



September 1999
Revised November 1999

NC7SZ18

TinyLogic™ UHS 1-of-2 Non-Inverting Demultiplexer with 3-STATE Deselected Output (Preliminary)

General Description

The NC7SZ18 is a 1-of-2 non-inverting demultiplexer. The device will buffer the data on the A pin and pass to either output Y_0 or Y_1 dependent on whether state of the select pin (S) is LOW or HIGH respectively. The deselected output will be placed into a high impedance state. 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 broad V_{CC} operating range. The device is specified to operate over the 1.65V to 5.5V V_{CC} operating range. The inputs and outputs are high impedance when V_{CC} is 0V. Inputs tolerate voltages up to 5.5V independent of V_{CC} operating range.

Features

- Space saving SC70 6-lead surface mount package
- High Impedance output when deselected
- Ultra High Speed: t_{PD} 3.5 ns Typ into 50 pF at 5V 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
- Patented noise/EMI reduction circuitry implemented

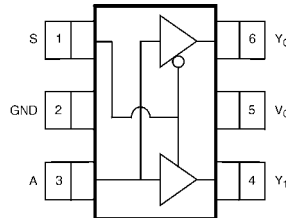
Ordering Code:

Order Number	Package Number	Package Top Mark	Package Description	Supplied As
NC7SZ18P6X	MAA06A	Z18	6-Lead SC70, EIAJ SC88, 1.25mm Wide	3k Units on Tape and Reel

Pin Descriptions

Pin Names	Description
A	Data Input
S	Demultiplexer Select
Y_0, Y_1	Outputs

Connection Diagram

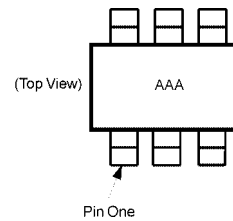


Function Table

Input		Output	
S	A	Y_0	Y_1
L	L	L	Z
L	H	H	Z
H	L	Z	L
H	H	Z	H

H = HIGH Logic Level
L = LOW Logic Level
Z = 3-STATE

Pin One Orientation Diagram



AAA = 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).

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Absolute Maximum Ratings ^(Note 1)		Recommended Operating Conditions	
Supply Voltage (V_{CC})	-0.5V to +7.0V	Supply Voltage Operating (V_{CC})	1.65V to 5.5V
DC Input Voltage (V_{IN})	-0.5V to +7.0V	Supply Voltage Data Retention (V_{CC})	1.5V to 5.5V
DC Output Voltage (V_{OUT})	-0.5V to +7.0V	Input Voltage (V_{IN})	0V to V_{CC}
DC Input Diode Current (I_{IK})		Output Voltage (V_{OUT})	0V to V_{CC}
@ $V_{IN} \leq -0.5V$	-20 mA	Operating Temperature (T_A)	-40°C to +85°C
@ $V_{IN} \leq V_{CC} + 0.5V$	20 mA	Input Rise and Fall Time (t_r, t_f)	
DC Output Diode Current (I_{OK})		$V_{CC} @ 1.8V \pm 0.15V, 2.5V \pm 0.2V$	0 ns/V to 20 ns/V
@ $V_{IN} \leq -0.5V$	-20 mA	$V_{CC} @ 3.3V \pm 0.3V$	0 ns/V to 10 ns/V
@ $V_{IN} \leq V_{CC} + 0.5V$	20 mA	$V_{CC} @ 5.0V \pm 0.5V$	0 ns/V to 5 ns/V
DC Output Current (I_{OUT})	± 50 mA	Thermal Resistance (θ_{JA})	350°C/W
DC V_{CC} or Ground Current (I_{CC}/I_{GND})	± 50 mA	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.	
Storage Temperature Range (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		

