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December 2010

NC7WZ16 TinyLogic[®] UHS Dual Buffer

Features

- Ultra-High Speed: t_{PD} 2.4ns (Typical) into 50pF at 5V V_{CC}
- High Output Drive: ±24mA at 3V V_{CC}
- Broad V_{CC} Operating Range: 1.65V to 5.5V
- Matches Performance of LCX when Operated at 3.3V V_{CC}
- Power Down High-Impedance Inputs/Outputs
- Over-Voltage Tolerance Inputs Facilitate 5V to 3V Translation
- Proprietary Noise/EMI Reduction Circuitry
- Ultra-Small MicroPak™ Packages
- Space-Saving SC70 Package

Description

The NC7WZ16 is a dual buffer from Fairchild's Ultra-High Speed Series of TinyLogic®. 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 $V_{\rm CC}$ operating range. The device is specified to operate over the 1.65V to 5.5V $V_{\rm CC}$ range. The inputs and outputs are high impedance when $V_{\rm CC}$ is 0V. Inputs tolerate voltages up to 7V independent of $V_{\rm CC}$ operating voltage.

Ordering Information

Part Number	Top Mark	Package	Packing Method
NC7WZ16P6X	Z16	6-Lead SC70, EIAJ SC-88a, 1.25mm Wide	3000 Units on Tape & Reel
NC7WZ16L6X	C7	6-Lead MicroPak™, 1.00mm Wide	5000 Units on Tape & Reel
NC7WZ16FHX	C7	6-Lead, MicroPak2™, 1x1mm Body, .35mm Pitch	5000 Units on Tape & Reel

Connection Diagrams

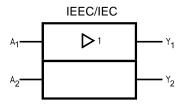
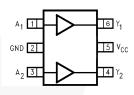


Figure 1. Logic Symbol

Pin Configurations





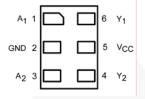
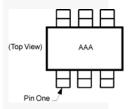


Figure 3. MicroPak™ (Top Through View)



Notes:

- 1. AAA represents Product Code Top Mark (see ordering code).
- 2. Orientation of Top Mark determines Pin One location. Read the top product code mark left to right. Pin One is the lower left pin.

Figure 4. Pin 1 Orientation

Pin Definitions

Pin # SC70	Pin # MicroPak™	Name	Description
1	1	A ₁	Input
2	2	GND	Ground
3	3	A ₂	Input
4	4	Y ₂	Output
5	5	V _{CC}	Supply Voltage
6	6	Y ₁	Output

Function Table

Y= A

Inputs	Output
Α	Υ
L	L
Н	Н

H = HIGH Logic Level

L = LOW Logic Level

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Param	neter	Min.	Max.	Unit
V _{CC}	Supply Voltage		-0.5	7.0	V
V _{IN}	DC Input Voltage		-0.5	7.0	V
V _{OUT}	DC Output Voltage		-0.5	7.0	V
I _{IK}	DC Input Diode Current	V _{IN} < 0V		-50	mA
lok	DC Output Diode Current	V _{OUT} < 0V		-50	mA
I _{OUT}	DC Output Source / Sink Current			±50	mA
I _{CC} or I _{GND}	DC V _{CC} or Ground Current			±100	mA
T _{STG}	Storage Temperature Range		-65	+150	°C
TJ	Junction Temperature Under Bias	3		+150	°C
TL	Junction Lead Temperature (Solo	dering, 10 Seconds)		+260	°C
		SC70-6		180	
P_D	Power Dissipation	MicroPak™-6		130	mW
		MicroPak2™-6		120	
FCD	Human Body Model, JEDEC:JES	D22-A114		4000	V
ESD	Charge Device Model, JEDEC:JE	SD22-C101		2000]

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Conditions	Min.	Max.	Unit
V	Supply Voltage Operating		1.65	5.50	V
V_{CC}	Supply Voltage Data Retention		1.50	5.50]
V_{IN}	Input Voltage		0	5.5	V
V _{OUT}	Output Voltage		0	Vcc	V
		V _{CC} =1.8V, 2.5V ±0.2V	0	20	
t_r, t_f	Input Rise and Fall Times	V _{CC} =3.3V ±0.3V	0	10	ns/V
		V _{CC} =5.5V ±0.5V	0	5	
T _A	Operating Temperature		-40	+125	°C
		SC70-6		425	
θ_{JA}	Thermal Resistance	MicroPak™-6		500	°C/W
		MicroPak2™-6		560	

Note:

3. Unused inputs must be held HIGH or LOW. They may not float.

DC Electrical Characteristics

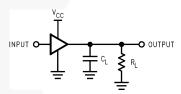
Symbol Parameter			Conditions		Т	T _A =25°C T _A =-40 to +85°C		C T _A =-40 to		
		V _{CC} (V)			Min.	Тур.	Max.	Min.	Max.	Units
\ /	HIGH Level Control	1.65 to 1.95			0.75V _{CC}			0.75V _{CC}		V
V_{IH}	Input Voltage	2.3 to 5.5			0.70V _{CC}			0.70 V _{CC}		V
\ <u>'</u>	LOW Level Control	1.65 to 1.95					0.25V _{CC}		0.25V _{CC}	V
V_{IL}	Input Voltage	2.3 to 5.5					0.30V _{CC}		0.30V _{CC}	V
		1.65			1.55	1.65		1.55		
		1.80			1.70	1.80		1.70		
		2.30		I _{OH} =-100μA	2.20	2.30		2.20		
		3.00			2.90	3.00		2.90		
.,	HIGH Level Output	4.50	,, ,,		4.40	4.50	1 44 1	4.40		,,
V_{OH}	Voltage	1.65	$V_{IN}=V_{IH}$	I _{OH} =-4mA	1.29	1.52		1.21		- V
		2.30		I _{OH} =-8mA	1.90	2.14		1.90		
		3.00		I _{OH} =-16mA	2.40	2.75		2.40		
		3.00		I _{OH} =-24mA	2.30	2.62		2.30		
		4.50		I _{OH} =-32mA	3.80	4.13		3.80		
		1.65				0.00	0.10		0.10	
	7	1.80				0.00	0.10		0.10	
	7/2	2.30		I _{OL} =100μA		0.00	0.10		0.10	
		3.00				0.00	0.10	\	0.10	
	LOW Level Output	4.50				0.00	0.10		0.10	
V_{OL}	Voltage	1.65	$V_{IN}=V_{IL}$	I _{OL} =4mA		0.08	0.24		0.24	V
		2.30		I _{OL} =8mA		0.10	0.30		0.30	
		3.00		I _{OL} =16mA		0.16	0.40		0.40	
		3.00		I _{OL} =24mA		0.24	0.55		0.55	
		4.50		I _{OL} =32mA	7	0.25	0.55		0.55	
I _{IN}	Input Leakage Current	0 to 5.5	$0 \geq V_{IN} \geq$	1			±0.1		±1.0	μA
I _{OFF}	Power Off Leakage Current	0	V _{IN} or V _O	_{UT} =5.5V			1.0		10	μA
I _{CC}	Quiescent Supply Current	1.65 to 5.50	V _{IN} =5.5V	, GND			1.0		10	μA

AC Electrical Characteristics

Cumbal	Parameter	V (V)	Conditions	٦	Γ _A =25°(С	T _A =-40 t	o +85°C	Units	Figure
Symbol	Parameter	V _{CC} (V)	Conditions	Min.	Тур.	Max.	Min.	Max.	Units	Figure
		1.65		1.8	5.5	9.6	1.8	10.6		
		1.80	C_L =15pF, R_L =1M Ω	1.8	4.6	8.0	1.8	8.8		
				1.0	3.0	5.2	1.0	5.8		Figure 5 Figure 6
t _{PLH} , t _{PHL}	Propagation Delay	3.30 ± 0.30		0.8	2.3	3.6	0.8	4.0		
		5.00 ± 0.50		0.5	1.8	2.9	0.5	3.2		
		3.30 ± 0.30	C _L =50pF,	1.2	3.0	4.6	1.2	5.1		Figure 5
		5.00 ± 0.50	R _L =500Ω	0.8	2.4	3.8	0.8	4.2		Figure 6
C _{IN}	Input Capacitance	0.00			2.5				pF	
	Power Dissipation	3.30			10				2	Figure 7
C _{PD}	Capacitance ⁽⁴⁾	5.00			12				pF	Figure 7

Note:

4. 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. C_{PD} is related to I_{CCD} dynamic operating current by the expression: I_{CCD}=(C_{PD})(V_{CC})(f_{IN})+(I_{CC}static).



