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NC7WV07 TinyLogic[®] ULP-A Bual Buffer (Open-Drain Output)

Features

- 0.9V to 3.6V V_{CC} Supply Operation
- 3.6V Over-Voltage Tolerant I/Os at Vcc from 0.9V to 3.6V
- Extremely High Speed tPD
 - 1.0ns: Typical for 2.7V to 3.6V V_{CC}
 - 1.2ns: Typical for 2.3V to 2.7V V_{CC}
 - 2.0ns: Typical for 1.65V to 1.95V V_{CC}
 - 3.2ns: Typical for 1.4V to 1.6V V_{CC}
 - 6.0ns: Typical for 1.1V to 1.3V V_{CC}
 - 13.0ns: Typical for 0.9V V_{CC}
- Power-Off High-Impedance Inputs and Outputs
- High Static Drive (I_{OH}/I_{OL})
 - \pm 24mA at 3.00V V_{CC}
 - \pm 18mA at 2.30V V_{CC}
 - \pm 6mA at 1.65V V_{CC}
 - \pm 4mA at 1.4V V_{CC}
 - $\pm 2mA$ at 1.1V V_{CC}
 - $\pm 0.1 mA$ at 0.9V V_{CC}
- Uses Proprietary Quiet Series[™] Noise/EMI Reduction Circuitry
- Ultra-Small MicroPakTM Packages
- Ultra-Low Dynamic Power

Description

The NC7WV07 is a dual buffer with open drain output from Fairchild's Ultra Low Power-A series of TinyLogic® ULP-A is ideal for applications that require extreme high speed, high drive and low power. This product is designed for a wide low voltage operating range (0.9V to 3.6V V_{CC}) and applications that require more drive and speed than the TinyLogic ULP series, but still offer best in class low power operation.

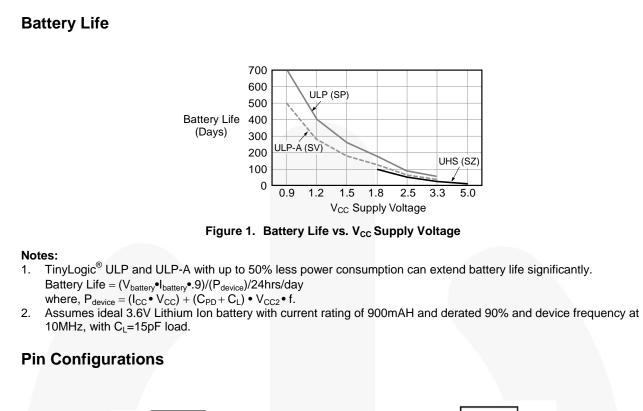
The NC7WV07 is uniquely designed for optimized power and speed, and is fabricated with an advanced CMOS technology to achieve high-speed operation while maintaining low CMOS power dissipation.

Ordering Information

Part Number	Top Mark	Package	Packing Method
NC7WV07P6X	V07	6-Lead SC70, EIAJ SC-88a, 1.25mm Wide	3000 Units on Tape & Reel
NC7WV07L6X	BC	6-Lead MicroPak™, 1.00mm Wide	5000 Units on Tape & Reel

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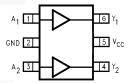


Figure 2. SC70 (Top View)

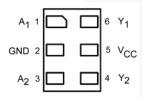


Figure 3. MicroPak (Top Through View)

Pin Definitions

Pin # SC70	Pin # MicroPak	Name	Description
1	1	A ₁	Data Inputs
2	2	GND	Ground
3	3	A ₂	Data Inputs
4	4	Y ₂	Output
5	5	V _{cc}	Supply Voltage
6	6	Y ₁	Output

Function Table

Inputs	Output
A	Y
L	L
Н	*H

H=HIGH Logic Level

L=LOW Logic Level

*H=HIGH Impedance Output Status (Open Drain)

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	Par	ameter	Min.	Max.	Unit
V _{CC}	Supply Voltage		-0.5	4.6	V
V _{IN}	DC Input Voltage		-0.5	4.6	V
V _{OUT}	DC Output Voltage		-0.5	4.6	V
I _{IK}	DC Input Diode Current	$V_{IN} < 0V$		-50	mA
Ι _{οκ}	DC Output Diode Current	V _{OUT} < 0V		-50	mA
I _{OL}	DC Output Sink Current		+50	mA	
I_{CC} or I_{GND}	DC V _{CC} or Ground Current per		±50	mA	
T _{STG}	Storage Temperature Range		-65	+150	°C
TJ	Junction Temperature Under E	Bias		+150	°C
TL	Junction Lead Temperature, S	oldering 10 Seconds		+260	°C
		SC70-5		150	
PD	Power Dissipation at +85°C	MicroPak-6		130	mW
		MicroPak2-6		120	
ESD	Human Body Model, JEDEC:J		4000	V	
ESD	Charge Device Model, JEDEC	:JESD22-C101		2000	v

