



### 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

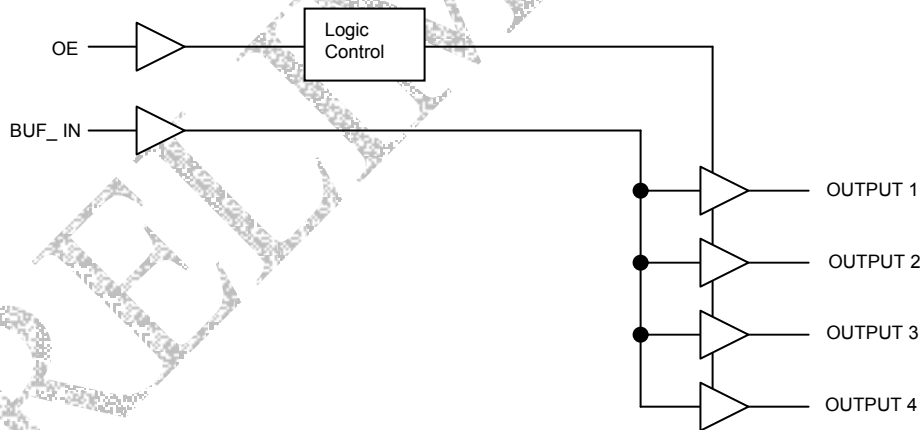
#### Functional Description

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

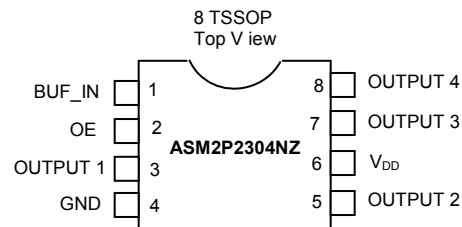
#### Block Diagram





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## 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 <sub>DD</sub>	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



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## Electrical Characteristics

Parameter	Description	Test Conditions	Min	Max	Unit
$V_{IL}$	Input LOW Voltage <sup>1</sup>		-	0.8	V
$V_{IH}$	Input HIGH Voltage <sup>1</sup>		2.0	-	V
$I_{IL}$	Input LOW Current	$V_{IN} = 0V$	-5	5	$\mu A$
$I_{IH}$	Input HIGH Current	$V_{IN} = V_{DD}$	-5	5	$\mu A$
$V_{OL}$	Output LOW Voltage <sup>2</sup>	$I_{OL} = 24\text{ mA}$	-	0.8	V
		$I_{OL} = 12\text{ mA}$	-	0.55	V
$V_{OH}$	Output HIGH Voltage <sup>2</sup>	$I_{OH} = -24\text{ mA}$	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 Devices<sup>3</sup>

Parameter	Name	Description	Min	Typ	Max	Unit
$t_D$	Duty Cycle <sup>2</sup> = $t_2 \div t_1$	Measured at 1.5V	40.0	50.0	60.0	%
$t_3$	Rise Time <sup>2</sup>	Measured between 0.8V and 2.0V	-	-	1.50	nS
$t_4$	Fall Time <sup>2</sup>	Measured between 0.8V and 2.0V	-	-	1.50	nS
$t_5$	Output to Output Skew <sup>2</sup>	All outputs equally loaded	-	-	200	pS
$t_6$	Propagation Delay, BUF_IN Rising Edge to OUTPUT Rising Edge <sup>2</sup>	Measured at $V_{DD}/2$	2.5	3.5	5	nS

Note:

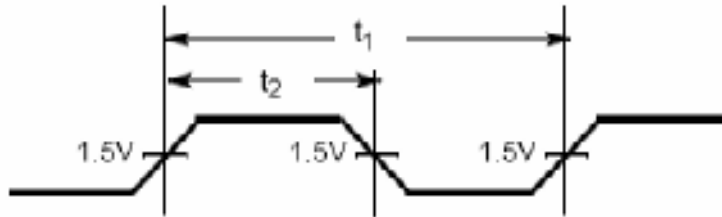
1. BUF\_IN input has a threshold voltage of  $V_{DD}/2$ .
2. Parameter is guaranteed by design and characterization. It is not 100% tested in production.
3. All parameters specified with loaded outputs.



