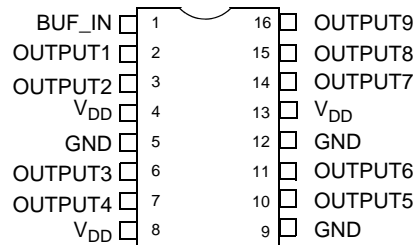


## Pinouts

**Figure 1. CY2309NZ - 16 SOIC-Top View**



**Table 1. Pin Description for CY2309NZ**

Pin	Signal	Description
4, 8, 13	V <sub>DD</sub>	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

## Maximum Ratings

Supply Voltage to Ground Potential.....-0.5V to +7.0V

DC Input Voltage (Except REF) ..... -0.5V to V<sub>DD</sub> + 0.5V

DC Input Voltage REF .....-0.5V to 7V

Storage Temperature ..... -65°C to +150°C

Junction Temperature ..... 150°C

Static Discharge Voltage  
(per MIL-STD-883, Method 3015) ..... >2,000V

## Operating Conditions for Commercial and Industrial Temperature Devices

Parameter	Description	Min	Max	Unit
V <sub>DD</sub>	Supply Voltage	3.0	3.6	V
T <sub>A</sub>	(Ambient Operating Temperature) Commercial	0	70	°C
	(Ambient Operating Temperature) Industrial	-40	85	°C
C <sub>L</sub>	Load Capacitance, Fout < 100 MHz		30	pF
	Load Capacitance, 100 MHz < Fout < 133.33 MHz		15	pF
C <sub>IN</sub>	Input Capacitance		7	pF
BUF_IN, OUTPUT [1:9]	Operating Frequency	DC	133.33	MHz
t <sub>PU</sub>	Power up time for all VDDs to reach minimum specified voltage (power ramps must be monotonic)	0.05	50	ms

## Electrical Characteristics for Commercial and Industrial Temperature Devices

Parameter	Description	Test Conditions	Min	Max	Unit
V <sub>IL</sub>	Input LOW Voltage <sup>[1]</sup>			0.8	V
V <sub>IH</sub>	Input HIGH Voltage <sup>[1]</sup>		2.0		V
I <sub>IL</sub>	Input LOW Current	V <sub>IN</sub> = 0V		50.0	μA
I <sub>IH</sub>	Input HIGH Current	V <sub>IN</sub> = V <sub>DD</sub>		100.0	μA
V <sub>OL</sub>	Output LOW Voltage <sup>[2]</sup>	I <sub>OL</sub> = 8 mA		0.4	V
V <sub>OH</sub>	Output HIGH Voltage <sup>[2]</sup>	I <sub>OH</sub> = -8 mA	2.4		V
I <sub>DD</sub>	Supply Current	Unloaded outputs at 66.66 MHz		32	mA

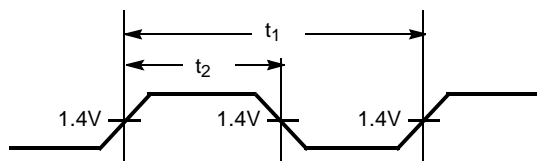
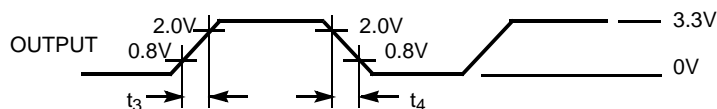
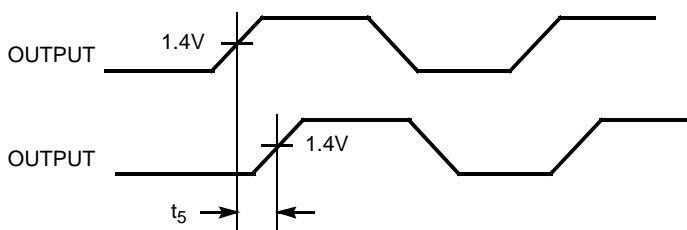
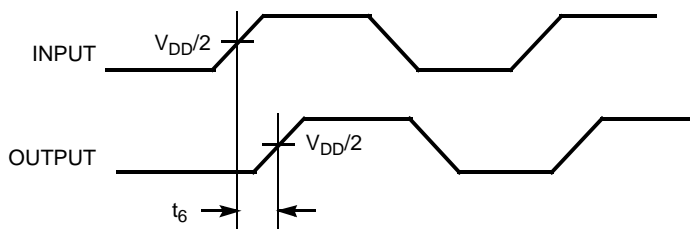
### Notes

1. BUF\_IN input has a threshold voltage of V<sub>DD</sub>/2.

2. Parameter is guaranteed by design and characterization. It is not 100% tested in production.

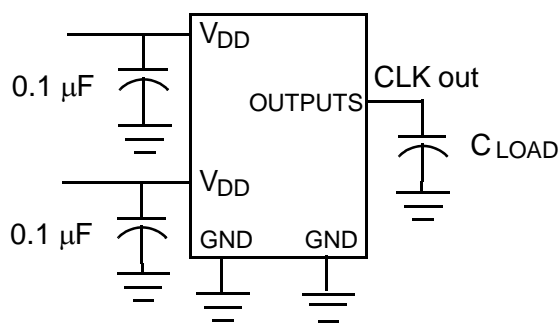
**Switching Characteristics** for Commercial and Industrial Temperature Devices<sup>[3]</sup>

