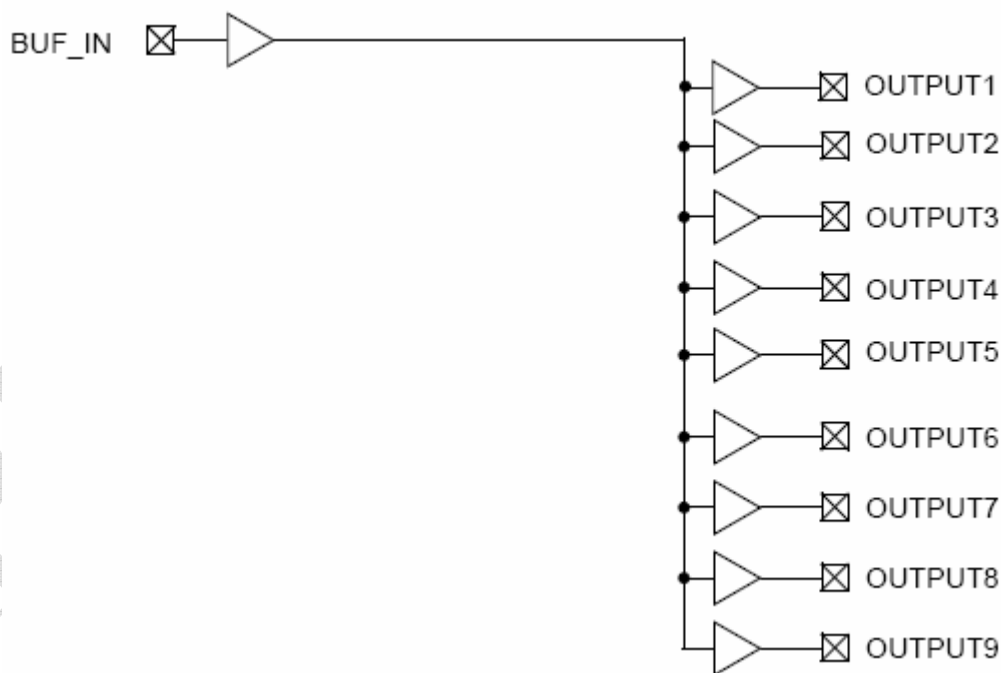## Nine Output 3.3V Buffer

Features

- One-input to Nine-Output Buffer/Driver
- Supports two DIMMs or four SO-DIMMs with one additional output for feedback to an external or chipset PLL
- Low power consumption for mobile applications Less than 32 mA at 66.6 MHz with unloaded outputs
- 1nS Input-Output delay
- Buffers all frequencies from DC to 133.33 MHz
- Output-output skew less than 250pS
- Multiple V_{DD} and V_{SS} pins for noise and electromagnetic interference (EMI) reduction
- Space-saving 16-pin 150-mil SOIC Package
- 3.3V operation
- Commercial and Industrial temperature parts are available

Functional Description

The ASM2P2309NZ is a low-cost buffer designed to distribute high-speed clocks in mobile PC systems and desktop PC systems with SDRAM support. The part has nine outputs, eight of which can be used to drive two DIMMs or four SO-DIMMs, and the remaining can be used for external feedback to a PLL. The device operates at 3.3V and outputs can run up to 133.33 MHz.

The ASM2P2309NZ is designed for low EMI and power optimization. It has multiple V_{SS} and V_{DD} pins for noise optimization and consumes less than 32 mA at 66.6 MHz, making it ideal for the low-power requirements of mobile systems. It is available in an ultra-compact 150-mil 16-pin SOIC package.
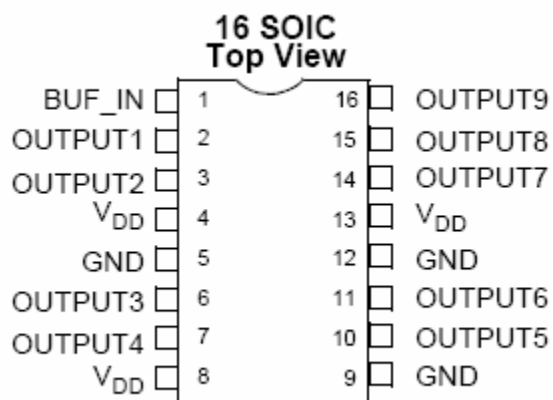
Block Diagram

Alliance Semiconductor
2575, Augustine Drive ● Santa Clara, CA ● Tel: 408.855.4900 ● Fax: 408.855.4999 ● www.alsc.com

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Pin Configuration for ASM2P2309NZ

Pin Description for ASM2P2309NZ

Pin	Signal	Description
4, 8, 13	V_{DD}	3.3V Digital Voltage Supply
5, 9, 12	GND	Ground
1	BUF_IN	Input Clock
2, 3, 6, 7, 10, 11, 14, 15, 16	OUTPUT [1:9]	Outputs

