

勝特力材料 886-3-5753170
 勝特力电子(上海) 86-21-54151736
 勝特力电子(深圳) 86-755-83298787
[Http://www.100y.com.tw](http://www.100y.com.tw)



October 1996
 Revised February 2005

NC7SZ08 TinyLogic® UHS 2-Input AND Gate

General Description

The NC7SZ08 is a single 2-Input AND Gate 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_{CC} operating range. The device is specified to operate over the 1.65V to 5.5V V_{CC} range. The inputs and output are high impedance when V_{CC} is 0V. Inputs tolerate voltages up to 6V independent of V_{CC} operating voltage.

Features

- Space saving SOT23 or SC70 5-lead package
- Ultra small MicroPak™ Pb-Free leadless package
- Ultra High Speed; t_{PD} 2.7 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
- Matches the performance of LCX when operated at 3.3V V_{CC}
- Power down high impedance inputs/output
- Overvoltage tolerant inputs facilitate 5V to 3V translation
- Patented noise/EMI reduction circuitry implemented

Ordering Code:

Order Number	Package Number	Product Code Top Mark	Package Description	Supplied As
NC7SZ08M5X	MA05B	7Z08	5-Lead SOT23, JEDEC MO-178, 1.6mm	3k Units on Tape and Reel
NC7SZ08M5_NL (Note 1)	MA05B	7Z08	Pb-Free 5-Lead SOT23, JEDEC MO-178, 1.6mm	3k Units on Tape and Reel
NC7SZ08M5X_NL (Note 2)	MA05B	7Z08	Pb-Free 5-Lead SOT23, JEDEC MO-178, 1.6mm	3k Units on Tape and Reel
NC7SZ08P5X	MAA05A	Z08	5-Lead SC70, EIAJ SC-88a, 1.25mm Wide	3k Units on Tape and Reel
NC7SZ08P5_NL (Note 1)	MAA05A	Z08	Pb-Free 5-Lead SC70, EIAJ SC-88a, 1.25mm Wide	3k Units on Tape and Reel
NC7SZ08P5X_NL (Note 2)	MAA05A	Z08	5-Lead SC70, EIAJ SC-88a, 1.25mm Wide	3k Units on Tape and Reel
NC7SZ08L6X	MAC06A	GG	Pb-Free 6-Lead MicroPak, 1.0mm Wide	5k Units on Tape and Reel

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

Note 1: "_NL" indicates lead-free product (per JEDEC J-STD-020B).

Note 2: "_NL" indicates lead-free product (per JEDEC J-STD-020B). Device is available in Tape and Reel only.

TinyLogic® is a registered trademark of Fairchild Semiconductor Corporation.
 MicroPak™ is a trademark of Fairchild Semiconductor Corporation.

NC7SZ08 TinyLogic® UHS 2-Input AND Gate

NC7SZ08

Logic Symbol



Pin Descriptions

Pin Names	Description
A, B	Inputs
Y	Output
NC	No Connect

Function Table

$$Y = AB$$

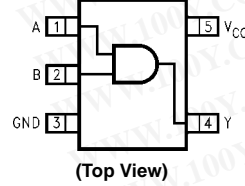
Inputs		Output
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

