



NC7SZ11 TinyLogic® UHS Three-Input AND Gate

Features

- Ultra-High Speed: t_{PD} 2.7 ns (Typical) into 50 pF at 5V V_{CC}
- High Output Drive: ± 24 mA at 3 V V_{CC}
- Broad V_{CC} Operating Range: 1.65 V to 5.5 V
- Power Down High Impedance Inputs/Outputs
- Over-Voltage Tolerance inputs facilitate 5 V to 3 V Translation
- Proprietary Noise/EMI Reduction Circuitry
- Ultra-Small MicroPak™ Packages
- Space-Saving SC70 Package

Description

The NC7SZ11 is a single three-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 broad V_{CC} operating range. The device is specified to operate over the 1.65 V to 5.5 V V_{CC} operating range. The inputs and output are high impedance when V_{CC} is 0 V. Inputs tolerate voltages up to 7 V, independent of V_{CC} operating voltage.

Ordering Information

Part Number	Top Mark	Package	Packing Method
NC7SZ11P6X	Z11	6-Lead SC70, EIAJ SC-88a, 1.25 mm Wide	3000 Units on Tape & Reel
NC7SZ11L6X	E7	6-Lead MicroPak™, 1.00 mm Wide	5000 Units on Tape & Reel

Connection Diagrams

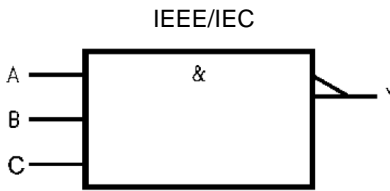
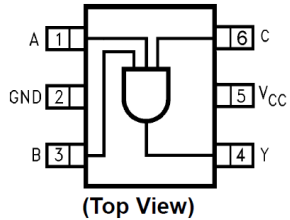
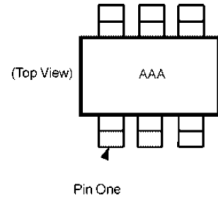


Figure 1. Logic Symbol

Pin Configurations



Pin One Orientation Diagram



AAA represents Product Code Top Mark - see ordering code.

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

Figure 2. SC70 (Top View)

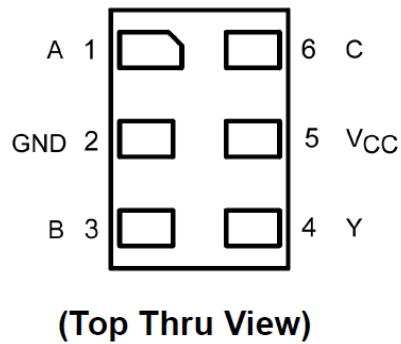


Figure 3. MicroPak (Top Through View)

Pin Definitions

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

Function Table

Y=ABC

Inputs			Output
A	B	C	Y
X	X	L	L
X	L	X	L
L	X	X	L
H	H	H	H

H = HIGH Logic Level

L = LOW Logic Level

X = Either LOW or HIGH 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	Parameter		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} < -0.5 V		-50	mA
I _{OK}	DC Output Diode Current	V _{OUT} < -0.5 V		-50	mA
		V _{OUT} > 6 V, V _{CC} =GND		+20	
I _{OUT}	DC Output Current			±50	mA
I _{CC} OR I _{GND}	DC V _{CC} OR Ground Current			±50	mA
T _{STG}	Storage Temperature Range		-65	+150	°C
T _J	Junction Temperature Under Bias			+150	°C
T _L	Junction Lead Temperature (Soldering, 10 Seconds)			+260	°C
P _D	Power Dissipation at +85°C	SC70-6		150	mW
		MicroPak-6		130	
ESD	Human Body Model, JESD22-A114			4000	V
	Charged Device Model, JESD22-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 _{CC}	Supply Voltage Operating		1.65	5.50	V
	Supply Voltage Data Retention		1.50	5.50	
V _{IN}	Input Voltage		0	5.5	V
V _{OUT}	Output Voltage		0	V _{CC}	V
T _A	Operating Temperature		-40	+85	°C
t _r , t _f	Input Rise and Fall Times	V _{CC} at 1.8 V, 2.5 V ± 0.2 V	0	20	ns/V
		V _{CC} at 3.3 V ± 0.3 V	0	10	
		V _{CC} at 5.0 V ± 0.5 V	0	5	
θ _{JA}	Thermal Resistance	SC70-6		425	°C/W
		MicroPak-6		500	