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Absolute Maximum Ratings

Parameter	Min	Max	Unit
Supply Voltage to Ground Potential	-0.5	7.0	V
DC Input Voltage (Except REF)	-0.5	V_{DD} + 0.5	V
DC Input Voltage (REF)	-0.5	0.7	V
Storage Temperature	-65	+150	°C
Junction Temperature		150	°C
Static Discharge Voltage (As per JEDEC STD 22- 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	(Ambient Operating Temperature), Commercial	0	70	°C
	(Ambient Operating Temperature), Industrial	−40	85	°C
C_L	Load Capacitance, Fout < 100 MHz	-	30	pF
	Load Capacitance,100 MHz < Fout < 133.33 MHz	-	15	pF
C_{IN}	Input Capacitance	-	7	pF
BUF_IN, OUTPUT [1:9]	Operating Frequency	DC	133.33	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 for Commercial and Industrial Temperature Devices

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	-	50.0	µA
I_{IH}	Input HIGH Current	V_{IN} = V_{DD}	-	100.0	µA
V_{OL}	Output LOW Voltage[2]	I_{OL} = 8 mA	-	0.4	V
V_{OH}	Output HIGH Voltage[2]	I_{OH} = −8 mA	2.4	-	V
I_{DD}	Supply Current	Unloaded outputs at 66.66 MHz	-	32	mA

Switching Characteristics for Commercial and Industrial Temperature Devices[3]

Parameter	Name	Description	Min.	Typ.	Max.	Unit
t_D	Duty Cycle[2] = $t_2 \div t_1$	Measured at 1.4V	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	-	-	250	pS
t_6	Propagation Delay, BUF_IN Rising Edge to OUTPUT Rising Edge[2]	Measured at V_{DD}/2	1	5	9.2	nS

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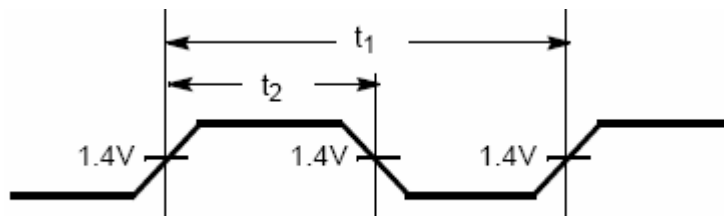2. Parameter is guaranteed by design and characterization. It is not 100% tested in production.
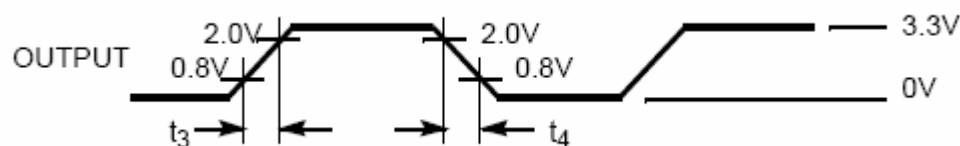3. All parameters specified with loaded outputs.

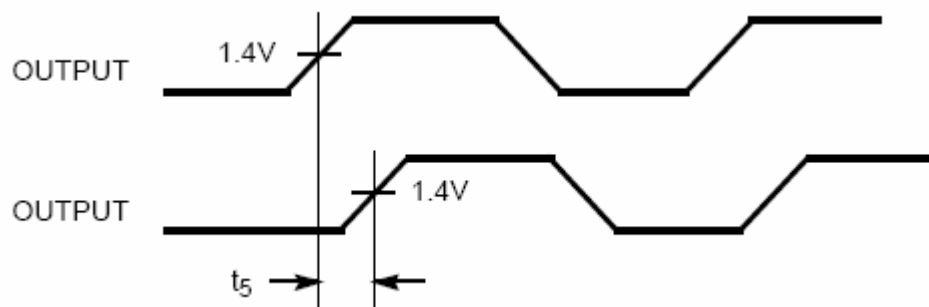Notice: The information in this document is subject to change without notice.

