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NC7NZ34 TinyLogic® UHS Triple Buffer

General Description

The NC7NZ34 is a triple buffer from Fairchild's Ultra High Speed Series of TinyLogic® in the space saving US8 package. The device is fabricated with advanced CMOS technology to achieve ultra high speed with high output drive while maintaining low static power dissipation over a very broad V_{CC} operating range. The device is specified to operate over the 1.65V to 5.5V V_{CC} range. The inputs and outputs are high impedance when V_{CC} is 0V. Inputs tolerate voltages up to 7V independent of V_{CC} operating voltage.

Features

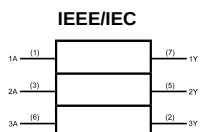
- Space saving US8 surface mount package
- MicroPak™ Pb-Free leadless package
- Ultra High Speed: t_{PD} 2.4 ns Typ into 50 pF at 5V V_{CC}
- High Output Drive: ± 24 mA at 3V V_{CC}
- Broad V_{CC} Operating Range: 1.65V to 5.5V
- Power down high impedance inputs/outputs
- Overvoltage tolerant inputs facilitate 5V to 3V translation
- Proprietary noise/EMI reduction circuitry implemented

Ordering Code:

Order Number	Package Number	Product Code Top Mark	Package Description	Supplied As
NC7NZ34K8X	MAB08A	NZ34	8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide	3k Units on Tape and Reel
NC7NZ34L8X	MAC08A	P9	Pb-Free 8-Lead MicroPak, 1.6 mm Wide	5k Units on Tape and Reel

Pb-Free package per JEDEC J-STD-020B.

Logic Symbol



Pin Descriptions

Pin Names	Description
A_1, A_2, A_3	Data Inputs
Y_1, Y_2, Y_3	Output

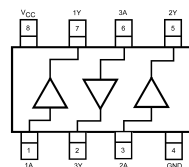
Function Table

$$Y = A$$

Input	Output
A	Y
L	L
H	H

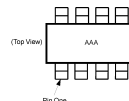
H = HIGH Logic Level
L = LOW Logic Level

Connection Diagrams



(Top View)

Pin One Orientation Diagram

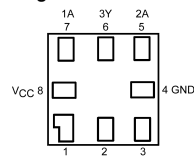


Pin One

AAA represents Product Code Top Mark - see ordering code

Note: Orientation of Top Mark determines Pin One location. Read the top product code mark left to right, Pin One is the lower left pin (see diagram).

Pad Assignments for MicroPak



(Top Thru View)

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MicroPak™ is a trademark of Fairchild Semiconductor Corporation.

Absolute Maximum Ratings(Note 1)

Supply Voltage (V_{CC})	–0.5V to +7.0V
DC Input Voltage (V_{IN})	–0.5V to +7.0V
DC Output Voltage (V_{OUT})	–0.5V to +7.0V
DC Input Diode Current (I_{IK})	
$V_{IN} < 0V$	–50 mA
DC Output Diode Current (I_{OK})	
$V_{OUT} < 0V$	–50 mA
DC Output Source/Sink Current (I_{OUT})	±50 mA
DC V_{CC}/GND Current (I_{CC}/I_{GND})	±100 mA
Storage Temperature (T_{STG})	–65°C to +150°C
Junction Temperature under Bias (T_J)	150°C
Junction Lead Temperature (T_L)	
(Soldering, 10 seconds)	260°C
Power Dissipation (P_D) @ +85°C	250 mW

Recommended Operating Conditions (Note 2)

Supply Voltage	
Operating (V_{CC})	1.65V to 5.5V
Data Retention	1.5V to 5.5V
Input Voltage (V_{IN})	0V to 5.5V
Output Voltage (V_{OUT})	0V to V_{CC}
Input Rise and Fall Time (t_r, t_f)	
$V_{CC} = 1.8V, 2.5V \pm 0.2V$	0 to 20 ns/V
$V_{CC} = 3.3V \pm 0.3V$	0 to 10 ns/V
$V_{CC} = 5.5V \pm 0.5V$	0 to 5 ns/V
Operating Temperature (T_A)	–40°C to +85°C
Thermal Resistance (θ_{JA})	250°C/W

Note 1: Absolute maximum ratings are DC values beyond which the device may be damaged or have its useful life impaired. The datasheet specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. Fairchild does not recommend operation outside datasheet specifications.

Note 2: Unused inputs must be held HIGH or LOW. They may not float.