Note:

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

DC Electrical Characteristics

Symbol	Parameter	V _{CC}	Conditions	T _A =25°C			T _A =-40 to +85°C		Unit
				Min.	Typ.	Max.	Min.	Max.	
V _{IH}	HIGH Level Input Voltage	1.8 ± 0.15		0.75 V _{CC}			0.75 V _{CC}		V
		2.30 to 5.50		0.70 V _{CC}			0.70 V _{CC}		
V _{IL}	LOW Level Input Voltage	1.8 ± 0.15				0.25 V _{CC}		0.25 V _{CC}	V
		2.30 to 5.50				0.30 V _{CC}		0.30 V _{CC}	
V _{OH}	HIGH Level Output Voltage	1.65	V _{IN} =V _{IH} , I _{OH} =-100 μA	1.55	1.65		1.55		V
		2.30		2.20	2.30		2.20		
		3.00		2.90	3.00		2.90		
		4.50		4.40	4.50		4.40		
		1.65	I _{OH} =-4 mA	1.29	1.52		1.29		
		2.30	I _{OH} =-8 mA	1.90	2.15		1.90		
		3.00	I _{OH} =-16 mA	2.50	2.80		2.40		
		3.00	I _{OH} =-24 mA	2.40	2.68		2.30		
		4.50	I _{OH} =-32 mA	3.90	4.20		3.80		
V _{OL}	LOW Level Output Voltage	1.65	V _{IN} =V _{IL} , I _{OL} =100 μA		0.00	0.10		0.10	V
		2.30			0.00	0.10		0.10	
		3.00			0.00	0.10		0.10	
		4.50			0.00	0.10		0.10	
		1.65	I _{OL} =4 mA		0.80	0.24		0.24	
		2.30	I _{OL} =8 mA		0.10	0.30		0.30	
		3.00	I _{OL} =16 mA		0.15	0.40		0.40	
		3.00	I _{OL} =24 mA		0.22	0.55		0.55	
		4.50	I _{OL} =32 mA		0.22	0.55		0.55	
		I _{IN}	Input Leakage Current	0 to 5.5	V _{IN} =5.5 V, GND			±1	
I _{OFF}	Power Off Leakage Current	0	V _{IN} or V _{OUT} =5.5 V			1		10	μA
I _{CC}	Quiescent Supply Current	1.65 to 5.50	V _{IN} =5.5 V, GND			2		20	μA

AC Electrical Characteristics

Symbol	Parameter	V _{CC}	Conditions	T _A =25°C			T _A =-40 to +85°C		Unit	Figure
				Min.	Typ.	Max.	Min.	Max.		
t _{PLH} , t _{PHL}	Propagation Delay	1.80 ± 0.15	C _L =15 pF, R _L =1M Ω	2.0	9.0	18.5	2.0	19.0	ns	Figure 4 Figure 5
		2.50 ± 0.20		0.8	4.9	10.5	0.8	11.0		
		3.30 ± 0.30		0.5	3.5	8.5	0.5	9.0		
		5.00 ± 0.50		0.5	2.5	6.5	0.5	7.0		
		3.30 ± 0.30	C _L =50 pF, R _L =500 Ω	1.5	4.1	8.5	1.5	9.0		
		5.00 ± 0.50		0.8	2.9	7.5	0.8	8.0		
C _{IN}	Input Capacitance	0.00			4				pF	
C _{PD}	Power Dissipation Capacitance ⁽²⁾	3.30			20				pF	Figure 6
		5.00			25					

Note:

- 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 lading 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).