H = HIGH Logic Level

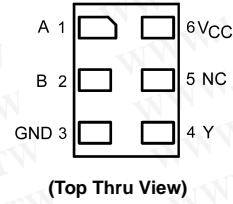
L = LOW Logic Level

Connection Diagrams

Pin Assignments for SC70 and SOT23



Pad Assignment for MicroPak



Absolute Maximum Ratings (Note 3)		Recommended Operating Conditions (Note 4)	
Supply Voltage (V_{CC})	-0.5V to +6V	Supply Voltage Operating (V_{CC})	1.65V to 5.5V
DC Input Voltage (V_{IN})	-0.5V to +6V	Supply Voltage Data Retention (V_{CC})	1.5V to 5.5V
DC Output Voltage (V_{OUT})	-0.5V to +6V	Input Voltage (V_{IN})	0V to 5.5V
DC Input Diode Current (I_{IK})		Output Voltage (V_{OUT})	0V to V_{CC}
@ $V_{IN} < -0.5V$	-50 mA	Operating Temperature (T_A)	-40°C to +85°C
@ $V_{IN} > 6V$	+20 mA	Input Rise and Fall Time (t_r, t_f)	
DC Output Diode Current (I_{OK})		$V_{CC} = 1.8V, 2.5V \pm 0.2V$	0 ns/V to 20 ns/V
@ $V_{OUT} < -0.5V$	-50 mA	$V_{CC} = 3.3V \pm 0.3V$	0 ns/V to 10 ns/V
@ $V_{OUT} > 6V, V_{CC} = GND$	+20mA	$V_{CC} = 5.0V \pm 0.5V$	0 ns/V to 5 ns/V
DC Output Current (I_{OUT})	± 50 mA	Thermal Resistance (θ_{JA})	
DC V_{CC}/GND Current (I_{CC}/I_{GND})	± 50 mA	SOT23-5	300°C/W
Storage Temperature (T_{STG})	-65°C to +150°C	SC70-5	425°C/W
Junction Temperature under Bias (T_J)	150°C		
Junction Lead Temperature (T_L)			
(Soldering, 10 seconds)	260°C		
Power Dissipation (P_D) @ +85°C			
SOT23-5	200 mW		
SC70-5	150 mW		

Note 3: 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 4: 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 Input Voltage	1.65 to 1.95 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 Input Voltage	1.65 to 1.95 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 Output Voltage	1.65 1.8 2.3 3.0 4.5	1.55	1.65		1.55		V	$V_{IN} = V_{IH}$	$I_{OH} = -100 \mu A$
			1.7	1.8		1.7				
V_{OH}	HIGH Level Output Voltage	1.65 2.3 3.0 4.5	2.2	2.3		2.2		V		$I_{OH} = -100 \mu A$
			2.9	3.0		2.9				
V_{OH}	HIGH Level Output Voltage	1.65 2.3 3.0 4.5	4.4	4.5		4.4		V		$I_{OH} = -100 \mu A$
			1.29	1.52		1.29				
V_{OH}	HIGH Level Output Voltage	1.65 2.3 3.0 4.5	1.9	2.15		1.9		V		$I_{OH} = -4 \text{ mA}$ $I_{OH} = -8 \text{ mA}$ $I_{OH} = -16 \text{ mA}$ $I_{OH} = -24 \text{ mA}$ $I_{OH} = -32 \text{ mA}$
			2.5	2.80		2.4				
V_{OH}	HIGH Level Output Voltage	1.65 2.3 3.0 4.5	2.4	2.68		2.3		V		$I_{OH} = -4 \text{ mA}$ $I_{OH} = -8 \text{ mA}$ $I_{OH} = -16 \text{ mA}$ $I_{OH} = -24 \text{ mA}$ $I_{OH} = -32 \text{ mA}$
			3.9	4.20		3.8				
V_{OL}	LOW Level Output Voltage	1.65 1.8 2.3 3.0 4.5	0.0 0.1			0.1 0.1		V	$V_{IN} = V_{IL}$	$I_{OL} = 100 \mu A$
			0.0 0.1			0.1 0.1				
V_{OL}	LOW Level Output Voltage	1.65 2.3 3.0 4.5	0.0 0.1			0.1 0.1		V		$I_{OL} = 100 \mu A$
			0.0 0.1			0.1 0.1				
V_{OL}	LOW Level Output Voltage	1.65 2.3 3.0 4.5	0.08	0.24		0.24		V		$I_{OL} = 4 \text{ mA}$ $I_{OL} = 8 \text{ mA}$ $I_{OL} = 16 \text{ mA}$ $I_{OL} = 24 \text{ mA}$ $I_{OL} = 32 \text{ mA}$
			0.10	0.3		0.3				
V_{OL}	LOW Level Output Voltage	1.65 2.3 3.0 4.5	0.15	0.4		0.4		V		$I_{OL} = 4 \text{ mA}$ $I_{OL} = 8 \text{ mA}$ $I_{OL} = 16 \text{ mA}$ $I_{OL} = 24 \text{ mA}$ $I_{OL} = 32 \text{ mA}$
			0.22	0.55		0.55				
V_{OL}	LOW Level Output Voltage	1.65 2.3 3.0 4.5	0.22	0.55		0.55		V		$I_{OL} = 4 \text{ mA}$ $I_{OL} = 8 \text{ mA}$ $I_{OL} = 16 \text{ mA}$ $I_{OL} = 24 \text{ mA}$ $I_{OL} = 32 \text{ mA}$
			0.22	0.55		0.55				
I_{IN}	Input Leakage Current	0 to 5.5	± 1			± 10		μA	$V_{IN} = 5.5V, GND$	
I_{OFF}	Power Off Leakage Current	0.0	1			10		μA	V_{IN} or $V_{OUT} = 5.5V$	
I_{CC}	Quiescent Supply Current	1.65 to 5.5	2.0			20		μA	$V_{IN} = 5.5V, GND$	