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 _{cc}	Supply Voltage		0.9	3.6	V	
V _{IN}	Input Voltage		0	3.6	V	
V _{OUT}	Output Voltage		0	3.6	V	
		V _{CC} =3.0V to 3.6V		+24.0		
		V _{CC} =2.3V to 3.6V		+18.0	- mA	
	Output Current in I	V _{CC} =1.65V to 1.95V		+6.0		
I _{OL}	Output Current in I _{OL}	V _{CC} =1.4V to 1.6V		+4.0		
		V _{CC} =1.1V to 1.3V	1	+2.0		
		V _{CC} =0.9V		+0.1		
T _A	Operating Temperature, Free Air		-40	+85	°C	
$\Delta t / \Delta V$	Minimum Input Edge Rate	V _{IN} =0.8V to 2.0, V _{CC} =3.0V		10	ns/V	
0	Thermal Desister of	SC70-5		425	°C / M	
θ_{JA}	Thermal Resistance	MicroPak-6		500	°C/W	

Note:

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

.	Dana d			T _A =2	25°C	T _A =-40 to 85°C		l Inite
Symbol	Parameter	V _{cc}	Conditions	Min.	Max.	Min.	Max.	Units
		0.90		.65 x V _{CC}		.65 x V _{cc}		1
		$1.10 \leq V_{CC} \leq 1.30$		$.65 \times V_{CC}$.65 x V _{CC}		
.,	HIGH Level Input	$1.40 \leq V_{CC} \leq 1.60$.65 x V _{cc}		.65 x V _{CC}		
VIH	V _{IH} Voltage	$1.65 \leq V_{CC} \leq 1.95$.65 x V _{cc}		.65 x V _{CC}		V
		$2.30 \leq V_{CC} \leq 2.70$		1.6		1.6		
		$2.70 \leq V_{CC} \leq 3.60$		2.0		2.0		
		0.90			.35 x V _{CC}		.35 x V _{CC}	
		$1.10 \leq V_{CC} \leq 1.30$			$.35 \times V_{CC}$.35 x V _{cc}	- V
N/	LOW Level Input	$1.40 \leq V_{CC} \leq 1.60$			$.35 \times V_{CC}$.35 x V _{cc}	
VIL	V _{IL} Voltage	$1.65 \leq V_{CC} \leq 1.95$.35 x V _{cc}		.35 x V _{cc}	
		$2.30 \leq V_{CC} \leq 2.70$			0.7		0.7	
		$2.70 \leq V_{CC} \leq 3.60$			0.8		0.8	
		0.90			0.1		0.1	
	$1.10 \leq V_{CC} \leq 1.30$			0.1		0.1		
		$1.40 \leq V_{CC} \leq 1.60$	- I _{OL} =100μA		0.2		0.2	-
		$1.65 \leq V_{CC} \leq 1.95$			0.2		0.2	
		$2.30 \leq V_{CC} \leq 2.70$			0.2		0.2	
		$2.70 \leq V_{CC} \leq 3.60$			0.2		0.2	
.,	LOW Level Output	$1.10 \leq V_{CC} \leq 1.30$	I _{OL} =2mA		0.25 x V_{CC}		0.25 x V_{CC}	
V _{OL}	Voltage	$1.40 \leq V_{CC} \leq 1.60$	I _{OL} =4mA		0.25 x V _{cc}		$0.25 \text{ x } V_{CC}$	V
		$1.65 \leq V_{CC} \leq 1.95$	I _{OL} =6mA		0.3		0.3	
		$2.30 \leq V_{CC} \leq 2.70$	10		0.4		0.4	
		$2.70 \leq V_{CC} \leq 3.60$	I _{OL} =12mA		0.4		0.4	1
		$2.30{\leq}~V_{CC}{\leq}~2.70$	10		0.6		0.6	
		$2.70 \leq V_{CC} \leq 3.60$	I _{OL} =18mA		0.4		0.4	
		$2.70 \leq V_{CC} \leq 3.60$	I _{OL} =24mA		0.55		0.55	
I _{IN}	Input Leakage Current	0.90 to 3.60	$0 \leq V_{IN} \leq 3.60$		±0.1		±0.5	μA
I _{OFF}	Power Off Leakage Current	0	$\begin{array}{l} 0 \leq \left(V_{\text{IN},} \; V_{\text{O}} \right) \\ \leq 3.60 \end{array}$		0.5		0.5	μA
	Quiescent Supply	0.90 to 3.60	$V_{IN}=V_{CC}$, or GND		0.9		0.9	μA
I _{cc} Current	Current	0.30 10 3.00	$\begin{array}{l} V_{CC} \leq V_{IN} \leq \\ 3.6V \end{array}$				±0.9	μΑ