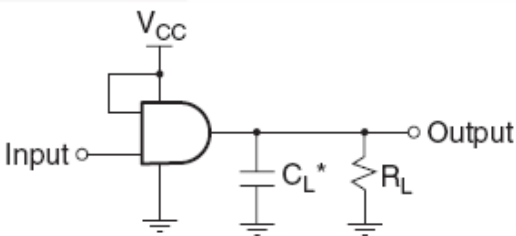


Figure 4. AC Test Circuit

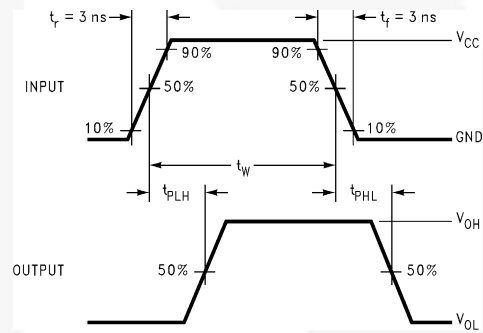


Figure 5. AC Waveforms

Notes:

- C_L includes load and stray capacitance.
- Input PRR=1.0 MHz; t_w500 ns.

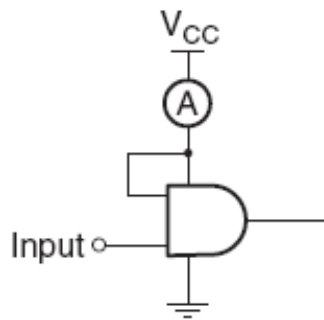