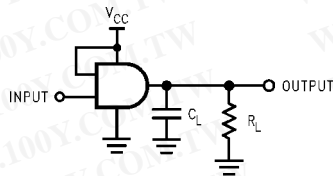
NC7SZ08

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} , t _{PHL}	Propagation Delay	1.65	2.0	6.3	12	2.0	12.7	ns	C _L = 15 pF, R _L = 1 MΩ	Figures 1, 3
		1.8	2.0	5.2	10	2.0	10.5			
		2.5 ± 0.2	0.8	3.4	7	0.8	7.5			
		3.3 ± 0.3	0.5	2.6	4.7	0.5	5.0			
		5.0 ± 0.5	0.5	2.2	4.1	0.5	4.4			
t _{PLH} , t _{PHL}	Propagation Delay	3.3 ± 0.3	1.5	3.3	5.2	1.5	5.5	ns	C _L = 50 pF, R _L = 500Ω	Figures 1, 3
		5.0 ± 0.5	0.8	2.7	4.5	0.8	4.8			
C _{IN}	Input Capacitance	0	4					pF		
C _{PD}	Power Dissipation Capacitance	3.3	20					pF	(Note 5)	Figure 2
		5.0	25							

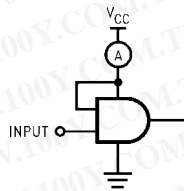
Note 5: CPD is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I_{CCD}) at no output loading and operating at 50% duty cycle. (See Figure 2.) C_{PD} is related to I_{CCD} dynamic operating current by the expression:
 $I_{CCD} = (C_{PD})(V_{CC})(f_{IN}) + (I_{CC} \text{ static})$