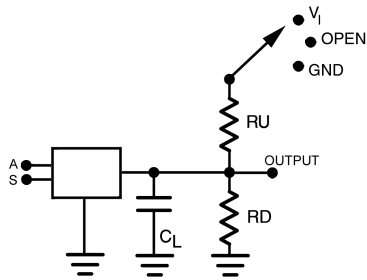
DC Electrical Characteristics

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 Input Voltage	1.65 – 1.95 2.3 – 5.5	0.75 V_{CC}			0.75 V_{CC} 0.7 V_{CC}		V	
V_{IL}	LOW Level Input Voltage	1.65 – 1.95 2.3 – 5.5			0.25 V_{CC} 0.3 V_{CC}			V	
V_{OH}	HIGH Level 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				
		3.0	2.9	3.0	2.9				
		4.5	4.4	4.5	4.4				
		2.3	1.9	2.15	1.9				$I_{OH} = -8 \text{ mA}$ $I_{OH} = -16 \text{ mA}$ $I_{OH} = -24 \text{ mA}$ $I_{OH} = -32 \text{ mA}$
		3.0	2.4	2.80	2.4				
		3.0	2.3	3.68	2.3				
		4.5	3.8	4.20	3.8				
V_{OL}	LOW Level Output Voltage	1.65	0.0		0.10		V	$V_{IN} = V_{IL}$	$I_{OL} = 100 \mu\text{A}$
		2.3	0.0		0.10				
		3.0	0.0		0.10				
		4.5	0.0		0.10				
		2.3	0.10		0.3				$I_{OL} = 8 \text{ mA}$ $I_{OL} = 16 \text{ mA}$ $I_{OL} = 24 \text{ mA}$ $I_{OL} = 32 \text{ mA}$
		3.0	0.15		0.4				
		3.0	0.22		0.55				
		4.5	0.22		0.55				
I_{IN}	Input Leakage Current	0 to 5.5	± 0.1		± 1		μA	$V_{IN} = 5.5V, \text{GND}$	
I_{OZ}	3-STATE Output Leakage	1.65 to 5.5V	± 0.5		± 5		μA	$V_{IN} = V_{IL} \text{ or } V_{IH}$ $0 < V_{OUT} \leq 5.5V$	
I_{OFF}	Power Off Leakage Current	0.0	1		10		μA	$V_{IN} \text{ or } V_{OUT} = 5.5V$	
I_{CC}	Quiescent Supply Current	1.8 to 5.5	1		10		μA	$V_{IN} = 5.5V, \text{GND}$	

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 A to Y ₀ or Y ₁	1.8 ± 0.15					12.5	C _L = 15 pF, R _D = 1 MΩ S1 = OPEN	Figure 1	
t _{PHL}		2.5 ± 0.2					8.4		Figure 3	
		3.3 ± 0.3							6.1	
		5.0 ± 0.5							5.4	
t _{PLH}	Propagation Delay A to Y ₀ or Y ₁	3.3 ± 0.3					6.7	C _L = 50 pF, R _L = 500Ω S1 = OPEN	Figure 1	
t _{PHL}		5.0 ± 0.5							6.0	Figure 3
t _{PZL}	Output Enable Time	1.8 ± 0.15					15	C _L = 50 pF R _D , R _U = 500Ω S1 = GND for t _{PZH} S1 = V _{IN} for t _{PZL} V _I = 2 x V _{CC}	Figure 1	
t _{PZH}		2.5 ± 0.2					9.5		Figure 3	
		3.3 ± 0.3							7.0	
		5.0 ± 0.5							6.3	
t _{PLZ}	Output Disable Time	1.8 ± 0.15					14.0	C _L = 50 pF R _D , R _U = 500Ω S1 = GND for t _{PHZ} S1 = V _{IN} for t _{PLZ} V _I = 2 x V _{CC}	Figure 1	
t _{PHZ}		2.5 ± 0.2					9.2		Figure 3	
		3.3 ± 0.3							6.7	
		5.0 ± 0.5							6.0	
C _{IN}	Input Capacitance	OPEN		4 8				pF		
C _{PD}	Power Dissipation	3.3		TBD				pF	(Note 2)	
	Capacitance	5.0		TBD					Figure 2	

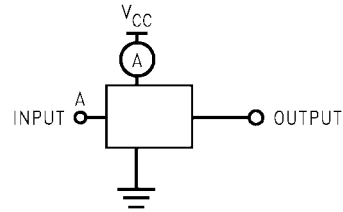
Note 2: C_{PD} is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I_{CCD}) at no output loading and operating at 50% duty cycle. (See Figure 2.) C_{PD} is related to I_{CCD} dynamic operating current by the expression:
I_{CCD} =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

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%
 S Input = GND or V_{CC}

FIGURE 2. I_{CCD} Test Circuit

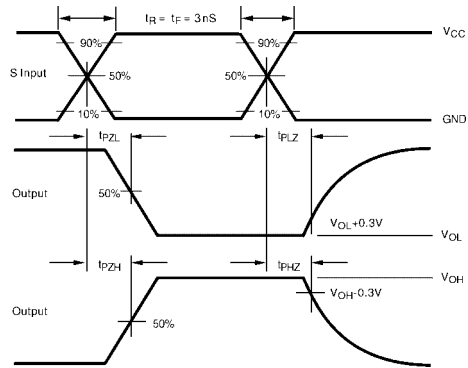
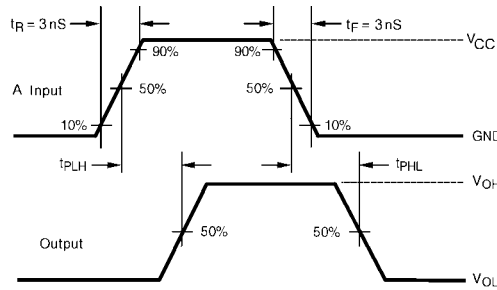


FIGURE 3. AC Waveforms

Tape and Reel Specification							
TAPE FORMAT							
Package Designator	Tape Section	Number Cavities	Cavity Status	Cover Tape Status			
P6X	Leader (Start End)	125 (typ)	Empty	Sealed			
	Carrier	3000	Filled	Sealed			
	Trailer (Hub End)	75 (typ)	Empty	Sealed			