AC Electrical Characteristics										
Cumb al					T _A =25°C		T _A =-40 to 85°C			
Symbol Parameter	V _{cc}	Conditions	Min.	Тур.	Max.	Min.	Max.	Units	Figure	
		0.90	$C_L=15pF$, $R_U=R_D=1M\Omega$		13					
		$1.10 \leq V_{CC} \leq 1.30$	C _L =15pF,	2.0	6.0	15.0	1.0	18.6		
t _{PZL} , t _{PLZ}	Propagation	$1.40 \leq V_{CC} \leq 1.60$	$R_{U}=R_{D}=2k\Omega$	1.0	3.2	8.7	1.0	9.7	ns	Figure 4 Figure 5
	Delay	$1.65 \leq V_{CC} \leq 1.95$	C _L =30pF, R _U =R _D =500Ω	1.0	2.0	6.0	1.0	6.8		
		$2.30 \leq V_{CC} \leq 2.70$		0.7	1.2	3.6	0.6	4.7		
		$2.70 \leq V_{CC} \leq 3.60$		0.5	1.0	3.3	0.4	4.0		
C _{IN}	Input Capacitance	0			2				pF	
C _{OUT}	Output Capacitance	0			6.5					
C_{PD}	Power Dissipation Capacitance	0.90 to 3.60	V _{IN} =0V or V _{CC} , f=10MHz		10				pF	

AC Loadings and Waveforms

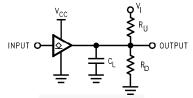
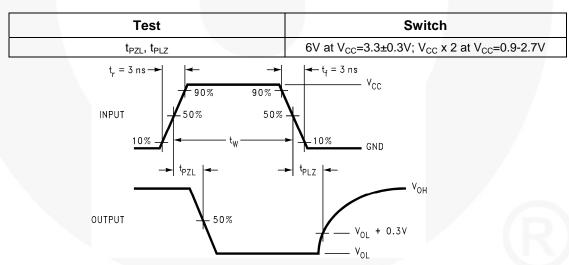
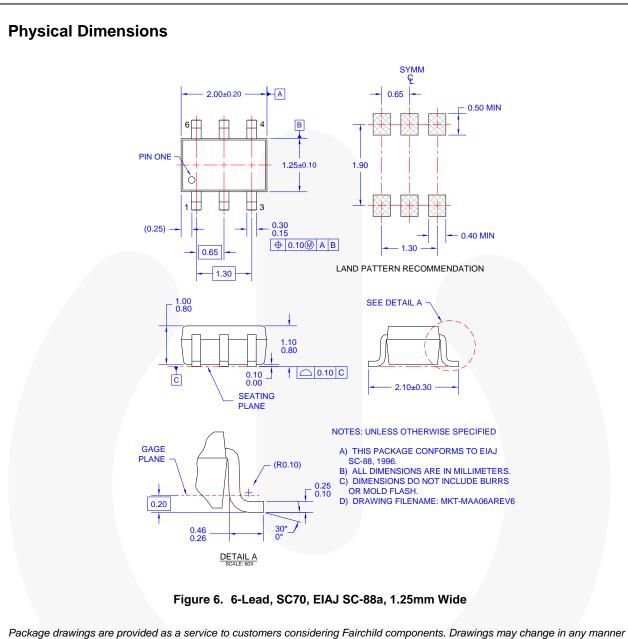


Figure 4. AC Test Circuit





		V _{cc}				
Symbol	3.3V ± 0.3V	2.5V ± 0.2V	1.8V ± 0.15V	1.5V ± 0.1V	1.2V ± 0.1V	0.9V
V _{mi}	1.5V	V _{CC} /2				
V _{mo}	V _{OL} + 0.30V	V _{OL} + 0.15V	V _{OL} + 0.15V	V _{OL} + 0.10V	V _{OL} + 0.10V	V _{OL} + 0.10V



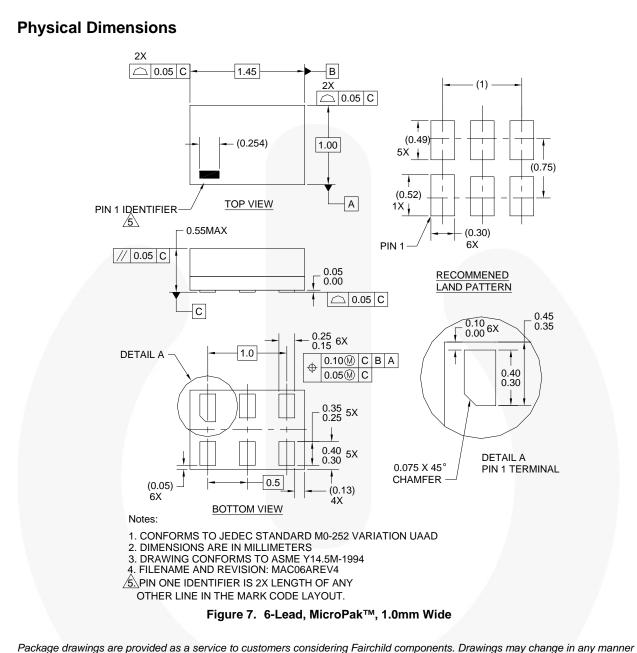
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P6X	Carrier	3000	Filled	Sealed
	Trailer (Hub End)	75 (Typical)	Empty	Sealed



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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

NC7WV07 — TinyLogic[®] ULP-A Dual Buffer (Open-Drain Output)

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Rev. 162

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