



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
- Space-saving 8-pin TSSOP Package
- 3.3V operation

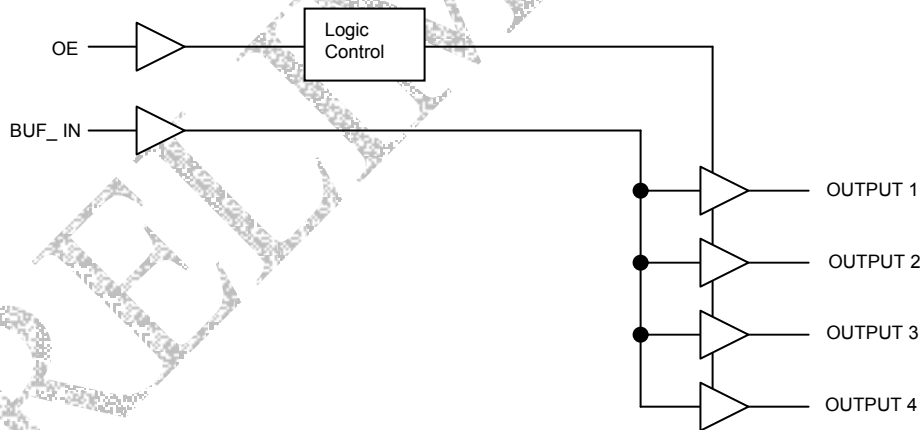
Functional Description

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

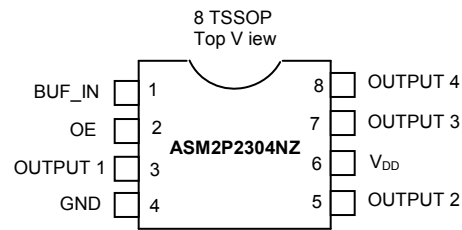
Block Diagram





rev 0.4

Pin Configuration



Pin Description

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



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Absolute Maximum Ratings

Parameter	Min	Max	Unit
Supply Voltage to Ground Potential	-0.5	7	V
DC Input Voltage (Except REF)	-0.5	$V_{DD} + 0.5$	V
DC Input Voltage (REF)	-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



rev 0.4

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	5	μA
V_{OL}	Output LOW Voltage ²	$I_{OL} = 24\text{ mA}$	-	0.8	V
		$I_{OL} = 12\text{ mA}$	-	0.55	V
V_{OH}	Output HIGH Voltage ²	$I_{OH} = -24\text{ mA}$	2.0	-	V
		$I_{OH} = -12\text{ mA}$	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 = $t_2 \div t_1$	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	-	-	200	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

Note:

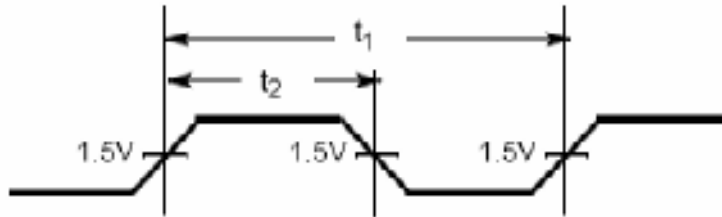
1. BUF_IN input has a threshold voltage of $V_{DD}/2$.
2. Parameter is guaranteed by design and characterization. It is not 100% tested in production.
3. All parameters specified with loaded outputs.



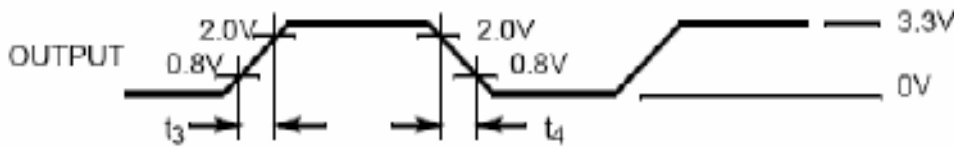
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Switching Waveforms