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

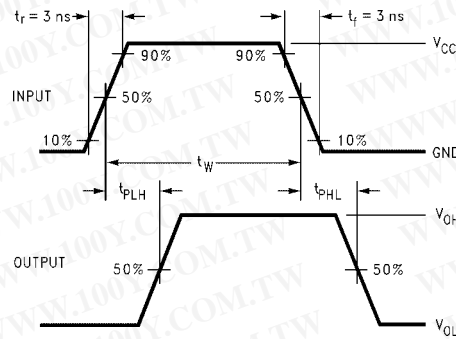


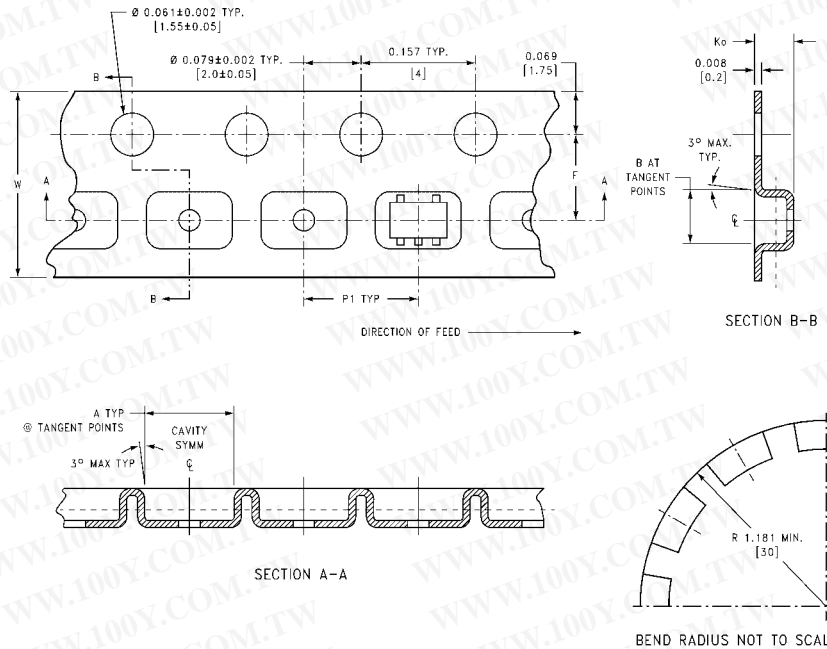
FIGURE 3. AC Waveforms

Tape and Reel Specification

TAPE FORMAT for SC70 and SOT23

Package Designator	Tape Section	Number Cavities	Cavity Status	Cover Tape Status
M5X, P5X	Leader (Start End)	125 (typ)	Empty	Sealed
	Carrier	3000	Filled	Sealed
	Trailer (Hub End)	75 (typ)	Empty	Sealed

TAPE DIMENSIONS inches (millimeters)



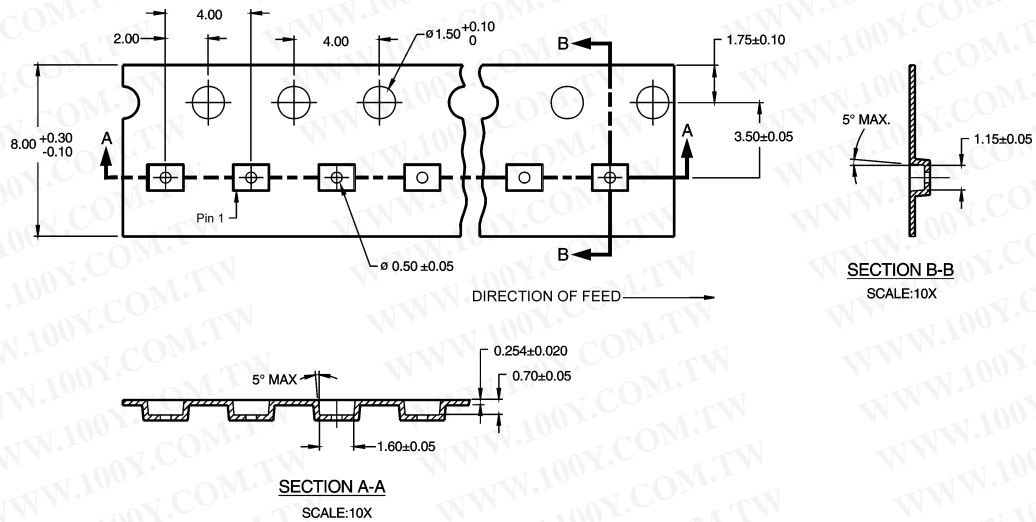
Package	Tape Size	DIM A	DIM B	DIM F	DIM K_0	DIM P1	DIM W
SC70-5	8 mm	0.093 (2.35)	0.096 (2.45)	0.138 ± 0.004 (3.5 ± 0.10)	0.053 ± 0.004 (1.35 ± 0.10)	0.157 (4)	0.315 ± 0.004 (8 ± 0.1)
SOT23-5	8 mm	0.130 (3.3)	0.130 (3.3)	0.138 ± 0.002 (3.5 ± 0.05)	0.055 ± 0.004 (1.4 ± 0.11)	0.157 (4)	0.315 ± 0.012 (8 ± 0.3)