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Switching Waveforms

Duty Cycle Timing
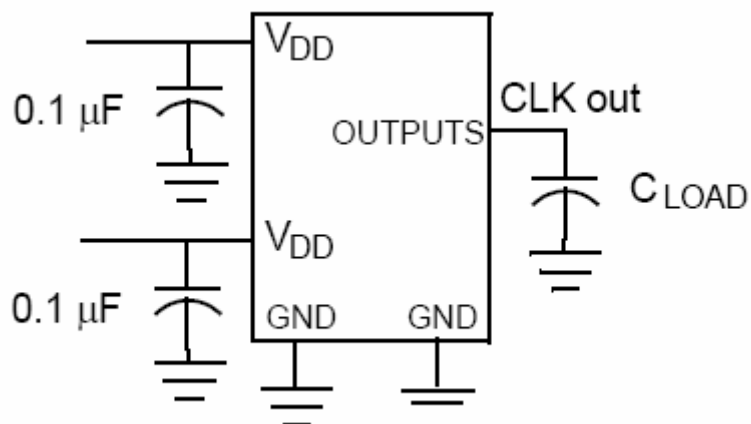

All Outputs Rise/Fall Time

Output-Output Skew

Input-Output Propagation Delay

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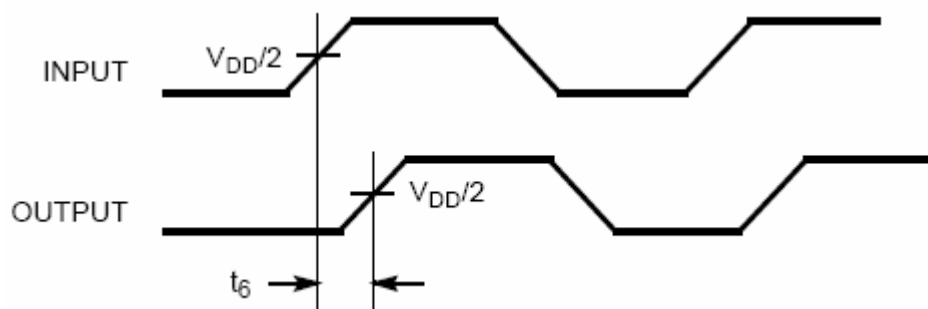
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Test Circuits

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Package Information

16-lead (150 Mil) Molded SOIC Package
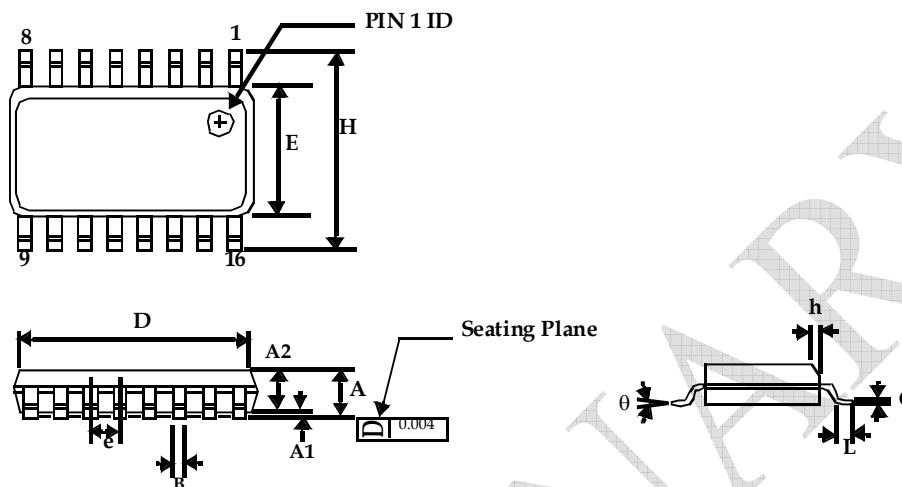
Symbol	Dimensions			
	Inches		Millimeters	
	Min	**Max**	**Min**	**Max**
A	0.053	0.069	1.35	1.75
A1	0.004	0.010	0.10	0.25
A2	0.049	0.059	1.25	1.50
B	0.013	0.022	0.33	0.53
C	0.008	0.012	0.19	0.27
D	0.386	0.394	9.80	10.01
E	0.150	0.157	3.80	4.00
e	0.050 BSC		1.27 BSC	
H	0.228	0.244	5.80	6.20
h	0.010	0.016	0.25	0.41
L	0.016	0.035	0.40	0.89
θ	0°	8°	0°	8°

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Ordering Codes

Part Number	Marking	Package Type	Operating Range
ASM5P2309NZF-08-ST	5P2309NZF	16-pin 150-mil SOIC, Pb Free	Commercial
ASM5P2309NZF-08-SR	5P2309NZF	16-pin 150-mil SOIC, Tape and Reel, Pb Free	Commercial
ASM5I2309NZF-08-ST	5I2309NZF	16-pin 150-mil SOIC, Pb Free	Industrial
ASM5I2309NZF-08-SR	5I2309NZF	16-pin 150-mil SOIC, Tape and Reel, Pb Free	Industrial
ASM5P2309NZG-08-ST	5P2309NZG	16-pin 150-mil SOIC, Green	Commercial
ASM5P2309NZG-08-SR	5P2309NZG	16-pin 150-mil SOIC, Tape and Reel, Green	Commercial
ASM5I2309NZG-08-ST	5I2309NZG	16-pin 150-mil SOIC, Green	Industrial
ASM5I2309NZG-08-SR	5I2309NZG	16-pin 150-mil SOIC ,Tape and Reel, Green	Industrial

Device Ordering Information

A S M 2 P 2 3 0 9 N Z F - 1 6 - S 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
Q = QFN	X = SC-70

DEVICE PIN COUNT

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

PART NUMBER

X= Automotive   I= Industrial   P or n/c = Commercial
  (-40C to +125C)   (-40C to +85C)   (0C to +70C)

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.

Nine Output 3.3V Buffer   **8 of 9**

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

Nine Output 3.3V Buffer

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