Figure 6. I_{CCD} Test Circuit

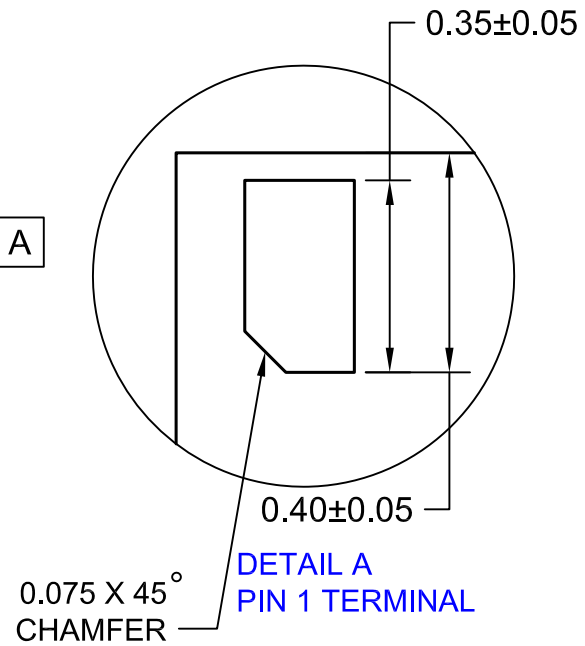
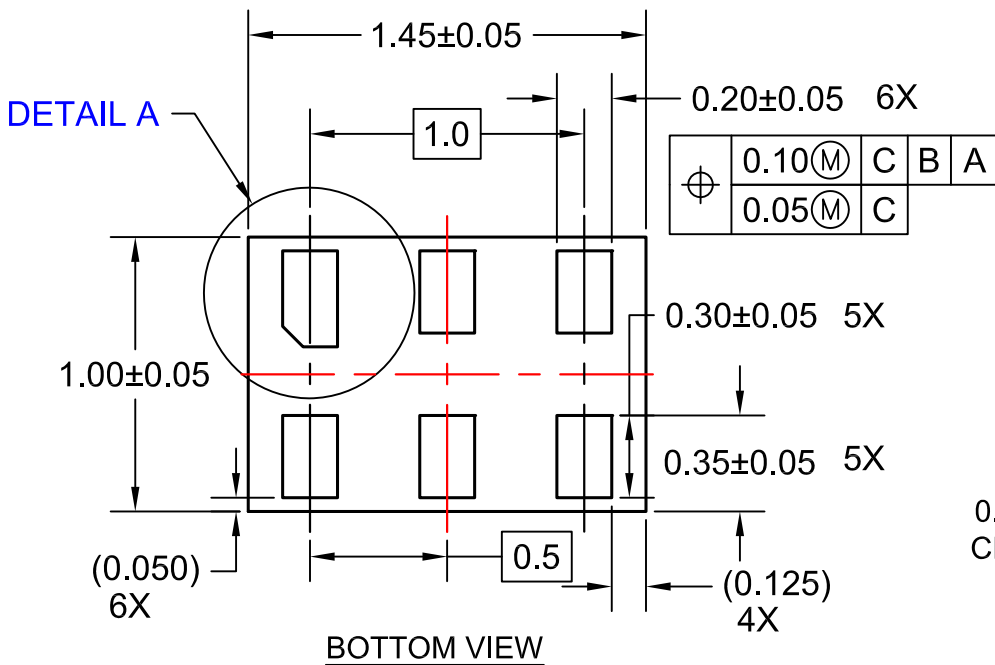
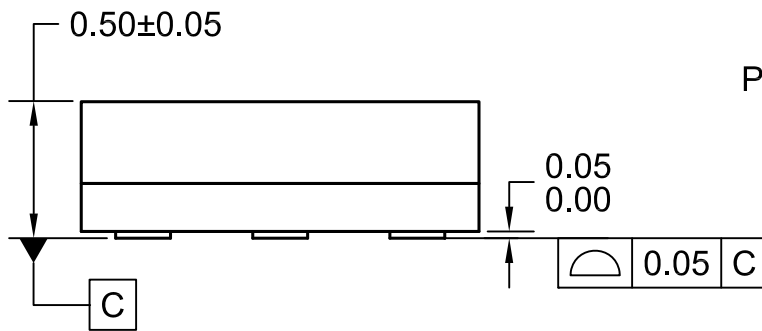
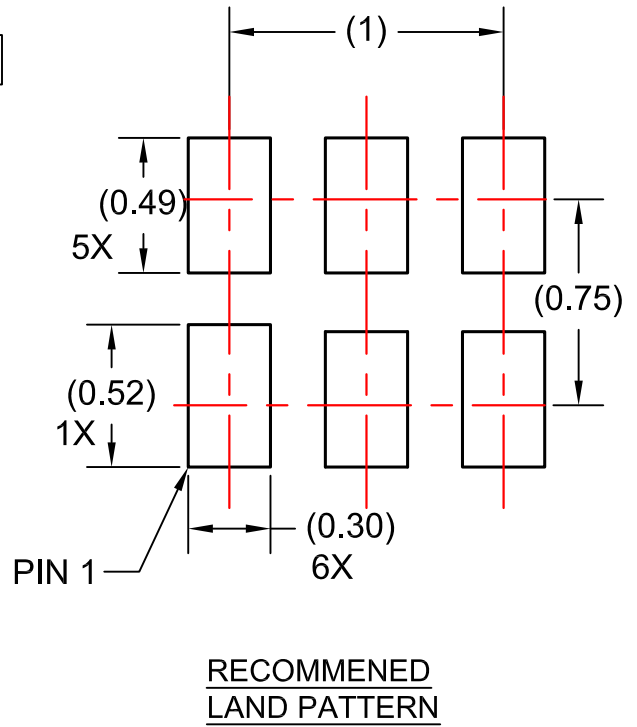
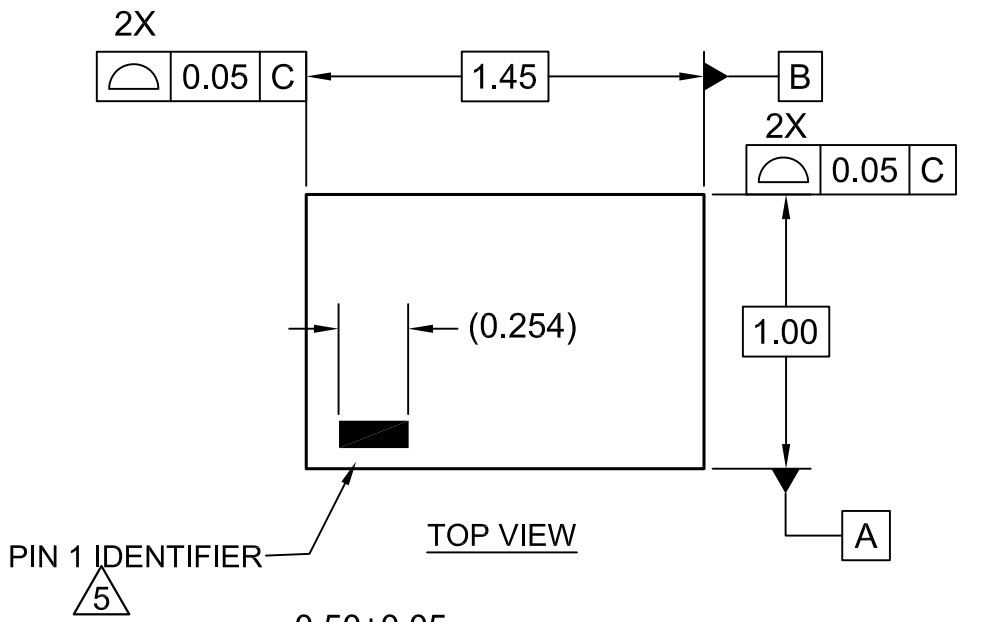
Note:

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

Tape and Reel Specifications

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

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



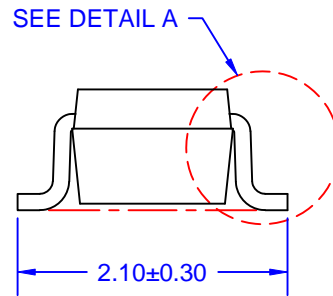
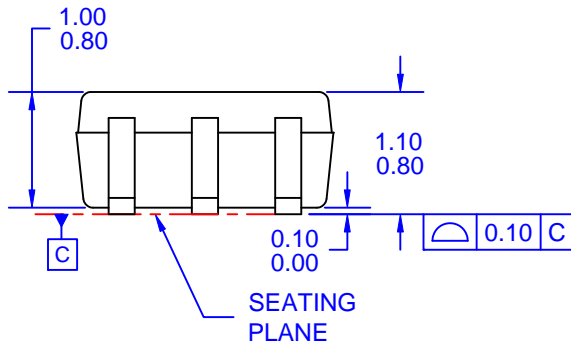
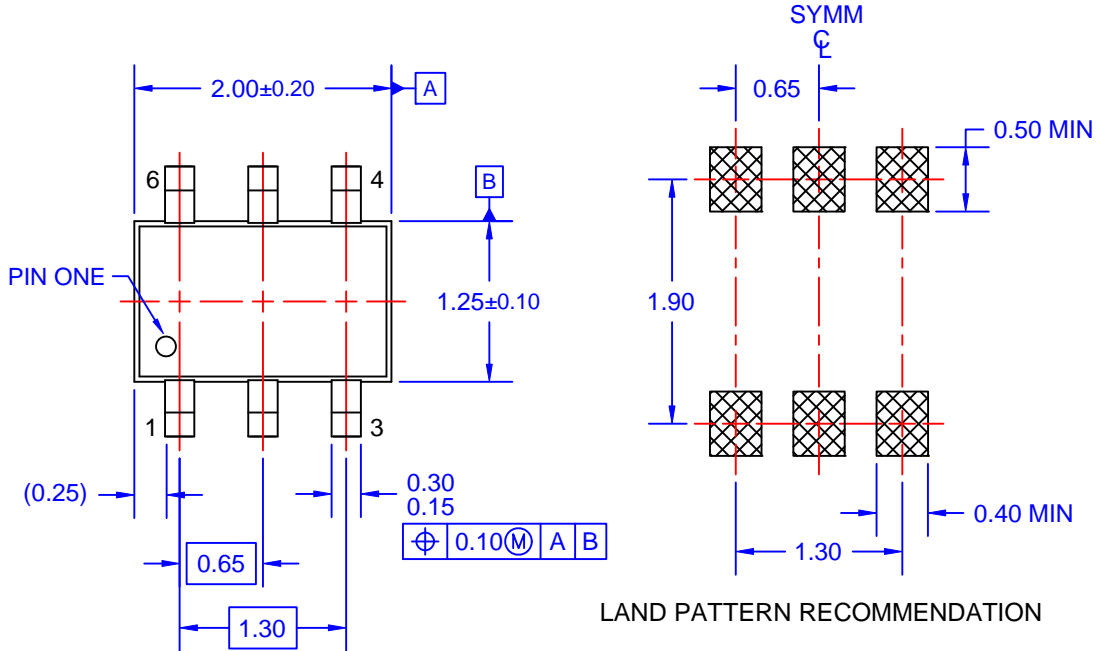
NOTES:

1. CONFORMS TO JEDEC STANDARD MO-252 VARIATION UAAD
2. DIMENSIONS ARE IN MILLIMETERS
3. DRAWING CONFORMS TO ASME Y14.5M-2009
4. LANDPATTERN RECOMMENDATION PER FSC
5. PIN ONE IDENTIFIER IS 2X LENGTH OF ANY OTHER LINE IN THE MARK CODE LAYOUT.
6. FILENAME AND REVISION: MAC06AREV6



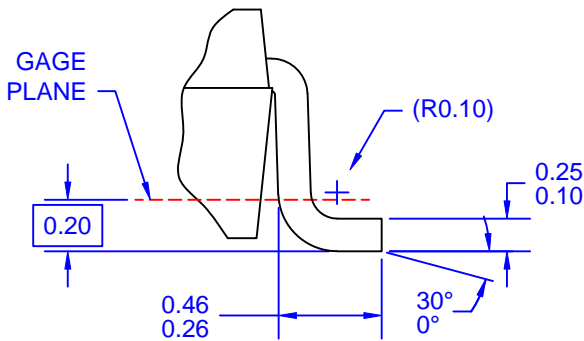
THIS DRAWING IS THE PROPERTY OF FAIRCHILD SEMICONDUCTOR CORPORATION. NO USE THEREOF SHALL BE MADE OTHER THAN AS A REFERENCE FOR PROPOSALS AS SUBMITTED TO FAIRCHILD SEMICONDUCTOR CORPORATION FOR JOBS TO BE EXECUTED IN CONFORMITY WITH SUCH PROPOSALS UNLESS THE CONSENT OF SAID FAIRCHILD SEMICONDUCTOR CORPORATION HAS PREVIOUSLY BEEN OBTAINED. NO PART OF THIS DRAWING SHALL BE COPIED OR DUPLICATED OR ITS CONTENTS DISCLOSED, THE INFORMATION CONTAINED ON THIS DRAWING IS CONFIDENTIAL AND PROPRIETARY.