NC7SZ08

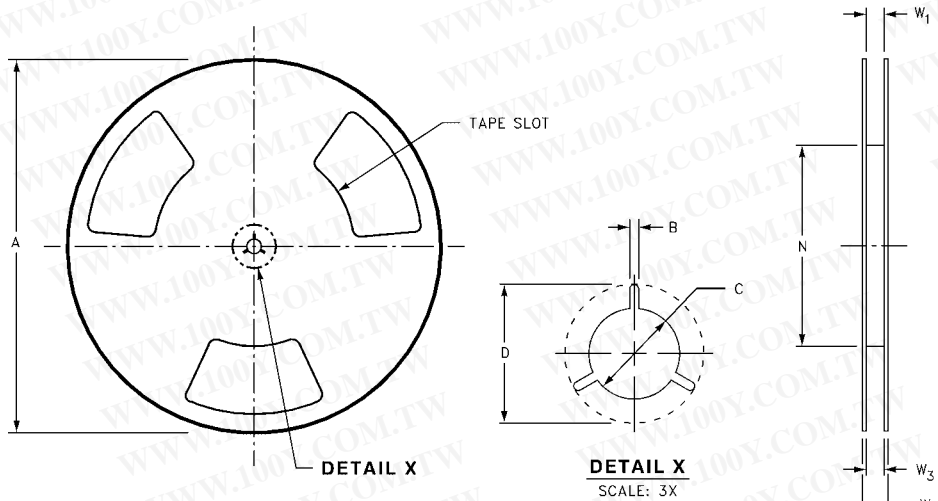
Tape and Reel Specification (Continued)

TAPE FORMAT for MicroPak

Package Designator	Tape Section	Number Cavities	Cavity Status	Cover Tape Status
P6X	Leader (Start End)	125 (typ)	Empty	Sealed
	Carrier	5000	Filled	Sealed
	Trailer (Hub End)	75 (typ)	Empty	Sealed



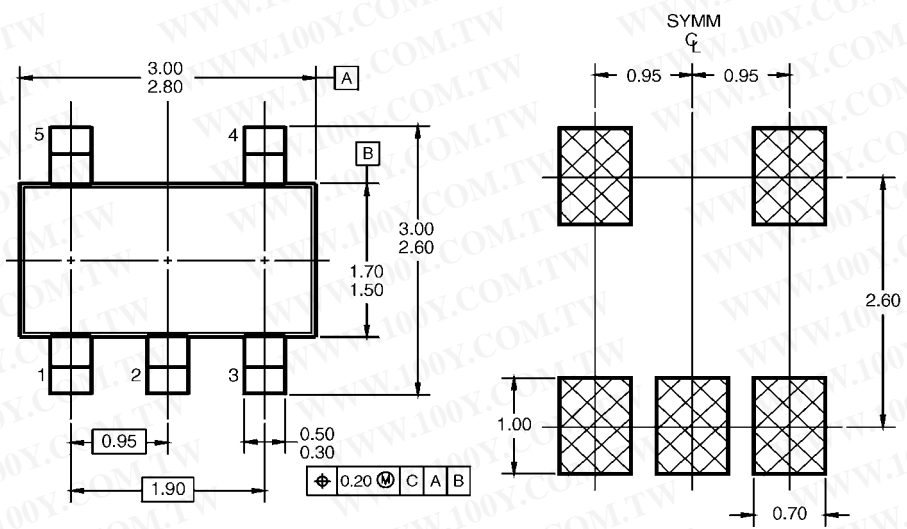
REEL DIMENSIONS inches (millimeters)