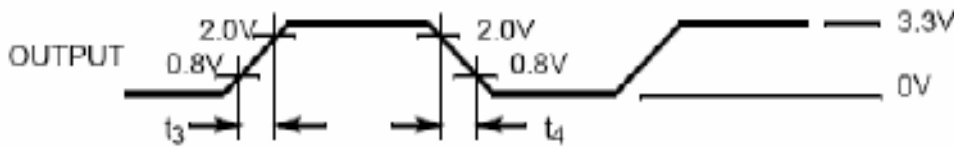
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### Switching Waveforms

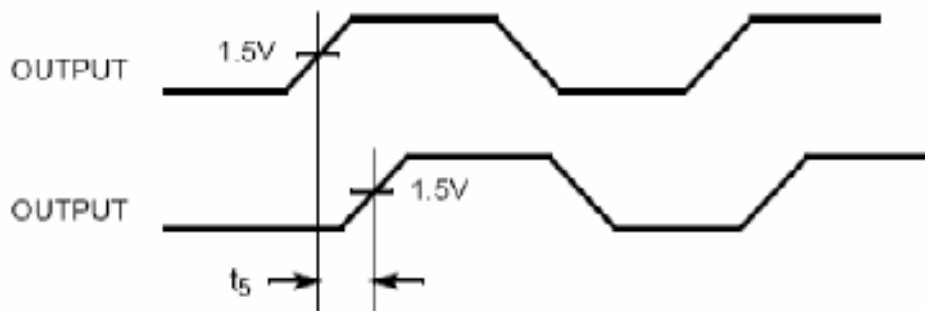
#### Duty Cycle Timing



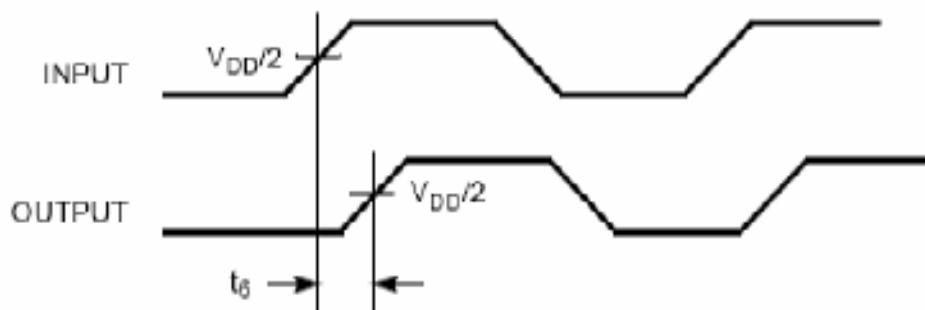
#### All Outputs Rise/Fall Time



#### Output-Output Skew



#### Input-Output Propagation Delay

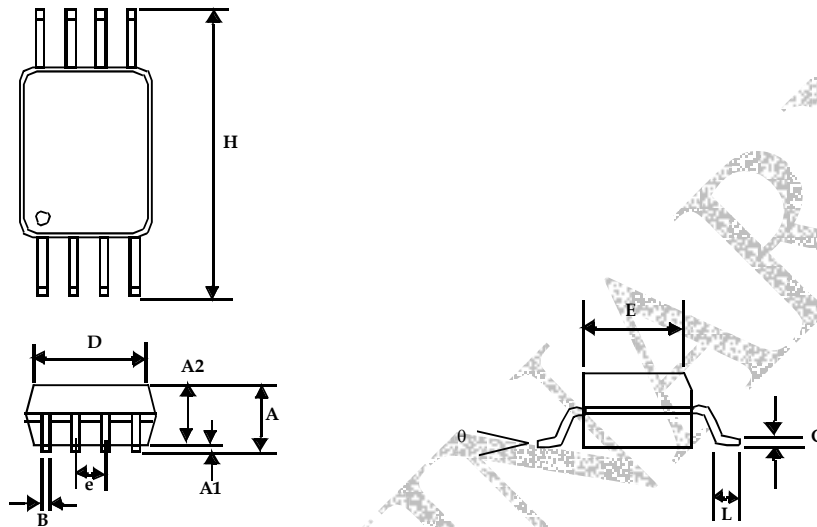




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## Package Information