Note:

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

Figure 5. AC Test Circuit

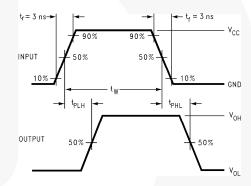


Figure 6. AC Waveforms



Note:

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

Figure 7. I_{CCD} Test Circuit

Physical Dimensions

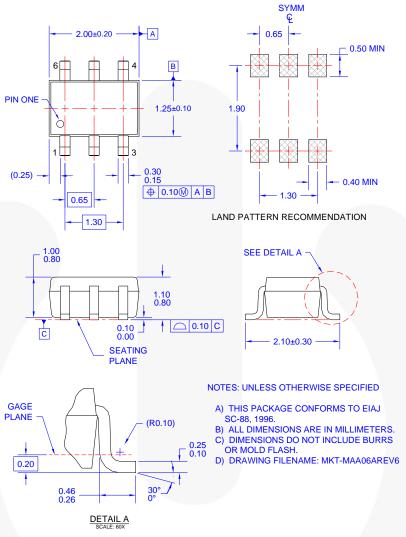


Figure 8. 6-Lead, SC70, EIAJ SC-88a, 1.25mm Wide

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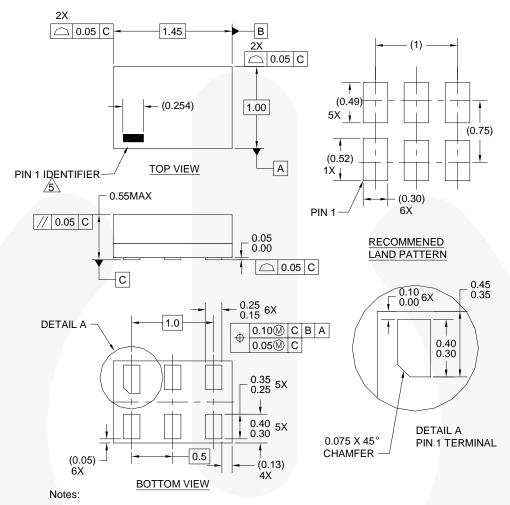
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Tape and Reel Specifications

Please visit Fairchild Semiconductor's online packaging area for the most recent tape and reel specifications: http://www.fairchildsemi.com/products/analog/pdf/sc70-6_tr.pdf.

Package Designator	Tape Section	Cavity Number	Cavity Status	Cover Type Status
	Leader (Start End)	125 (Typical)	Empty	Sealed
P6X	Carrier	3000	Filled	Sealed
	Trailer (Hub End)	75 (Typical)	Empty	Sealed

Physical Dimensions



- 1. CONFORMS TO JEDEC STANDARD M0-252 VARIATION UAAD
- 2. DIMENSIONS ARE IN MILLIMETERS
- 3. DRAWING CONFORMS TO ASME Y14.5M-1994
- 4. FILENAME AND REVISION: MAC06AREV4
- 5. PIN ONE IDENTIFIER IS 2X LENGTH OF ANY

OTHER LINE IN THE MARK CODE LAYOUT.

Figure 9. 6-Lead, MicroPak™, 1.0mm Wide

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Package Designator	Tape Section	Cavity Number	Cavity Status	Cover Type Status
	Leader (Start End)	125 (Typical)	Empty	Sealed
L6X	Carrier	5000	Filled	Sealed
	Trailer (Hub End)	75 (Typical)	Empty	Sealed

Physical Dimensions

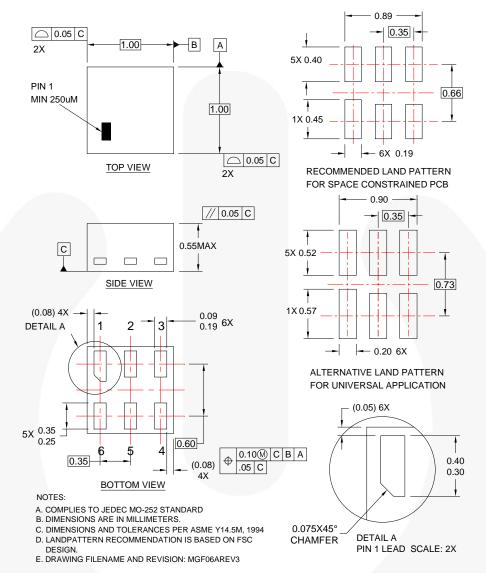


Figure 10. 6-Lead, MicroPak2™, 1x1mm Body, .35mm Pitch

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Package Designator	Tape Section	Cavity Number	Cavity Status	Cover Type Status
	Leader (Start End)	125 (Typical)	Empty	Sealed
FHX	Carrier	5000	Filled	Sealed
	Trailer (Hub End)	75 (Typical)	Empty	Sealed





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