REVISIONS		
LTR	DESCRIPTION	DATE
A	RELEASE TO DOCUMENT CONTROL	
B	REVISE AS PER EIAJ	JUL 21, 1998
C	FSC LAND PATTERN REC.	AUG 18, 1998
D	REDRAW AS PER STD DW TEMPLATE: ADD MIN FOOT LENGTH DIM. CHG DIM STYLE FR DEVIATION TO LIMITS. REARRANGE DWG TITLE. ADD DWG NUMBER & REV. AT LOWER LEFT CORNER OF TEMPLATE	AUG 04, 1999
E	CHG LD WIDTH DIM FR 2.25 ± 0.25 TO 2.10 ± 0.30 ; LD THICK FR 0.80 ± 0.10 TO 1.10 ± 0.10 ; LD SPREAD FR 2.10 ± 0.30 TO 2.10 ± 0.30 ; FT LENGTH FR 0.25 ± 0.10 TO 0.25 ± 0.10 ; REM LD DIM (0.43)	17 JAN 2007
F	ADD PIN ONE INDICATOR; CHG DWG TEMPLATE & FORMAT TO STANDARD.	14 JUL 2009



NOTES: UNLESS OTHERWISE SPECIFIED

- A) THIS PACKAGE CONFORMS TO EIAJ SC-88, 1996.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH.
- D) DRAWING FILENAME: MKT-MAA06AREV6



DETAIL A
SCALE: 60X

APPROVALS	DATE	FAIRCHILD SEMICONDUCTOR™			
DRAWN: J.J. COMPARATIVO JR.	14JUL2009	6LD, SC-70, EIAJ SC-88, 1.25MM WIDE			
CHECKED: H. ALLEN					
APPROVED: M.R. GESTOLE					
C.N. TANGPUZ		SCALE 1:1	SIZE N/A	DRAWING NUMBER MKT-MAA06A	REV 6
PROJECTION		FORMERLY: N/A	SHEET: 1 OF 1		



TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

AccuPower™	F-PFS™	OPTOPLANAR®	
Awinda®	FRFET®		TinyBoost®
AX-CAP®*	Global Power Resource SM	PowerTrench®	TinyBuck®
BitSiC™	GreenBridge™	PowerXS™	TinyCalc™
Build it Now™	Green FPS™	Programmable Active Droop™	TinyLogic®
CorePLUS™	Green FPS™ e-Series™	QFET®	TINYOPTO™
CorePOWER™	Gmax™	QS™	TinyPower™
CROSSVOL™	GTO™	Quiet Series™	TinyPWM™
CTL™	IntelliMAX™	RapidConfigure™	TinyWire™
Current Transfer Logic™	ISOPLANAR™		TranSiC™
DEUXPEED®	Making Small Speakers Sound Louder and Better™	Saving our world, 1mW/W/kW at a time™	TriFault Detect™
Dual Cool™	MegaBuck™	SignalWise™	TRUECURRENT®*
EcoSPARK®	MICROCOUPLER™	SmartMax™	μSerDes™
EfficientMax™	MicroFET™	SMART START™	
ESBC™	MicroPak™	Solutions for Your Success™	UHC®
	MicroPak2™	SPM®	Ultra FRFET™
Fairchild®	MillerDrive™	STEALTH™	UniFET™
Fairchild Semiconductor®	MotionMax™	SuperFET®	VCX™
FACT Quiet Series™	MotionGrid®	SuperSOT™-3	VisualMax™
FACT®	MTi®	SuperSOT™-6	VoltagePlus™
FAST®	MTx®	SuperSOT™-8	XS™
FastvCore™	MVN®	SupreMOS®	Xsens™
FETBench™	mWSaver®	SyncFET™	仙童™
FPS™	OptoHiT™	Sync-Lock™	
	OPTOLOGIC®		

* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. TO OBTAIN THE LATEST, MOST UP-TO-DATE DATASHEET AND PRODUCT INFORMATION, VISIT OUR WEBSITE AT [HTTP://WWW.FAIRCHILDSEMI.COM](http://www.fairchildsemi.com). FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

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 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 of 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.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I72