

NC7WZ04 TinyLogic™ UHS Dual Inverter

General Description

The NC7WZ04 is a dual inverter from Fairchild's Ultra High Speed Series of TinyLogic™ in the space saving SC70 6-lead 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 1.8V to 5.5V V_{CC} range. The inputs tolerate voltages up to 7V independent of V_{CC} operating voltage.

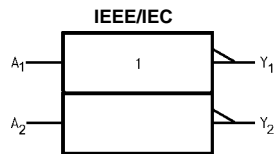
Features

- Space saving SC70 6-lead package
- Ultra High Speed: t_{PD} 2.3 ns Typ into 50 pF at 5V V_{CC}
- High Output Drive: ± 24 mA at 3V V_{CC}
- Broad V_{CC} Operating Range; 1.8V to 5.5V
- Matches the performance of LCX when operated at 3.3V V_{CC}
- Power down high impedance inputs/outputs
- Overvoltage tolerant inputs facilitate 5V to 3V translation
- Patented noise/EMI reduction circuitry implemented

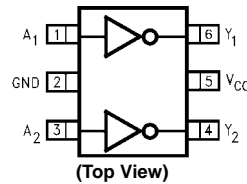
Ordering Code:

Order Number	Package Number	Package Top Mark	Package Description	Supplied As
NC7WZ04P6	MAA06A	Z04	6-lead SC70, EIAJ SC88, 1.25mm Wide	250 Units on Tape and Reel
NC7WZ04P6X	MAA06A	Z04	6-lead SC70, EIAJ SC88, 1.25mm Wide	3k Units on Tape and Reel

Logic Symbol



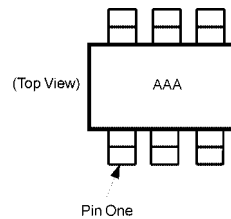
Connection Diagrams



Pin Descriptions

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

Pin One Orientation Diagram



Function Table

$$Y = \bar{A}$$

Input	Output
A	Y
L	H
H	L

H = HIGH Logic Level
L = LOW Logic Level

AAA represents Package Top Mark - see ordering code

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

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	180 mW

Recommended Operating Conditions (Note 2)

Supply Voltage	
Operating (V_{CC})	1.8V 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})	350°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

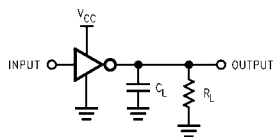
Symbol	Parameter	V_{CC} (V)	$T_A = +25^\circ C$			$T_A = -40^\circ C$ to $+85^\circ C$		Units	Conditions	
			Min	Typ	Max	Min	Max			
V_{IH}	HIGH Level Control Input Voltage	1.8	0.75 V_{CC}			0.75 V_{CC}		V		
		2.3 to 5.5	0.7 V_{CC}			0.7 V_{CC}				
V_{IL}	LOW Level Control Input Voltage	1.8	0.25 V_{CC}			0.25 V_{CC}		V		
		2.3 to 5.5	0.3 V_{CC}			0.3 V_{CC}				
V_{OH}	HIGH Level Control Output Voltage	1.8	1.7	1.8	1.7		V	$V_{IN} = V_{IL}$	$I_{OH} = -100 \mu A$	
		2.3	2.2	2.3	2.2				$I_{OH} = -8 \text{ mA}$	
		3.0	2.9	3.0	2.9				$I_{OH} = -16 \text{ mA}$	
		4.5	4.4	4.5	4.4				$I_{OH} = -24 \text{ mA}$	
		2.3	1.9	2.14	1.9				$I_{OH} = -32 \text{ mA}$	
		3.0	2.4	2.75	2.4				$I_{OL} = 100 \mu A$	
		3.0	2.3	2.62	2.3				$I_{OL} = 8 \text{ mA}$	
		4.5	3.8	4.13	3.8				$I_{OL} = 16 \text{ mA}$	
V_{OL}	LOW Level Control Output Voltage	1.8	0.0			0.1		V	$V_{IN} = V_{IH}$	$I_{OL} = 8 \text{ mA}$
		2.3	0.0			0.1				$I_{OL} = 16 \text{ mA}$
		3.0	0.0			0.1				$I_{OL} = 24 \text{ mA}$
		4.5	0.0			0.1				$I_{OL} = 32 \text{ mA}$
		2.3	0.10		0.3	0.3				$I_{OL} = 8 \text{ mA}$
		3.0	0.16		0.4	0.4				$I_{OL} = 16 \text{ mA}$
		3.0	0.24		0.55	0.55				$I_{OL} = 24 \text{ mA}$
		4.5	0.25		0.55	0.55				$I_{OL} = 32 \text{ mA}$
I_{IN}	Input Leakage Current	0 to 5.5				±1.0	μA	$0 \leq V_{IN} \leq 5.5V$		
I_{OFF}	Power Off Leakage Current	0.0				10	μA	V_{IN} or $V_{OUT} = 5.5V$		
I_{CC}	Quiescent Supply Current	1.8 to 5.5				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	Fig. No.
			Min	Typ	Max	Min	Max			
t _{PLH}	Propagation Delay	1.8	1.8	4.4	7.6	1.8	8.4	ns	C _L = 15 pF, R _L = 1 MΩ	Figure 1
t _{PHL}		2.5 ± 0.2	1.2	3.0	5.1	1.2	5.6			Figure 3
		3.3 ± 0.3	0.8	2.2	3.4	0.8	3.8			
		5.0 ± 0.5	0.5	1.8	2.8	0.5	3.1			
t _{PLH}	Propagation Delay	3.3 ± 0.3	1.2	2.9	4.5	1.2	5.0	ns	C _L = 50 pF, R _L = 500Ω	Figure 1
t _{PHL}		5.0 ± 0.5	0.8	2.3	3.6	0.8	4.0			Figure 3
C _{IN}	Input Capacitance	0	2.5					pF		
C _{PD}	Power Dissipation	3.3	9					pF	(Note 3)	Figure 2
	Capacitance	5.0	11							