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

**Switching Waveforms**
**Figure 2. Duty Cycle Timing**

**Figure 3. All Outputs Rise/Fall Time**

**Figure 4. Output-Output Skew**

**Figure 5. Input-Output Propagation Delay**

**Note**

3. All parameters specified with loaded outputs.

## Test Circuits

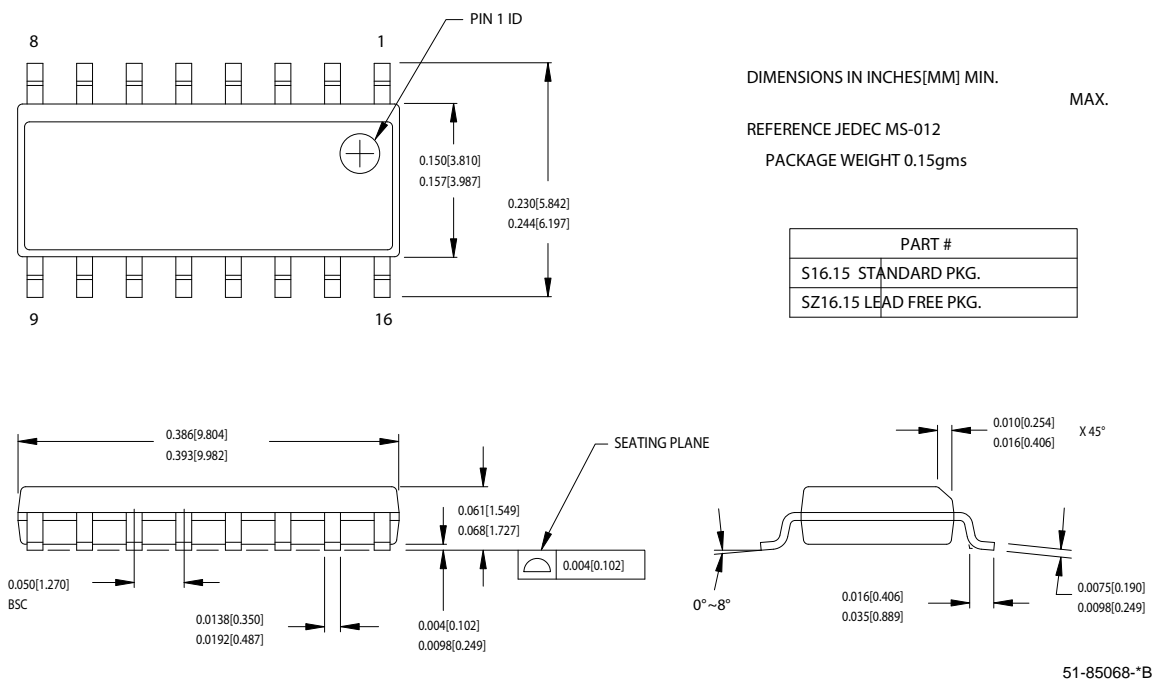


## Ordering Information

Ordering Code	Package Type	Operating Range
CY2309NZSC-1H <sup>[4]</sup>	16-pin 150-mil SOIC	Commercial
CY2309NZSC-1HT <sup>[4]</sup>	16-pin 150-mil SOIC – Tape and Reel	Commercial
<b>Pb-free</b>		
CY2309NZSXC-1H	16-pin 150-mil SOIC	Commercial
CY2309NZSXC-1HT	16-pin 150-mil SOIC – Tape and Reel	Commercial
CY2309NZSXI-1H	16-pin 150-mil SOIC	Industrial
CY2309NZSXI-1HT	16-pin 150-mil SOIC – Tape and Reel	Industrial

## Package Diagram

Figure 6. 16-Pin (150-Mil) SOIC S16



### Note

- Not recommended for new designs.

## Document History Page

Document Title: CY2309NZ Nine-Output 3.3V Buffer Document Number: 38-07182				
REV.	ECN	Orig. of Change	Submission Date	Description of Change
**	111858	DSG	12/09/01	Change from Spec number: 38-00709 to 38-07182
*A	121834	RBI	12/14/02	Power-up requirements added to Operating Conditions Information
*B	130563	SDR	10/23/03	Added industrial operating temperature to operating conditions
*C	212991	RGL/GGK	03/30/04	Updated the propagation delay $T_6$ spec to 9.2 ns in the Switching Characteristics table
*D	270149	RGL	10/04/04	Added Lead-free devices Replaced 8.7ns Input/Output Delay to 1ns Input/Output Delay in the features section
*E	2568533	AESA	09/23/08	Updated template. Added Note "Not recommended for new designs." Changed "SDRAM [1:9]" to "OUTPUT [1:9]" in Operating Conditions table. Removed part number CY2309NZSI-1H and CY2309NZSI-1HT.

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