DC Electrical Characteristics

Symbol	Parameter	V_{CC} (V)	$T_A = +25^\circ\text{C}$			$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		Units	Conditions	
			Min	Typ	Max	Min	Max			
V_{IH}	HIGH Level Control Input Voltage	1.8 ± 0.15 2.3 to 5.5	$0.75 V_{CC}$ $0.7 V_{CC}$			$0.75 V_{CC}$ $0.7 V_{CC}$		V		
V_{IL}	LOW Level Control Input Voltage	1.8 ± 0.15 2.3 to 5.5	$0.25 V_{CC}$ $0.3 V_{CC}$			$0.25 V_{CC}$ $0.3 V_{CC}$		V		
V_{OH}	HIGH Level Control Output Voltage	1.65	1.55	1.65		1.55		V	$V_{IN} = V_{IH}$	$I_{OH} = -100 \mu\text{A}$
		2.3	2.2	2.3		2.2				$I_{OH} = -4 \text{ mA}$
		3.0	2.9	3.0		2.9				$I_{OH} = -8 \text{ mA}$
		4.5	4.4	4.5		4.4				$I_{OH} = -16 \text{ mA}$
		1.65	1.29	1.52		1.29				$I_{OH} = -24 \text{ mA}$
		2.3	1.9	2.14		1.9				$I_{OH} = -32 \text{ mA}$
		3.0	2.4	2.75		2.4				
		3.0	2.3	2.62		2.3				
V_{OL}	LOW Level Control Output Voltage	1.65		0.0	0.1		0.1	V	$V_{IN} = V_{IL}$	$I_{OL} = 100 \mu\text{A}$
		2.3		0.0	0.1		0.1			$I_{OL} = 4 \text{ mA}$
		3.0		0.0	0.1		0.1			$I_{OL} = 8 \text{ mA}$
		4.5		0.0	0.1		0.1			$I_{OL} = 16 \text{ mA}$
		1.65		0.08	0.24		0.24			$I_{OL} = 24 \text{ mA}$
		2.3		0.10	0.3		0.3			$I_{OL} = 32 \text{ mA}$
		3.0		0.16	0.4		0.4			
		3.0		0.24	0.55		0.55			
I_{IN}	Input Leakage Current	0 to 5.5	±0.1			±1.0		μA	$0 \leq V_{IN} \leq 5.5V$	
I_{OFF}	Power Off Leakage Current	0.0	1.0			10		μA	V_{IN} or $V_{OUT} = 5.5V$	
I_{CC}	Quiescent Supply Current	1.65 to 5.5	1.0			10		μA	$V_{IN} = 5.5V, GND$	

AC Electrical Characteristics

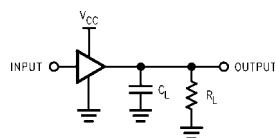
Symbol	Parameter	V _{CC} (V)	T _A = +25°C			T _A = -40°C to +85°C		Units	Conditions	Figure Number
			Min	Typ	Max	Min	Max			
t _{PLH}	Propagation Delay	1.8 ± 0.15	1.8	4.6	8.0	1.8	8.8	ns	C _L = 15 pF, R _L = 1 MΩ	Figures 1, 3
t _{PHL}		2.5 ± 0.2	1.0	3.0	5.2	1.0	5.8			
		3.3 ± 0.3	0.8	2.3	3.6	0.8	4.0			
		5.0 ± 0.5	0.5	1.8	2.9	0.5	3.2			
t _{PLH}	Propagation Delay	3.3 ± 0.3	1.2	3.0	4.6	1.2	5.1	ns	C _L = 50 pF, R _L = 500Ω	Figures 1, 3
t _{PHL}		5.0 ± 0.5	0.8	2.4	3.8	0.8	4.2			
C _{IN}	Input Capacitance	0	2.5					pF		
C _{PD}	Power Dissipation	3.3	9					pF	(Note 3)	Figure 2
	Capacitance	5.0	11							

Note 3: C_{PD} is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I_{CCD}) at no output loading and operating at 50% duty cycle. (See Figure 2.) C_{PD} is related to I_{CCD} dynamic operating current by the expression:
 $I_{CCD} = (C_{PD})(V_{CC})(f_{IN}) + (I_{CC} \text{Static})$.