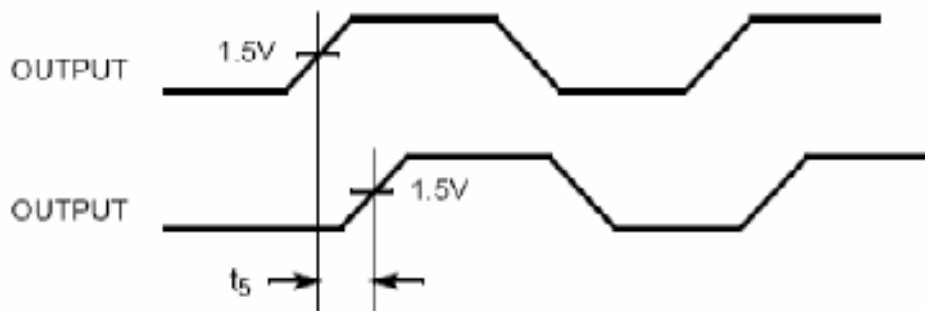
Duty Cycle Timing



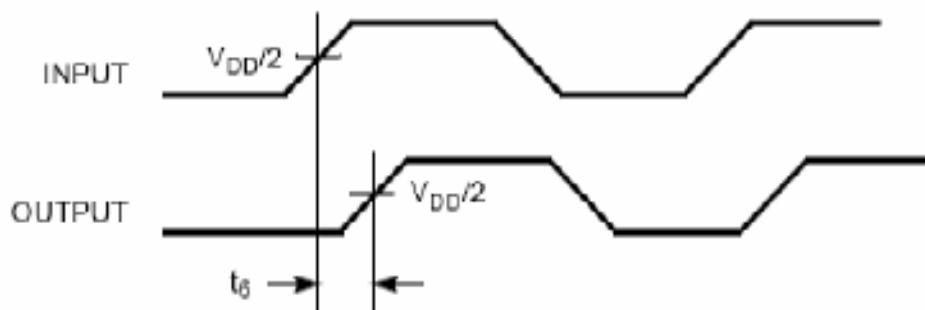
All Outputs Rise/Fall Time



Output-Output Skew



Input-Output Propagation Delay

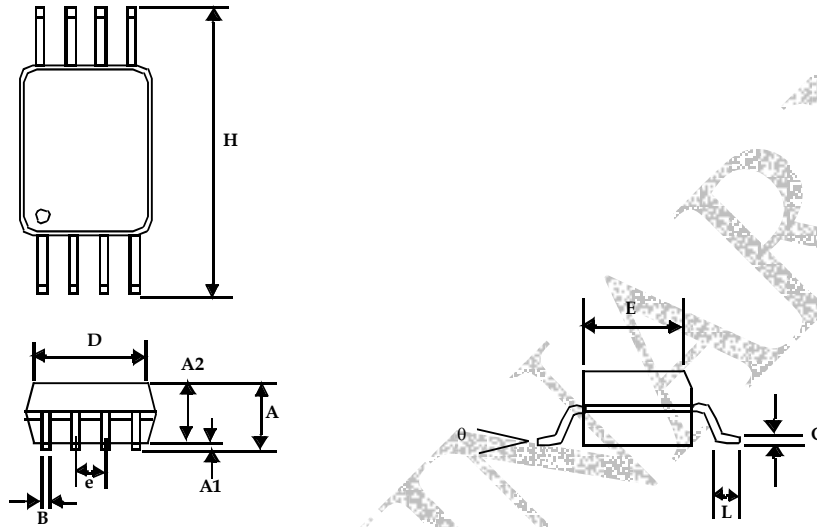




rev 0.4

Package Information

8-lead Thin Shrunken 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°



rev 0.4

Ordering Codes

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

Device Ordering Information

A S M 2 P 2 3 0 4 N Z F - 0 8 - T R

R = Tape & reel, T = Tube or Tray

O = SOT	U = MSOP
S = SOIC	E = TQFP
T = TSSOP	L = LQFP
A = SSOP	U = MSOP
V = TVSOP	P = PDIP
B = BGA	D = QSOP
O = QFN	X = SC-70

DEVICE PIN COUNT

F = LEAD FREE AND RoHS COMPLIANT PART
G = GREEN PACKAGE

PART NUMBER

X = Automotive (-40C to +125C)	I = Industrial (-40C to +85C)	P or n/c = Commercial (0C to +70C)
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1 = Reserved	6 = Power Management
2 = Non PLL based	7 = Power Management
3 = EMI Reduction	8 = Power Management
4 = DDR support products	9 = Hi Performance
5 = STD Zero Delay Buffer	0 = Reserved

ALLIANCE SEMICONDUCTOR MIXED SIGNAL PRODUCT

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 Alliance Semiconductor, dated 11-11-2003

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