## 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
$\theta$	0°	8°	0°	8°

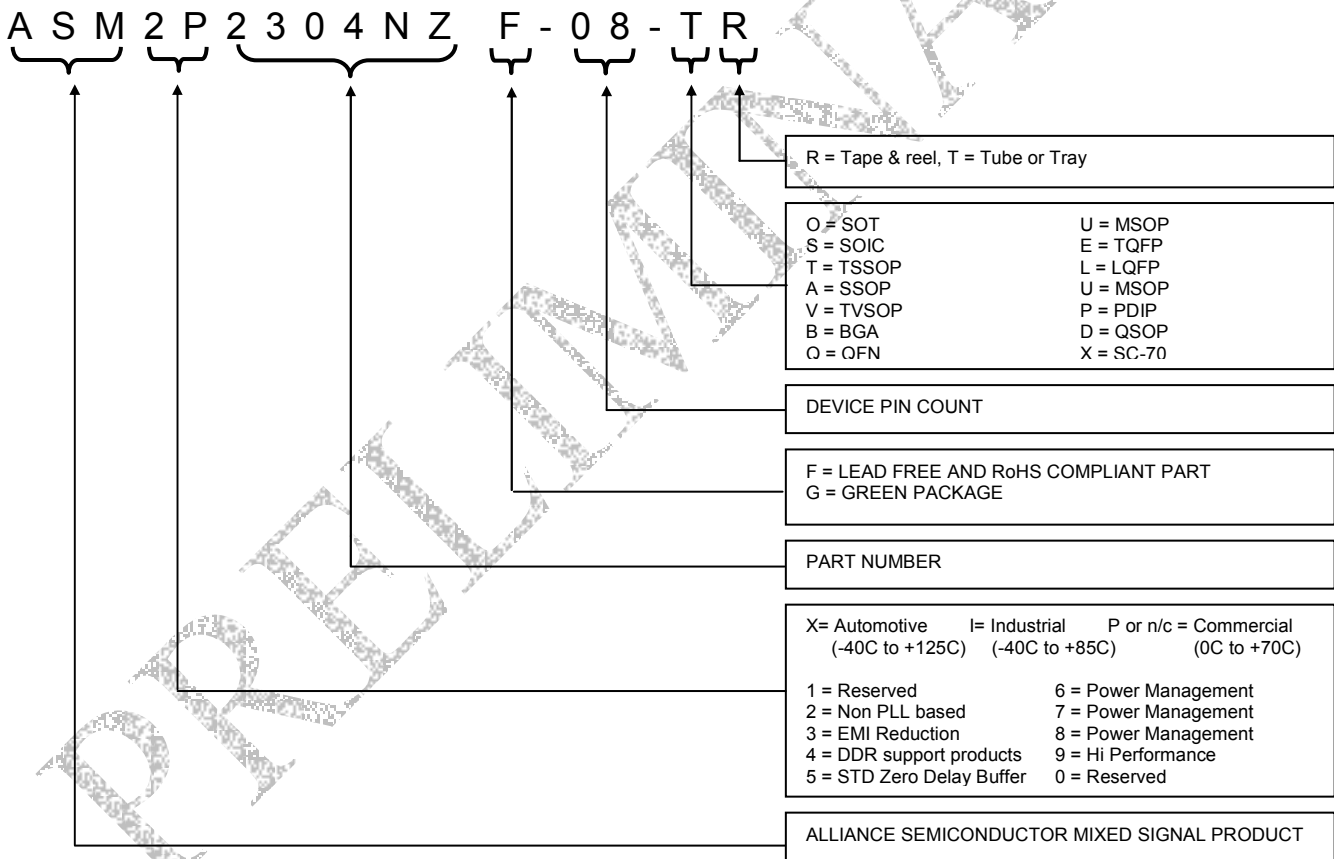


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Ordering Codes

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



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



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Document Version: 0.4

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

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