Dynamic Switching Characteristics

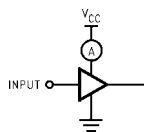
Symbol	Parameter	Conditions	V _{CC} (V)	T _A = 25°C	Unit
				Typical	
V _{OLP}	Quiet Output Dynamic Peak V _{OL}	C _L = 50pF, V _{IH} = 5.0V, V _{IL} = 0V	5.0	0.8	V
V _{OLV}	Quiet Output Dynamic Valley V _{OL}	C _L = 50pF, V _{IH} = 5.0V, V _{IL} = 0V	5.0	-0.8	V

AC Loading and Waveforms



C_L includes load and stray capacitance
 Input PRR = 1.0 MHz; t_W = 500 ns

FIGURE 1. AC Test Circuit



Input = AC Waveform; t_r = t_f = 1.8 ns;
 PRR = 10 MHz; Duty Cycle = 50%

FIGURE 2. I_{CCD} Test Circuit

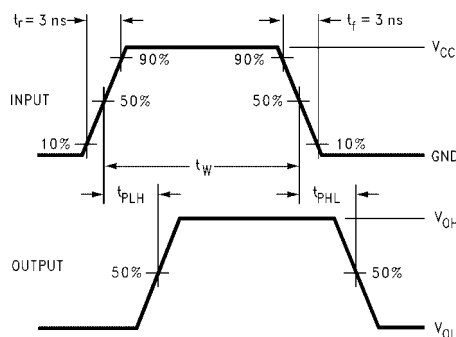
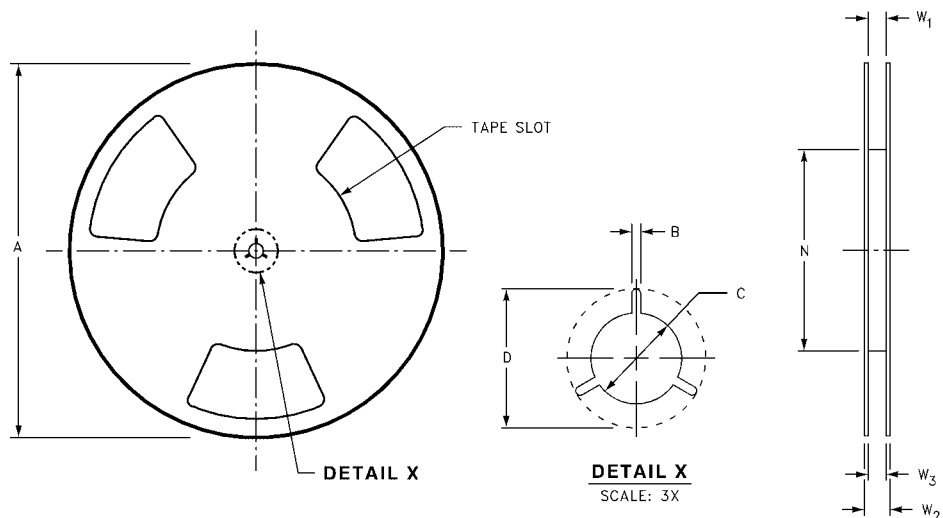


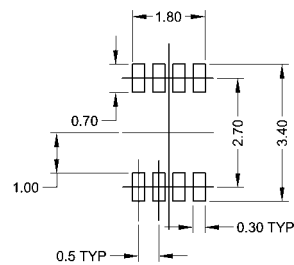
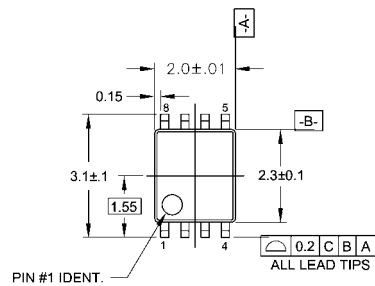
FIGURE 3. AC Waveforms

Tape and Reel Specification (Continued)
REEL DIMENSIONS inches (millimeters)

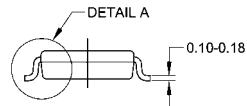
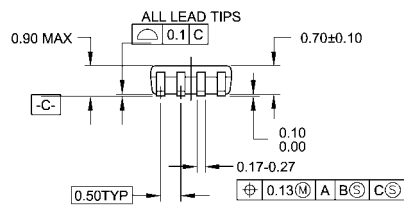


Tape Size	A	B	C	D	N	W1	W2	W3
8 mm	7.0 (177.8)	0.059 (1.50)	0.512 (13.00)	0.795 (20.20)	2.165 (55.00)	0.331 + 0.059/-0.000 (8.40 + 1.50/-0.00)	0.567 (14.40)	W1 + 0.078/-0.039 (W1 + 2.00/-1.00)

Physical Dimensions inches (millimeters) unless otherwise noted

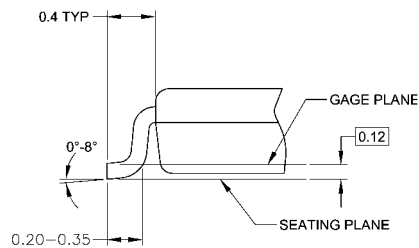


LAND PATTERN RECOMMENDATION



NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MO-187
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
- D. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M, 1982.



DETAIL A

MAB08AREVC

8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide
Package Number MAB08A

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