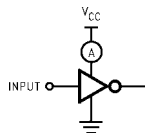
Note 3: C_{PD} is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I_{CCD}) at no output loading and operating at 50% duty cycle. (See Figure 2.) C_{PD} is related to I_{CCD} dynamic operating current by the expression:
 $I_{CCD}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

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 = variable; Duty Cycle = 50%

FIGURE 2. I_{CCD} Test Circuit

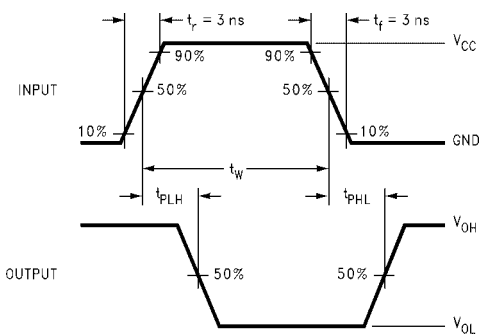


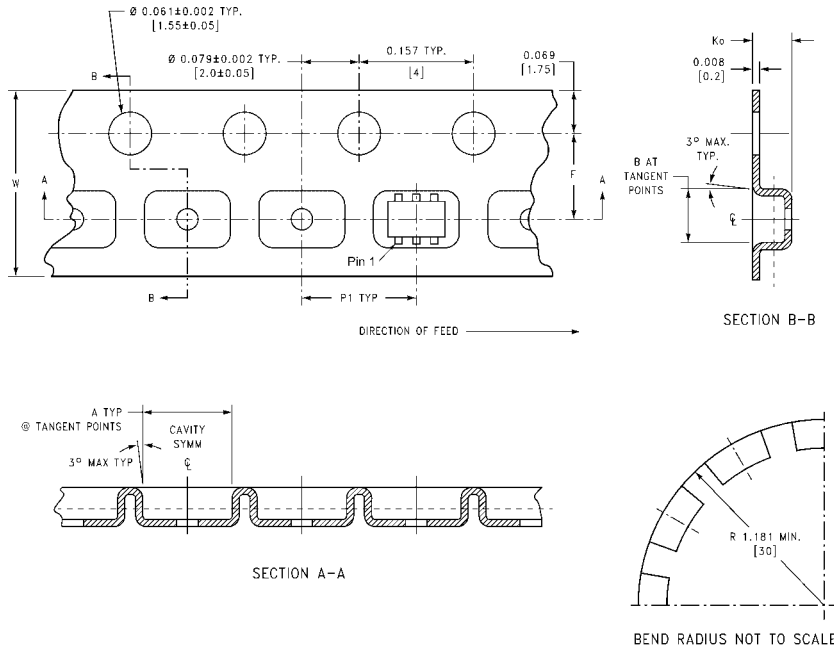
FIGURE 3. AC Waveforms

Tape and Reel Specification

TAPE FORMAT

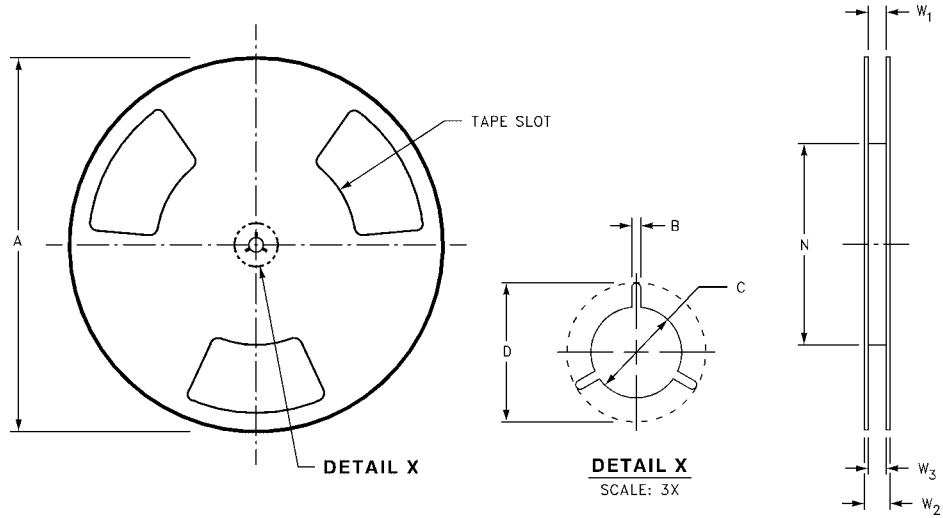
Package Designator	Tape Section	Number Cavities	Cavity Status	Cover Tape Status
P6	Leader (Start End)	125 (typ)	Empty	Sealed
	Carrier	250	Filled	Sealed