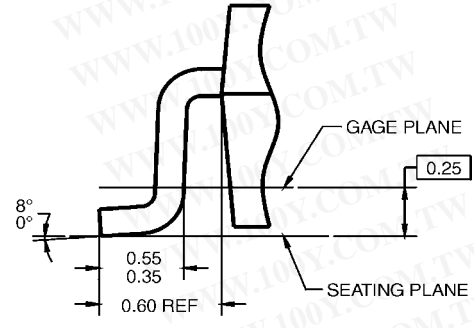
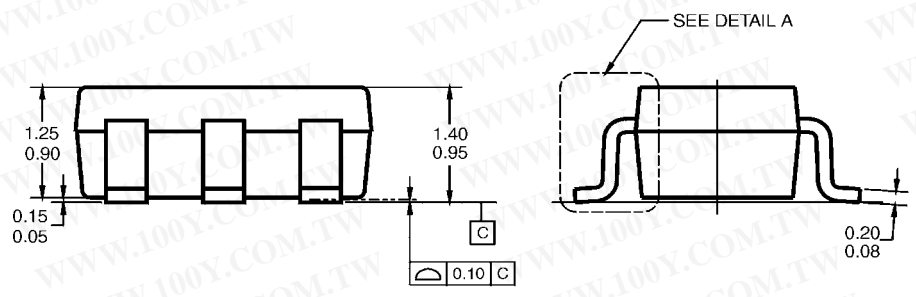
Tape Size	A	B	C	D	N	W1	W2	W3
8 mm	7.0 (177.8)	0.059 (1.50)	0.512 (13.00)	0.795 (20.20)	2.165 (55.00)	$0.331 + 0.059/-0.000$ ($8.40 + 1.50/-0.00$)	0.567 (14.40)	$W1 + 0.078/-0.039$ ($W1 + 2.00/-1.00$)

NCS7S208

Physical Dimensions inches (millimeters) unless otherwise noted



LAND PATTERN RECOMMENDATION



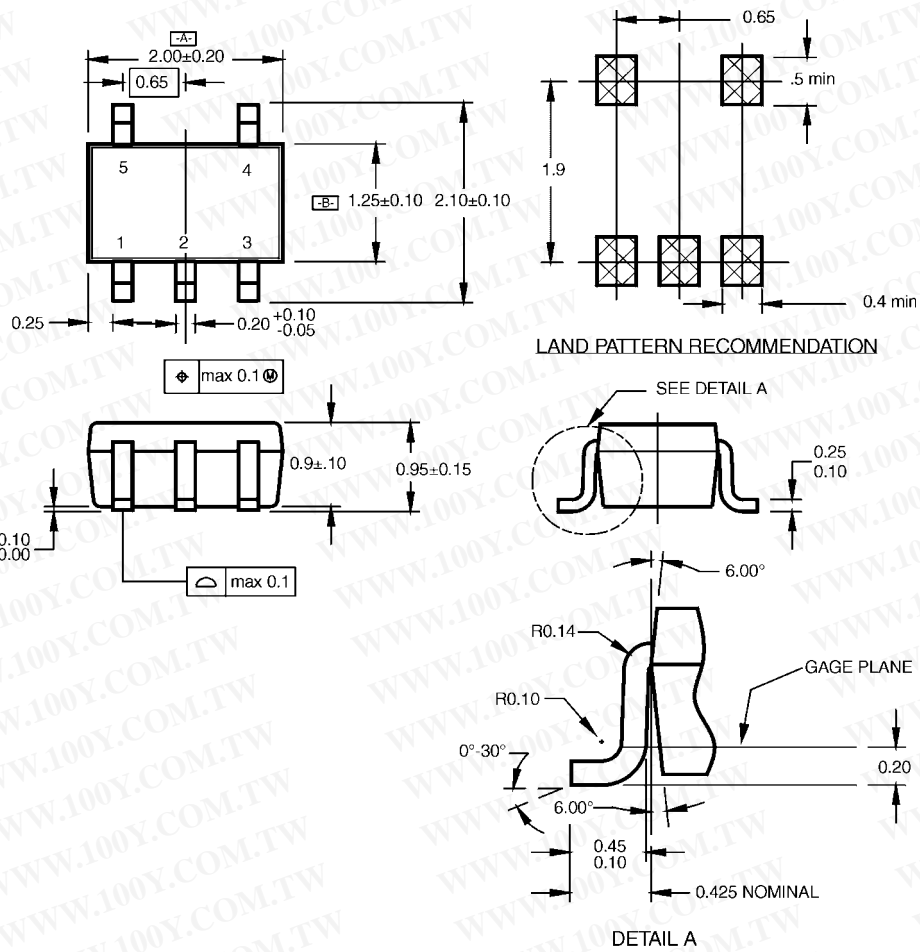
- NOTES: UNLESS OTHERWISE SPECIFIED
- A) THIS PACKAGE CONFORMS TO JEDEC MO-178, ISSUE B, VARIATION AA, DATED JANUARY 1999.
 - B) ALL DIMENSIONS ARE IN MILLIMETERS.