TAPE DIMENSIONS inches (millimeters)

The technical drawings show the following dimensions and features:

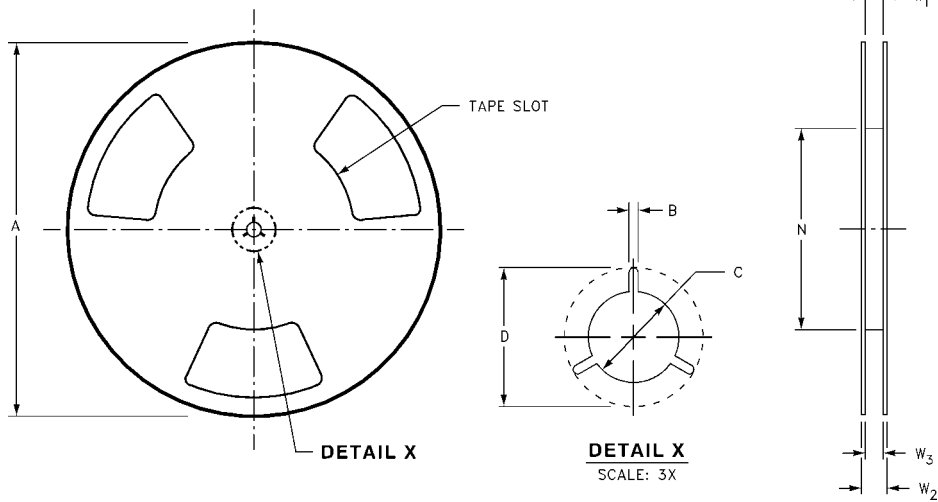
- Top View:** Shows a carrier tape with four cavities. Dimensions include cavity diameter $\varnothing 0.061 \pm 0.002$ TYP. [1.55 ± 0.05], cavity pitch 0.157 TYP. [4], and cavity width 0.069 [1.75]. The carrier width is 0.079 ± 0.002 TYP. [2.0 ± 0.05]. A "Pin 1" is indicated on the carrier.
- SECTION B-B:** A cross-sectional view showing the carrier thickness K_0 and a gap of 0.008 [0.2]. It also shows a 3° MAX. TYP. chamfer and the location of section line B at tangent points.
- SECTION A-A:** A cross-sectional view showing the carrier thickness A TYP. and a 3° MAX TYP. chamfer. It indicates the cavity is symmetric (CAVITY SYMM) and shows the location of section line A at tangent points.
- BEND RADIUS:** A detail showing a minimum bend radius $R 1.181$ MIN. [30].

PACKAGE DIMENSIONS TABLE:

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)

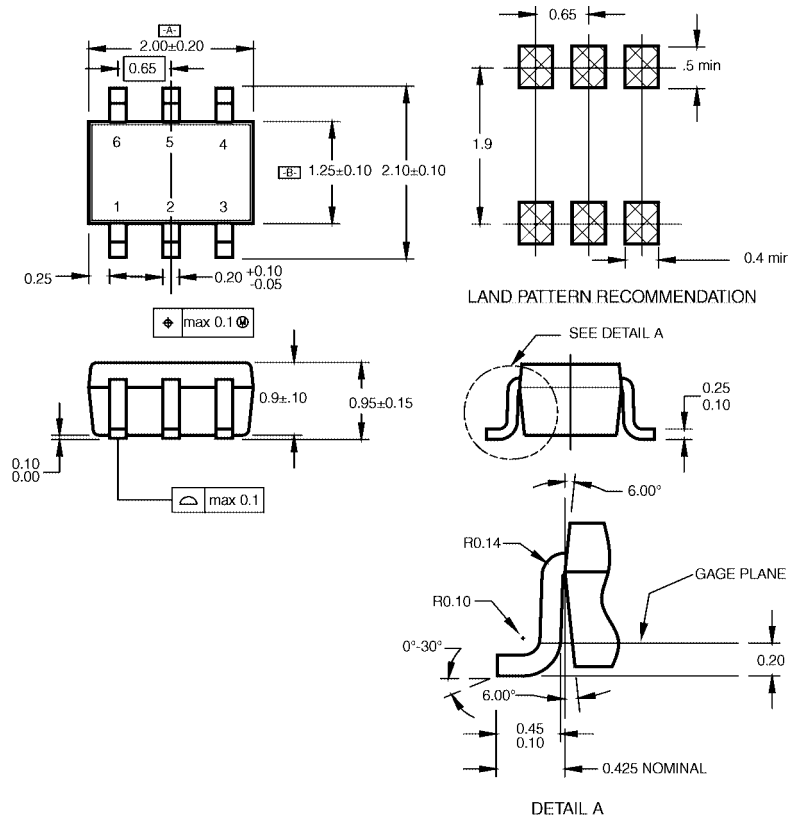
NC7SZ18

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.

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

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