	Trailer (Hub End)	75 (typ)	Empty	Sealed
P6X	Leader (Start End)	125 (typ)	Empty	Sealed
	Carrier	3000	Filled	Sealed
	Trailer (Hub End)	75 (typ)	Empty	Sealed

TAPE DIMENSIONS inches (millimeters)



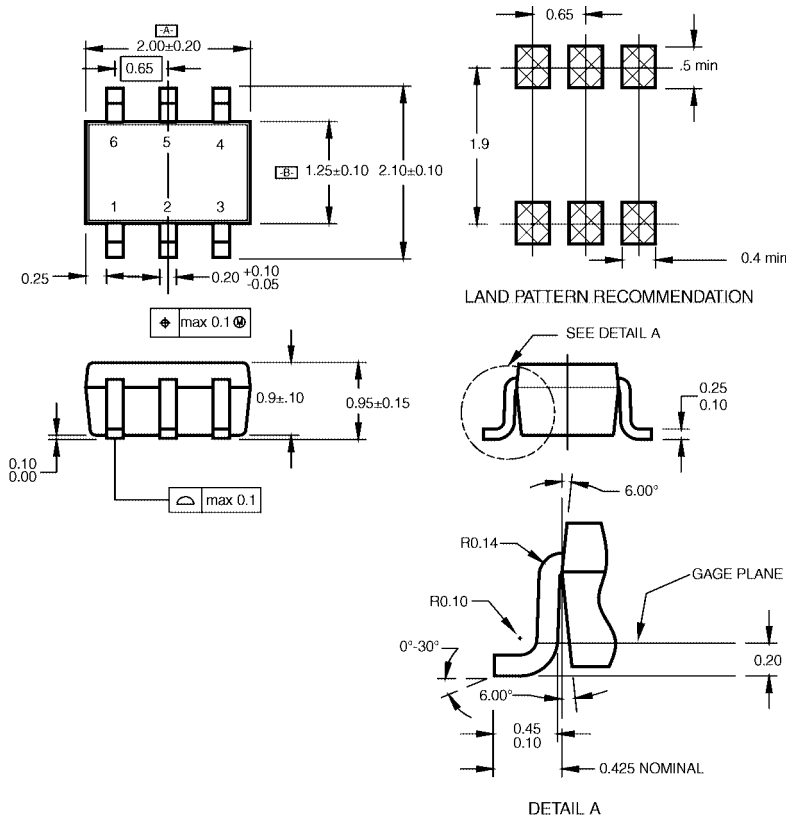
Package	Tape Size	DIM A	DIM B	DIM F	DIM K_0	DIM P1	DIM W
SC70-6	8 mm	0.093 (2.35)	0.096 (2.45)	0.138 ± 0.004 (3.5 ± 0.10)	0.053 ± 0.004 (1.35 ± 0.10)	0.157 (4)	0.315 ± 0.004 (8 ± 0.1)

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



NOTES:

- A. CONFORMS TO EIAJ REGISTERED OUTLINE DRAWING SC88.
- B. DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH.
- C. DIMENSIONS ARE IN MILLIMETERS.

MAA06ARevC

**6-Lead SC70, EIAJ SC88, 1.25mm Wide
Package Number MAA06A**

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