MA05BRevC

5-Lead SOT23, JEDEC MO-178, 1.6mm
Package Number MA05B

NC7SZ08

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



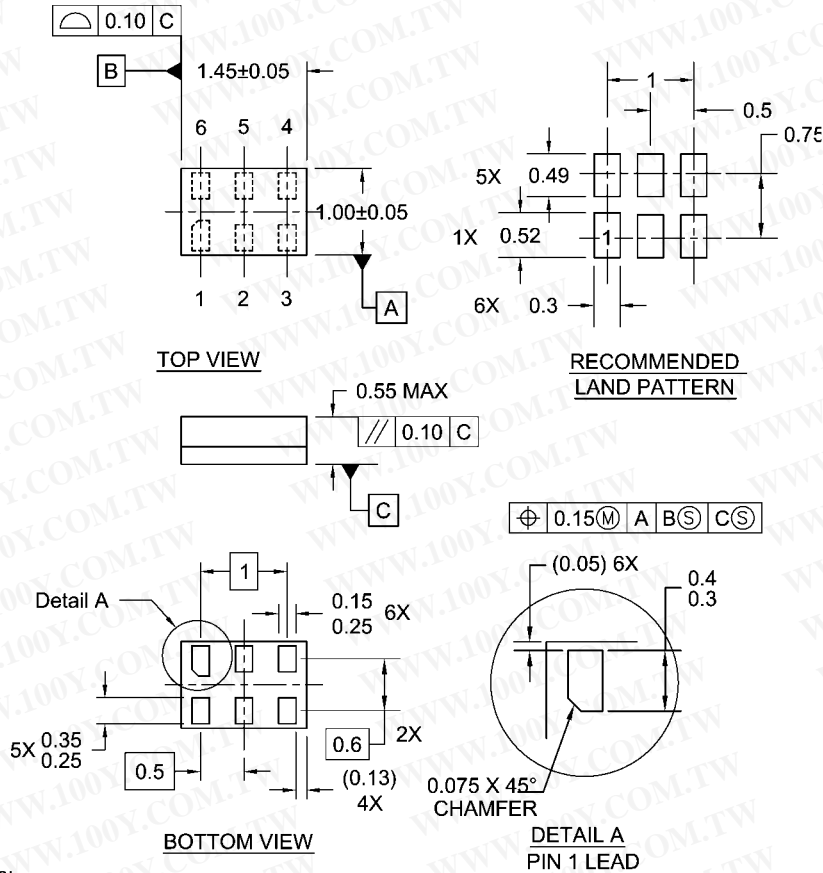
NOTES:

- A. CONFORMS TO EIAJ REGISTERED OUTLINE DRAWING SC88A.
- B. DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH.
- C. DIMENSIONS ARE IN MILLIMETERS.

MAA05ARevC

5-Lead SC70, EIAJ SC-88a, 1.25mm Wide
Package Number MAA05A

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



Notes:

1. JEDEC PACKAGE REGISTRATION IS ANTICIPATED
2. DIMENSIONS ARE IN MILLIMETERS
3. DRAWING CONFORMS TO ASME Y14.5M-1994

MAC06ARevB

**Pb-Free 6-Lead MicroPak, 1.0mm Wide
Package Number MAC06A**

Fairchild does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and Fairchild reserves the right at any time without notice to change said circuitry and specifications.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

www.fairchildsemi.com