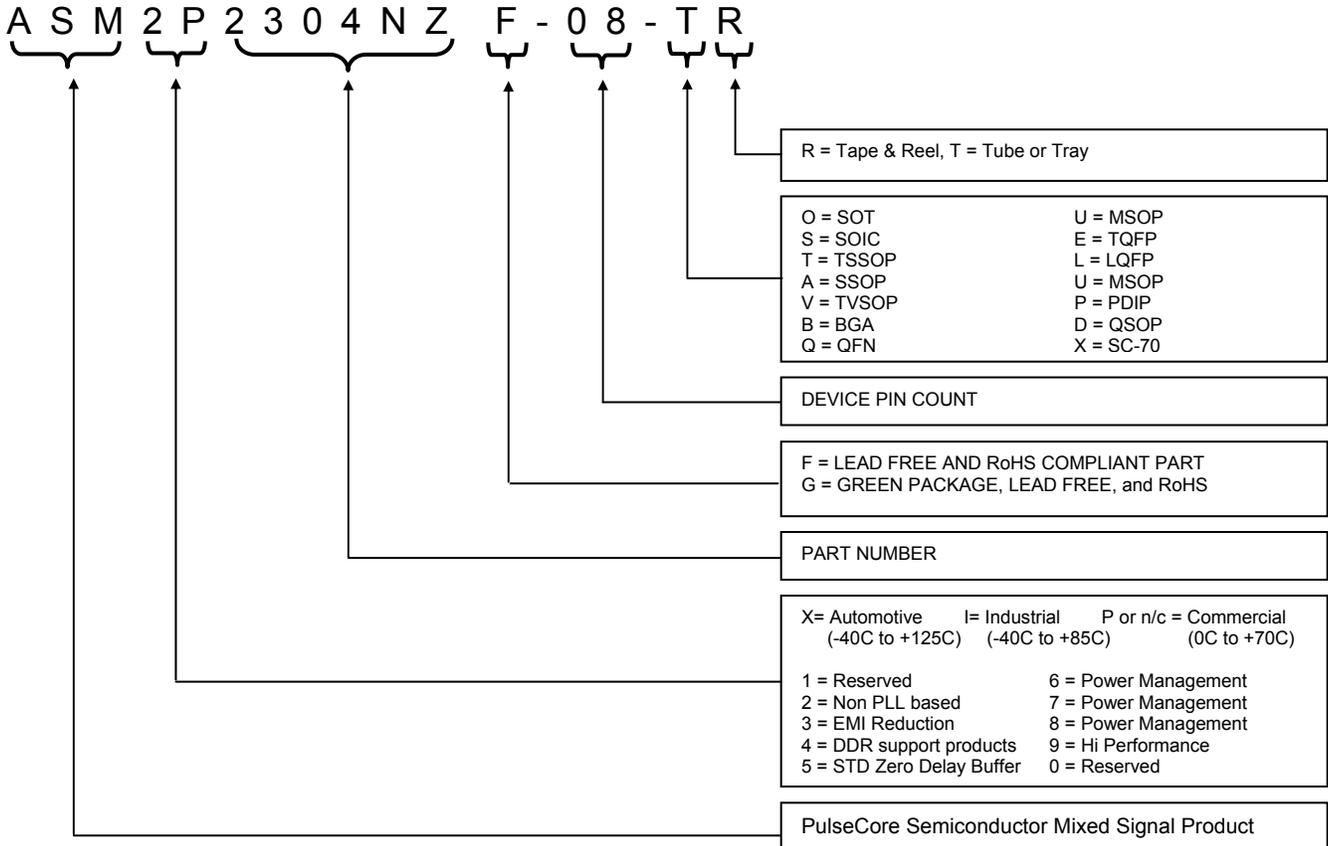


Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A1	0.004	0.010	0.10	0.25
A	0.053	0.069	1.35	1.75
A2	0.049	0.059	1.25	1.50
B	0.012	0.020	0.31	0.51
C	0.007	0.010	0.18	0.25
D	0.193 BSC		4.90 BSC	
E	0.154 BSC		3.91 BSC	
e	0.050 BSC		1.27 BSC	
H	0.236 BSC		6.00 BSC	
L	0.016	0.050	0.41	1.27
θ	0°	8°	0°	8°

Ordering Codes

Part Number	Marking	Package Type	Temperature
ASM2P2304NZF-08-ST	2P2304NZF	8-pin SOIC - Tube, Pb Free	Commercial
ASM2P2304NZF-08-SR	2P2304NZF	8-pin SOIC - Tape and Reel, Pb Free	Commercial
ASM2I2304NZF-08-ST	2I2304NZF	8-pin SOIC - Tube, Pb Free	Industrial
ASM2I2304NZF-08-SR	2I2304NZF	8-pin SOIC - Tape and Reel, Pb Free	Industrial
ASM2P2304NZG-08-ST	2P2304NZG	8-pin SOIC - Tube, Green	Commercial
ASM2P2304NZG-08-SR	2P2304NZG	8-pin SOIC - Tape and Reel, Green	Commercial
ASM2I2304NZG-08-ST	2I2304NZG	8-pin SOIC - Tube, Green	Industrial
ASM2I2304NZG-08-SR	2I2304NZG	8-pin SOIC - Tape and Reel, Green	Industrial
ASM2P2304NZF-08-TT	2P2304NZF	8-pin TSSOP - Tube, Pb Free	Commercial
ASM2P2304NZF-08-TR	2P2304NZF	8-pin TSSOP - Tape and Reel, Pb Free	Commercial
ASM2I2304NZF-08-TT	2I2304NZF	8-pin TSSOP - Tube, Pb Free	Industrial
ASM2I2304NZF-08-TR	2I2304NZF	8-pin TSSOP - Tape and Reel, Pb Free	Industrial
ASM2P2304NZG-08-TT	2P2304NZG	8-pin TSSOP - Tube, Green	Commercial
ASM2P2304NZG-08-TR	2P2304NZG	8-pin TSSOP - Tape and Reel, Green	Commercial
ASM2I2304NZG-08-TT	2I2304NZG	8-pin TSSOP - Tube, Green	Industrial
ASM2I2304NZG-08-TR	2I2304NZG	8-pin TSSOP - Tape and Reel, Green	Industrial

Device Ordering Information



Licensed under US patent #5,488,627, #6,646,463 and #5,631,920.



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Note: This product utilizes US Patent # 6,646,463 Impedance Emulator Patent issued to PulseCore Semiconductor, dated 11-11-2003

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